Government of Meghalaya
Education Department

DERT
DIRECTORATE OF EDUCATIONAL
RESEARCH & TRAINING

Reach to Teach
FOUNDATION

CM IMPACT Meghalaya Learning Enhancement Programme

IMPACT

CHIEF MINISTER'S INITIATIVE TO MAXIMIZE PASS ACHIEVEMENT AND CLASSROOM TRIUMPH

CLASS 09

Achieving grade-appropriate learning levels

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Class 9

INDEX

Note for Teachers

Dear Teacher,

The **Meghalaya Class Readiness Programme MCRP**, implemented at the start of this academic year was a **bridge course** which focused on enhancing the learning outcomes and competencies of the previous classes to help achieve the current grade-level outcomes. We sincerely appreciate your dedication, hard work, and commitment to this initiative, ensuring every student moves forward in their learning journey. The MCRP plays a crucial role in ensuring students, particularly those struggling, acquire the necessary competencies to progress through their classes without difficulty.

On completion of the MCRP, in order to assist you in conducting regular classes effectively and to keep the momentum alive, chapter-wise activities will be shared with you throughout the academic year. This will help students attain grade-level learning through experiential, activity-based elements linked to learning outcomes and competencies, and will aid you in reinforcing concepts covered in each chapter. This approach will also encourage students to reflect on and apply what they learn.

While you will be teaching the subject as per your timetable and syllabus, it is suggested that you conduct the given activities along with the chapter you are teaching from the NCERT textbook.

The following are some important points that will help you understand the usage of the modules in a better manner:

- The modules provide **suggestive activities** you can undertake while teaching a chapter. These activities are aligned with the theme/concepts of the chapter and have experiential learning at their core. These are also aligned to specific learning outcomes and competencies, thus helping your students acquire certain skills.

- At the end of each chapter, a competency-based assessment is included to help you identify your students' learning levels and determine areas that may require additional revision. These assessment activities are **aligned with the formative assessments suggested in the Assessment Blueprint** (revised in February 2025).

- A learning level tracker (as given during MCRP) is provided. Please use this to monitor individual students' achievement of learning outcomes and competencies. This will give you a clear picture of how your students are doing and what areas they need extra support in.

If you have any queries, please contact our helpline number: **+91 9205666274.**

Wishing you an engaging and fruitful academic year ahead! Here's hoping your students become independent learners and your classroom interactions remain exciting, learning outcome-driven and without additional burden to you.

Meghalaya Learning Enhancement Programme

ENGLISH

UNIT : 1

Chapter : The Road Not Taken

Activity 1 The Calm of the Early Morning

35 mins

Instructions

- Print out the following paragraph and distribute it in groups. If you are unable to print it, you may write the passage on the board.
- Read out the passage for the students once and if required explain the passage in the local language.
- Next, ask the students to read the passage on their own and answer the questions below.

The Calm of the Early Morning

The early morning is a time of tranquillity, where the world feels calm and peaceful. As the first rays of sunlight peek over the horizon, a soft golden glow spreads across the sky, slowly dispelling the darkness of the night. The air is crisp and cool, filled with the fresh scent of dew on grass and the earth's dampness. Birds begin to sing softly, their melodies echoing in the stillness. The trees stand tall and silent, their leaves gently swaying in the light breeze. As the day awakens, everything seems new, full of promise, and brimming with the quiet beauty of nature.

A. How is the atmosphere described in the passage?
   a) Busy and noisy
   b) Calm and peaceful
   c) Dark and stormy
   d) Warm and dry

B. What spreads across the sky as the first rays of sunlight appear?
   a) Soft golden glow
   b) Thick clouds
   c) A rainbow
   d) A dark shadow

C. How is the scent of the air in the early morning?
   a) Dusty and dry
   b) Fresh and filled with dew
   c) Strong and polluted
   d) Sweet and fragrant

D. According to the passage, what do the birds do early in the morning?

_____
_____
_____
_____

E. How does the passage describe the trees in the morning?

_____
_____
_____
_____
_____

Activity 2 Determiners

35 mins

Instructions

- Explain the concept of Determiners through the notes below. Tell the students that in this activity, the focus will be on 4 kinds of Determiners - Articles, Demonstrative, Possessive, and Quantifiers.

  - ***Define determiners -*** *"Words used before a noun to specify it."*

    Explain their functions with specific examples. - "This book" specifies a particular book. "Some pens" indicate an unspecified number.
  - ***Introduce the following determiners:***

    Articles (a, an, the) - explain the differences between indefinite (a, an) and definite (the) articles. *I need a pencil. (any pencil) I need the pencil. (a specific pencil)*

    Demonstratives (this, that, these, those) - show the uses related to distance and number with examples. - *this car (near, singular) those bikes (far, plural)*

    Possessives (my, your, his, her, our, their) - relate to ownership. This is my dog.

    Quantifiers (some, much, many, a few, any, several, little, all, etc.) - specify quantity.

    I have some money. He does not have any notebooks.

- Write the following sentences on the board, and ask students to rewrite them using the correct determiners:

  A. There is few water in the glass.
  B. He has a oranges in his lunchbox.
  C. I bought much books from the fair.
  D. She found any mistakes in the assignment.
  E. There are little students in the classroom today.
  F. We need an hour to complete this task.
  G. They have many information about the project.
  H. He drank a juice in the morning.
  I. I have some friend in this city.
  J. She put much sugar in her tea.

Activity 3 Writing Formal Letters

35 mins

Instructions

- Begin by explaining the types of formal letters in communication. Discuss scenarios where formal letters are used (e.g., job applications, complaints, requests to authorities, etc.).
- Conduct a class discussion and ask students if they have ever written a formal letter to anybody.
- Discuss situations where enquiry letters are required such as requesting course details or product information. Discuss the following format which is used to write letters of enquiry:

Sender's Address (Your Address):

The sender's address is written at the top left-hand corner of the page.

Do not write your name here, only the address.

Include your **name, address,** and **city/postal code**.

Date

Below the sender's address, write the date when the letter is being written.

Receiver's Address (Camp Organiser's Address):

Write the full name and address of the camp organisation to which you are writing.

Leave a line after the sender's address and date before starting this section.

Subject

Subject: A concise statement about the purpose of the letter (e.g., "Inquiry About Summer Camp").

This should be written in bold or underlined for clarity.

Salutation

Start with **"Dear Sir/Madam,"** if you do not know the specific person's name.

If you know the name of the recipient, use "Dear Mr./Ms. [Last Name]," instead

Body of the Letter

- **Introduction:** Start with a polite opening, stating the purpose of the letter.
  Example: "I am writing to inquire about the summer camp organised by your organisation."
- **Request for Information:** Politely ask for the details you need, such as:
- **Duration of the camp**
- **Activities** offered during the camp
- **Fees** for participation
- **Registration process**

Closing

Use a formal closing like **"Yours faithfully,"** (since you don't know the name of the recipient).

Leave space for your signature and then type your name below.

A. You are interested in attending a summer camp organised by a reputed organisation in your city. Write an inquiry letter to the camp organisers requesting detailed information about the camp, such as the duration, activities, fees, and registration process.

UNIT: 1 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options:

1. What was the condition of the two roads in the poem?
   a) One was more worn and the other was clean.
   b) Both roads were equally travelled.
   c) Both roads were covered with leaves, meaning no one had taken the roads.
   d) One road was blocked, and the other was clear.
2. Why did the speaker feel sorry in the poem?
   a) Because both roads seemed equally travelled.
   b) Because the two roads were the same.
   c) Because the speaker could not travel both roads.
   d) Because the roads were blocked by undergrowth.
3. What is the significance of the road that the speaker chooses in the poem?
   a) It was the road that was more travelled.
   b) It was the road that appeared less worn and more inviting.
   c) It was the road that led to the destination.
   d) It was the road that looked like it had fewer obstacles.
4. What does the phrase “I took the one less travelled by” signify?
   a) The speaker chose the more popular path.
   b) The speaker chose a difficult path that few people had taken.
   c) The speaker followed a well-known path.
   d) The speaker chose to return to the first path.

Read the following extracts and answer the questions:

Extract 1

"Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth."

5. Why does the poet feel sorry in these lines?

_____
_____
_____

Extract 2

"I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I—
I took the one less travelled by,
And that has made all the difference."

6. What does the poet mean by "that has made all the difference"?

_____
_____
_____

Answer the following questions:

7. According to you, discuss what these phrases mean in the poem:
   (i) a yellow wood (ii) it was grassy and wanted wear

_____
_____
_____
_____
_____

8. What does the speaker mean by "I shall be telling this with a sigh"?

_____
_____
_____
_____
_____

9. What do you think the last two lines of the poem mean? Looking back, does the poet regret his choice or accept it?

_____
_____
_____
_____
_____
_____
_____

10. Have you ever had to make a difficult choice (or do you think you will have difficult choices to make)? How will you decide which option to pick? What will be your reasons?

_____
_____
_____
_____
_____
_____

Section B (Grammar)

The following paragraph has not been edited. There is one error in each line related to determiners. The table shows the line number and the error in each line. Write its correction against the correct blank number. The first one has been done for you.

A scientist experimented to test much theories about plant growth (1). She collected data from a plants grown in different conditions (2). Many information was gathered, but some results were inconsistent (3). She concluded that little adjustments in the environment could lead to significant changes (4).

Line	Error	Correction
(1)	much	several_____
(2)	A	_____
(3)	many	_____
(4)	little	_____

Section C (Writing)

You have noticed that there is an increasing amount of plastic waste in your locality, and it is affecting the environment. Write a letter to the editor of a local newspaper, expressing your concern about the issue and suggesting measures that can be taken to reduce plastic waste.

Ensure that you:

- Use the formal letter format.
- Mention specific points of concern, such as the environmental impact of plastic waste.
- Suggest practical solutions like reducing the use of plastic bags, organising awareness campaigns, etc.
- Write the letter in a polite, clear, and concise manner.

UNIT: 1 Answer Key

Section A (Literature)

1. c) Both roads were covered with leaves, meaning no one had taken the roads.
2. c) Because the speaker could not travel both roads.
3. b) It was the road that appeared less worn and more inviting.
4. b) The speaker chose a difficult path that few people had taken.
5. The poet feels sorry because he can only choose one of the two roads, meaning he cannot experience both paths in life.
6. The poet means that his choice of the less-travelled road has significantly influenced his life and shaped his experiences.
7. (i) **"A yellow wood"**:

   This phrase creates an image of a forest in autumn, where the leaves have turned yellow. It suggests a moment of change or transition, setting the tone for the choices the speaker must make.

   (ii) **"It was grassy and wanted wear"**:

   This phrase describes a road that is less travelled, with grass growing on it, indicating that fewer people have chosen it. It symbolises an unconventional or less popular choice that the speaker decides to make.
8. By "I shall be telling this with a sigh," the speaker implies that, in the future, they will reflect on their choice with a sense of nostalgia or contemplation, possibly feeling both content and regretful about the path they took.
9. The last two lines of the poem, suggest that the speaker reflects on their choice in the future. The sigh indicates that the speaker may feel a mix of emotions—perhaps a sense of regret or wonder about how their choice shaped their life. However, the line *"And that has made all the difference"* reveals that the speaker ultimately accepts their decision, acknowledging that the choice, though difficult, has led them to a unique and significant path in life. The poet doesn't outright regret the choice but instead values the impact it had on their journey.
10. The answer to this question will be completely subjective, based on student's experiences.

Section B (Grammar)

(1) The
(2) Much
(3) Few

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating letter writing are:

- Does it follow the format of a formal letter (date, first-person narration, formal tone)?
- Is the content relevant to the given prompt or theme?
- Does the body of the letter have a clear beginning, middle, and end?
- Are the sentences complete and grammatically, correct?
- Does the paragraph avoid excessive repetition?
- Does the student use a range of vocabulary instead of repeating the same words?
- Are common words spelled correctly?
- Is proper punctuation used (capital letters, commas, periods, etc.)?
- Is the paragraph coherent?
- Is there a personal touch or unique perspective in the writing?

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 1		
		Chapter: The Road Not Taken		
		Level 1	Level 2	Level 3

UNIT : 2
Chapters : The Sound of Music, Wind

Activity 1 Literacy Rates in India

35 mins

Instructions

- Print out the following passage and distribute them in groups or write the passage on the board.
- Read out the passage for the students once and if required explain the passage in the local language.
- Ask the students to read the passage and answer the questions below.

Literacy rates in India

India, one of the world's most populous countries, has made significant strides in improving literacy rates over the past few decades. However, challenges remain, particularly in rural areas and among marginalised communities. The Indian government, through various initiatives such as the "Sarva Shiksha Abhiyan" and "Rashtriya Madhyamik Shiksha Abhiyan," has focused on increasing access to education, improving school infrastructure, and reducing dropout rates.

Despite these efforts, literacy rates in India still vary widely across states, regions, and social groups. According to the 2011 Census, the national literacy rate stood at 74.04%. However, some states like Kerala have achieved near-universal literacy, while others, particularly in the northern and eastern regions, continue to face challenges. For instance, Bihar and Uttar Pradesh have relatively lower literacy rates compared to states like Goa and Tamil Nadu.

Gender disparity is also a significant concern, with the literacy rate for women being considerably lower than that for men. Social and cultural barriers, early marriages, and lack of access to education have contributed to this gap. In rural areas, girls often face more difficulties in accessing education due to socio-economic conditions and gender norms.

To address these disparities, the government has launched several programs focusing on women's education, such as Beti Bachao Beti Padhao, and initiatives to improve the literacy rate in backward regions. Additionally, NGOs and community-based organizations have played a crucial role in promoting literacy through adult education programs, vocational training, and awareness campaigns.

Technology has also contributed to promoting literacy, with initiatives like digital classrooms, online learning platforms, and mobile apps providing educational content to remote areas. The advent of mobile learning has opened up new opportunities for both children and adults to improve their literacy skills.

Despite the progress made, there are still significant hurdles in achieving complete literacy in India. Factors like poverty, illiteracy among adults, lack of infrastructure, and poor teacher training continue to pose challenges. However, the focus on inclusive education, government initiatives, and the use of technology has been a beacon of hope for improving literacy rates and ensuring that every Indian has access to quality education.

Choose the correct answer from the options given:

A. Which of the following is NOT mentioned as a government initiative to improve literacy in India?

a) Sarva Shiksha Abhiyan

b) Rashtriya Madhyamik Shiksha Abhiyan
c) Beti Bachao Beti Padhao
d) Pradhan Mantri Jan Dhan Yojana

B. According to the passage, which state in India has achieved near-universal literacy?
a) Uttar Pradesh
b) Bihar
c) Kerala
d) Tamil Nadu

C. What is a major factor contributing to the gender disparity in literacy rates in India?
a) Lack of educational institutions
b) Socio-economic conditions and early marriages
c) Lack of digital platforms
d) The low number of teachers

D. What role has technology played in promoting literacy in India?
a) Replacing traditional schools with online classes
b) Providing educational content through mobile apps and online platforms
c) Reducing the number of teachers
d) Limiting access to education in rural areas

E. Which of the following is one of the challenges mentioned in the passage that still affects literacy in India?
a) A reduction in government funding
b) Lack of digital infrastructure
c) Poor teacher training and lack of infrastructure
d) No government initiatives

Answer the following questions:

F. What challenges do rural areas and marginalised communities face in improving literacy rates in India?

_____
_____
_____
_____
_____

G. How has technology contributed to improving literacy rates in India, particularly in remote areas?

_____
_____
_____
_____
_____

Activity 2 Tenses

35 mins

Instructions

- Begin by revising the concept of tenses and explaining key rules for using tenses.

Teachers' Notes			
	Past	**Present**	**Future**
Simple	Describes an action that is now complete. E.g.: I played football.	Describes a repeated action. E.g.: I play football.	Describes an action which is planned to take place in the future. E.g.: I will play football.
Continuous	Describes an action that happened in the past over a length of time. E.g. I was playing football.	Describes an action that is happening now. E.g.: I am playing football.	Describes an action that will be happening for a length of time. E.g.: I will be playing football.
Perfect	Describes an action that had happened before another action took place. E.g.: I had played football.	Describes an action that has happened. E.g.: I have played football.	Describes an action that will be finished before another action takes place. E.g.: I will have played football.
Perfect ontinuous	Describes an action that had been happening before another action. E.g.: I had been playing football.	Describes an action that has started in the past and is continuing. E.g.: I have been playing football.	Describes an action that happens over time before another future action takes place. E.g.: I will have been playing football.

- Draw a large timeline on the blackboard. The timeline should be divided into three sections: **Past, Present, and Future with the classifications for each tense**
- Label each section clearly and explain to the students that the goal is to match sentences to the correct tense section on the timeline.
- Divide the students into 3-4 teams. Distribute a set of sentences with all types of tenses among the groups.
- Prepare a list of sentences in different tenses. Here are some example sentences:
  - She writes in her journal every day.
  - I am reading a book now.
  - We will be watching a movie at 8 PM.
  - He played football yesterday.
  - They will visit the museum tomorrow.
  - She was cooking dinner when I arrived.

- I have been studying for two hours.
- They have finished their homework.
- By next year, they will have been living in this city for a decade.
- She had been working there for five years before she quit.
- I had eaten before the guests arrived.
- He will have completed the project by Friday.

- Once they agree on the correct tense, a member of the team will come up to the board and write the sentence in the correct section of the timeline.
- Other teams will share their feedback.
- Share your feedback and help the teams to write the sentences in the correct places.

Activity 3 Article Writing

35 mins

Instructions

- Divide the class into small groups of 4-5 students.
- Start by introducing the topic to the class: "Exercise and Fitness in Our Daily Lives" and briefly explain that physical exercise is essential for maintaining overall health, particularly for teenagers, who experience rapid growth and development.
- Ask each group to discuss the following questions:
  - What kind of physical exercise do you do in your daily routine?
  - Why do you think it's important to exercise regularly?
  - How does exercise make you feel (both physically and mentally)?
  - What are some challenges you face in staying physically active?
  - Can you share any specific benefits you've experienced from regular exercise? Encourage students to actively participate in the discussion, share their personal experiences, and listen to others' points of view.
- Ask them to note down key points from the discussion that they can use later in their writing.
- After the group discussion, ask students to reflect on the conversation and write an article on the topic: "Importance of Physical Exercise for Teenagers." in 150-200 words.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

UNIT: 2 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. Where did Evelyn audition and score the highest marks in the history of the academy?
   a) Royal Academy of Music
   b) Trinity College of Music
   c) Royal College of Music
   d) Guildhall School of Music & Drama
2. In 1991, Which award was presented to Evelyn?
   a) International Classical Music Awards
   b) Billboard Music Awards
   c) Brit Awards
   d) Royal Philharmonic Society's prestigious Soloist of the Year
3. What does the poet imply about the wind's relationship with weakness?
   a) The wind helps the weak to grow stronger.
   b) The wind destroys weak things and challenges the frail.
   c) The wind is indifferent to both strong and weak.
   d) The wind is kind to weak bodies and frail hearts.
4. According to the poem, what is the key to making the wind our friend?
   a) Keeping the windows closed to prevent the wind from entering.
   b) Building strong homes, firming the body, and making the heart steadfast.
   c) Ignoring the wind and letting it blow freely.
   d) Always trying to control the wind and its actions.

Read the following extracts and answer the following questions-

Extract 1

The young boy took to music early in life. At the age of three when his mother took him to his maternal uncle's house in Benaras (now Varanasi), Bismillah was fascinated watching his uncle practise the shehnai. Soon Bismillah started accompanying his uncle, Ali Bux, to the Vishnu temple of Benaras where Bux was employed to play the shehnai. Ali Bux would play the shehnai and Bismillah would sit captivated for hours on end. Slowly, he started getting lessons in playing the instrument and would sit practising throughout the day. For years to come the temple of Balaji and Mangala Maiya and the banks of the Ganga became the young apprentice's favourite haunts where he could practise in solitude. The flowing waters of the Ganga inspired him to improvise and invent raagas that were earlier considered to be beyond the range of the shehnai.

5. How did the environment of Benaras influence Bismillah Khan's musical development?

_____
_____
_____
_____
_____

Extract 2

Wind, come softly.
Don't break the shutters of the windows.
Don't scatter the papers.
Don't throw down the books on the shelf.
There, look what you did — you threw them all down.
You tore the pages of the books. You brought rain again.

6. In the poem, what is the speaker's reaction to the wind's actions?

_____
_____
_____
_____
_____

Answer the following questions:

7. Why did Aurangzeb ban the playing of the pungi?

_____
_____
_____
_____
_____

8. What does the poet say about the wind god winnows?

_____
_____
_____
_____
_____

9. How does Evelyn hear music?

_____
_____
_____
_____
_____
_____

Section B (Grammar)

Fill in the blanks with the correct form of the verb:

1. By the time you arrive, I _____ (finish) my homework.
2. She _____ (read) a book when I called her yesterday.
3. Right now, they _____ (watch) a movie in the theatre.

Section C (Writing)

Write an article in 150-200 words on the importance of time management for students. Discuss how effective time management can improve academic performance, reduce stress, and help maintain a healthy balance between school and personal life.

UNIT: 2 Answer Key

Section A (Literature)

Choose the correct answer from the given options:

1. a)
2. d)
3. b)
4. b)
5. The environment of Benaras had a profound influence on Bismillah Khan's musical development. The city's rich cultural and spiritual atmosphere, particularly the Vishnu temple and the banks of the Ganga, provided him with a tranquil and inspiring setting for his practice. The peaceful surroundings allowed him to practice in solitude, while the flowing waters of the Ganga inspired him to experiment and improvise. This connection to the sacred and serene environment helped him develop new raagas and expand the range of the shehnai, shaping his unique musical style.
6. The poet's reaction to the wind's actions is one of frustration and disappointment. At first, the speaker pleads with the wind to be gentle — asking it not to break the shutters, scatter papers, or knock down books. But then, as the wind ignores the plea and causes destruction, the tone shifts to one of reproach: "There, look what you did." The speaker seems upset by the wind's chaos, especially as it brings more rain and tears pages from the books. It shows a sense of helplessness in the face of nature's uncontrollable power.
7. Aurangzeb banned the playing of the pungi because it produced a harsh and unpleasant sound. He found the sound of the pungi disturbing and unfit for royal courts and formal occasions.
8. This means that the wind god destroys or weakens fragile things, whether they are physical structures like houses and doors, or intangible things like people's health, lives, and emotions. The wind symbolises the force of nature that tests the strength of everything it encounters.
9. Evelyn Glennie hears music through vibrations. Despite being deaf, Evelyn has developed the ability to sense and interpret sound through the vibrations that reach her body. She feels the vibrations in the floor, the seats, and even the instruments she plays, allowing her to experience music uniquely and profoundly. Her sensitivity to these vibrations helps her perform music with great skill and emotion, proving that one can still connect with music even without hearing it in the conventional sense.

Section B (Grammar)

1. By the time you arrive, I will have finished my homework.
2. She was reading a book when I called her yesterday.
3. Right now, they are watching a movie in the theatre.

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating article writing are:

- Are ideas logically organized and connected?
- Are vocabulary and expressions varied and suited to the topic?
- Are the grammar, punctuation, and spellings mostly, correct?
- Are examples or personal opinions used to make it more interesting?
- Are linking words and phrases (e.g., however, moreover, therefore) used to guide the reader?
- Does it reinforce the purpose or message of the article?
- Is the ending memorable, thoughtful, or thought-provoking?

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 2		
		Chapters:	1. The Sound of Music	
			2. Wind	
		Level 1	Level 2	Level 3

UNIT : 3
Chapter : The Little Girl

Activity 1 A Morning in the Garden

35 mins

Instructions

- Print out the following passage and distribute them in groups or write the passage on the board.
- Read out the passage for the students once and if required explain the passage in the local language.
- Ask the students to read the passage on their own and answer the questions.

A Morning in the Garden

The morning sunbathed the garden in a warm, golden light, casting long shadows on the dewy grass. The air was fresh, carrying the sweet scent of blooming roses and jasmines. Birds chirped melodiously from the trees, while butterflies fluttered around the colourful flowers. The gentle breeze rustled the leaves, and the soft hum of bees added a peaceful soundtrack to the serene scene. As I stood there, the beauty of the garden filled me with a sense of calm, making it a perfect start to the day.

A small squirrel darted across the path, pausing now and then to nibble on a nut. It seemed as if even the animals were enjoying the morning. In the distance, the gardener moved quietly between the rows of plants, trimming overgrown branches and watering thirsty flowers. The soft splash of water mixed with the rustling leaves, creating a rhythm that matched the peaceful mood of the place.

I took a deep breath, trying to take in every detail—the colours, the scents, the sounds. It felt like time had slowed down, letting me appreciate nature's gentle gifts. For a moment, all worries faded away, and I felt deeply connected to the world around me. The garden wasn't just a place; it was a reminder to slow down and find joy in the simple things.

Choose the correct answer from the options given:

A. What filled the garden with golden light in the morning?
   a) The moon
   b) The stars
   c) The morning sun
   d) The lanterns

B. What scents were carried by the fresh air?
   a) Lilies and lavender
   b) Roses and jasmines
   c) Mangoes and peaches
   d) Grass and leaves

C. Who was working in the garden?

a) A farmer
b) The narrator
c) A gardener
d) A child

Answer the following question:

D. Describe the sound that added to the peaceful atmosphere of the garden.

_____
_____
_____
_____

E. How does the narrator describe the overall atmosphere of the garden, and how does it affect their mood?

_____
_____
_____
_____

F. What role do the bees, gardener and squirrel play in the garden to enhance the beauty of the garden?

_____
_____
_____
_____

Activity 2 Subject Verb Concord

35 mins

Instructions

- Begin the class by defining Subject-verb concord and explaining the key rules with examples.

Teachers' Notes

Rules for Subject Verb Agreement
Rule 1:
Singular Subject = Singular Verb
A singular subject takes a singular verb. ('s' or 'es' is added after the verb when it is Present Tense.

- **Example:** The cat runs fast

Rule 2:
Plural Subject = Plural Verb
A plural subject takes a plural verb.

- **Example:** The dogs **bark** loudly

Rule 3:
Words Joined by 'And' = Plural Verb
When two subjects are joined by **and**, use a plural verb.

- **Example:** My friend and I **are** going to the market.

Exception: If the subjects refer to the same person or thing, use a singular verb.

- **Example:** Bread and butter is my favourite breakfast.

Rule 4 :

Words Joined by 'Or' or 'Nor' = Closest Subject Rule

When subjects are joined by or or nor, the verb agrees with the subject closest to it.

- **Example:** Either the teacher or the students are responsible.
- **Example:** Neither the students nor the teacher is responsible.

Rule 5 :

Collective Nouns = Singular or Plural

A collective noun (e.g., team, jury, group) takes a singular verb if it acts as a single unit but a plural verb if members act individually.

- **Singular:** The team is ready for the match.
- **Plural:** The team are arguing among themselves.

Rule 6:

Indefinite Pronouns = Singular

Indefinite pronouns like **everyone, someone, nobody, each, anyone** take singular verbs.

- **Example:** Everyone **enjoys** the game.

Exceptions: Both, few, many, others, several take plural verbs.

- **Example:** Few know the answer

Rule 7:

Titles, Names, or Quantities = Singular Verb

Titles, names of books, and quantities take a singular verb even if they look plural.

- **Example: "The Chronicles of Narnia" is a great book.**
- **Example: Ten dollars is enough.**

Rule 8 :

Subjects with 'Each' or 'Every' = Singular

When each or every precedes the subject, use a singular verb.

- **Example: Each student has a book.**
- **Example : Every teacher and student is present**

Rule 9:

Subjects Starting with 'There' or 'Here' = Verb Matches Real Subject

When a sentence begins with "there" or "here," the verb agrees with the subject that follows it.

- **Example: There is a book on the table.**
- **Example: Here are the keys you lost.**

Rule 10 :

Subjects Separated by Words = Ignore Interrupting Phrases

Ignore phrases or clauses between the subject and the verb.

- **Example: The bouquet of flowers is beautiful.**

Rule 11 :

Gerunds or Infinitives = Singular

Gerunds (verbs ending in -ing) or infinitives (to + verb) used as subjects take singular verbs.

- **Example: Running is good for health.**
- **Example: To read books is my favorite hobby.**

Rule 12 :

Plural Nouns That Are Singular in Meaning = Singular Verb

Nouns like mathematics, news, physics take singular verbs.

- **Example: Mathematics is my favourite subject.**

Rule 13 :

Some Words Are Always Plural

Words like scissors, trousers, glasses take plural verbs.

- **Example: These scissors are sharp.**

- Divide the class into small groups.
- Write down a list of subjects on separate cards or slips of paper and on other cards, write corresponding verbs.
- Give each group a set of subject and verb cards.
- Ask the groups to match the subject cards with the correct verb cards.
- After matching, groups should read aloud their pairs and explain why the subject and verb match.

Example Subject Cards:

- The dog
- They
- My sister
- The children
- The teacher

Example Verb Cards:

- is
- are
- enjoys
- have
- was

Activity 3 Story Writing

35 mins

Instructions

- Divide the students into small groups (4-5 students per group).
- Read aloud the story beginning provided to the students and write it on the board.

  "One day, Jessie was walking home from school when he found a small, abandoned puppy on the side of the road. The puppy looked lost and scared. Jessie decided to take it home, but he wasn't sure what to do next."
- Ask each group to discuss what happens next in the story. Encourage them to brainstorm different ideas, such as:
  - Where will Jessie take the puppy?
  - What challenges will Jessie face?
  - How will she take care of the puppy?
  - Will there be any surprises in the story?
- After the discussion, ask each student to individually write their own version of the story based on the group's ideas.
- Encourage them to add details, describe the puppy and Jessie's emotions, and create a resolution for the story.
- Once the students have finished writing, allow them to share their stories with the class.

UNIT: 3 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. Why did the little girl's grandmother send her down on Sunday afternoons?
   a) to have a "nice talk with Father and Mother
   b) to clean the area
   c) to find grandmother's books
   d) to sleep on the sofa
2. Why was there a hue and cry in the house that night?
   a) Kezia had misplaced her father's speech.
   b) Kezia had torn up important papers for her surprise.
   c) The servants had lost some valuable documents.
   d) Kezia had forgotten to complete her homework.
3. What did the little girl observe while looking through the gap in the fence?
   a) The MacDonalds were having a family dinner.
   b) The Macdonald children were playing tag.
   c) The father was scolding the children.
   d) The father was gardening with the children.
4. Why did the little girl wake up shivering?
   a) The child had a bad dream about a butcher with a knife and a rope.
   b) The child was afraid of the dark and wanted to sleep with Grannie.
   c) The child was lost and couldn't find her father.
   d) The child was hungry and needed food.

Read the following extracts and answer the following questions-

Extract 1

She never stuttered with other people — had quite given it up — but only with Father, because then she was trying so hard to say the words properly. "What's the matter? What are you looking so wretched about? Mother, I wish you taught this child not to appear on the brink of suicide... Here, Kezia, carry my teacup back to the table carefully." He was so big — his hands and his neck, especially his mouth when he yawned. Thinking about him alone was like thinking about a giant.

4. Why did the little girl stutter when speaking to her father?

_____
_____
_____
_____
_____

Extract 2

Crying too much to explain, she lay in the shadowed room watching the evening light make a sad little pattern on the floor. Then Father came into the room with a ruler in his hands. "I am going to beat you for this," he said. "Oh, no, no", she screamed, hiding under the bedclothes. He pulled them aside. "Sit up," he ordered, "and hold out your hands. You must be taught once and for all not to touch what does not belong to you." "But it was for your b-b-birthday." Down came the ruler on her little, pink palms.

6. *Why was the little girl being punished by her father?*

_____
_____
_____
_____
_____

Answer the following questions:

7. Who were the people in Kezia's family?

_____
_____
_____
_____
_____

8. In what ways did Kezia's grandmother encourage her to get to know her father better?

_____
_____
_____
_____
_____

9. How does Kezia begin to see her father as a human being who needs her sympathy?

_____
_____
_____
_____
_____
_____
_____
_____
_____

Section B (Grammar)

Fill in the blanks with the correct form of the verb-

1. The students _____ (is/are) excited about the upcoming trip.
2. She _____ (go/goes) to the library every afternoon.
3. Either the teacher or the students _____ (has/have) to bring the materials.
4. My brother _____ (like/likes) to play football on weekends.
5. The news _____ (is/are) very shocking today.

Section C (Writing)

"You are walking in the park when you suddenly hear a faint sound coming from behind a large tree. Curious, you go closer and find a small bird with a broken wing. What do you do to help the bird, and what happens next?" Complete the story in 100-120 words.

UNIT: 3 Answer Key

Section A (Literature)

Choose the correct answer from the given options-

1. a)
2. b)
3. b)
4. a)
5. The little girl, Kezia, stuttered when speaking to her father because she was trying so hard to say the words properly. Her nervousness and effort to please or avoid making mistakes likely made her more anxious, which caused her to stutter, especially in front of her father.
6. The little girl was being punished by her father because she had taken something that did not belong to her. She had apparently taken an item, related to her father's belongings, and her father was teaching her not to touch things that weren't hers, even though she had intended it for his birthday.
7. Kezia's family consisted of her father, mother and grandmother.
8. The grandmother suggested that Kezia should try to talk to her father and get to know him by having a conversation, instead of being afraid of him.
9. Kezia's observation of her father's tiredness and her realization that he works hard every day without anyone to look after him makes her see him as a human being. She notices that he is not a giant or a strict figure, but a person with feelings and a big heart. This realization changes her perspective, and she begins to feel sympathy for him. She sees him not just as a strict father, but as someone who needs her care and love.

Section B (Grammar)

1. The students **are** excited about the upcoming trip.
2. She **goes** to the library every afternoon.
3. Either the teacher or the students **have** to bring the materials.
4. My brother **likes** to play football on weekends.
5. The news **is** very shocking today.

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating story writing are:

- The plot is the sequence of events that make up the story. It includes an introduction, rising action, climax, falling action, and conclusion.
- Characters are the people or beings that drive the story forward.
- The setting is where and when the story takes place.
- The conflict is the central problem or challenge the characters face.
- The theme is the central idea or message the story conveys.
- The point of view is the perspective from which the story is told.
- Dialogue is the conversation between characters.
- Style and Language - the way the story is written affects its tone and impact.
- Pacing refers to how quickly or slowly the events unfold in the story.
- Often, stories have a deeper moral or lesson for the reader.

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 3		
		Chapter: The Little Girl		
		Level 1	Level 2	Level 3

UNIT : 4
Chapters : A Truly Beautiful Mind, The Lake Isle of Innisfree

Activity 1 Conservation of Wetlands in Meghalaya

35 mins

Instructions

- Print out the following passage and distribute them in groups or write the passage on the board.
- Read out the passage for the students once and if required explain the passage in the local language.
- Ask the students to read the passage and answer the questions.

Conservation of Wetlands in Meghalaya

Meghalaya, known as the "Abode of Clouds," is home to a rich biodiversity, with numerous wetlands, forests, and rivers that support a wide variety of plants and animals. One of the most significant wetlands in Meghalaya is the ***Umiam Lake****, located near the state capital, Shillong. The lake and surrounding wetlands are crucial for the local ecosystem, serving as a habitat for many species of birds, fish, and plants. However, over the years, the lake has faced environmental challenges due to pollution, encroachment, and climate change.*

In 2017, the government of Meghalaya, in collaboration with local communities, launched a conservation initiative aimed at preserving the Umiam Lake and other wetlands across the state. The project focused on reducing pollution, restoring the natural vegetation around the lake, and ensuring sustainable use of resources by local communities. Special efforts were made to educate the public about the importance of wetlands in maintaining the balance of the ecosystem.

One of the key steps in the project was the creation of ***wetland conservation zones*** *around the lake, where human activity is regulated to prevent further damage to the environment. The local communities were also encouraged to participate in the project, with a focus on promoting eco-friendly tourism and sustainable agricultural practices.*

These efforts have shown positive results, with improved water quality, a rise in bird populations, and an increase in the number of tourists visiting the lake to witness its natural beauty. Local fishermen, who once struggled due to declining fish stocks, have benefited from the restored ecosystem, as fish populations began to thrive again.

Choose the correct answer from the options given below:

A. What is the primary purpose of the conservation initiative launched in Meghalaya in 2017?
   a) To increase agricultural production around Umiam Lake
   b) To preserve the Umiam Lake and other wetlands in the state
   c) To encourage deforestation for urban development
   d) To build more tourist facilities around the lake

B. Which of the following was one of the key actions taken in the conservation project around Umiam Lake?
   a) Introducing industrial activities near the lake
   b) Establishing wetland conservation zones to regulate human activity
   c) Encouraging overfishing to boost the local economy
   d) Promoting the construction of new buildings around the lake

C. What positive result came from the conservation efforts around Umiam Lake?
   a) Decrease in bird populations
   b) Decline in fish stocks
   c) Improvement in water quality and a rise in bird populations
   d) Increase in industrial pollution

Answer the following questions:

D. How did the government and local communities collaborate to conserve the wetlands?

_____
_____
_____
_____

E. How has eco-friendly tourism helped the local communities around the wetlands?

_____
_____
_____
_____

Activity 2 Modals

35 mins

Instructions

- Start by introducing Modals to the class.
- Explain the common Modals used.

Teachers' Notes

Introduce modals: Modals are helping verbs that add meaning to the main verb by expressing ability, possibility, permission, necessity, or advice.

• Modal	• Purpose	• Examples
• *Can/cannot*	• ability or permission	• I can speak French. • You cannot park your bike here.
• *Could*	• past ability or polite request	• I could read when I was three. • Could you help me, please?
• *May/might*	• possibility or permission	• It may rain today. • You may leave early.
• *Must/mustn't*	• necessity or prohibition	• You must wear a helmet. • You mustn't use your phone during the class.
• *Should/ought to*	• advice or obligation	• You should exercise daily. • We ought to respect our elders.
• *Will/would*	• future certainty or polite request	• I will call you tomorrow. • Would you like some tea?

- **Explain key rules to use modals**
  - Modals are always followed by the base form of the main verb.
    Correct: She can sing.
    Incorrect: She can sings.
  - Modals do not change form for different subjects.
    Correct: He must go. / They must go.
    Incorrect: He must goes.
  - Modals do not take "-s", "-ed", or "-ing" forms.

- Ask students to pair up. In each pair, students will take turns asking and answering questions using different modals. Each pair will get a scenario to role-play.

Example - Planning a Group Project

- **Student 1**: You are a team leader. Ask your team members about their roles, deadlines, and expectations for the project.
- **Student 2**: You are a team member. Ask about the project goals, your responsibilities, and any support you need.

Example Questions:

Team Leader: "Can you complete the research by Friday?"

Team Member: "I should be able to do that. What do you need me to focus on?"

Team Leader: "You must submit the draft by the end of the week."

Team Member: "Should I include the background research in my part?"

Scenarios:

- **Scenario 1**: You are at a restaurant. One person is the waiter, and the other is the customer. Use modals for asking about the menu and making requests.
- **Scenario 2**: You are a teacher and a student. The student asks for permission to leave early, and the teacher gives advice on how to improve study habits.
- **Scenario 3**: You are the store cashier and customer at a grocery store. Ask about prices, discounts, and the total amount.
- **Scenario 4**: You are the librarian and customer. Help the customer find books, check if the books are available, and offer information about the library's services.
- **Scenario 5**: You are the patient and doctor. Ask the doctor about your symptoms, possible treatments, and what you should do to recover.
- **Scenario 6**: You are the technician and customer. Ask the technician to fix your computer and how much time repair will take because it is not turning on.
- **Scenario 7**: You are the job interviewer and candidate. Ask the candidate about previous job experience.
- **Scenario 8**: You are hotel receptionist and guest. Ask if there are any rooms available with sea view and cost per night.
- **Scenario 9**: You are parent and child. Ask the parent if you can go out to play after finishing homework.
- **Scenario 10**: You are teacher and student. Ask the teacher to help you with a math problem.

Activity 3 Analytical Paragraph Writing

35 mins

Instructions

- The following table shows details about the internet activities for six categories for different age groups. Write an analytical paragraph for the table given in around 150-200 words.

Internet Activities by Age Group

	Age group						
Activity%	Teens	20s	30s	40s	50s	60s	70+
Get News	76	73	76	75	71	74	70
Online games	81	54	37	29	25	25	32
Downloads	52	46	27	15	13	8	6
Product research	0	79	80	83	79	74	70
Buying a product	43	68	69	68	67	65	41
searching for people	5	31	23	23	24	29	27

UNIT: 4 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. What did the headmaster of Einstein's school tell his father?
   a) Einstein would never make a success at anything.
   b) Einstein would be a successful musician.
   c) Einstein would become a teacher.
   d) Einstein would be a great success.
2. What was Einstein highly gifted in?
   a) Literature and history
   b) Mathematics and physics
   c) Music and art
   d) Philosophy and economics
3. What is the speaker planning to do in the poem "The Lake Isle of Innisfree"?
   a) Go on a vacation
   b) Start a farm
   c) Go to the city for work
   d) Build a small cabin in Innisfree and live there
4. What does the speaker hear when standing on the roadway or pavements in the poem "The Lake Isle of Innisfree"?
   a) The sound of birds chirping
   b) The sound of the lake water lapping by the shore
   c) The sound of people talking
   d) The sound of wind blowing through the trees

Read the following extracts and answer the following questions-

Extract 1

At the urging of a colleague, Einstein wrote a letter to the American President, Franklin D. Roosevelt, on 2 August 1939, in which he warned: "A single bomb of this type . . . exploded in a port, might very well destroy the whole port together with some of the surrounding territory." His words did not fail to have an effect. The Americans developed the atomic bomb in a secret project of their own and dropped it on the Japanese cities of Hiroshima and Nagasaki in August 1945.

5. What was the result of Einstein's letter to President Roosevelt?

_____
_____
_____
_____
_____
_____
_____

Extract 2

And I shall have some peace there, for peace comes dropping slow
Dropping from the veils of the morning to where the cricket sings;
There midnight's all a glimmer, and noon a purple glow,
And evenings full of the linnet's wings.

6. What is full of the linnet's wings in the poem?

_____
_____
_____
_____

7. What did Einstein call his desk drawer at the patent office? Why?

_____
_____
_____
_____
_____

8. Why does the world remember Einstein as a "world citizen"?

_____
_____
_____
_____
_____
_____
_____

9. Do you think Innisfree is only a place, or a state of mind? Does the poet actually miss the place of his boyhood days?

_____
_____
_____
_____
_____
_____
_____

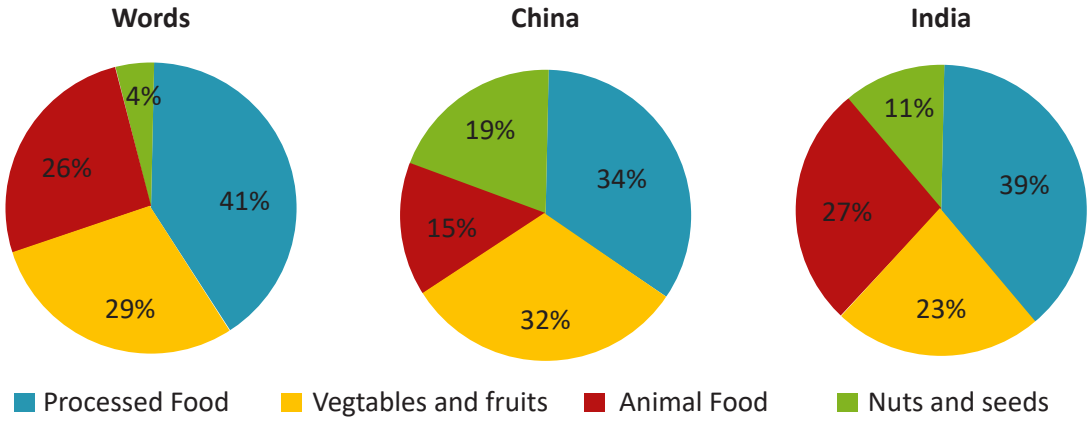
Section B (Grammar)

Fill in the blanks with the correct modal verb (can, could, will, would, should, may, might, must):

1. You _____ study harder if you want to pass the exam.
2. She _____ speak three languages fluently.
3. _____ you please help me with this project?
4. He _____ be at the office right now; I saw him leave earlier.
5. You _____ bring your umbrella, it looks like it might rain.

Section C (Writing)

Below given are three pie charts showing consumption habits of India, China and World overall in 2008. Write an analytical paragraph describing the pie charts (100-120 words).



UNIT: 3 Answer Key

Section A (Literature)

1. a)
2. b)
3. d)
4. b)
5. The result of Einstein's letter to President Roosevelt was that it helped spur the development of the atomic bomb by the United States. After receiving the letter, Roosevelt took the warning seriously and initiated the secret Manhattan Project, which ultimately led to the creation of the atomic bomb. This bomb was dropped on the Japanese cities of Hiroshima and Nagasaki in August 1945, contributing to the end of World War II.
6. In the poem, "evenings full of the linnet's wings" refers to the peaceful and serene atmosphere of the evening, as imagined by the speaker. The image of "linnet's wings" suggests a sense of freedom, tranquility, and natural beauty, enhancing the calmness of the evening described in the poem.
7. In the story "A Truly Beautiful Mind," Einstein referred to his desk drawer at the patent office as his "thinking desk." He did so because, despite working at the patent office, he often used this time to think about scientific ideas.
8. The world remembers Einstein as a "world citizen" because of his strong belief in global peace, his support for the rights of individuals, and his advocacy for democracy and human rights. Despite his fame as a scientist, Einstein was deeply concerned with social and political issues. He spoke out against nationalism, militarism, and injustice, and worked towards the betterment of humanity. He also supported the establishment of the League of Nations and later, the United Nations. His humanitarian efforts and commitment to global well-being earned him the title of "world citizen.
9. In "The Lake Isle of Innisfree," Innisfree can be interpreted as both a place and a state of mind. While it is a real place in the poet's boyhood memories, it also represents an idealised space of peace and solitude that the poet yearns for. The poet expresses a deep desire to escape the noise and busyness of urban life and seeks the tranquil haven of Innisfree, which symbolises inner peace and harmony. The poet does indeed miss the place of his boyhood days. He longs for the simplicity and serenity he associates with Innisfree, where he imagines living in harmony with nature, surrounded by the peaceful sounds of the natural world.

Section B (Grammar)

1. You **should** study harder if you want to pass the exam.
2. She **can** speak three languages fluently.
3. **Could** you please help me with this project?
4. He **can't** be at the office right now; I saw him leave earlier.
5. You **may** bring your umbrella; it looks like it might rain.

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating analytical passage writing are:

10. Does the paragraph start with a clear and focused topic sentence?
11. Does the paragraph go beyond summary and show critical thinking?
12. Does the paragraph stay focused on one main idea?
13. Are linking words or phrases used effectively to connect ideas (e.g., furthermore, in contrast, this shows that)?
14. Is there a variety of sentence structures and vocabulary?
15. Does the paragraph end with a sentence that summarizes or reinforces the main point?
16. Does it offer a concluding thought or insight based on the analysis?

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 4		
		Chapters:	1. A Truly Beautiful Mind	
			2. The Lake Isle of Innisfree	
		Level 1	Level 2	Level 3

UNIT : 5
Chapters- The Snake and the Mirror, A Legend of the Northland

Activity 1 Life in a Hill Village

35 mins

Instructions

- Print out the following passage and distribute them in groups or write the passage on the board.
- Read out the passage for the students once and if required explain the passage in the local language.
- Divide the class into 4-5 groups.
- Ask them to read the passage and then discuss in their groups about their daily routine in the village. What do they do in the morning, afternoon, and evening? The discussion can be based on the following questions-
  - What time do you wake up?
  - What chores or work do you help with?
  - How do you go to school?
  - What do you do after school?
  - How do you spend your evening?

Life in a Hill Village

Nestled among the green hills of Meghalaya, the village wakes up slowly with the first light of dawn. The air is fresh and crisp, carrying the scent of wildflowers, wet soil, and burning firewood. Small wooden houses with tin roofs stand neatly along narrow, winding paths. Smoke rises gently from chimneys as families begin their morning chores. In the distance, the sound of a cock crowing echoes across the valley, followed by the gentle hum of life beginning.

Children walk to school along stone paths lined with moss, greeting elders with respectful smiles and soft "khublei" wishes. Women in jainkyrshahs tend to work in kitchen gardens, picking fresh herbs and vegetables, while men head out to the fields or forests. The hills around the village are thick with pine and bamboo, and crystal-clear streams flow nearby, their water as cold as the morning air. Though life is simple here, it is peaceful, connected to nature, and rich with tradition—a place where community matters and every sunset paints the sky in quiet beauty.

- Now ask them to write a short paragraph (about 50–60 words) about their daily life in the village.
- At the end, ask the groups to read out the paragraphs and correct them wherever needed.

Activity 2 Reported Speech Chain

35 mins

Instructions

- Discuss with the students on Direct and Indirect Speech.
- Give some examples.

	Direct Speech	Indirect Speech
Example 1	"I am going to the market," said Priya.	Priya said that she was going to the market.
Example 2	"Can you help me with my homework?" asked Rahul.	Rahul asked if I could help him with his homework.

- Explain the rules for transforming sentences from direct to indirect speech.
- You may refer to the note given below.

Teachers' notes

- **Change of Pronouns**
  - Pronouns in direct speech often change to match the perspective of the reporting speaker.
    Direct: She said, "I am happy."
    Reported: She said (that) she was happy.
- **Tense Shift**
  - When the reporting verb is in the past tense, the tense in the reported speech usually shifts back.

Change in Tense	Direct Speech	Reported Speech
Present Simple → Past Simple	*He said, "I eat apples."*	*He said (that) he ate apples.*
Present Continuous → Past Continuous	*She said, "I am working."*	*She said (that) she was working.*
Present Perfect → Past Perfect	*He said, "I have finished my homework."*	*He said (that) he had finished his homework.*
Past Simple → Past Perfect	*She said, "I visited Paris."*	*She said (that) she had visited Paris.*

  - **No Change of Tense** in the following cases:
    - If the reporting verb is in the **present tense** or refers to a universal truth.
      Direct: He says, "The Earth orbits the Sun."
      Reported: He says (that) the Earth orbits the Sun.
- **Changes in Time and Place References**
  - Words indicating time and place may change:
    - **Now →** Then
    - **Today →** That day
    - **Tomorrow →** The next day / Following day
    - **Yesterday →** The previous day

- **Here → There**
  Example:
  Direct: He said, "I will go there tomorrow."
  Reported: He said (that) he would go there the next day.

- **Reporting Questions**
  - For **Yes/No questions**, use **if** or **whether**:
    Direct: She asked, "Are you coming?"
    Reported: She asked if I was coming.
  - For **Wh- questions**, the question word is retained:
    Direct: He asked, "Where do you live?"
    Reported: He asked where I lived.
    Remember! – Word order in reported questions is like a statement (subject + verb), not like a question.

- **Reporting Imperatives**
  - Imperatives are reported with **to + base verb** for affirmative commands and **not to + base verb** for negatives:
    Direct: She said, "Close the door."
    Reported: She told me to close the door.
    Direct: He said, "Don't shout."
    Reported: He told me not to shout.

- **Modals in Reported Speech**
  - Some modal verbs change:

    Example:
    Direct: She said, "I can swim."
    Reported: She said (that) she could swim.
  - Modals like **could**, **might**, **should**, and **would** usually stay the same.

- **No Reporting Changes for Certain Verbs**
  - Verbs like **say**, **tell**, and **ask** are used with different structures:
  - **Say** doesn't take an object:
    Direct: She said, "I am ready."
    Reported: She said (that) she was ready.
  - **Tell** requires an object:
    Direct: She told me, "I am ready."
    Reported: She told me (that) she was ready.

- Form a circle or line with the students.
- Begin by whispering a sentence in direct speech to the first student.

Example:

"Riya said, 'I love playing football.'"

- That student changes it to reported speech and says it aloud to the next student.
  "Riya said that she loved playing football."
- The next student creates a new direct sentence (based on anything they like) and whispers it to the next person, who then reports it.
- Keep the chain going around the circle.

Activity 3 Analytical Paragraph

35 mins

Instructions

- Draw both timetables on the board – one for school days and one for holidays.
- Explain the schedules – briefly go over each time slot and activity in both tables, highlighting how students spend their time on school days versus holidays.
- Ask students to observe and analyse – encourage them to focus on the differences in routine, use of time, balance between study and leisure, and overall structure.
- Writing Task: Ask the students to write an analytical paragraph (150–200 words) comparing the two schedules. They should include:
  - Key differences in how time is spent
  - The balance between study, play, and rest
  - Which schedule they find more effective or enjoyable, and why

School days

Time	Activity
5:30 am – 6:00 am	Wake up and freshen up
6:00 am – 6:30 am	Morning exercise
6:30 am – 7:30 am	Study/ Revision
7:30 am – 8:00 am	Breakfast
8:00 am – 2:00 pm	School
2:00 pm – 2:30 pm	Lunch
2:30 pm – 3:30 pm	Rest/Nap
3:30 pm – 5:00 pm	Homework/Study
5:00 pm – 6:00 pm	Outdoor play
6:00 pm – 7:00 pm	Hobbies
7:00 pm – 8:00 pm	Dinner and family time
8:00 pm – 9:00 pm	Reading
9:00 pm	Sleep

Holidays

Time	Activity
6:30 am – 7:30 am	Wake up and freshen up
7:30 am – 8:00 am	Morning walk/Exercise
8:00 am – 8:30 am	Study/Reading
8:30 am – 9:00 am	Breakfast
9:00 am – 11:00 am	Hobbies/Creative work
11:00 am – 1:00 pm	Study/Homework
1:00 pm – 2:00 pm	Lunch & Rest
2:00 pm – 4:00 pm	Watch educational videos/Leisure reading
4:00 pm – 6:00 pm	Outdoor play
6:00 pm – 7:00 pm	Light study
7:00 pm – 8:00 pm	Dinner and family time
8:00 pm – 9:00 pm	Reading
9:00 pm	Sleep

- Encourage the students to draw clear comparisons, thoughtful observations, and proper paragraph structure.

UNIT: 5 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. What was the homeopath doing before the snake incident occurred?
   a) He was cleaning his room.
   b) He was treating a patient.
   c) He had just returned from a restaurant after having dinner.
   d) He was sleeping in his bed.
2. Why did the narrator want to marry a fat woman doctor?
   a) He admired the medical profession.
   b) He believed a fat woman would be kind and caring.
   c) He thought she wouldn't be able to chase him if he made a mistake and ran away.
   d) He wanted someone who could help him with his studies.
3. What do the children in the Northland look like, according to the poem?
   a) Little snowmen
   b) Eskimos
   c) Bear's cubs
   d) Reindeer riders
4. Why did the woman not give away the tiny cake she baked?
   a) It was not baked properly.
   b) She wanted to eat it later.
   c) She thought it was too small to offer, yet too large to give away.
   d) She forgot about it and put it on the shelf.

Read the following extracts and answer the following questions-

Extract 1

I did not know anything for certain. What sex was this snake, was it male or female? I will never know; for the snake unwound itself from my arm and slowly slithered into my lap. From there it crept onto the table and moved towards the mirror. Perhaps it wanted to enjoy its reflection at closer quarters. I was no mere image cut in granite. I was suddenly a man of flesh and blood. Still holding my breath I got up from the chair. I quietly went out through the door into the veranda. From there I leapt into the yard and ran for all I was worth.

5. Describe the speaker's reaction and actions when the snake moved towards the mirror. What do these actions reveal about his state of mind?

_____
_____
_____
_____

Extract 2

She had a scarlet cap on her head,
And that was left the same;
But all the rest of her clothes were burned
Black as a coal in the flame.

6. What does the condition of the girl's clothes in the poem suggest about what happened to her, and why was only the scarlet cap left unchanged?

_____
_____
_____

Answer the following questions-

7. What two "important" decisions did the doctor make while he was looking into the mirror?

_____
_____
_____
_____

8. "The Snake and the Mirror" is a story about a frightening incident but narrated humorously. What makes it humorous?

_____
_____
_____
_____

9. In the poem, *A Legend of the Northland*, why does the poet say that the children cannot understand the story?

_____
_____
_____
_____
_____

Section B (Grammar)

Change the following direct speech into reported speech:

1. She said, "I am going to the market now."
2. Rahul said, "My brother will help you with the homework."
3. The teacher said, "You must submit your assignment by tomorrow."
4. He asked, "Did you see the movie last night?"
5. Mother said to me, "Don't forget to take your umbrella."

Section C (Writing)

Study the table given below showing the global poverty rate over the years and the key contributing factors. Write an analytical paragraph analysing the global poverty trends and the reasons behind the change.

Year	Global Poverty Rate	Key Contributing factors
1990	**36%**	Lack of access to education, healthcare, and basic services.
2020	**9%**	Economic growth, improved education, healthcare reforms, international aid, and better infrastructure.
2023	**8.5%**	Poverty reduction programs, and investments in education, health, and job creation played a major role.

UNIT: 5 Answer Key

Section A (Literature)

1. c)
2. c)
3. c)
4. c)
5. The speaker's reaction and actions when the snake moves towards the mirror reveal a mixture of fear, confusion, and fascination. When the snake moves towards the mirror, the speaker describes it as if the snake is "enjoying its reflection at closer quarters." This suggests that the speaker is still in a state of shock and bewilderment, not entirely aware of his surroundings.
6. In the poem "A Legend of the Northland", the condition of the girl's clothes suggests that she had been punished for her greed. The poem describes how she was transformed into a woodpecker after she refused to give away her small cake to a poor man, even though she had plenty of food.
7. The two decisions were –
    a. To marry a woman doctor who was rich: The doctor decided that he would marry a woman doctor who had a lot of money and good medical practice.
    b. To avoid marrying a thin woman: The doctor decided that the woman he would marry should be fat, with the reason being that if he made a mistake and needed to run away, a fat woman would not be able to chase him.
8. In "The Snake and the Mirror", the frightening incident of the snake coiled around the doctor's arm is narrated humorously through the contrast between the seriousness of the situation and the doctor's comical reactions. Instead of focusing on the danger, the doctor is preoccupied with his appearance and thoughts about marrying a rich, fat woman to avoid being chased. His absurdly trivial concerns, like wondering about the snake's sex, add to the humour. The delayed, over-the-top reaction of the doctor—finally running away in a panic—creates an ironic and comedic contrast with the deadly situation he faces.
9. In the poem, *A Legend of the Northland*, the poet says that the children cannot understand the story because it is based in a distant, cold land where days are short, and nights are long. This is very different from what most children experience. Also, the story has a deeper moral about greed and generosity, which young children might not fully grasp. The poet may also mean that children are naturally innocent and generous, so they may not understand how someone could be so selfish. However, as people grow older, they often struggle with selfishness, making the poem's lesson more relevant to adults than to children.

Section B (Grammar)

1. She said that she was going to the market then.
2. Rahul said that his brother would help me with the homework.
3. The teacher said that I must submit my assignment by the next day.
4. He asked if I had seen the movie the previous night.
5. Mother told me not to forget to take my umbrella.

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating analytical passage writing are:

- Does the paragraph start with a clear and focused topic sentence?
- Does the paragraph go beyond summary and show critical thinking?
- Does the paragraph stay focused on one main idea?
- Are linking words or phrases used effectively to connect ideas (e.g., furthermore, in contrast, this shows that)?
- Is there a variety of sentence structures and vocabulary?
- Does the paragraph end with a sentence that summarizes or reinforces the main point?
- Does it offer a concluding thought or insight based on the analysis?

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 5		
		Chapters:	1.The Snake and the Mirror	
			2. A Legend of the Northland	
		Level 1	Level 2	Level 3

UNIT : 6

Chapters : My Childhood, No Men Are Foreign

Activity 1 A Decline in Reading Habits Among Students

35 mins

Instructions

- Print out the following passage and distribute them in groups or write the passage on the board.
- Read out the passage for the students once and if required explain the passage in the local language.
- Divide the class into 4-5 groups.
- Ask the students to read the passage.

A Decline in Reading Habits Among Students

A recent study conducted by the National Literacy Survey 2023 has highlighted a sharp decline in the reading habits of students aged 10 to 16 years. The survey covered over 5,000 students across different regions of India. It found that most students prefer spending their free time on screens rather than reading books.

According to the data, in 210, students read for an average of 60 minutes a day, but by 2023, that number had dropped to just 20 minutes. The study also found that only 25% of students read for pleasure, while 75% read only when required for schoolwork. The availability of smartphones, easy access to video content, and social media distractions are believed to be major reasons for this decline.

The decline in reading habits can have serious effects on students' language skills, imagination, and academic performance. Reading helps improve vocabulary, concentration, and critical thinking, all of which are essential for overall development. To reverse this trend, schools and parents should encourage regular reading through reading hours, library visits, and book clubs, helping students rediscover the joy of reading.

- After the reading session, ask the students to engage in a group discussion about a book or story they have read recently.
- Mention that they may choose to talk about the entire book or focus on one particular story from it.
  - Guide them to include the following points in their discussion:
  - The name of the book or story
  - The theme or main idea of the story
  - Why it is their favourite
  - One thing they liked the most about the story (e.g., a character, a twist, the writing style, etc.)
- After the group discussion, ask students to write a short paragraph (100–150 words) on the topic “My Favourite Book / Story.”
- Instruct them to include the following points in their paragraph:
  - The name of the book or story
  - A summary of what it is about
  - What makes the story interesting (characters, plot, message, etc.)
  - Why they would recommend it to others

Activity 2 Determiners

35 mins

Instructions

- Begin the class by revising the concept of Determiners.
- Revise the type of Determiners which had already been discussed in the class.
- Introduce the class to the new types of Determiners.
- You can refer to the notes below.

Teachers' notes

Introduce new types of determiners

Numbers (one, two, first, second, etc.) - indicate the exact quantity or order.	**Distributives** (each, either, every, neither) - focus on individuals within a group.	**Interrogative determiners** (what, whose, which) - use these determiners in questions.
Example: He stood first in the class	Example: Each student must submit the project work by Monday.	Example: Whose bag is this?

- Divide the students into 4-5 groups.
- Write the four short paragraphs with blanks on the board or take printouts.
- Each group will have one paragraph with them. The group will discuss and fill up the blanks with suitable determiners.

Group 1

There were ___ (1) students who participated in the quiz competition. The ___ (2) round was the most difficult. Only ___ (3) teams made it to the finals. The ___ (4) team that won received a trophy and certificates.

Group 2

___ (1) student must bring their water bottle for the trip. ___ (2) of the two buses will stop for snacks. ___ (3) Students will be given a snack pack. Neither of the students should forget their ID card. ___ (4) student is responsible for their belongings.

Group 3

___ (1) subject do you find most interesting — Science or History? ___ (2) is your notebook with the drawings? ___ (3) student left their bag in the classroom? ___ (4) of the two topics would you like to present?

Group 4

There are ___ (1) reasons why I love this book. The ___ (2) chapter is my favourite. ___ (3) part of the story teaches an important lesson. ___ (4) of the characters do you relate to the most?

- Once they complete the activity, ask the groups to write a short paragraph using Numbers, Distributives and Interrogative Determiners.
- At the end, ask the group to share their activities with the class.

Activity 3 Article Writing

35 mins

Instructions

- Start by discussing the importance of healthy eating for teenagers, especially in terms of growth, energy levels, and maintaining a balanced lifestyle.
- Highlight key areas like balanced meals, hydration, the importance of fruits and vegetables, limiting junk food, and the role of physical activity.
- Your discussion may include the following points.
  - **Importance of a balanced diet**: Why is it crucial for adolescents to maintain a balanced diet?
  - **Foods to include**: Which foods are essential for growth and development?
  - **Foods to avoid**: What are the harmful effects of junk food, sugary drinks, and processed snacks?
  - **Hydration**: Why is water important for teenagers, and how much should they drink?
  - **Meal planning**: How can teenagers plan meals to ensure they get the right nutrients?
  - **Role of exercise**: How does regular physical activity contribute to healthy eating habits?
- Divide the class into small groups of 3–4 students and ask them to write an article on **The Importance of Healthy Eating Habits for Teenagers**.
- Ask the group to follow the format given below.
  - **Introduction**: Briefly introduce why healthy eating is important for adolescents.
  - **Body**: Discuss the key factors of healthy eating such as a balanced diet, foods to eat and avoid, hydration, and the role of exercise.
  - **Conclusion**: Offer tips or suggestions for how adolescents can improve their eating habits.
- At the end, ask the groups to share their articles with the class.

UNIT: 6 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. What quality of Abdul Kalam's father is highlighted in the passage?
   a) He was very wealthy
   b) He was well-educated
   c) He was wise and genero
   d) He was strict and disciplined

2. What was Abdul Kalam's first earning experience during the Second World War?
   a) Selling newspapers with his brother-in-law
   b) Collecting tamarind seeds and selling them at a local shop
   c) Helping his cousin distribute newspapers thrown from a moving train
   d) Working at a provision shop on Mosque Street

3. What does the poet mean by the line *"Is earth like this, in which we all shall lie"*?
   a) People should travel to different countries.
   b) The earth belongs only to the people of one nation.
   c) Everyone shares the same earth and meets the same end—death.
   d) Only soldiers lie on the ground during war.

4. What is the main theme of the poem "No Men Are Foreign"?
   a) Patriotism and love for one's own country
   b) The importance of war in defending nations
   c) Universal brotherhood and peace
   d) The glory of ancient civilizations

Read the following extracts and answer the following questions-

Extract 1

The whole country was filled with an unprecedented optimism. I asked my father for permission to leave Rameswaram and study at the district headquarters in Ramanathapuram. He told me as if thinking aloud, "Abul ! I know you have to go away to grow. Does the seagull not fly across the sun, alone and without a nest?" He quoted Khalil Gibran to my hesitant mother, "Your children are not your children. They are the sons and daughters of Life's longing for itself. They come through you but not from you. You may give them your love but not your thoughts. For they have their own thoughts."

5. What does this excerpt tell us about the influence Kalam's parents had on him during his youth?

_____
_____
_____
_____

Extract 2

It is the human earth that we defile.
Our hells of fire and dust outrage the innocence
Of air that is everywhere our own,
Remember, no men are foreign, and no countries strange.

6. What does the poet mean by *"It is the human earth that we defile"* and how does it relate to the theme of the poem?

_____
_____
_____

Answer the following questions-

7. Who were Abdul Kalam's school friends? What did they later become?

_____
_____
_____

8. How did the Second World War affect Kalam's life?

_____
_____
_____

9. "...whenever we are told to hate our brothers ..." When do you think this happens? Why? Who 'tells' us? Should we do as we are told at such times? What does the poet say?

_____
_____
_____

Section B (Grammar)

Choose the correct determiner and fill in the blanks-

1. ___ (Many / Much) people in our class are preparing for the science exhibition.
2. I have ___ (few / a few) books that can help you with your project.
3. ___ (This / These) apples on the table look delicious.
4. She doesn't have ___ (some / any) friends in her new school.
5. There is ___ (a little / little) water left in the bottle.

Section C (Writing)

Write an article on the topic: "The Importance of Mental Wellness Among Teenagers."

- In your article, discuss the following points:
  - What mental wellness means and why it matters for teenagers
  - Common mental health challenges faced by teens today (e.g., stress, anxiety, peer pressure)
  - How schools, families, and friends can support mental well-being
  - Tips for teenagers to take care of their mental health (e.g., exercise, sleep, seeking help)

UNIT: 6 Answer Key

Section A (Literature)

Choose the correct answer from the given options:

1. c)
2. c)
3. c)
4. c)
5. This excerpt shows that Kalam's parents supported his dreams, even if it meant letting him go. His father quoted Khalil Gibran: *"Your children are not your children... They come through you but not from you..."* — meaning children have their own identity and purpose. Parents can guide and love them, but they must allow them to think and grow independently. This belief helped Kalam follow his path with confidence.
6. The line "It is the human earth that we defile" means that when we engage in war, violence, or hatred, we are not harming just our enemies or other nations—we are damaging our own shared planet and humanity. The poet emphasizes that all humans live on the same earth, breathe the same air, and are connected by common experiences.
7. Abdul Kalam's school friends were Ramanadha Sastry, Aravindan, and Sivaprakasan. Ramanadha became the priest of the Rameswaram temple, Aravindan started a transport business for pilgrims, and Sivaprakasan became a catering contractor for Southern Railways.
8. The Second World War affected Kalam's life by creating new opportunities for work. During the war, there was a sudden demand for tamarind seeds, and Kalam began collecting and selling them, which gave him his first earnings. Later, when train services were stopped at Rameswaram, his cousin needed help distributing newspapers. Kalam took up the job and started earning a regular income. These experiences taught him the value of hard work, responsibility, and self-reliance at a young age.
9. This happens during times of war, conflict, or social and political unrest when people are divided by religion, caste, race, or nationality.
   Such hatred is often spread to create divisions and gain power or control. It benefits those who want to create fear or maintain authority.
   Leaders, politicians, the media, or those in power may try to influence us by spreading propaganda or false information.
   No, we should not. We must think for ourselves and choose peace over hatred.
   The poet reminds us that all people are the same — we share the same emotions, needs, and humanity. He urges us to reject hatred and live in harmony.

Section B (Grammar)

1. **Many** people in our class are preparing for the science exhibition.
2. I have **a few** books that can help you with your project.
3. **These** apples on the table look delicious.
4. She doesn't have **any** friends in her new school.
5. There is **a little** water left in the bottle.

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating article writing are:

- Are ideas logically organized and connected?
- Are vocabulary and expressions varied and suited to the topic?
- Are the grammar, punctuation, and spellings mostly, correct?
- Are examples or personal opinions used to make it more interesting?
- Are linking words and phrases (e.g., however, moreover, therefore) used to guide the reader?
- Does it reinforce the purpose or message of the article?
- Is the ending memorable, thoughtful, or thought-provoking?

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 6		
		Chapters:	1. My Childhood	
			2. No Men Are Foreign	
		Level 1	Level 2	Level 3

UNIT : 7
Chapters : Reach for the Top

Activity 1 The Losar Festival

35 mins

Instructions

- Read out the passage for the students once, and if required, explain the passage in the local language.
- Highlight how different festivals reflect different cultures, traditions, and values.

The Losar Festival

Losar is the Tibetan New Year festival, celebrated with great joy and tradition, especially in regions such as Ladakh, Sikkim, Arunachal Pradesh, and by Tibetan communities worldwide. The word "Losar" comes from two Tibetan words—lo, meaning "year," and sar, meaning "new." It marks the beginning of the lunar calendar and usually falls between January and March.

Preparations for Losar begin several days in advance. Homes are cleaned and decorated, old items are removed, and new clothes are prepared. People believe that cleaning the house removes negativity and makes space for good luck in the new year.

The celebrations usually last for several days. People visit monasteries, light lamps, offer prayers, and participate in colourful traditional dances and music performances. One of the most important rituals is making offerings to the deities and spirits for peace and prosperity.

Families come together to share special meals, including dishes like khapse (deep-fried pastry), butter tea, and various meat and noodle preparations. Children wear traditional clothes and receive blessings and gifts from elders.

Losar is more than just a celebration—it is a time for reflection, renewal, and strengthening bonds with family and the community.

- Begin the class by asking students: What festivals do you celebrate with your family? Why do we celebrate festivals? What makes a festival special to you?
- Ask students to form pairs and tell them to discuss their favourite festival with their partner.
  - Encourage them to talk about: When and where it is celebrated, what special food, clothes, or customs are involved, and why they enjoy it.
- After the discussion, each student will write a short paragraph (8–10 lines) about their favourite festival in their notebook.
- Once the writing is complete, students exchange notebooks with their partner and ask them to read each other's paragraphs and share feedback with them.

Activity 2 Tenses

35 mins

Instructions

- Begin the class by revising the concept of Tenses.

Teachers' Notes

	Past	Present	Future
Simple	Describes an action that is now complete. E.g.: I played football.	Describes a repeated action. E.g.: I play football.	Describes an action that is planned to take place in the future. E.g.: I will play football.
Continuous	Describes an action that occurred over some time in the past. E.g. I was playing football.	Describes an action that is happening now. E.g.: I am playing football.	Describes an action that will be happening for a length of time. E.g.: I will be playing football.
Perfect	Describes an action that had happened before another action took place. E.g.: I had played football.	Describes an action that has happened. E.g.: I have played football.	Describes an action that will be finished before another action takes place. E.g.: I will have played football.
Perfect Continuous	Describes an action that had been happening before another action. E.g.: I had been playing football.	Describes an action that has started in the past and is continuing. E.g.: I have been playing football.	Describes an action that happens over time before another future action takes place. E.g.: I will have been playing football.

- Divide the students into groups of 8, depending on the size of the class.
- Ask each group to choose one topic:

  Preparing for a school event, studying for exams, playing a sport, planning a trip, or celebrating a festival. They can also choose any topic of their choice other than these topics.
- Tell them to divide a page in their notebook into 8 sections. Example:

  Topic: Studying for Exams

Tense	Example Sentence
Simple Present Tense	We study before the exams.
Simple Past Tense	We studied hard for the exams.
Present Continuous	We are studying hard for tomorrow's exam.
Past Continuous	We were studying when the lights went out.
Present Perfect	We have completed the science syllabus.

Past Perfect	We had finished the revision before the test began.
Present Perfect Continuous	We have been studying since morning.
Past Perfect Continuous	We had been studying for hours before we took a break.

- Explain the groups that each person in the group will make one sentence based on the tenses mentioned.
- Then, have each group come to the front and ask them to present the sentences.
- Guide the students if they need any help with forming correct sentences.

Activity 3 Story Writing

35 mins

Instructions

- Begin with a discussion: Have you ever helped someone in trouble? What would you do if you saw a child alone or crying in a public place? Why is it important to act responsibly in such situations?
- Then, give them the following situation and ask them to write a short story (100-120 words) describing what happened next.
- Situation- You were walking home from school when you noticed a child crying at the corner of the street. The child seemed lost and scared.

  Include: What did you do to help the child? How was the situation resolved? How did you feel after the incident?
- Ask the students to add a title to their stories.

UNIT: 7 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. Which blessing surprised the holy man during Santosh's birth?
   a) That they would welcome a daughter instead of a son
   b) That she would become rich
   c) That she'd climb Mount Everest
   d) That she'd be educated
2. What dream kept Maria Sharapova motivated, according to the chapter?
   a) To win every Grand Slam
   b) To become the world's number one tennis player
   c) To represent Russia at the Olympics
   d) To retire early
3. According to the poet, what is required to kill a tree completely?
   a) A few cuts at the bark
   b) Pulling out all the roots
   c) Burning the leaves
   d) Cutting the branches only
4. What happens to the tree's "bleeding bark" after hacking or chopping?
   a) It bleeds endlessly
   b) It dries immediately
   c) It turns black
   d) It heals soon

Read the following extracts and answer the following questions-

Extract 1

Within twelve months, Santosh found herself a member of an Indo-Nepalese Women's Expedition that invited her to join them. She then scaled the Everest a second time, thus setting a record as the only woman to have scaled the Everest twice, and securing for herself and India a unique place in the annals of mountaineering. In recognition of her achievements, the Indian government bestowed upon her one of the nation's top honours, the Padmashri.

5. Why is Santosh's achievement important for India?

_____
_____
_____
_____
_____
_____
_____

Extract 2

Then the matter
Of scorching and choking
In sun and air,
Browning, hardening,
Twisting, withering,
And it is done.

6. What do the words “scorching,” “choking,” and “withering” suggest about the conditions?

_____
_____
_____
_____
_____

7. When Santosh Yadav finished her college education, she had to write a letter of apology to her father. Why did she do so?

_____
_____
_____
_____
_____

8. What does the poet mean by “Strength of the tree exposed”?

_____
_____
_____
_____
_____

9. Compare and contrast the lives, struggles, and achievements of Santosh Yadav and Maria Sharapova. What qualities made them successful in their respective fields?

_____
_____
_____
_____
_____
_____
_____
_____
_____

Section B (Grammar)

Fill in the Blanks with the Correct Verb Form:

1. I _____ (not/finish) my homework yet, so I can't go out.
   (Present Perfect)
2. They _____ (watch) a movie when the phone rang.
   (Past Continuous)
3. She _____ (study) for her exams every evening this week.
   (Present Perfect Continuous or Present Continuous)
4. We _____ (have) lunch when our relatives arrived.
   (Past Continuous)
5. He was tired because he _____ (not/sleep) well the night before.
   (Past Perfect)

Section C (Writing)

One morning, you woke up to find that it was raining heavily, and your school bus didn't arrive. You decided to walk to school with your friend, and something unexpected happened on the way.

Write a short story (100–150 words) including: What happened during your walk, how you and your friend handled the situation, and how the story ended. Give a title to the story.

UNIT: 7 Answer Key

Section A (Literature)

1. a)
2. b)
3. b)
4. d)
5. Santosh's achievement is important for India because she became the only woman to scale Mount Everest twice, bringing great pride and recognition to the country. Her success not only showcased the strength and determination of Indian women but also secured India a unique place in the history of mountaineering. Her accomplishments were nationally acknowledged when she was awarded the Padmashri, one of India's highest civilian honours.
6. The words "scorching," "choking," and "withering" suggest that the conditions are extremely harsh, dry, and unbearable. They create a picture of intense heat and dryness that causes living things to burn, suffocate, and wither. These words emphasise the cruelty of nature when there is no water, highlighting the suffering and damage caused by drought or lack of care.
7. Santosh apologised to her father because she had enrolled in the Nehru Institute of Mountaineering at Uttarkashi without first seeking his permission, which made her feel sorry for having made that decision independently.
8. The poet means that the real strength of the tree lies in its roots, which are hidden deep underground. When someone tries to kill a tree by cutting it down, it doesn't die easily because it can regrow. But when the tree is uprooted, its roots are pulled out and exposed to sunlight and air. This exposure deprives the tree of its source of life, ultimately weakening and rendering it vulnerable, ultimately leading to its demise.
9. Santosh Yadav and Maria Sharapova, though from different backgrounds, showed great determination. Santosh challenged traditional norms in Haryana to become the first woman to climb Mount Everest twice. Her courage and strong will led to her success. Maria Sharapova moved from Russia to the U.S. to pursue tennis. She faced loneliness and hardship but stayed focused on her goal. Her mental toughness helped her become the world's number one tennis player. Both overcame difficulties through hard work, discipline, and self-belief, proving that strong determination leads to success.

Section B (Grammar)

1. have not finished
2. were watching
3. has been studying
4. were having
5. had not slept

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating story writing are:

- The plot is the sequence of events that make up the story. It includes an introduction, rising action, climax, falling action, and conclusion.
- Characters are the people or beings that drive the story forward.
- The setting is where and when the story takes place.
- The conflict is the central problem or challenge the characters face.
- The theme is the central idea or message the story conveys.
- The point of view is the perspective from which the story is told.
- Dialogue is the conversation between characters.
- Style and Language - the way the story is written affects its tone and impact.
- Pacing refers to how quickly or slowly the events unfold in the story.
- Often, stories have a deeper moral or lesson for the reader.

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 7		
		Chapters:	1. Reach for the Top	
			2. On Killing a Tree	
		Level 1	Level 2	Level 3

UNIT : 8
Chapters : Kathmandu

Activity 1 Smartphone Use Among Teenagers in Rural India

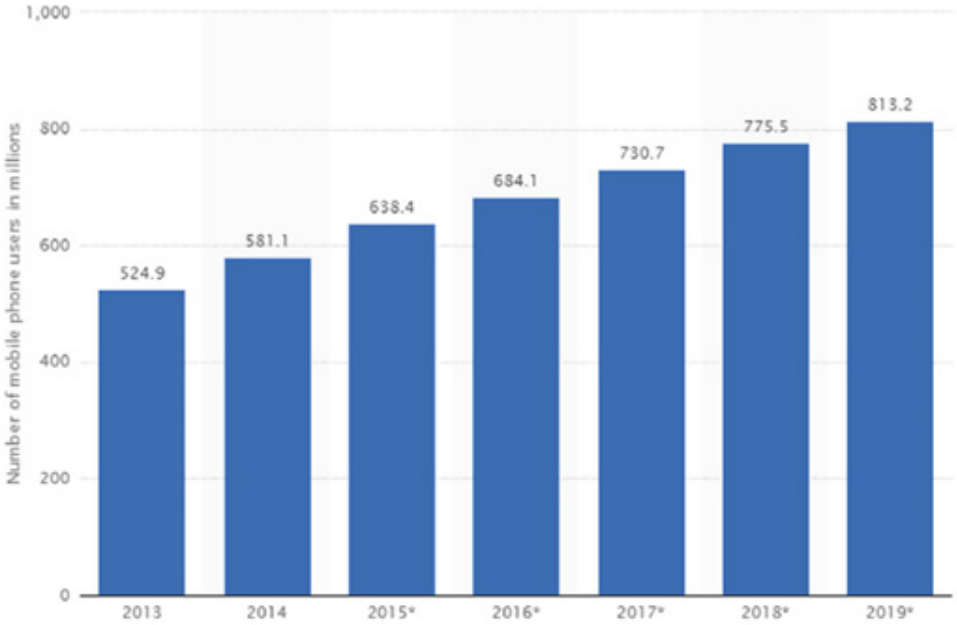
35 mins

Instructions

- Carry out the option that works best for you:
  - Print out the following passage and distribute it in groups.
  - Write the passage on the board.
- Read out the passage for the students once, and if required, explain the passage in the local language.

Smartphone Use Among Teenagers in Rural India

In recent years, smartphones have become increasingly common, even in rural parts of India. A study by the Annual Status of Education Report (ASER) 2024 shows that 82.2% of children aged 14 to 16 in rural areas know how to use a smartphone. However, only 57% of them used the device for educational purposes during the past week, while around 76% used it primarily for social media and entertainment.



As shown in the bar graph above, the number of mobile phone users in India increased rapidly from 107 million in 2013 to over 500 million by 2019. This growth reflects the fast spread of mobile technology across all regions and age groups.

While access to smartphones is no longer limited to urban populations, the way these devices are used varies greatly. For many rural teenagers, smartphones are a source of entertainment more than a tool for learning. This highlights a growing need to create awareness about balanced and meaningful use of digital technology in young lives.

- Begin the class with a discussion: How many of you use a smartphone? What do you mostly use it for? (Learning, games, videos, social media, etc.) Do you think smartphones help or distract students from learning?
- Ask the students to form pairs and re-read the passage, and observe the chart.
- Each pair will discuss:
  - What do the percentage figures in the passage suggest?
  - What the chart shows about mobile phone growth in India.
  - Whether their usage matches the trend.
- After the discussion, ask the students to write a short paragraph on "How I use my smartphone." If they don't own one, write about how they plan to use it when they do.

Activity 2 Subject-Verb Concord Chain

35 mins

Instructions

- Start the class by revising the concept of Subject-Verb concord.

Subject-Verb Concord (Agreement) means the subject and the verb in a sentence must agree in number — singular subjects take singular verbs; plural subjects take plural verbs.

Basic Rules to Remember

- Singular subject → singular verb
  Example: *He runs fast*.
- Plural subject → plural verb
  Example: *They run fast*.
- When subjects are joined by and use a plural verb.
  Example: *Ravi and Sita are friends*.
- When subjects are joined by or, either...or, neither...nor the verb agrees with the subject nearer to it.
  Example: *Either the teacher or the students are present*.
  Neither the boys nor the girls are here.
- Collective nouns (team, family, etc.) usually take singular verbs when acting as a unit.
  Example: *The team is winning*.
- Some nouns like *news, mathematics, and physics* are singular and take singular verbs.
  Example: *The news is good*.
- Words like *each, every, everyone, and nobody* take singular verbs.
  Example: *Everyone likes chocolate*.

- After explaining the concept of Subject- Verb- Concord, play the game – Chain of Sentences.
- Initiate the game by saying a sentence aloud with correct subject-verb agreement, for example: *"The dog barks loudly."*
- The next student must repeat the sentence but change the subject to a plural or singular noun and adjust the verb accordingly, for example: *"The dogs bark loudly."*
- The third student adds a new sentence and uses the verb correctly, for example: *"The cat sleeps on the sofa."*

- The fourth student changes the subject from singular to plural and accordingly uses the verb.
- This continues around the class, with each student creating a new sentence by changing the subject and making sure the verb agrees.
- If a student makes a mistake, the class can help correct it together.
- Guide the students to construct the correct sentences.

Activity 3 Formal Letter Writing

35 mins

Instructions

- Start with a class discussion: What is the condition of the roads in your area? Have you ever seen potholes, waterlogging, or open drains? Have any accidents happened because of bad roads? Whose responsibility is it to repair the roads?
- Then, tell them that they will write a formal letter to the Municipal Commissioner of their area complaining about the poor condition of roads in their locality, which is causing accidents and inconvenience to the residents.
- Write the structure of the formal letter on the board.

Sender's Address
Date
Receiver's Designation and Address
Subject Line
Salutation (Dear Sir/Madam)
Body of the Letter (Introduction, Main Content, Conclusion)
Formal Closing (Yours sincerely/faithfully)
Name and Designation (if any)

- Once they have written the letter, ask them to exchange their notebooks with a partner.
- Tell them to read the partner's letter carefully and give feedback politely.
- Share your feedback also with the students.

UNIT: 8 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. Who do you find in the streets of Kathmandu?
   a) Fruit sellers
   b) Flute sellers
   c) Hawkers of postcards
   d) All of the above
2. The flutes on the pole of the fruit seller are compared to:
   a) A beehive
   b) A bunch of oranges
   c) The quills of a porcupine
   d) None of the above
3. What does the poet mean by “She seemed a thing that could not feel / The touch of earthly years”?
   a) She has grown stronger with age
   b) She is no longer affected by time or life
   c) She is asleep and dreaming
   d) She is full of life and energy
4. What is the central theme of the poem?
   a) Joy and celebration
   b) The beauty of nature
   c) Grief and acceptance of death
   d) Love and hope

Read the following extracts and answer the following questions-

Extract 1

I consider what route I should take back home. If I were propelled by enthusiasm for travel per se, I would go by bus and train to Patna, then sail up the Ganges past Benaras to Allahabad, then up the Yamuna, past Agra to Delhi. But I am too exhausted and homesick; today is the last day of August. Go home, I tell myself: move directly towards home. I enter a Nepal Airlines office and buy a ticket for tomorrow's flight.

5. What does this passage reveal about the speaker’s experience so far?

_____
_____
_____
_____
_____

Extract 2

A Slumber did my spirit seal-

I had no human fears.

6. What does the phrase "a slumber did my spirit seal" mean?

_____
_____
_____
_____
_____

7. What is the belief at Pashupatinath about the end of Kaliyug?

_____
_____
_____
_____
_____

8. In the poem "A Slumber Did My Spirit Seal", how does the poet describe the state of the girl after her death?

_____
_____
_____
_____
_____

9. How does the author describe Kathmandu's busiest streets?

_____
_____
_____
_____
_____

Section B (Grammar)

Fill in the blanks with the correct form of the verb in brackets to match the subject.

1. The list of items _____ (is/are) on the table.
2. Neither of the boys _____ (has/have) finished the homework.
3. Each of the players _____ (was/were) wearing a team jersey.
4. My friends _____ (enjoy/enjoys) playing football in the evening.
5. The sound of the bells _____ (is/are) very soothing.

Section C (Writing)

Write a letter to the Librarian of your school requesting him/her to issue you a duplicate library card as you have lost the original.

UNIT: 8 Answer Key

Section A (Literature)

Choose the correct answer from the given options-

1. d)
2. c)
3. b)
4. c)
5. This passage reveals that the speaker has had a long and tiring journey. Although the speaker initially thinks about taking a scenic and adventurous route home, travelling by bus, train, and boat through several cities, feelings of exhaustion and homesickness have taken over. The speaker's decision to buy a direct flight ticket shows a strong desire to return home quickly rather than continue exploring. This indicates that the journey has been emotionally and physically draining.
6. The phrase "a slumber did my spirit seal" means that the speaker's soul was in a deep, peaceful sleep or unconscious state, making him unaware of pain, fear, or the realities of life.
7. According to the belief at Pashupatinath temple, when the small shrine on the Bagmati River near the temple emerges fully from the water, it will signal the end of Kaliyug — the present age of darkness and corruption in Hindu mythology — and the arrival of a new era. This belief is deeply rooted in the local religious tradition and adds to the spiritual significance of the temple.
8. In the poem "A Slumber Did My Spirit Seal", the poet describes the girl's state after death as peaceful and eternal. She is no longer affected by time or earthly experiences. She cannot see, hear, or feel anything. The poet says she has become one with nature and now silently moves with the rocks, stones, and trees, suggesting that she is at rest and a part of the natural world forever.
9. The author, Vikram Seth, describes Kathmandu's busiest streets as crowded, noisy, and lively. He mentions the streets are full of fruit sellers, flute sellers, hawkers of postcards, and shops selling various things like film rolls, chocolates, and copper utensils. The place is filled with the sound of car horns, bicycle bells, stray cows, vendors shouting, and temple bells, creating a chaotic yet vibrant atmosphere. This vivid description brings out the unique energy and disorder of the city.

Section B (Grammar)

1. is
2. has
3. was
4. enjoy
5. is

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating Letter writing are:

- Does it follow the format of a Letter (date, first-person narration, formal tone)?
- Is the content relevant to the given prompt or theme?
- Does the paragraph have a clear beginning, middle, and end?
- Are the sentences complete and grammatically, correct?
- Does the paragraph avoid excessive repetition?
- Does the student use a range of vocabulary instead of repeating the same words?
- Are common words spelt correctly?
- Is proper punctuation used (capital letters, commas, periods, etc.)?
- Is the paragraph coherent?
- Is there a personal touch or unique perspective in the writing?
- Are common words spelt correctly?

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Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 8		
		Chapters:	3. Kathmandu	
			4. A Slumber Did My Spirit Seal	
		Level 1	Level 2	Level 3

UNIT : 9

Chapters : If I Were You

Activity 1 Community Practices in Meghalaya

35 mins

Instructions

- Print out the following passage and distribute them in groups or write the passage on the board.
- Read out the passage for the students once and if required, explain the passage in the local language.

Community Practices in Meghalaya

Meghalaya is not only known for its scenic beauty but also for its strong and active community life. Most villages in the state follow traditional systems of local governance, where decisions are taken collectively. The Dorbar Shnong (village council) is a key part of this structure. Headed by a village headman or Rangbah Shnong, the Dorbar takes care of daily issues like cleanliness, discipline, and resource management. Villagers attend meetings and work together to solve local problems.

An important community practice in Meghalaya is shramdaan, which means voluntary service. On certain days, all villagers come together to clean the surroundings, repair footpaths, or clear drains. No one is forced — people join willingly because they feel a sense of responsibility toward their community. Children learn from a young age to take part in such efforts. These practices help strengthen unity, cooperation, and a shared sense of pride.

Community efforts also play a big role in protecting the environment. In many areas, forests, rivers, and natural springs are preserved by the village through unwritten rules passed down over generations. Sacred groves, or Law Kyntang, are special forests protected by traditional beliefs and are not allowed to be cut or harmed. These community-driven conservation practices have helped Meghalaya remain green and rich in biodiversity.

- Begin by asking some questions: Have you ever attended a Dorbar Shnong meeting or seen one happening? What kind of community work is done in your locality? Why do you think people do things like cleaning their surroundings together or protecting forests? What is shramdaan, and have you or someone you know taken part in it?
- Now, ask them to imagine they are a community leader in their village or locality.

  Think of one new community practice they would like to introduce for the welfare of people or the protection of the environment.
- Some examples to inspire ideas:

  A “No Plastic Day” in the village each week, Monthly tree-planting or waste segregation events, Water-saving campaigns in the community, Community reading corners or study groups for children, A mobile help desk for elderly or disabled people.
- Have the students come to the front and speak about their ideas.
- Encourage every student to participate, even if briefly, and offer positive feedback and gently guide those who need support.

Activity 2 Modals

35 mins

Instructions

- Start by revising the concept of Modals. You can refer to the table below.

Modal	Usage	Example (Direct Speech)	Example (Reported Speech)
can	ability, permission	"I can swim."	She said she **could** swim.
could	past ability, polite permission	"Could I borrow a pen?"	He asked if he **could** borrow a pen.
may	permission, possibility	"May I leave early?"	She asked if she **might** leave early.
might	possibility	"I might go to the party."	He said he **might** go to the party.
must	necessity, obligation	"You must study hard."	She said I **had to** study hard.
should	advice	"You should exercise."	He said I **should** exercise.
shall	suggestion, future (formal)	"Shall we start now?"	They asked if they **should** start then.
will	future	"I will help you."	She said she would help me.
would	polite offer, future-in-the-past	"I would love to join."	He said he **would** love to join.

- Pair up the students.
- Each student will act as both an interviewer and an interviewee.
  - Each student writes 2-3 questions using modals. Examples: Can you cook something by yourself? Should we always follow rules? May I ask you a personal question?
- Partners interview each other and write down each other's answers word-for-word (direct speech).
- Each student writes a short report about what their partner said using reported speech and the correct modals. Example:
  - I asked Daisy if she could cook something by herself. She said she could make pasta.
  - I asked her if she must finish her homework on time. She said she had to because her teacher checks it daily.

Activity 3 Letter Writing

35 mins

Instructions

- Start with a class discussion:

  "Have you ever visited a historical or natural site in Meghalaya?"

  "What was the most interesting place you've visited?"

  "Why do tourists come to Meghalaya?"

  "What are some places you'd like to visit?"

  "What can we learn from visiting places like the Living Root Bridges or Mawphlang Sacred Forest?"
- Then, tell the students that they will write a letter to the Director of Tourism, Government of Meghalaya, requesting the organisation of an educational tour for students to important cultural and historical sites like Nongkhnum Island, Mawlynnong Village, and the Living Root Bridges. Explain how such a tour will benefit students and promote awareness about local heritage.
- Write the structure of the formal letter on the board.

Sender's Address
Date
Receiver's Designation and Address
Subject Line
Salutation (Dear Sir/Madam)
Body of the Letter (Introduction, Main Content, Conclusion)
Formal Closing (Yours sincerely/faithfully)
Name and Designation (if any)

- Once they have written the letter, ask them to exchange their notebooks with a partner.
- Tell them to read the partner's letter carefully and give feedback politely.
- Share your feedback also with the students.

UNIT: 9 Assessment

35 mins

Section A (Literature)

Choose the correct answer from the given options-

1. What is the profession of Gerrard in the play?
   a) A playwright
   b) A teacher
   c) A criminal
   d) A detective
2. Why does the intruder come to Gerrard's cottage?
   a) To rob him
   b) To hide from the police and assume Gerrard's identity
   c) To ask for food
   d) To threaten him for money
3. How does Gerrard outsmart the intruder?
   a) By calling the police
   b) By pretending to be a criminal too
   c) By fighting him physically
   d) By escaping through the window
4. What quality of Gerrard helps him deal with the situation successfully?
   a) Strength
   b) Wealth
   c) Intelligence and calmness
   d) Anger and threats

Answer the following question-

Extract 1

GERRARD: Oh, don't be a fool. Look for yourself.

Gerrard opens door and steps away. Intruder Jeans forward to inspect it, with his side towards Gerrard, but with the revolver ready. As he turns his head, Gerrard gives him a push into the cupboard, knocking the revolver out of his hand. He slams the door and Jocks it, picks up the revolver and goes to the phone, where he stands with the gun pointed at the cupboard door.

5. Why did the intruder lean forward to inspect the door? What was he trying to find out?

_____
_____
_____
_____
_____

Extract 2

Intruder: Sit down there, and no funny business. (Motions to a chair, and seats himself on the divan by the bag.) Now then, we'll have a nice little talk about yourself!

6. Who is the intruder speaking to, and what does this scene reveal about his intentions?

_____
_____
_____
_____
_____

7. Why does the intruder choose Gerrard as the man whose identity he wants to take on?

_____
_____
_____
_____
_____

8. What is Gerrard's profession? Please quote the part of the play that supports your answer.

_____
_____
_____
_____
_____

9. Write a paragraph about Gerrard and the intruder to show what qualities they have.

_____
_____
_____
_____
_____
_____

Section B (Grammar)

Fill in the blanks with the correct modal.

Choose from these modals:

can, could, may, must, should

1. You _____ finish your homework before watching TV.
2. I _____ speak three languages fluently.
3. It looks cloudy; it _____ rain later.
4. Students _____ wear their ID cards on campus.
5. When I was a child, I _____ climb trees very easily.

Section C (Writing)

Write a letter to the Director of Meghalaya State Transport, requesting an increase in the number of buses in your area during school hours, as students are facing great difficulty commuting.

UNIT: 9 Answer Key

Section A (Literature)

1. a)
2. b)
3. b)
4. c)
5. The intruder leaned forward to inspect the door because Gerrard had claimed that he was also a criminal who needed to live in hiding and had an escape route prepared. The intruder wanted to check if Gerrard was telling the truth about the door leading to an exit or getaway. He was trying to find out whether Gerrard was lying or actually had a secret way to escape, which would prove that Gerrard was not an ordinary man, as he first seemed.
6. The intruder is speaking to Gerrard, the main character of the play. This scene reveals that the intruder is trying to take control of the situation by intimidating Gerrard. He intends to force Gerrard to reveal personal details about his life so he can later assume Gerrard's identity and escape from the police, as he is a criminal on the run. The intruder's threatening tone shows that he is desperate and dangerous.
7. The intruder chooses Gerrard as the man whose identity he wants to take on because he believes Gerrard lives alone in a quiet, isolated cottage, has no visitors, and leads a simple, private life. The intruder thinks that by killing Gerrard and taking over his identity, he can avoid being caught by the police and live safely without suspicion. He assumes Gerrard has no close contacts or social ties, making it easier to disappear into his life.
8. Gerrard is a playwright by profession. This is revealed in the play when he tells the intruder, "I'm a playwright. I write plays for the stage." Earlier in the scene, he also makes a theatrical remark: "In most drama, exits and entrances are very important. That's why I've just made my entry a trifle unobtrusively." These lines clearly show that Gerrard is involved in writing and producing plays, which also explains his calm and clever way of handling the dangerous situation with the intruder.
9. Gerrard is intelligent, calm, and quick-witted, while the intruder is aggressive, nervous, and desperate. Throughout the play, Gerrard stays composed even when threatened at gunpoint, and he uses his presence of mind to outsmart the intruder by pretending to be a criminal himself. This clever trick not only saves his life but also turns the situation in his favour. On the other hand, the intruder is impulsive and overconfident. He believes he can easily take over Gerrard's identity and escape the law, but his lack of careful thinking leads to his capture. The contrast between Gerrard's cleverness and the intruder's foolishness is what drives the plot and adds suspense to the story.

Section B (Grammar)

1. should
2. can
3. may
4. must
5. could

Section C (Writing)

Since creative writing tasks are subjective in nature, the answers will vary from student to student. Some aspects to consider while evaluating Letter writing are:

- Does it follow the format of a Letter (date, first-person narration, formal tone)?
- Is the content relevant to the given prompt or theme?
- Does the paragraph have a clear beginning, middle, and end?
- Are the sentences complete and grammatically, correct?
- Does the paragraph avoid excessive repetition?
- Does the student use a range of vocabulary instead of repeating the same words?
- Are common words spelt correctly?
- Is proper punctuation used (capital letters, commas, periods, etc.)?
- Is the paragraph coherent?
- Is there a personal touch or unique perspective in the writing?
- Are common words spelt correctly?

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Level 1: Not able to solve problems and having difficulty comprehending the problem

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: English		
Roll No.	Name of the Student	Unit: 9		
		Chapters: 1. If I Were You		
		Level 1	Level 2	Level 3

Meghalaya Learning Enhancement Programme

MATHS

Chapter 1 : Number Systems

Activity 1 Mystery Number Hunt

35 mins

Instructions

- Begin the class by asking students, "Have you ever wondered why some numbers can be written as simple fractions while others cannot?" To describe take an example of the number $\frac{3}{4}$ which is easy to write, but what about √2?
- Prepare small cards with various numbers. Ensure these numbers include examples of rational and irrational numbers (e.g., $\sqrt{2}$, π, $\frac{3}{4}$, 5, -7, 1.414, $\frac{22}{7}$). You may change the numbers.
- Hide these cards in different places around the classroom/school premises.
- Divide the class into small teams of 3-4 students each.
- Ask each team to find as many cards as they can.
- Once they find a card, they must decide whether the number is rational or irrational.
- For an extra challenge, ask them to identify which rational numbers have terminating or non-terminating decimals.
- At the end, discuss the correct answers with the class and explain why each number belongs to a specific category.

Activity 2 Real Number Relay

35 mins

Instructions

- Begin the class by a discussion on "Did you know that real numbers are all around us?"
  To explain you may use some examples like- from measuring distances to calculating time, they play a vital role in our lives. Today, we will learn to add, subtract, multiply, and divide real numbers through a fast-paced Real Number Relay!
- Divide the class into relay teams with 4-5 students in each.
- Each team member will solve one operation involving real numbers (addition, subtraction, multiplication, or division).
- Prepare a set of problems for each operation, such as: (You may change the problem)
  - Simplify: $\sqrt{3} + 2\sqrt{3}$
  - Multiply: $(\sqrt{5}) \times (\sqrt{20})$
  - Add: $2 + \frac{3}{4}$
- One student from each team will solve the first problem and pass the solution to the next team member.

- The team that finishes solving all problems correctly and the fastest is declared the winner.
- After the activity, review the problems with the class to reinforce correct methods and solutions.
- Conclude by emphasising the importance of accurate calculations in real-life situations. Highlight how operations on real numbers are used in fields like engineering, physics, and daily activities like budgeting or shopping.

Activity 3 Decimal Detective

35 mins

Instructions

- Ask the class, "Have you ever noticed how some decimals repeat forever while others stop?"

For instance, 0.333… goes on endlessly, while 2.5 stops after one decimal place. Today, we will become Decimal Detectives and learn to identify different types of decimal expansions!

- Write the following numbers on the board: (You may change the numbers)
  - 0.333...
  - 1.732...
  - 2.5
  - 3.14159...
- Ask the students to observe each number carefully.
- Guide them to classify the numbers as either terminating decimals, repeating decimals, or non-terminating and non-repeating decimals.
- Encourage students to explain their reasoning behind each classification.
- For additional practice, ask students to convert simple fractions (like $\frac{1}{8}$ or $\frac{7}{3}$ into decimal form and classify them accordingly.
- Discuss the answers and explain how these classifications relate to rational and irrational numbers.
- Conclude the activity by highlighting how rational numbers can either terminate or repeat, while irrational numbers have endless, non-repeating decimal expansions. Discuss practical uses, like how these numbers appear in scientific measurements and calculations.

Assessment

60 mins

Answer the following questions:

1. A rational number between $\sqrt{2}$ and $\sqrt{3}$ is:
   a) 1.9
   b) $\frac{(\sqrt{2}.\sqrt{3})}{2}$
   c) 1.5
   d) 1.8
2. An irrational number between 5 and 6 is:
   a) $\sqrt{(5+6)}$
   b) $\sqrt{(5-6)}$
   c) $\sqrt{(5x6)}$
   d) None
3. Which of the following is an irrational?
   a) $\frac{\sqrt{4}}{\sqrt{9}}$
   b) $\frac{\sqrt{12}}{\sqrt{3}}$
   c) $\sqrt{7}$
   d) $\sqrt{81}$
4. $\sqrt{12} \times \sqrt{15}$ is equal to:
   a) 5
   b) $5\sqrt{6}$
   c) $6\sqrt{5}$
   d) 6
5. The value of $\frac{322}{5}$ is:
   a) 2
   b) 4
   c) 16
   d) 14
6. A square has an area of 72 m^2. Find the length of its side in decimal form rounded to two decimal places.
7. Find three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$.
8. Evaluate $\frac{271}{3}$
9. If $a = \sqrt{3}$ and $b = 4$, find the value of:
   a) $a^2 + b^2$
   b) $(a + b)^2$
10. Express 0.454545... as a fraction.

Answer Key

1. (c) 1.5
2. (c) $\sqrt{(5x6)}$
3. (c) $\sqrt{7}$
4. (c) $6\sqrt{5}$
5. (b) 4
6. Length of side = $\sqrt{72} \approx 8.49$ (Approximating the square root to two decimal places.)
7. The given two rational numbers are $\frac{5}{7}$ and $\frac{9}{11}$.

   $\frac{5}{7}$ = 0.714285714.....

   $\frac{9}{11}$ = 0.81818181.....

   Hence, the three irrational numbers between $\frac{5}{7}$ and $\frac{9}{11}$ can be:

   0.720720072000...

   0.730730073000...

   0.808008000...
8. $\frac{271}{3}$ = 3 (Since 3 × 3 × 3 = 27.)
9. Solution:

   a) $a^2 + b^2 = (\sqrt{3})^2 + 4^2 = 3 + 16 = 19$

   b) $(a + b)^2 = a^2 + b^2 + 2ab = 3 + 16 + 2(\sqrt{3} \times 4) = 19 + 8\sqrt{3}$
10. Let x = 0.454545...

    100x = 45.4545...

    100x - x = 45

    99x = 45

    $x = \frac{45}{99} = \frac{5}{11}$

Learning Level Tracker

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As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Number Systems		
		Level 1	Level 2	Level 3

Chapter 2 : Polynomials

Activity 1 The Mystery of Missing Numbers

30 mins

Instructions

- Begin the class with some ice-breaking questions such as
  "Have you ever thought about how equations describe patterns in the real world?"
- Ask the students to think of a number pattern. Then ask them what if we could represent it using algebra?
- The teacher will write different algebraic expressions on the board, such as:
  - $2x + 3$
  - $5x^2 + 4x - 6$
  - $7xy + 3y$
  - 8
- Each group will receive flashcards containing algebraic expressions. Their task is to classify them as polynomials or not and determine their degree.
- After discussion, each group will present their findings.
- Teacher will correct any misconceptions and highlight key learning points.

Activity 2 The Zero Hunt

35 mins

Instructions

- Start the class with a brief discussion on 'What if I told you that finding the zeroes of a polynomial is like solving a detective mystery?"
- The teacher will write a few polynomials on the board, such as:
  - $x^2 - 4$
  - $x^2 + 5x + 6$
  - $x^3 - 3x^2 - 4x + 12$
- Students will be asked to work in pairs to determine the zeroes of each polynomial using factorisation or the trial method.
- Discuss the meaning of zeroes in real life, such as where a thrown ball hits the ground.
- Ask them to compare the zeroes to the points where the polynomial graph intersects the x-axis.

Activity 3 Factorisation Maze

35 mins

Instructions

- Start the class by asking an ice-breaking question, such as
  "Have you ever played a maze game where you have to find the right path?"
- Teacher will provide students with different polynomials that can be factorised using different methods, such as:
  - $x^2 + 7x + 10$
  - $x^3 - 2x^2 - x + 2$
- Students will be asked to work through different factorisation techniques in groups, such as:
  - Splitting the middle term
  - Using algebraic identities
  - Factorisation by grouping

  Teacher will support them in this process.
- After factorising, students will be asked to cross-check answers with peers and the teacher.

Assessment

35 mins

Answer the following questions:

1. Which of the following is a polynomial?
   a) $3x + 2$
   b) $\sqrt{x} + 5$
   c) $\frac{1}{x}$
   d) $2x^3 - x + 7$
2. The degree of the polynomial $4x^5 - 3x^3 + 2x^2 - 7$ is:
   a) 2
   b) 3
   c) 4
   d) 5
3. Which of the following is an algebraic identity?
   a) $(a - b)^2 = a^2 - 2ab + b^2$
   b) $a^2 + b^2 = (a + b)^2$
   c) $a^3 - b^3 = (a - b)(a^2 - b^2)$
   d) None of the above
4. If $(x - 3)$ is a factor of the polynomial $x^2 - 7x + 12$, then one of its zeroes is:
   a) 2
   b) 3
   c) 4
   d) 5
5. The factorisation of $x^2 - 16$ is:
   a) $(x + 4)(x - 4)$
   b) $(x - 4)(x - 4)$
   c) $(x + 16)(x - 16)$
   d) None of the above
6. Obtain an example of a monomial and a binomial having degrees of 82 and 99, respectively.
7. Evaluate the following using suitable identity $(102)^3$
8. Observe the value of the polynomial $5x – 4x^2 + 3$ at $x = 2$ and $x = –1$.
9. Compute the perimeter of a rectangle whose area is $25x^2 – 35x + 12$.
10. Factorise $64m^3–343n^3$.

Answer Key

1. (a) 3x + 2

   A polynomial does not contain square roots, negative exponents, or division by variables. √x + 5 and 1/x are not polynomials.

2. (d) 5

   The degree of a polynomial is the highest power of the variable. Here, the highest exponent is 5.

3. (a) $(a - b)^2 = a^2 - 2ab + b^2$

   This is a standard algebraic identity. The others are incorrect or incomplete formulas.

4. (b) 3

   If (x - 3) is a factor, then x = 3 is a root of the polynomial.

5. (a) (x + 4) (x - 4)

   This is a difference of squares:

   $x^2 - 16 = (x-4)(x+4)$

6. An example of a monomial having a degree of 82 = x^{82}

   An example of a binomial having a required degree of 99 = $x^{99} + 7$

7. We can write 102 as 100+2

   Using identity, $(x+y)^3 = x^3 + y^3 + 3xy(x+y)$ $(100+2)^3 = (100)^3 + 2^3 + (3\times100\times2)(100+2) = 1000000 + 8 + 600(100 + 2) = 1000000 + 8 + 60000 + 1200 = 1061208$

8. Let the polynomial be $f(x) = 5x - 4x^2 + 3$

   Now, for x = 2, $f(2) = 5(2) - 4(2)^2 + 3 \Rightarrow f(2) = 10 - 16 + 3 = -3$

   The value of the polynomial $5x - 4x^2 + 3$ at x = 2 is -3.

   Similarly, for x = –1, $f(-1) = 5(-1) - 4(-1)^2 + 3 \Rightarrow f(-1) = -5 - 4 + 3 = -6$

   The value of the polynomial $5x - 4x^2 + 3$ at x = -1 is -6.

9. Area of rectangle = $25x^2 - 35x + 12$

   We know the area of a rectangle = length × breadth

   So, by factoring $25x^2 - 35x + 12$, the length and breadth can be obtained.

   $25x^2 - 35x + 12 = 25x^2 - 15x - 20x + 12$

   $\Rightarrow 25x^2 - 35x + 12 = 5x(5x - 3) - 4(5x - 3)$

   $\Rightarrow 25x^2 - 35x + 12 = (5x - 3)(5x - 4)$

   Thus, the length and breadth of a rectangle are (5x – 3) (5x – 4).

   So, the perimeter = 2(length + breadth)

   Therefore, the perimeter of the given rectangle = $2[(5x - 3) + (5x - 4)] = 2(5x - 3 + 5x - 4) = 2(10x - 7) = 20x - 14$

   Hence, the perimeter of the rectangle = 20x – 14

10. The expression $64m^3 - 343n^3$ can be written as

    $(4m)^3 - (7n)^3$ $64m^3 - 343n^3 = (4m)^3 - (7n)^3$

    We know that $x^3 - y^3 = (x-y)(x^2+xy+y^2)$

    Thus, $64m^3 - 343n^3 = (4m)^3 - (7n)^3$

    $= (4m-7n)[(4m)^2 + (4m)(7n) + (7n)^2]$

    $= (4m-7n)(16m^2+28mn+49n^2)$

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Polynomials		
		Level 1	Level 2	Level 3

Chapter 3 : Coordinate Geometry

Activity 1 Human Coordinate Plane

30 mins

Instructions

- Draw a large Cartesian plane on the classroom floor using chalk or tape. Label the **x-axis and y-axis** clearly.
- Mark the **origin (0,0)** at the centre where the two axes meet. Extend the axes with positive and negative markings.
- Divide the students into four groups and assign each group a **specific quadrant**.
- Distribute coordinate cards with different points like (3,4), (-2,5), (-4, -3), etc. to students.
- Ask each group to **walk and stand at their assigned coordinate** on the floor.
- Have students observe patterns in each quadrant by noting the signs of x and y. For example, in Quadrant I, both x and y are positive (e.g., (3,4)), while in Quadrant III, both are negative (e.g., (-4, -3)). Ask them to describe these patterns.
- Now, change one coordinate in their pair and ask them to move accordingly. For instance, change (3,4) to (3, -4) and observe that the point moves from Quadrant I to Quadrant IV, and discuss:
  - What happens when only the y-coordinate changes? (The point reflects across the x-axis.)
  - What if only the x-coordinate changes? (The point reflects across the y-axis.)
  - What if both coordinates change signs? (The point moves diagonally across the origin.)
- Conclude the activity by emphasizing that the Cartesian plane helps in precise positioning, which is crucial in navigation (GPS systems), mapping (city grids), and computer graphics (image transformations).

Activity 2 Mapping the Classroom

30 mins

Instructions

- Assign the centre of the classroom as the origin (0,0) and mark it clearly with chalk. Use a long scale or tape to extend imaginary x and y axes across the room, adding evenly spaced markings (e.g., every 1 or $\frac{1}{2}$ meter) to help measure distances accurately.
- Ask students to identify objects in the room (e.g., blackboard, teacher's desk, fan, door).
- Students measure distances of objects from the origin and record them as (x, y) coordinates.
- Write these coordinates on the board and ask students to plot them on graph paper.
- Have students compare their graphs and verify accuracy.
- Discuss how this relates to real-world mapping, city planning, and GPS systems.

- Wrap up by explaining how coordinates help locate places precisely. Navigation apps like Google Maps use a global coordinate system called latitude and longitude, similar to our x and y axes. Every place on Earth has a unique coordinate, and GPS devices use satellites to calculate your exact position based on these coordinates, enabling accurate navigation.

Activity 3 Find Your Partner (Matching Coordinates)

30 mins

Instructions

- Prepare **two sets** of cards:
  - o One set with **coordinate points** written on them (e.g., (3,2), (-1,4), etc.).
  - o Another set with **pre-drawn graphs** marking the same points.
- Distribute one card to each student—half of the students receive a coordinate card (e.g., (3,2)), while the other half receive a graph paper card with a pre-drawn point matching one of the coordinates.
- Students must walk around the classroom to find their matching partner—the student with the graph card that correctly represents their coordinate. For example, if a student has (3,2), they must find the student whose graph has a point plotted at (3,2). If they choose incorrectly, they should recheck and correct their match.
- Once paired, each student must explain **why the coordinate is correct**.
- If a student picks the wrong match, ask them to correct themselves.
- Once all pairs are formed, draw a large Cartesian plane on the floor and ask each pair to stand at their corresponding coordinates. This will help them visualize how every point has a unique location.
- Wrap up the activity and discuss how each point's uniqueness is crucial in fields like astronomy (locating stars in space), architecture (precise building measurements), and robotics (programming movements based on coordinates).

Assessment

35 mins

Answer the following questions:

1. The coordinates of a point in the second quadrant are always:
   a) (+, +)
   b) (-, -)
   c) (-, +)
   d) (+, -)
2. The x-coordinate of any point on the y-axis is always:
   a) 0
   b) 1
   c) -1
   d) y - coordinate
3. What is the point of intersection of x-axis and y-axis called?
   a) Axis Centre
   b) Midpoint
   c) Origin
   d) None
4. If a point lies on the x-axis, its y-coordinate is always:
   a) Equal to x
   b) 0
   c) 1
   d) Negative
5. Which quadrant does (-3, -5) belong to?
   a) I
   b) II
   c) III
   d) IV
6. Name each part of the given plane formed by the Vertical and horizontal lines.
7. Write the mirror image of the given Point (2, 3) and (-4, -6) with respect to the x-axis.
8. How will you describe the table lamp position on your study table to another person?

Answer Key

1. (c) (-,+)
2. (a) 0
3. (c) Origin
4. (b) 0
5. (c) III
6. The vertical line is called the y- axis and the horizontal line is called the x-axis. And these form four quadrants.
7. The mirror image of the given Point (2, 3) is (2, -3) with respect to the x-axis. The mirror image of the Point (-4, -6) is (-4,6) with respect to the x-axis.
8. We use two lines, a perpendicular and a horizontal line, to describe the location of the table lamp on the study table. Using the horizontal and perpendicular lines as the X and Y axes of the table, respectively, and the perpendicular line as the Y axis. Consider the intersection of the X and Y axes in one of the table's corners as the origin. The table's length is now its Y axis, and its width is its X axis. Create a point by connecting the line from the origin to the table light. It is necessary to compute the Point's separation from the X and Y axes before expressing the results in terms of coordinates. The table lamp will be in the coordinates (x, y) because the Point is separated from the X- and Y-axis by x and y, respectively.

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Coordinate Geometry		
		Level 1	Level 2	Level 3

Chapter 5 : Euclid's Geometry

Activity 1 Discovering Postulate Through Everyday Observation

30 mins

Instructions

- Begin the class by asking students, "Have you ever noticed that a straight stick, no matter how long or short, remains straight?".
- Distribute different objects like sticks, ropes, books, and sheets of paper.
- Instruct students to:
  - Compare the **edges of books and paper** to see if they are straight.
  - Stretch a rope and observe how it forms a **straight line**.
- Ask students to discuss and **write down observations** about straightness and parallelism.
- Relate findings to **Euclid's First Postulate**: "A straight line can be drawn from any point to any other point."
- By the end of the activity, discuss the importance of **axioms in mathematics and real life**, such as in **construction, engineering, and design**.

Activity 2 The Postulate Challenge (Building Geometry Rules)

30 mins

Instructions

- Ask in the class, '"Have you ever wondered why all bridges or roads follow straight paths?"
- Divide the class into **five groups**, assigning each group **one Euclidean postulate**.
- Provide materials like **graph paper, rulers, and pencils**.
- Each group must:
  - **Draw and demonstrate their postulate** with real-life examples.
  - **Explain why their postulate is necessary** for geometry.
- Allow groups to **present their findings** to the class.
- Conclude by explaining how **Euclid's postulates laid the foundation for modern geometry and mathematics**. Discuss:
  - **Universality**: Euclid's postulates apply to all geometric constructions, from simple shapes to complex structures.
  - **Logical Deduction**: They form the basis for proving theorems and solving geometric problems systematically.
  - **Real-World Applications**: Roads, bridges, buildings, and even computer graphics rely on Euclidean principles for precise design and construction.
  - **Advancements in Mathematics**: Euclidean geometry paved the way for non-Euclidean geometries, which are essential in understanding space, relativity, and advanced physics.

Activity 3 The Equal Weight Experiment

30 mins

Instructions

- Start with asking a situation in the class,
  "Imagine you have three bags of rice. If the first and second bag weigh the same, and the second and third bag also weigh the same, what can we conclude about the first and third bag?"
- **Provide three weighing scales** (or digital balances) and three identical objects. Label them as A, B, and C.
- **Ask students to weigh A and B together**. If they balance, it means A = B.
- **Now weigh B and C**. If they balance, it means B = C.
- **Finally, weigh A and C**. They will balance, proving that A = C.
- Tell them the activity they performed is nothing but the Euclid's Axiom:
  "Things which are equal to the same thing are equal to one another."
- Wrap up the activity by discussing:
  - On how to relate this axiom to numbers: If 5 = 3+2 and 3+2 = 4+1, then 5 = 4+1.
  - On how we can connect this to logical reasoning in algebra and daily life (e.g., money transactions, equal rankings in exams).

Assessment

35 mins

Answer the following questions:

1. Euclid's geometry is based on:
   a) Experiments
   b) Axioms and Postulates
   c) Calculations
   d) Measurement
2. A line segment has:
   a) Infinite length
   b) Two endpoints
   c) No endpoints
   d) One endpoint
3. The number of Euclid's postulates is:
   a) 3
   b) 4
   c) 5
   d) 6
4. The fifth postulate states that if a line meets two lines such that the sum of interior angles is less than 180°, then the two lines:
   a) Are perpendicular
   b) Will meet on the same side
   c) Will never meet
   d) Are parallel
5. A plane is defined as:
   a) A flat surface extending infinitely in all directions
   b) A closed shape
   c) A 3D figure
   d) A line with endpoints
6. What is an axiom?
7. How is a postulate different from an axiom?
8. It is known that x + y = 10 and that x = z. Show that z + y = 10.
9. Look at the given figure. Show that length AH > sum of lengths of AB + BC + CD.

10. If point C is called a mid-point of line segment AB. Prove that every line segment has one and only one mid-point.

Answer Key

1. (b) Axioms and Postulates
2. (b) Two endpoints
3. (c) 5
4. (b) Will meet on....
5. (a) A flat surface.....
6. An axiom is a self-evident truth that does not require proof.
7. A postulate is an assumption specific to geometry, while an axiom is a general truth applicable to all mathematics.
8. According to the question, we have, x + y = 10 … (i) and, x = z …(ii)
   Applying Euclid's axiom, "if equals are added to equals, the wholes are equal"
   We get, From Eq. (i) and (ii) x + y = z + y ….(iii)
   From Eqs. (i) and (iii) we get, z + y=10
9. From the given figure, we have AB + BC + CD = AD [AB, BC and CD are the parts of AD] Since, AD is also the part of AH. AH > AD [∵ The whole is greater than the part]
   So, length AH > sum of lengths of AB + BC + CD.
10. Let, AB be the line segment Assume that points P and Q are the two different midpoints of AB.
    Therefore, AP=PB ……(1) and AQ = QB …..(2)
    Also, PB + AP = AB (as it coincides with line segment AB)
    Similarly, QB + AQ = AB.
    Now, Adding AP to the L.H.S and R.H.S of the equation (1)
    We get, AP + AP = PB + AP (If equals are added to equals, the wholes are equal.)
    ⇒ 2 AP = AB — (3)
    Similarly, 2 AQ = AB — (4)
    From (3) and (4), 2 AP = 2 AQ ⇒ AP = AQ
    Thus, we conclude that P and Q are the same points.
    This contradicts our assumption that P and Q are two different midpoints of AB.
    Thus, it is proved that every line segment has one and only one mid-point.
    Hence Proved.

Learning Level Tracker

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Euclid's Geometry		
		Level 1	Level 2	Level 3

Chapter 6 : Lines and Angles

Activity 1 The Mystery of Opposite Angles

30 mins

Instructions

- Start with a question:
  "Hey students! Have you ever noticed the crossing of roads or zebra crossings? Or how windscreen wipers move and intersect?
  They form an interesting pattern! Have you ever thought about the angles formed when two lines intersect?"
- After asking the question, draw two intersecting lines on the board, forming four angles. Label them as ∠A, ∠B, ∠C, and ∠D.
- Let students draw the same in their notebook, two straight lines intersecting each other in any orientation they want.
- **Ask Students**: "Can we find any relation between these angles just by looking at them?"
- Give students protractors and ask them to measure all four angles in their notebooks.
- Let students compare the angles, guide them to note that opposite angles (∠A = ∠C and ∠B = ∠D) are always equal.
- Now the activity can be concluded by explaining that this is called the **Vertically Opposite Angles Theorem**, which states that when two lines intersect, the opposite angles are always equal.
- Wrap up by telly that the property is used in **construction, architecture, and even computer graphics** to ensure symmetry.

Activity 2 Human Angle Formation

30 mins

Instructions

- Engage with a Scenario:
  "Imagine you are holding a stick in your hand, and your friend is holding the other end. If you both stretch your arms straight, what angle do you form?"
- Let students form pairs by dividing the class into pairs. Ask each pair to stretch their arms to form different angles.
- Demonstrate a Liner Pair by asking two students to stand side by side with their arms forming two adjacent angles.
- Measure the angles using a protractor to measure the angles they form. Let them note the sum of both angles.
- **Observe the Result**: The sum of two adjacent angles on a straight line is **always 180°**.

- **Explain the Concept**: Highlight that this is the **Linear Pair Axiom**, which states that two adjacent angles on a straight line always add up to 180°.
- Wrap up the activity telling this property helps in **designing bridges, ramps, and even car steering mechanisms**.

Activity 3 The Secret Code of Parallel Lines

30 mins

Instructions

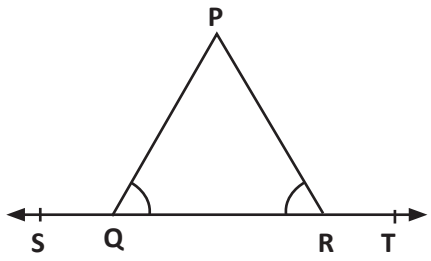
- Set the scenario:
  " Have you ever looked at staircase railings? The handrails are always parallel! But what happens when the vertical bars (transversal) cut across them?"
- On the board, draw two parallel lines and a transversal cutting across them.
- Let some of the students help in labelling the eight angles formed, then ask students to identify angles that seem equal.
- Use coloured chalks/markers/pens to mark:
  - **Corresponding Angles** (same position on each parallel line)
  - **Alternate Interior Angles** (Z-shaped angles)
  - **Co-interior Angles** (C-shaped angles, adding up to 180°)
- **Confirm with Protractors**: Ask students to verify by measuring angles.
- Explain the rule by introducing the three angle properties:
  - Corresponding angles are **equal**
  - Alternate interior angles are **equal**
  - Co-interior angles **add up to 180°**
- Wrap up by explaining the role of these properties in **map-making, designing railways, and even 3D animation!**

Assessment

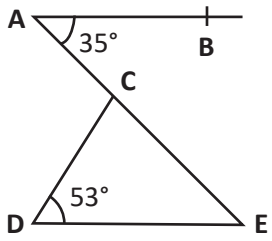
35 mins

Answer the following questions:

1. If two angles form a linear pair, their sum is:
   a) 90°
   b) 180°
   c) 360°
   d) 45°
2. If two lines are cut by a transversal and the alternate interior angles are equal, the lines are:
   a) Perpendicular
   b) Parallel
   c) Intersecting
   d) None
3. In a triangle, if two angles are 45° and 75°, the third angle is:
   a) 60°
   b) 90°
   c) 120°
   d) None
4. The exterior angle of a triangle is always equal to:
   a) Sum of adjacent interior angles
   b) Sum of opposite interior angles
   c) Double the largest interior angle
   d) Half the sum of all interior angles
5. Which angles are equal in parallel lines with a transversal?
   a) Adjacent angles
   b) Alternate interior angles
   c) Co-interior angles
   d) None of these
6. If one angle of the triangle is equal to the sum of the other two angles, then the triangle is?
7. The angles of a triangle are (x + 10) °, (x + 40) ° and (2x – 30) °. Find the value of x.
8. The angles of the triangle are in the ratio 5: 3: 7. The triangle is?

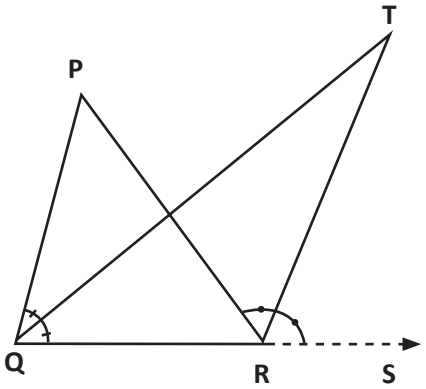


9. In the following figure, if AB || DE, ∠CDE = 53°, find ∠DCE.



10. In figure, the side QR of ΔPQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that

$\angle QTR = \frac{1}{2} \angle QPR$.



Answer Key

1. (b) 180°
2. (b) Parallel
3. (a) 60°
4. (b) Sum of opposite interior angles
5. (b) Alternate interior angles
6. We suppose the angles of △ABC be ∠A, ∠B and ∠C
   Given, ∠A= ∠B+∠C …(equation 1)
   But, in any △ABC, Using the angle sum property, we have, ∠A+∠B+∠C=180o …(equation 2)
   From equations (eq1) and (eq2), we get ∠A+∠A=180o ⇒2∠A=180o ⇒∠A=180o/2 = 90o ⇒∠A = 90o
   Thus, we get that the triangle is a right-angled triangle.
7. ∵ The sum of the angles of a triangle is 180°
   ∴ (x + 10)° + (x + 40)° + (2x – 30)° = 180°
   ⇒ (4x + 20)° = 180° ⇒ 4x = 160° ⇒ x = 40°
8. As per the question, The angles of the triangle are in the ratio of 5 : 3: 7
   Let the ratio 5:3:7 be 5x, 3x and 7x
   Using the angle sum property of the triangle, 5x + 3x +7x =180 ⇒15x=180⇒ x=12 Putting the value of x, i.e., x = 12, in 5x, 3x and 7x
   we have, 5x = 5×12 = 60⇒ 3x = 3×12 = 36 7x = 7×12 = 84
   As all the angles are less than 90, the triangle will be an acute-angled triangle.
9. ∵ AB || DE and AE is a transversal.
   ∴ ∠DEC = ∠EAB (Alternate interior angles)
   ⇒ ∠DEC = 35°
   In Δ CDE,
   ∠DCE + ∠CDE + ∠DEC = 180° (∵ The sum of the angles of a triangle 180°)
   ⇒ ∠DCE + 53° + 35° = 180°
   ⇒ ∠DCE + 88° = 180°
   ⇒ ∠DCE = 180° – 88° = 92°
10. ∵ ∠TRS is an exterior angle of ΔTQR.
    ∴ ∠TRS = ∠TQR + ∠QTR …… (1)
    [∵ An exterior angle of a triangle is equal to the sum of its two interior opposite angles.]
    ∴ ∠PRS is an exterior angle of ΔPQR.
    ∴ ∠PRS = ∠PQR + ∠QPR ……. (2)
    (∵ An exterior angle of a triangle is equal to the sum of its two interior opposite angles)
    ⇒ 2∠TRS = 2∠TQR + ∠QPR (∵ QT is the bisector of ∠PQR and RT is the bisector of ∠PRS)
    ⇒ 2(∠TRS – ∠TQR) = ∠QPR …… (3)
    From (1),
    ∠TRS – ∠TQR) = ∠QTR …… (4)
    From (3) and (4), we obtain
    $2\angle QTR = \angle QPR \Rightarrow \angle QTR = \frac{1}{2}\angle QPR$

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Lines and Angles		
		Level 1	Level 2	Level 3

Chapter 7 : Triangles

Activity 1 Angle Sum Mystery

30 mins

Instructions

- Begin the class by asking students, “Have you ever noticed how pizza slices form a shape? Do you think the angles inside every slice follow a rule?”.
- Draw different triangles on the board and ask students to estimate their angles.
- Provide students with a sheet of paper and ask them to draw any **triangle**.
- Using a protractor, they should **measure each interior angle** and write down the values.
- Ask them to **add all three angles**.
- They should repeat this process for at least **three different triangles**.
- Discuss: "Did you all get 180°? What does this tell us?"
  Let students themselves
- Ask students to discuss and **write down observations** about straightness and parallelism.
- Wrap up the activity:
  - And explain the **Angle Sum Property of a Triangle**: The sum of the interior angles of a triangle is always **180°**.
  - Emphasizing on real-life applications as this property is used in **carpentry, architecture, and robotics** to ensure correct angle measurements.

Activity 2 Magic inside Congruent Triangles

30 mins

Instructions

- Ask in the class, ‘“If I tear a piece of paper into two identical parts, can I arrange them to match perfectly?”
- Show two cut-out triangles of different shapes ask them, "Do you think these two are identical?"
- Distribute graph paper and ask students to draw **two triangles of the same size**:
  - Instruct them to choose any three points on the graph paper and connect them to form a triangle.
  - Then, guide them to redraw the exact same triangle by counting the squares and marking the same lengths for sides.
  - Ensure they use a ruler to keep the dimensions precise.
  - Once drawn, ask them to cut out both triangles and overlay them to check if they match exactly.
- If they match **exactly**, discuss **why**.
- Now, provide triangles where only **two sides and an angle** match (SAS) and discuss why they are congruent.

- Repeat for **SSS, ASA, RHS**, and ask them to **verify these rules with real drawings**.
- Wrap the activity by:
  - Highlight the **importance of congruence in bridge-building, spacecraft design, and engineering**.
  - Linking it to **rigid structures in architecture** where parts must fit perfectly.

Activity 3 The Bridge of Inequality

30 mins

Instructions

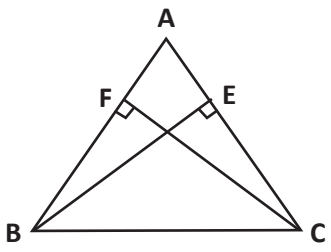
- Ask students in the class,
  "If you had three sticks of different lengths, could you form a triangle with any three of them?"
- Give each group **three straws** of different lengths and ask them to try forming a triangle.
  - Allow students to experiment with different combinations of three straws.
  - Some combinations will form a triangle, while others won't.
  - Encourage them to test different sets to observe when a triangle is possible.
- In some cases, they won't be able to form a triangle. Ask them to measure and **add two sides** to check if it's greater than the third side.
- Guide them to conclude the **Triangle Inequality Theorem**.
- Wrap up the activity by:
  - Discussing how this rule helps in **construction, 3D modelling, and road design**.
  - Telling how **Google Maps** and GPS rely on this concept to estimate **distances between locations**.

Assessment

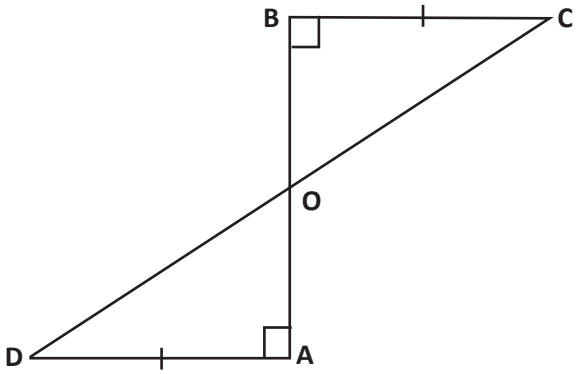
35 mins

Answer the following questions:

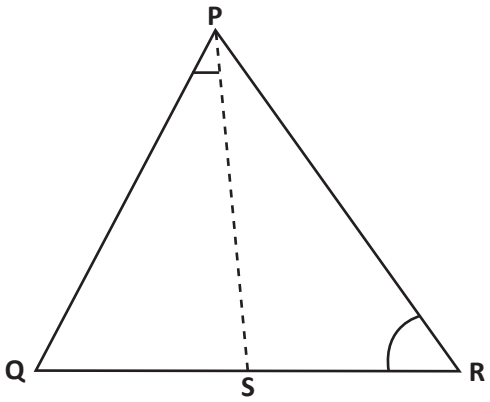
1. A triangle in which two sides are equal is called:
   a) Scalene Triangle
   b) Equilateral Triangle
   c) Isosceles Triangle
   d) None
2. Which of the following is not a criterion for congruence of triangles?
   a) SAS
   b) ASA
   c) SSA
   d) SSS
3. If Δ ABC ≅ Δ PQR, then which of the following is not true?
   a) AC = PR
   b) BC = PQ
   c) QR = BC
   d) AB = PQ
4. In Δ PQR, if ∠R > ∠Q, then:
   a) QR < PR
   b) PQ < PR
   c) PQ > PR
   d) QR > PR
5. In Δ PQR, ∠R = ∠P and QR = 4 cm and PR = 5 cm. Then the length of PQ is:
   a) 2 cm
   b) 2.5 cm
   c) 4 cm
   d) 5 cm
6. In Δ ABC, BC = AB and ∠B = 80°. Calculate ∠A?
7. An angle is 140 more than its complement. Find its measure.
8. ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively. Show that these altitudes are equal.



9. AD and BC are equal perpendiculars to a line segment AB. Show that CD bisects AB.



10. In the Figure, PR > PQ and PS bisect ∠QPR. Prove that ∠PSR > ∠PSQ.



Answer Key

1. (c) Isosceles Triangle
2. (c) SSA
3. (b) BC = PQ
4. (c) PQ > PR (As in a triangle PQR, if ∠R > ∠Q, then PQ > PR, because the side opposite to the greater angle is longer.)
5. (c) 4 cm
6. By using the angle sum property of a triangle, we get
   ⇒x + 80°+ x = 180° ⇒ 2x + 80°= 180° ⇒ 2x = 180°- 80° ⇒ 2x = 100° ⇒ x = 100°/2 = 50°
   Therefore, ∠A = 50°.
7. Two angles whose sum equals 90 degrees are called complementary angles.
   let first angle =x, then it's Complement = 90°−x
   According to the question,
   ⇒ x = 140 + 900 − x ⇒ x = 1040 − x ⇒ 2x = 1040 ⇒ x = 1040/2
   ∴ x = 520
8. Given: (i) BE and CF are altitudes. (ii) AC = AB
   To prove: BE = CF
   Proof: Triangles ΔAEB and ΔAFC are similar by AAS congruency,
   since; ∠A = ∠A (common arm)
   ∠AEB = ∠AFC (both are right angles)
   AB = AC (Given)
   ∴ ΔAEB ≅ ΔAFC and BE = CF (by CPCT).
9. Given, AD and BC are two equal perpendiculars to AB.
   To prove: CD is the bisector of AB
   Proof: Triangles ΔAOD and ΔBOC are similar by AAS congruency Since:
   - ∠A = ∠B (perpendicular angles)
   - AD = BC (given)
   - ∠AOD = ∠BOC (vertically opposite angles)

   ∴ ΔAOD ≅ ΔBOC.
   So, AO = OB (by CPCT).
   Thus, CD bisects AB (Hence proved).
10. Given, PR > PQ and PS bisects ∠QPR
    To prove: ∠PSR > ∠PSQ
    Proof: ∠QPS = ∠RPS — (1) (PS bisects ∠QPR)
    ∠PQR > ∠PRQ — (2) (Since PR > PQ as angle opposite to the larger side is always larger)
    ∠PSR = ∠PQR + ∠QPS — (3) (Since the exterior angle of a triangle equals the sum of opposite interior angles)
    ∠PSQ = ∠PRQ + ∠RPS — (4) (As the exterior angle of a triangle equals to the sum of opposite interior angles)
    By adding (1) and (2) we get:
    ∠PQR + ∠QPS > ∠PRQ + ∠RPS
    Now, from (1), (2), (3) and (4), we get ∠PSR > ∠PSQ.

Chapter 10 : Heron's Formula

Activity 1 The Lost Land

35 mins

Instructions

- Make a scenario, "Long ago, in the mythical kingdom of **Shillong**, all the land was divided into triangular plots. One day, the royal map of Shillong was damaged in a storm, and the areas of many plots were lost."
  The King has called upon the most trusted team of **Royal Team of Mathematicians** (that's your team!) to **help calculate the areas** of these irregular triangular plots using only the **lengths of their sides**. No height is available — only the side measurements.
  Your mission is to use your mathematical skill to find **the lost land** of Shillong using *Heron's Formula*!
- Form the teams: Divide the class into 4–5 teams of "Royal Mathematicians".
- Before the activity, prepare "Plot Cards" with different side measurements (e.g., sides: 7 cm, 8 cm, 9 cm).
- During the activity, each team receives 2-3 of these plot cards.
- Use Heron's Formula: Recall and write the formula on the board; let students calculate the semi perimeter, plug the values into the formula and calculate the area of each triangular plot.
- Once a team finds the area, they write it on the board under their plot number (e.g., Plot 1: Area = 26.83 cm^2).
- Bonus Challenge: Give one **"mystery triangle"** with very large or decimal side lengths and let students estimate or check if it can form a triangle (triangle inequality check).
- Wrap up the discussion and ask, "Why can't we use base × height here?"
  Emphasise how Heron's Formula is powerful when height isn't known, such as:
  - In **surveying irregular land.**
  - In **architecture** for triangular facades.
  - In **geography** when analysing maps.

Activity 2 Market of Triangles – Buy Land, Measure Right!

35 mins

Instructions

- Before class, prepare triangle "land deeds" – each a sheet with three side lengths of a triangle written (e.g., 5 cm, 6 cm, 7 cm), and assign each one a name like "Plot A", "Plot B", etc. You can make 6–8 unique cards depending on class size.
- Announce to students that they are **property investors in the Triangle Market**, and today's goal is to **buy land based on best area-to-cost ratio**. The twist: they only know the side lengths, not the area.
- Divide students into groups of 3–4. Distribute one plot deed to each group. Tell them they must calculate the **area using Heron's formula**.

- Remind them step-by-step:
    - Add all three sides, divide by 2 to get 's'.
    - Use Heron's formula: A = √(s(s-a) (s-b) (s-c))
- Give each plot a cost based on perimeter (say ₹10 per cm of perimeter). After calculating area and cost, ask each team to determine **Area per ₹1 spent**.
- Once all teams are done, have a "market discussion" — who got the best deal? Whose plot had the most land for the least cost?
- Wrap up by connecting this to **real estate, land buying, agriculture, and urban planning**, where buyers must decide value based on land area without always knowing the height or exact shape.

Activity 3 Guess the Triangle – A Strategic Game

35 mins

Instructions

- Before class, write 10 triangle descriptions on cards with **two sides and the area** written. The third side is **missing**.
  For example:
    - Triangle X: Side 1 = 5 cm, Side 2 = 6 cm, Area = 12 cm^2.
    - Triangle Y: Side 1 = 7 cm, Side 2 = 9 cm, Area = 26.8 cm^2.
- In class, announce: "Today we are **math detectives**! Your mission is to **find the missing side** of each triangle using Heron's Formula — backwards!"
- Divide students into small teams. Give each team one card at a time. Their task:
    - Assume a value for the third side.
    - Calculate the semi-perimeter and apply Heron's formula.
    - If the calculated area matches the given one, they've cracked the case.
- After one successful guess, they exchange the card for a new one. Keep score: teams earn 1 point per correctly "decoded" triangle.
- This will involve reverse logic, pattern observation, and even number sense. Encourage guesses within a realistic range — prompt with "Try values that form a valid triangle" or "What side would balance the triangle?"
- Conclude by discussing how **Heron's formula can be rearranged and used creatively in reverse problems**, just like in real-world fields like **forensics, archaeology, or astronomy**, where part of the data is missing.

Assessment

35 mins

1. If the perimeter of an equilateral triangle is 180 cm. Then its area will be:
   a) 900 cm^2
   b) $900\sqrt{3}$ cm^2
   c) $300\sqrt{3}$ cm^2
   d) $600\sqrt{3}$ cm^2

2. The sides of a triangle are 122 m, 22 m and 120 m respectively. The area of the triangle is:
   a) 1320 m^2
   b) 1300 m^2
   c) 1400 m^2
   d) 1420 m^2

3. The sides of a triangle are in the ratio 12: 17: 25 and its perimeter is 540 cm. The area is:
   a) 1000 cm^2
   b) 5000 cm^2
   c) 9000 cm^2
   d) 8000 cm^2

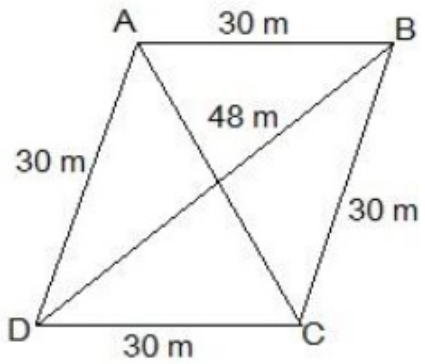
4. The base of a right triangle is 8cm and the hypotenuse is 10 cm. Its area will be
   a) 24 cm^2
   b) 40 cm^2
   c) 48 cm^2
   d) 80 cm^2

5. The length of each side of an equilateral triangle having an area of $9\sqrt{3}$ cm^2 is
   a) 8 cm
   b) 36 cm
   c) 4 cm
   d) 6 cm

6. The edges of a triangular board are 6 cm, 8 cm and 10 cm. The cost of painting it at the rate of 9 paise per cm^2 is?
7. The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3: 2. Find the area of the triangle.
8. A rhombus-shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30 m and its longer diagonal is 48 m, how much area of grass field will each cow be getting?

Answer Key

1. b) $900\sqrt{3}$ cm^2
2. a) 1320 m^2
3. c) 9000 cm^2
4. a) 24 cm^2
5. d) 6 cm
6. s = (6 + 8 + 10)/2 = 12 cm
   Hence, by using Heron's formula, we can write:
   A = $\sqrt{[12(12 – 6)(12 – 8)(12 – 10)]} = \sqrt{[(12)(6)(4)(2)]} = \sqrt{576}$ = 24 cm^2
   Therefore, the cost of painting at a rate of 9 paise per cm^2 = 24 × 9 paise = Rs. 2.16
7. According to the question, The perimeter of the isosceles triangle = 32 cm
   It is also given that, Ratio of equal side to base = 3 : 2
   Let the equal side = 3x
   So, base = 2x Perimeter of the triangle = 32 ⇒ 3x + 3x + 2x = 32 ⇒ 8x = 32 ⇒ x = 4.
   Equal side = 3x = 3×4 = 12 and Base = 2x = 2×4 = 8
   The sides of the triangle = 12cm, 12cm and 8cm.
   Let a = 12, b = 12, c = 8 s = (a + b + c)/2 ⇒ s = (12 + 12 + 8)/2 = 32/2 = 16.
   Area of the triangle = $\sqrt{(s(s-a)(s-b)(s-c))} = \sqrt{(16(16-12)(16-12)(16-8))} = \sqrt{(16\times4\times4\times8)} = 32\sqrt{2}$ cm ^{2}
8. Draw a rhombus-shaped field first with the vertices as ABCD. The diagonal AC divides the rhombus into two congruent triangles which are having equal areas. The diagram is as follows.
   Consider the triangle BCD, Its semi-perimeter = (48 + 30 + 30)/2 m = 54 m Using Heron's formula, Area of the ΔBCD =
   A = $\sqrt{(s(s-a)\ (s-b)\ (s-c))} = \sqrt{(54(54-48)\ (54-30)\ (54-30))}$ m^2 = $\sqrt{54x6x24x24}$ = 432m^2
   ∴ Area of field = 2 × area of the ΔBCD = (2 × 432) m ^{2} = 864 m ^{2} Thus, the area of the grass field that each cow will be getting = (864/18) m ^{2} = 48 m ^{2}



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Name of the School:	**UDISE:**
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Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Heron's Formula		
		Level 1	Level 2	Level 3

Chapter 4 : Linear Equations in Two Variables

Activity 1 Café XY – Create Your Own Menu Equation

30 mins

Instructions

- Begin the session by telling students they're setting up a small café. Today, they are creating a simple menu with **two items only** — say, sandwiches and juice.
- Before class, prepare slips with **different total bill values and individual prices** (e.g., Sandwich = ₹20, Juice = ₹10, Total Bill = ₹100).
- Divide students into groups. Give each group a card:
  "In your café, sandwiches cost ₹20, juice costs ₹10. A customer paid ₹100. What combinations of items could they have bought?"
- Ask students to let:
  - x = number of sandwiches
  - y = number of juices
- Guide them to form the equation: **20x + 10y = 100**
  Then, ask them to **find at least 3 combinations** (solutions) for the equation.
- Once they find combinations like (x=2, y=6), (x=3, y=4), etc., ask them to **plot those on a graph**. One group member can mark each point and draw the line.
- Have groups present their menu, their equation, and graph.
- Conclude by connecting this to **business and budgeting**, where one needs to **represent situations with equations**, understand constraints, and explore multiple valid combinations.

Activity 2 Coordinate Walk: Be the Equation!

35 mins

Instructions

- Before class, tape or chalk a **large coordinate grid** on the floor. Label the axes clearly — positive and negative directions too.
- Tell students they're now part of a **GPS navigation system**, where their movement is guided by an equation.
- Call out an equation like **x + y = 4**
  Assign different students the role of (x, y) points — (0,4), (1,3), (2,2), etc.
- As you call each value, the students "walk" to their assigned coordinate on the grid and "stand" on the point. This forms a **line of people** — literally representing the equation!

- Ask the class to observe:
  - Do they all lie in a straight line?
  - What's common about all these points?
- Switch to another equation: **2x – y = 0** and repeat the process.
- Reflect by saying:
  "See how each equation is a rule that all these points must follow — and together, they form a line. That's why we call it a **linear equation**."

Activity 3 Two Variables, One Story

35 mins

Instructions

- Start with storytelling:
  "Aldo is buying notebooks and pens. A notebook costs ₹15, and a pen costs ₹5. He spends ₹60 in total. What did Aldo buy?"
- Write this as:
  15x + 5y = 60, where
  x = number of notebooks,
  y = number of pens
- Ask students to turn this story into a **table of values** — trying combinations like (x=2, y=?), (x=1, y=?), etc., and **filling missing values**.
- Once they have multiple solutions, ask:
  - What do these combinations mean in real life?
  - Could Aldo have bought 3 notebooks and 3 pens? Check.
- Extend the challenge: give each group a **new "story"**:
  - A person buys mangoes and bananas.
  - A taxi charges a fixed base fare plus per km charge.
  - A recipe uses a fixed ratio of two ingredients.
- Let students **create their own equations and tables**, then exchange with another group to **interpret and solve**.
- Conclude with the insight that **linear equations in two variables describe real-life transactions, ratios, purchases, and patterns.** They aren't just abstract math!

Assessment

35 mins

Answer the following questions:

1. The linear equation 3x-11y=10 has:
   a) Unique solution
   b) Two solutions
   c) Infinitely many solutions
   d) No solutions
2. The solution of equation x-2y = 4 is:
   a) (0,2)
   b) (2,0)
   c) (4,0)
   d) (1,1)
3. Find the value of k, if x = 1, y = 2 is a solution of the equation 2x + 3y = k.
   a) 5
   b) 6
   c) 7
   d) 8
4. The graph of linear equation x+2y = 2, cuts the y-axis at:
   a) (2,0)
   b) (0,2)
   c) (0,1)
   d) (1,1)
5. Any point on the line x = y is of the form:
   a) (k, -k)
   b) (0, k)
   c) (k, 0)
   d) (k, k)
6. The linear equation 2x – 5y = 7 has _____ solutions?
7. Find four solutions individually for the equation 2x + y = 7.
8. Draw the graph of the linear equation 3x + 4y = 6. At what points, the graph cuts X and Y-axis?

Answer Key

1. c) Infinitely many solutions
2. c) (4,0)
3. d) 8
4. c) (0,1)
5. d) (k, k)
6. The linear equation 2x-5y has infinitely many solutions.
   Because the equation 2x-5y = 7 is a single equation, that involves two variables. Hence, for different values of x, we will get different values of y and vice-versa.
   Therefore, infinitely many solutions.

7. For the four answers of 2x + y = 7, we replace different values for x and y

   Let x = 0 ⇒ 2x + y = 7 (2×0)+y = 7 y = 7 (0,7)

   Let x = 1 ⇒ 2x + y = 7 (2×1)+y = 7 2+y = 7 y = 7 – 2 y = 5 (1,5)

   Let y = 1 ⇒ 2x + y = 7 2x+ 1 = 7 2x = 7 – 1 2x = 6 x = 3 (3,1)

   Let x = 2 ⇒ 2x + y = 7 2(2)+y = 7 4+y = 7 y = 7 – 4 y = 3 (2,3)

   The answers are (0, 7), (1,5), (3,1), (2,3)

8. Given equation,

   3x + 4y = 6.

   We need at least 2 points on the graph to draw the graph of this equation,

   Thus, the points the graph cuts

   (i) x-axis

   Since the point is on the x-axis, we have y = 0.

   Substituting y = 0 in the equation, 3x + 4y = 6,

   We get,

   3x + 4×0 = 6

   ⇒ 3x = 6

   ⇒ x = 2

   Hence, the point at which the graph cuts x-axis = (2, 0).

   (ii) y-axis

   Since the point is on the y-axis, we have, x = 0.

   Substituting x = 0 in the equation, 3x + 4y = 6,

   We get,

   3×0 + 4y = 6

   ⇒ 4y = 6

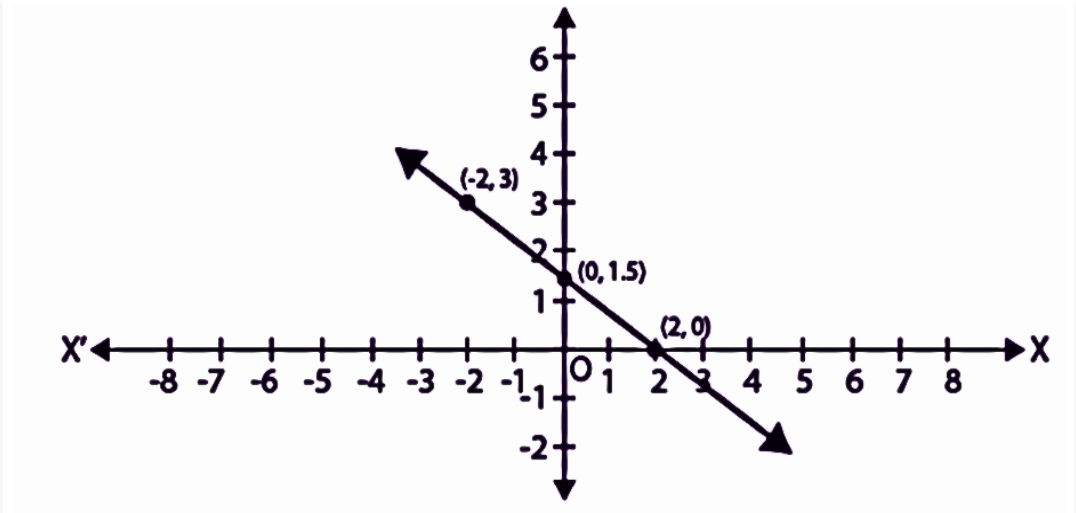
   ⇒ y = 6/4

   ⇒ y = 3/2

   ⇒ y = 1.5

   Hence, the point at which the graph cuts y-axis = (0, 1.5).

   Plotting the points (0, 1.5) and (2, 0) on the graph.



Learning Level Tracker

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Linear Equations in Two Variables		
		Level 1	Level 2	Level 3

Chapter 8 : Quadrilaterals

Activity 1 Shape Detective – The Missing Quadrilateral

30 mins

Instructions

- Start the session by saying:
  "Last night, someone stole a quadrilateral from the shape museum! The only clues we have are about the angles and sides… You need to find out which quadrilateral it was."
- Before class, prepare mystery clue cards. Each card gives **properties of a quadrilateral** but not the name. For example:
  - "All sides are equal, opposite angles are equal, but not right angles."
  - "Only one pair of opposite sides is parallel."
  - "Diagonals bisect each other and are equal."
- Divide students into small groups (3-4) and hand one clue to each group.
- Ask them to **read the clues, discuss, and deduce** which quadrilateral is being described.
- Once they guess, they must **draw it accurately** on a sheet and label the key properties.
- Groups present their shape, explain how the clues helped, and verify with other groups.

Conclude by connecting how understanding **properties of sides, angles, and diagonals** helps identify and distinguish different quadrilaterals in both geometry and real-life designs (tiles, windows, signs).

Activity 2 Angle Architect – Complete the House

30 mins

Instructions

- Tell Students:
  "You've been hired as an architect to complete the design of houses with incomplete shapes. Your job is to use angle knowledge to figure out the missing measurements."
- Before class, prepare half-drawn quadrilaterals on sheets where **only 2 or 3 angles** are given, and students need to **find the missing one** using the property:
  - Sum of all angles in a quadrilateral = 360°
- Distribute sheets and let them work individually or in pairs to calculate the missing angles.
- Encourage them to **explain their thought process**, not just write the number.
- Extend the challenge:
  - Add real-life backstories: "This is the floor plan of a museum room…"
  - Ask: "Why must the final corner angle be what you got?"

Wrap up by reinforcing that in any quadrilateral — whether it's a table, door frame, or building — angles must logically add up to 360°, and each angle depends on the others

Activity 3 Human Quadrilateral – Form it with Friends!

30 mins

Instructions

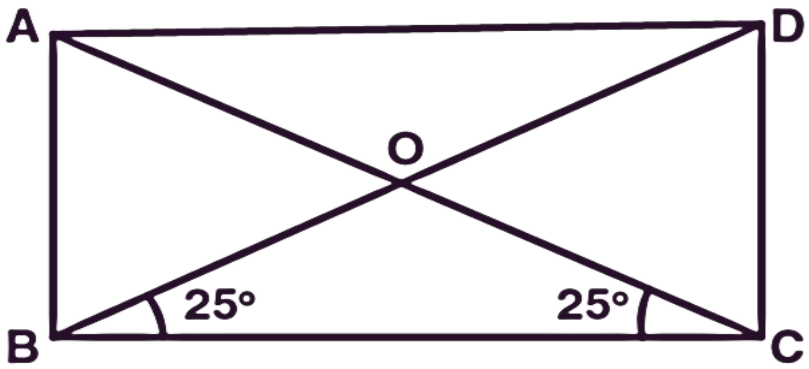
- Begin with a fun physical setup. Say:
  "Today, you're not just learning quadrilaterals — you'll become one!"
- Take students outside or to an open space. Mark a centre point on the ground with chalk or tape.
- Divide the class into groups of 4. Each student will play the role of a **vertex** of a quadrilateral.
- Assign each group a specific quadrilateral to form: square, rectangle, parallelogram, trapezium, kite, etc.
- Guide them:
  - Use measuring tapes or strings to make sure the **sides are accurate**.
  - Use protractors to measure angles between students (this builds practical sense).
  - Help them stretch strings across from opposite corners to act as **diagonals**.
- Ask each group to freeze in position. Now go group by group asking:
  - "What's the length of this side?"
  - "Are opposite sides equal?"
  - "Do the diagonals bisect?"
- Switch roles and shapes, and rotate tasks so each student plays multiple roles.

Wrap up by showing that a **quadrilateral is not just a drawing but a structure with logic** in sides, angles, and symmetry — just like bridges, rooms, and road signs.

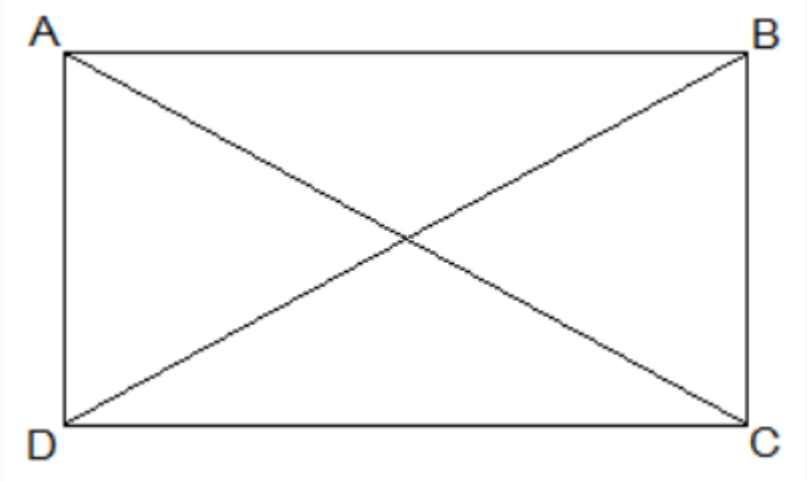
Assessment

35 mins

1. A diagonal of a parallelogram divides it into two congruent:
   a) Square
   b) Parallelogram
   c) Triangles
   d) Rectangle
2. Which of the following is not true for a parallelogram?
   Opposite sides are equal
   Opposite angles are equal
   Opposite angles are bisected by the diagonals
   Diagonals bisect each other.
3. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rhombus, if
   a) PQRS is a rhombus
   b) PQRS is a parallelogram
   c) Diagonals of PQRS are perpendicular
   d) Diagonals of PQRS are equal.
4. A rhombus can be a:
   a) Parallelogram
   b) Trapezium
   c) Kite
   d) Square
5. A trapezium has:
   a) One pair of opposite sides parallel
   b) Two pairs of opposite sides parallel to each other
   c) All its sides are equal
   d) All angles are equal
6. What is a quadrilateral? Mention 6 types of quadrilaterals.
7. Is it possible to draw a quadrilateral whose all angles are obtuse angles?
8. Calculate all the angles of a quadrilateral if they are in the ratio 2:5:4:1.
9. A diagonal of a rectangle is inclined to one side of the rectangle at 25º. Find the acute angle between the diagonals.



10. If the diagonals of a parallelogram are equal, then show that it is a rectangle.



Answer Key

1. c) Triangles
2. c) Opposite angles are bisected by the diagonals
3. d) Diagonals of PQRS are equal.
4. d) Square
5. a) One pair of opposite sides parallel
6. A quadrilateral is a four-sided polygon with a closed shape. It is a two-dimensional geometric figure characterized by having four edges (sides) and four vertices (corners).
   Types: Rectangle, Square, Parallelogram, Rhombus, Trapezium, Kite.
7. It is known that the sum of angles of a quadrilateral is always 360°. To have all angles as obtuse, the angles of the quadrilateral will be greater than 360°. So, it is not possible to draw a quadrilateral whose all angles are obtuse angles.
8. As the angles are in the ratio 2:5:4:1, they can be written as- 2x, 5x, 4x, and x
   Now, as the sum of the angles of a quadrilateral is 360°, 2x + 5x + 4x + x = 360°
   Or, x = 30°
   Now, all the angles will be,
   2x =2 × 30° = 60° 5x = 5 × 30° = 150° 4x = 4 × 30° = 120°, and x = 30°
9. In a triangle BOC,
   ∠OBC = ∠OCB (Opposite angles of isosceles triangle)
   Therefore, ∠OBC + ∠OCB+∠BOC = 180º
   25º+25º + ∠BOC = 180º
   ∠BOC = 180º- 50º
   ∠BOC = 130º.
   By using the linear pair,
   ∠AOB + ∠BOC = 180º
   ∠AOB = 180º – 130º
   ∠AOB= 50º

Hence, the acute angle between the diagonals is 50º.

10. Given that,

AC = BD

To show that ABCD is a rectangle if the diagonals of a parallelogram are equal

To show ABCD is a rectangle, we have to prove that one of its interior angles is right-angled.

Proof,

In ΔABC and ΔBAD,

AB = BA (Common)

BC = AD (Opposite sides of a parallelogram are equal)

AC = BD (Given)

Therefore, ΔABC ≅ ΔBAD [SSS congruency]

∠A = ∠B [Corresponding parts of Congruent Triangles]

also,

∠A+∠B = 180° (Sum of the angles on the same side of the transversal)

⇒ 2∠A = 180°

⇒ ∠A = 90° = ∠B

Therefore, ABCD is a rectangle.
Hence Proved.

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Name of the School:	**UDISE:**
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Class: 9		Subject: Maths		
		Chapter: Quadrilaterals		
Roll No.	Name of the Student	Level 1	Level 2	Level 3

Chapter 9 : Circles

Activity 1 Decoding the Sacred Stone Circles of Nartiang

30 mins

Instructions

- Start the activity with a captivating scenario:

  "Deep in the Jaintia Hills of Meghalaya, stand the ancient monolithic stone circles of Nartiang, believed to be sites of great historical and cultural significance. Imagine you are a team of **Ancient Geometry Decoders**, tasked with understanding the precise mathematical principles behind these sacred structures. The elders believe that the placement of certain stones, forming 'chords' within a grand circular layout, holds secrets related to the angles they create at the very heart of the circle. Your mission is to uncover one of these fundamental geometric truths!"

  Tell students they are **Ancient Geometry Decoders**, uncovering the mathematical secrets of historical structures.
- Divide the class into 4–5 **"Decoder Teams."**
- On the board or a large chart paper, draw a clear, large circle. Mark its centre prominently. This will be used for demonstration.
  - **Prepare "Sacred Circle Worksheets":** For each "Decoder Team," provide a worksheet with 2-3 pre-drawn circles (each about 8-10 cm radius) with their centres clearly marked. This ensures consistency.
  - **Provide Tools:** Each team will need **compasses, rulers, and protractors**.
- Begin by reminding students what a **chord** is (a line segment connecting two points on a circle). Then, explain what it means for a chord to **subtend an angle at the centre** (the angle formed when you connect the endpoints of the chord to the centre of the circle). Use your large circle diagram on the board for this demonstration.
- Explain that the primary secret to decode today is 'If two chords in a circle are equal in length, what can we say about the angles they form at the centre?' The theorem states they will be equal. Let's actively verify this geometric principle!"
- On one of their worksheet circles, each team will draw two distinct chords of exactly the same predetermined length (e.g., both 7 cm long, ensure they are not parallel or overlapping for better visual distinction).
- For each chord, they will **connect its two endpoints to the centre of the circle** using their rulers. This action forms two separate triangles within the circle.
- Using their protractors, teams will **carefully measure the angle subtended by each chord at the centre of the circle**.
- Ask teams to compare their measured angles. They should consistently observe that the angles are indeed equal.
- Wrap up the discussion by asking:
  - "How does understanding that equal chords create equal angles at the centre help us understand the symmetry and properties of circles?"
  - "Can you think of any real-world applications where knowing this relationship might be important, for instance, in designing wheels, gears, or even patterns?"

- Emphasise how these fundamental geometric properties are crucial in fields like architecture, engineering (e.g., precise spacing of spokes in a wheel or teeth on a gear), and design, ensuring balance, precision, and functionality.

Activity 2 The Precision of the Community Stage

30 mins

Instructions

- Start the class with a scenario:

  "As **Precision Engineers**, your village is building a circular community stage. You need to understand how central support beams (from the stage's middle) precisely brace the stage's edge segments ('chords').

  Your mission is to: uncover the geometric rules for perfect stability!"
- Divide the class into 4–5 "Engineering Teams."
- Before the class, draw a large circle with a marked centre on the board for demonstration and provide each team with 2-3 pre-drawn circles (8-10 cm radius) with marked centres.
- Briefly review chords and introduce lines from the centre to a chord, focusing on perpendicular and bisection.
- Explain "If a line from the centre is perpendicular to a chord, it bisects the chord. Let's prove it!"
- Ask students to do these steps in a worksheet circle, **draw any chord**. From the centre, **draw a line segment perpendicular to the chord** (using a set square). Mark where it meets the chord. **Measure the two segments** of the chord.
- Wrap-up discussion:
  - "How do these theorems ensure stability and accuracy in circular designs like our stage?"
  - "Where else are these principles used (e.g., wheels, gears, construction)?"

Activity 3 The Heritage Window Design Challenge

30 mins

Instructions

- Start with a scenario:

  "Imagine you are **Heritage Architects** tasked with restoring an old, grand building in Shillong known for its beautiful, intricate window designs. Many of these windows feature quadrilateral (four-sided) panes that are meant to fit perfectly within decorative circular arches. To ensure these new panes are accurately cut and truly fit within their circular frames, you need to understand a crucial geometric secret: **When can a four-sided shape truly fit perfectly inside a circle, with all its corners touching the circle's edge?** Your mission is to uncover this principle!"

  Tell students they are **Heritage Architects/Designers**, investigating geometric properties for accurate restoration.
- Divide the class into 4–5 "Design Teams."
- Before the activity draw various quadrilaterals (some cyclic, some not) on the board and provide worksheets with similar pre-drawn quadrilaterals for each team. Do not reveal which are cyclic.

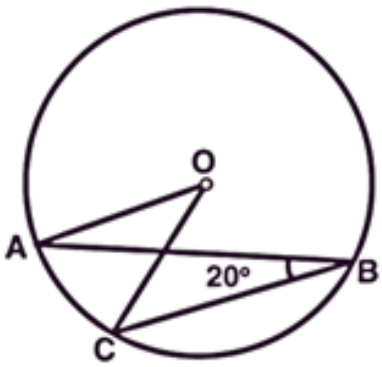
- Explain that a quadrilateral is "cyclic" if all its vertices lie on a circle. Present the theorem: **"If the sum of a pair of opposite angles of a quadrilateral is 180^{o}, then the quadrilateral is cyclic."** Tell students they will verify this rule experimentally.
- For each quadrilateral on their worksheet, students will measure all four angles and then calculate the sum of each pair of opposite angles (e.g., A+C, B+D).
- Based on their angle sums, students will predict if a quadrilateral is cyclic.
- They will then attempt to draw a circumcircle (a circle passing through all four vertices) using a compass for *every* quadrilateral.
- Ask students to find that a perfect circumcircle can *only* be drawn around quadrilaterals where opposite angles summed to (approximately) 180°. Explain that this observation directly supports the theorem.
- Wrap up the activity as: “Discuss how this theorem ensures precise fitting in circular designs (e.g., windows, patterns, engineering parts) and its importance for architects and designers.”

Assessment

35 mins

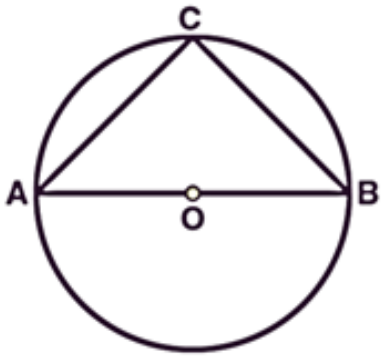
Answer the following questions:

1. The centre of the circle lies in_____ of the circle.
   a) Interior
   b) Exterior
   c) Circumference
   d) None of the above
2. The longest chord of the circle is:
   a) Radius
   b) Arc
   c) Diameter
   d) Segment
3. Equal _____ of the congruent circles subtend equal angles at the centres.
   a) Segments
   b) Radii
   c) Arcs
   d) Chords
4. If there are two separate circles drawn apart from each other, then the maximum number of common points they have:
   a) 0
   b) 1
   c) 2
   d) 3
5. The angle subtended by the diameter of a semi-circle is:
   a) 900
   b) 450
   c) 1800
   d) 600
6. In the given figure, if $\angle ABC = 20^o$, then find $\angle AOC$.



7. Prove that if chords of congruent circles subtend equal angles at their centres, then the chords are equal.

8. In the given figure, if AOB is a diameter of the circle and AC = BC, then ∠CAB is equal to?



Answer Key

1. Interior
2. Diameter
3. Chords
4. 0
5. 180°
6. Given that, ∠ABC = 20° .

   ∠AOC = 2∠ABC (since the angle subtended by an arc at the centre of the circle is double the angle subtended at the remaining part.)

   Now, substitute the values, we get

   ∠AOC = 2 × 20°

   Therefore, ∠AOC = 40°.
7. Here, it is given that ∠AOB = ∠COD i.e. they are equal angles.

   Now, we will have to prove that the line segments AB and CD are equal i.e. AB = CD. Proof: In triangles AOB and COD, ∠AOB = ∠COD (as given in the question)

   OA = OC and OB = OD ((these are the radii of the circle)

   So, by SAS congruency, ΔAOB ≅ ΔCOD.

   ∴ By the rule of CPCT, AB = CD. (Hence proved).
8. We know that the angle at circumference subtended by the diameter of the circle is the right angle.

   Hence, ∠ACB = 90°

   Also, given that AC = BC

   Therefore, ∠CAB = ∠CBA (As, the angles opposite to equal sides are also equal)

   Now, by using the angle sum property of triangle in ΔACB, we can write

   ∠CAB + ∠ABC + ∠BCA = 180°

   ∠CAB + ∠CAB + 90° = 180°

   2∠CAB = 180° – 90°

   ∠CAB = 45°

   Therefore, ∠CAB is equal to 45°.

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Roll No.	Name of the Student	Chapter: Circles		
		Level 1	Level 2	Level 3

Chapter 11 : Surface Areas and Volumes

Activity 1 Crafting the Traditional Rain Shelter (The "Kupiah" Project)

30 mins

Instructions

- Begin with a practical question to the class:
  "Imagine yourselves as **Traditional Craftsperson** in Meghalaya, designing conical rain shelters (like a *Kupiah*). The monsoon season is approaching, and your goal is to use materials efficiently by precisely determining the **Curved Surface Area (CSA)** and **Total Surface Area (TSA)** of your shelter. This activity assigns students the role of **Traditional Craftspersons / Shelter Designers**, working collaboratively in teams."
  Students will assume the role of **Traditional Craftsperson/ Shelter Designers**. They will work in 4–5 "Craft Teams" to complete the activity.
- Provide each team with a large sheet of stiff paper or thin cardstock (A3 or A4 size), a large compass (at least 10-15 cm radius), a ruler, pencil, scissors, adhesive tape or glue, and a scientific calculator.
- Prepare specific instructions for drawing a sector of a circle for each team (e.g., "Draw a sector with a radius of **15 cm** and a central angle of **144°**."). These precise dimensions are crucial for consistent results among teams.
- Begin by introducing that a cone's curved surface, when unfolded, forms a sector of a circle. Students will then precisely draw this sector on their paper using the given dimensions. After carefully cutting out the sector, they will form the cone's curved top by joining the two straight edges with tape or glue.
- Guide students to understand how the sector relates to the cone. Students will observe that the radius of their original sector (e.g., 15 cm) is the cone's **slant height (l)**. They will then calculate the arc length of their sector using the formula Arc Length = (Central Angle / 360°) × 2π × l. Recognising that this arc length is the cone's base circumference (2πr), they will calculate and record the cone's **base radius (r)** using r = Arc Length / (2π).
- Explain that the material for the curved top is simply the area of the sector. Students will calculate the area of their sector (which is the CSA) using CSA = (Central Angle / 360°) × π × l^2. Following this, the teacher will lead students through the derivation of the πrl formula. This involves showing them that (Central Angle / 360°) = r/l (since both Arc Length = 2πr and Arc Length = (Central Angle / 360°) × 2πl), and then substituting this r/l into the sector area formula (r/l) × πl^2 = πrl. Students will then verify this by calculating πrl using their determined 'r' and 'l' values, confirming it matches their sector's area calculation.
- Explain that a complete rain shelter needs a flat base. Students will calculate the area of the circular base using the radius 'r' they found: Area of Base = πr^2. Finally, they will determine the **Total Surface Area (TSA)** of their cone by adding the Curved Surface Area (CSA) and the Area of the Base (TSA = CSA + Area of Base or TSA = πrl + πr (l + r)).
- Wrap up the discussion:
  - Discuss how physically constructing the cone helped students understand the origin and application of the surface area formulas.
  - Explore other real-world applications where conical surface area calculations are vital, such as in packaging, manufacturing, and architectural design (e.g., party hats, funnels, conical roofs, rocket nose cones).
  - Emphasise that this understanding is crucial for calculating material costs and efficiency in various industries.

Activity 2 Filling Granaries in the Khasi Hills

30 mins

Instructions

- Begin with a relatable setup:

  Imagine yourselves as **Agricultural Engineers** responsible for designing efficient granaries in the picturesque Khasi Hills. You need to understand precisely how much grain a conical storage container can hold. Your mission is to experimentally discover the formula for the **Volume of a Right Circular Cone** and apply it to calculate the capacity of your granary. This activity assigns students the role of **Agricultural Engineers/Storage Managers**, working collaboratively in teams.

  Students will assume the role of **Agricultural Engineers/Storage Managers**. They will work in 4–5 "Granary Design Teams" to complete the activity.
- Teacher's Preparation:
  - Provide each team with one empty plastic or cardboard right circular **cone** and one empty plastic or cardboard right circular cylinder. It is crucial that both the cone and the **cylinder** have the **exact same base radius ('r')** and the **exact same perpendicular height ('h')**.
  - Provide a supply of dry sand, rice, or small beads as the "grain."
  - Ensure each team has a tray or old newspaper to minimise mess during the filling process.
  - Each team will also need a ruler or measuring tape to confirm dimensions.
- **Introduction & Setup**. Begin by discussing the practical need to measure the capacity of containers, especially those with conical shapes in agriculture. Emphasise that direct measurement of volume can be tricky, but mathematical formulas simplify it. Distribute the cone, cylinder, "grain," and measuring tools to each team.
- **Measuring and Confirming Dimensions**. Guide students to measure the base radius ('r') and the perpendicular height ('h') of both their cone and their cylinder. Students must confirm that the 'r' and 'h' values are identical for both shapes. This step is critical for the experiment's validity.
- **The Volume Comparison Experiment**. Instruct students to fill the cone with sand (or rice/beads). Then, they will carefully empty the contents of the full cone into the empty cylinder. They should repeat this process, refill the cone and pour its contents into the cylinder until the cylinder is completely full. Students should count precisely how many times they need to fill the cone to entirely fill the cylinder.
- **Deriving the Volume Formula**. Facilitate a class discussion based on the experimental results. Students should consistently find that it takes approximately **three (3) full cones** to fill one cylinder of the same base and height. Guide them to recall the formula for the volume of a cylinder (Volume of Cylinder = $\pi r^2 h$). Based on their experiment, conclude that the **Volume of a Cone** is therefore one-third of the volume of a cylinder with the same base radius and height: Volume of Cone = $(\frac{1}{3})\ \pi r^2 h$.
- **Calculating Cone Volume**. Now that they have derived the formula, students will apply it. **Student Task:** Using the 'r' and 'h' values they measured in 2nd Step (Measuring dimensions step), they will calculate the actual volume of their cone using the formula Volume = $(\frac{1}{3})\ \pi r^2 h$.
- Wrap up by highlighting:
  - Discuss how this hands-on experiment helped them understand the relationship between the volumes of cones and cylinders.
  - Explore other real-world applications where knowing the volume of cones is essential (e.g., designing funnels, measuring piles of sand/grain, ice cream cones, construction, packaging).
  - Emphasise that this fundamental geometric understanding is crucial for efficient storage, manufacturing, and resource management in various fields.

Activity 3 Balloon Experiment – The Sphere Story

30 mins

Instructions

- Start with curiosity:

  "If you blow a balloon, how much rubber stretches across its surface? And how much air does it hold?"

  Students will take on the role of Mathematical Explorers / Balloon Engineers. They will work in teams of 4–5 to conduct measurements, perform calculations, and draw conclusions.
- Provide each team with a round balloon, a long piece of thread or a flexible measuring tape, a ruler, a scientific calculator.
- Provide pre-cut plastic balls or hollow hemispheres (one per team). It's ideal if these hemispheres have a radius comparable to what a slightly inflated balloon might achieve.
- Instruct each team to inflate their balloon slightly so it forms a near-perfect sphere (avoid over-inflation to maintain a spherical shape). Demonstrate and guide students on how to accurately measure the balloon's circumference (the widest part around its middle) using a piece of thread or a flexible ruler. Once the circumference (C) is measured, students will calculate the radius (r) using the formula $r = \frac{C}{(2\pi)}$. Emphasise that careful measurement here is crucial for accurate subsequent calculations.
- Guide students to calculate the surface area and volume of their inflated balloon. Importance of this step: This step is vital as it directly addresses the initial curiosity: "how much rubber stretches across its surface?" (surface area) and "how much air does it hold?" (volume). By applying the formulas, students quantify these abstract concepts for their own physical object. Students will calculate the Surface Area using $SA = 4\pi r^2$ and the Volume using $V = (4/3)\ \pi r^3$, recording their results.
- Hemispherical Investigation. Now, introduce the concept of hemispheres. Ask students: "What if we sliced the balloon in half? What shapes do we get?" and "What would be the surface area of a hemisphere?" Provide each team with a pre-cut plastic ball or a hollow hemisphere. Students will then measure its radius (which should ideally be like their balloon's radius for comparison) and calculate its curved surface area (half of a full sphere's surface area, $2\pi r^2$) and its total surface area (including the flat base, $3\pi r^2$). They will then compare these calculations with those of their full balloon (sphere).
- Conclude the activity by reinforcing the practical relevance of these calculations. Discuss how understanding the surface area and volume of spheres and hemispheres helps us in real-world scenarios: in knowing how much material is needed for manufacturing balls, understanding the scale and properties of planets, or calculating the material required for constructing domes and spherical containers.
- Wrap up the discussion as:
  - Discuss how the hands-on measurement and calculation helped them understand the properties of spheres and hemispheres.
  - Review the formulas for surface area and volume of a sphere and a hemisphere.
  - Brainstorm other real-life examples where these calculations are essential.

Assessment

35 mins

Answer the following questions:

1. The diameter of the base of a cone is 10.5 cm, and its slant height is 10 cm. The curved surface area is
   a) 150 cm^2
   b) 165 cm^2
   c) 177 cm^2
   d) 180 cm^2
2. The volume of a hemisphere whose radius is r is:
   a) $4/3\ \pi r^3$
   b) $4\pi r^3$
   c) $2\pi r^3$
   d) $\frac{2}{3}\pi\ r^3$
3. The total surface area of a cone whose radius is $\frac{r}{2}$ and slant height 2l is?
4. Calculate the amount of ice-cream that can be put into a cone with base radius 3.5 cm and height 12 cm.
5. The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases.
6. The hollow sphere, in which the circus motorcyclist performs his stunts, has a diameter of 7 m. Find the area available to the motorcyclist for riding.
7. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. Find the cost of whitewashing its curved surface at the rate of Rs.210 per 100 m^2.

Answer Key

1. 165 cm^2
2. $\frac{2}{3}\pi r^3$
3. The total surface area of cone = $\pi r (l + r)$ square units.

   If $r = \frac{r}{2}$ and $l = 2l$, then the TSA of cone becomes,

   TSA of cone = $\pi(\frac{r}{2})\ [(2l+(\frac{2}{r})]$

   $=\pi[(rl)+(\frac{r2}{4})]$

   TSA of new cone $=\pi r[l+(\frac{r}{4})]$
4. Given, Base radius = r = 3.5 cm; Height = h = 12 cm

   The amount of ice-cream that can be put into a cone = Volume of cone

   $= (\frac{1}{3})\ \pi r^2 h = (\frac{1}{3}) \times (\frac{22}{7}) \times 3.5 \times 3.5 \times 12 = 154\ cm^3$
5. Given, Radius of balloon = r = 7 cm

   Radius of pumped balloon = R = 14 cm

   Ratio of surface area = $\frac{\text{(TSA of balloon with r = 7 cm)}}{\text{(TSA of balloon with R = 14 cm)}}$

   $= \frac{(4\pi r^2)}{(4\pi R^2)} = \frac{r^2}{R^2} = \frac{(7)^2}{(14)^2} = \frac{49}{196} = \frac{1}{4}$

   Hence, the ratio of surface areas of the balloon in the two cases is 1: 4.
6. Given, Diameter of the sphere = 7 m $\therefore$ Radius (r) = $\frac{7}{2}$ = 3.5 m

   Now, the riding space available for the motorcyclist = Surface area of the sphere

   $= 4\pi r^2 = 4 \times (\frac{22}{7}) \times 3.5 \times 3.5 = 154\ m^2$
7. Given, Slant height of a cone (l) = 25 m

   Diameter of the base of cone = 2r = 14 m $\therefore$ Radius = r = 7 m

   Curved Surface Area = $\pi rl = (\frac{22}{7})$ x 7 x 25 = 22 × 25 = 550 m^2

   Also, given that the cost of white-washing 100 m^2 = Rs. 210

   Hence, the total cost of whitewashing for 550 m^2 = (Rs. $\frac{(\text{Rs. } 210 \times 550)}{100}$ = Rs. 1155

Learning Level Tracker

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Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Surface Areas and Volumes		
		Level 1	Level 2	Level 3

Chapter 12 : Statistics

Activity 1 Favourite Fruit Face-Off

30 mins

Instructions

- Start with an exciting question:

  “Which fruit rules the class? Let’s find out with a visual representation!”

  Students will act as **Data Collectors & Visualisers**, actively participating in casting votes and constructing a visual representation of the class's preferences.
- Before class begins, prepare several slips of paper, each with the name of a common fruit written on it (e.g., Apple, Banana, Mango, Orange, Grapes). Ensure enough so each student receives one randomly. On the whiteboard or a large chart paper, write the names of these fruits clearly, leaving ample vertical space below each name.
- **Casting Votes & Forming a Live Bar Graph**. Distribute one random fruit slip to each student. Instruct each student to come to the board and "cast their vote" by sticking their slip directly under the name of the fruit they received. Emphasise that they should stack their slips vertically in a neat column. **As students place their slips, they will collectively and visually create a dynamic structure resembling a bar graph directly on the board**. This immediate visual feedback will clearly show which fruit's column is growing tallest.
- **Counting, Recording, and Formal Graph Construction**. Once all slips are on the board, guide students to collectively count and record the frequency (number of votes) for each fruit. Following this, the **student task:** instruct them to construct a formal bar graph on graph paper. They must use proper scaling on the axes (e.g., one unit representing one vote on the vertical axis) and clearly label both the horizontal axis (Fruit Names) and the vertical axis (Number of Votes/Frequency). Encourage them to use the live bar graph formed on the board as a direct reference and **verify** their formal graph paper representation against this initial visual.
- **Interpreting the Data**. Ask a series of interpretive questions to encourage data analysis: "Which fruit is most liked by the class based on your graph?" "What's the exact difference in preference (number of votes) between, say, Mango and Banana?" "Is it possible for a fruit to have zero votes in this kind of survey? What would that signify in terms of preference?"
- **Wrap-up and Real-Life Connections**. Wrap up the activity by reinforcing the utility and benefits of bar graphs. Explain that "Bar graphs are quick, colourful, and incredibly effective ways to represent and compare categorical data. They are widely used in various fields, including business for sales analysis, marketing for product preference, social studies for demographic trends, and even in daily news reports to make complex information easily understandable."

Activity 2 Heights in the Hall

30 mins

Instructions

- Begin with curiosity:

  “Do taller students sit at the back? Let’s measure and find out the height range of our class!”

  Students will serve as **Data Collectors & Analysts**, actively participating in measuring heights and then organising and visualising this data.
- Before class, arrange for a measuring tape or metre stick. Ask each student to note their **height in cm**.
- **Data Collection**. Start by asking each student to measure and note their height in centimetres. **Teacher guidance:** The teacher should supervise this process, ensuring students measure accurately, perhaps by standing against a wall with the measuring tape. Collect and record all student heights on the board as a raw list of data points.
- **Grouping Data and Constructing a Grouped Frequency Distribution Table**. Guide students to group the collected data into intervals. **Teacher's explanation:** To help students understand this concept, explain that when you have a lot of continuous data (like heights), listing every single height isn't very helpful for analysis. Grouping data puts similar values into 'bins' or 'classes.' For example, explain that heights like 130 cm, 131 cm, all the way up to 139 cm can form one group (130-139 cm). Emphasise the importance of clear, non-overlapping intervals. Then, guide students to count the number of students falling into each height group. Based on these counts, they will construct a formal grouped frequency distribution table with columns for 'Height Interval (cm)' and 'Number of Students (Frequency)'.
- Instruct students in plotting a histogram using their grouped frequency distribution table. Explain that a histogram visually represents this grouped data. On the X-axis, students should mark the class intervals (e.g., 130-139, 140-149, etc.). On the Y-axis, they will mark the number of students (frequency). **Highlight that there should be no gaps between the bars in a histogram** because the data (height) is continuous. For instance, if a group ends at 139 cm, the next group starts immediately at 140 cm, showing a continuous range. Demonstrate a small example on the board, sketching two adjacent bars for two hypothetical continuous intervals to illustrate the no-gap rule.
- Once histograms are plotted, ask interpretive questions: "Which height group is the most common in our class?" "Why are the bars in histograms touching, unlike the bars in a bar graph?" (Reinforce that it's because histograms represent continuous data, while bar graphs represent categorical data with distinct categories). Wrap up by emphasising that "Histograms are powerful tools that help us understand the distribution of continuous data – whether it's height ranges, exam scores, population trends, or even rainfall amounts."

Activity 3 Visualising Our Class's Height Distribution: A Dynamic View

30 mins

Instructions

- Begin with a warm, relatable setup:

  Building on our previous investigation into class heights, we've seen how a histogram visually represents our height ranges. Now, let's explore another powerful way to visualise this data, particularly useful for understanding trends or comparing distributions. Our mission is to transform our height data into a **frequency polygon**, a dynamic line graph that offers a unique perspective on continuous data. This activity assigns students the role of **Data Visualisers/Trend Analysts**, focusing on alternative data representation methods.
- Before the activity:
  - Ensure each team has access to the **grouped frequency distribution table** from the previous "Height Range" activity (or provide a pre-prepared one).
  - Each team will need graph paper, rulers, and pencils.
- Begin by briefly recalling the grouped frequency distribution table and histograms. Introduce the frequency polygon as another valuable method for representing continuous data, often used for highlighting patterns or comparing multiple datasets.
- Explain that a frequency polygon uses the **midpoints (class marks)** of each class interval to plot points. Guide students to calculate the class mark for each interval using Class Mark $= \frac{\text{(Lower Limit + Upper Limit)}}{\text{2 (e.g., for 130-139 cm, the class mark is 134.5 cm)}}$. Students will add a "Class Mark" column to their grouped frequency distribution table and complete these calculations.
- Guide students to plot the frequency polygon on their graph paper. The X-axis should represent the **class marks**, and the Y-axis the **frequency**. Students will plot a point for each class mark and its corresponding frequency. Emphasise that all plotted points must be joined with straight line segments. To "close" the polygon to the X-axis, instruct them to add two extra class marks (one before the first, one after the last), both with zero frequency, and connect the polygon to these points.
- Facilitate a discussion comparing the frequency polygon to the histogram (if available for the same data). Ask students what insights the frequency polygon offers and how the peak or slopes indicate patterns in student numbers.
- Wrap up Discussion:
  - Discuss how the frequency polygon provides a clear visual representation of data distribution, highlighting central tendencies and spread.
  - Reiterate the key difference between a frequency polygon and a bar graph (continuous vs. categorical data, use of class marks).
  - Explore real-world applications of frequency polygons (e.g., tracking temperature changes, visualising exam score distributions, analysing sales trends).

Assessment

35 mins

Answer the following questions:

1. Which type of data is best represented by a bar graph?
   a) Continuous data (e.g., heights of students)
   b) Categorical data (e.g., favourite fruits)
   c) Data showing changes over time (e.g., daily temperature)
   d) Data where bars always touch each other
2. In the class intervals 10-20, 20-30, 30-40, the number 30 is included in:
   a) 30-40
   b) 20-30
   c) both the intervals
   d) none of the intervals
3. What is a key characteristic of a histogram that distinguishes it from a bar graph?
   a) It represents data using different colours for each bar.
   b) It shows the relationship between two different variables.
   c) Its bars are always touching each other, indicating continuous data.
   d) It is primarily used for comparing individual items.
4. Let m be the midpoint and 'l' the upper-class limit of a class in a continuous frequency distribution. The lower limit of the class is
   a) 2m + l
   b) 2m - l
   c) m - l
   d) m – 2l
5. How is a frequency polygon typically constructed?
   a) By drawing vertical bars for each category.
   b) By connecting the midpoints of the tops of the bars in a histogram.
   c) By plotting points at the upper limits of class intervals and joining them.
   d) By drawing a continuous curve through all data points.
6. The population of Delhi State in different census years is as given below:

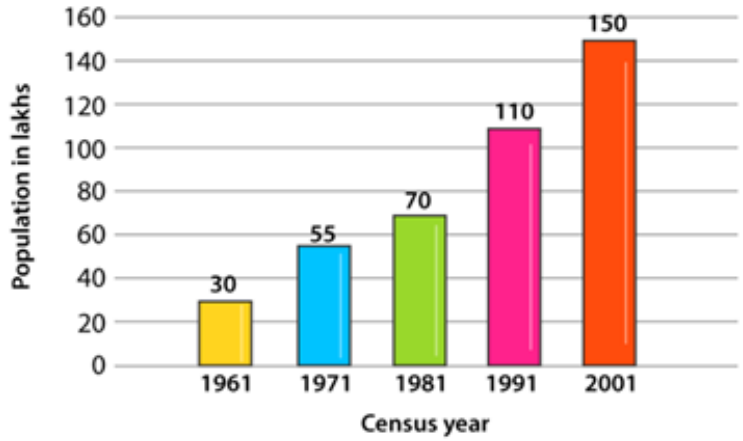
Census Year	1961	1971	1981	1991	2001
Population (Lakhs)	30	55	70	110	150

7. Draw a histogram for the following data distribution:

Height (cm)	40-45	45-50	50-55	55-60	60-65
Number of Boys	12	18	15	9	8

8. The height of 20 students of class V is noted as follows:
   4, 4.5, 5, 5.5, 4, 4, 4.5, 5, 5.5, 4, 3.5, 3.5, 4.2, 4.6, 4.2, 4.7, 5.5, 5.3, 5, 5.5.
   - Make a frequency distribution table for the above data.
   - Which is the most common height, and which is the rarest height among these students?

Answer Key

1. Categorical data (e.g., favourite fruits)
2. 30-40
3. Its bars are always touching each other, indicating continuous data.
4. m – 2l
5. By connecting the midpoints of the tops of the bars in a histogram.
6. 

7. 

8. The required frequency distribution table is given below, and the most common heights are 4 and 5.5. The rarest heights are 4.6 and 4.7.

Height	Tally Marks	Students
3.5	II	2
4	IIII	4
4.2	II	2
4.5	II	
4.6	I	1
4.7	I	1
5	III	3
5.3	I	1
5.5	IIII	4
Total		20

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Maths		
Roll No.	Name of the Student	Chapter: Statistics		
		Level 1	Level 2	Level 3

Meghalaya Learning Enhancement Programme

SCIENCE

Chapter 1 : Matter in our surroundings

Activity 1 How small are particles of matter?

35 mins

Materials Required

Turmeric powder , one glass of water , one large bowl of clear water and a small spoon

Instructions

- Take a glass of water and show it to the students (clear and transparent) and add a pinch of turmeric powder.
- Once the water changes colour, ask the students:
  a) What happened to the turmeric powder?
  b) Why does the colour of the water change to yellow?
- Explain that the colour spreads because tiny particles mix with water.
- Take 10 ml (about a small spoonful) of the coloured water and pour it into a bowl of clear water and stir it.
- Ask the students to observe the water. Ask the students if they see any change.
- Repeat the step once or twice more (taking water from the bowl and adding it to another clear bowl).
- Ask the students:
  a) Why does the water still change colour, even with so little added?
  b) Can we still see the original turmeric powder?
- Conclude by saying that the particles are so tiny that even a small amount spreads throughout the water.
- Further ask the students:
  a) Why does milk mix completely in water?
  b) Why does perfume spread in a room?
  c) Why do we smell bamboo shoot pickles from a distance?
- Guide them to understand that matter is made of tiny particles that are always moving and spreading.

Activity 2 Diffusion – How do particles of matter move?

35 mins

Materials Required

Turmeric powder , two glasses/bowls of water (one with cold water, one with warm water) and a spoon

Instructions

- Take two glasses/bowls—one with cold water and one with warm water.
- Add the same amount of turmeric powder to both at the same time. Do not stir.
- Ask students to observe:
  - What do you see in each glass?
  - What is the difference between mixing of turmeric in hot and cold water?
- Discuss:
  - Why does turmeric mix slowly in cold water but quickly in warm water?
  - What do you think will happen if we use hot water?
  - Can you think of other examples where heat helps things mix faster (e.g., making tea or dissolving sugar)?
- Guide them to understand:
- Everything is made of tiny moving particles.
- The particles move because they possess kinetic energy.
- As the particles are continuously moving, intermixing of particles of two different types of matter happens on their own, known as diffusion. They do so by getting into the spaces between the particles.
- Heat increases the kinetic energy, speeding up particle movement, making diffusion faster.

Activity 3 Compressibility test

35 mins

Materials Required

An empty plastic bottle, a filled water bottle and a solid object like chalk, eraser, or wooden stick

Instructions

- Divide students into small groups if possible.
- Ask students to press the following materials with their hands:
  i. An empty plastic bottle (loosely capped)
  ii. An empty plastic bottle with a tight cap

iii. A filled water bottle

iv. A chalk piece or eraser

- Ask students:
  a) Which material changed shape the most?
  b) Which material changed the least?
  c) Which bottle was easier to squeeze?
  d) Which bottle was harder to squeeze?
  e) What happened to the water in the bottle?
- Discuss why some materials are easy to compress while others are difficult.
- Start by asking students: What is matter made of?

  Then, guide their thinking: Does compressibility depend on the particles themselves, or does their arrangement play a role?
- Explain that the arrangement of particles determines how easily a material can be compressed.
  - **Gases** have more space between their particles, allowing them to be compressed easily.
  - **Solids** have tightly packed particles, making them difficult to compress.
  - **Liquids** fall in between—though their particles are close together, they can still flow and take the shape of their container.

  This difference in particle arrangement is what defines the **three states of matter**—solid, liquid, and gas.

Assessment

35 mins

Choose the correct answer:

1. Which of the following can be compressed easily?
   a) Water stored in a bamboo container
   b) A tightly closed plastic bottle
   c) Air inside an open plastic bottle
   d) A piece of wood from a Khasi pine tree
2. What happens when water is heated in a kettle?
   a) It evaporates and turns into steam
   b) It turns into ice
   c) It remains the same
   d) It becomes heavier
3. When ice melts, it changes into:
   a) Gas
   b) Water
   c) Solid
   d) Steam
4. Which state of matter has a definite shape and volume?
   a) Solid
   b) Liquid
   c) Gas
   d) Plasma
5. What causes condensation in the air?
   a) Heating of water vapour
   b) Cooling of water vapour
   c) Increase in pressure
   d) Expansion of gases

Answer the following:

6. Why is it easier to squeeze an empty plastic water bottle than a full one?

   _____
   _____

7. Why do gases diffuse faster than liquids?

   _____
   _____

8. What is sublimation? Name two substances that undergo sublimation.

   _____
   _____
   _____

9. Why do we feel cool when we apply acetone or perfume to our skin?

_____
_____
_____

10. A vendor in Meghalaya is selling hot momos on a cold day. As he opens the steaming pot, you notice that water droplets form on the lid of the pot. After a while, the vendor removes the pot from heat, and the steam stops coming out. Explain why this happens using the change of form of matter.

_____
_____
_____
_____
_____
_____

Answer Key

1. c)
2. a)
3. b)
4. a)
5. b)
6. An empty plastic bottle is easier to squeeze because air inside can be compressed. In a full bottle, the water cannot be compressed, making it harder to squeeze. This is because liquids do not change their volume easily like gases.
7. Gases diffuse faster than liquids because their particles are farther apart and move more freely at higher speeds. The weaker intermolecular forces in gases allow them to spread out and mix more rapidly compared to liquids, where the particles are closer and experience stronger intermolecular attraction.
8. Sublimation is the process in which a solid directly changes into a gas without passing through the liquid state. This occurs when the substance has weak intermolecular forces. Examples of substances that undergo sublimation are camphor and ammonium chloride.
9. Acetone and perfume evaporate quickly due to their volatile nature. During evaporation, they absorb heat from the skin, leading to a cooling effect. This happens because the particles with higher energy escape first, reducing the overall temperature of the skin surface.
10. When the vendor opens the steaming pot, the hot steam rises and comes into contact with the cooler lid. As the steam cools down, it loses heat energy and undergoes condensation, turning back into water droplets on the lid. This happens because cooling causes water vapour to change from a gaseous state to a liquid state. When the pot is removed from heat, the temperature inside the pot drops, reducing the formation of steam, and eventually, condensation stops.

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: Matter In Our Surroundings		
		Level 1	Level 2	Level 3

Chapter 2 : Is Matter Around Us Pure?

Activity 1 Identifying Mixtures

35 mins

Materials Required

Salt, Mud, Small transparent containers, Spoons, Water, Torch

Instructions

- Divide students into small groups and distribute materials, including three transparent containers filled with water, salt, mud, and spoons.
- Instruct each group to mix salt into the first container and stir with a spoon until it dissolves completely.
- Ask students to observe and describe what happens to the salt after mixing.
- Instruct each group to mix mud into the second container and stir with a spoon.
- Ask students to observe what happens to the mud after mixing.
- Ask the following questions to guide observations:
  - What do you notice about the two mixtures?
  - Does the salt remain visible, or does it disappear?
  - Does the mud mix completely or settle down over time?
- Explain that saltwater forms a homogeneous mixture (a clear solution) and muddy water forms a heterogeneous mixture (with visible particles).
- Instruct students to draw labelled diagrams of both mixtures.
- Ask students to describe the visible properties of each mixture in their notebooks.
- Hand out torches to each group and instruct them to shine a light from the side through each container.
- Ask students to observe and discuss:
  - Can you see the light beam clearly inside the liquid?
  - Does the light pass through without scattering?
- Explain that in saltwater, light passes through without scattering because it is a true solution, whereas in muddy water, light scatters due to suspended particles, making it a colloid or suspension depending on particle size.
- Guide students to classify the mixtures based on their observations of light behaviour.

Activity 2 Understanding Saturation

35 mins

Materials Required

Salt, Small transparent containers, Spoons

Instructions

- Divide students into small groups and distribute the materials, including transparent containers, salt, spoons, and water.
- Instruct each group to fill three containers with the same amount of water (about half-full).
- Guide students to gradually dissolve salt in the containers:
  - *Add one spoon of salt to Container 1, stir for 30 seconds, and observe if it dissolves completely.*
  - *Add three spoons of salt to Container 2, stirring after each spoon, and observe if the water remains clear.*
  - *Add five spoons of salt to Container 3, stirring continuously, and note any changes in clarity.*
  - *Continue adding salt one spoon at a time until it no longer dissolves and settles at the bottom.*
- Ask students to classify the solutions based on their observations:
  - ***Unsaturated solution*** *– When the salt dissolves completely.*
  - ***Concentrated solution*** *– When more salt is added but still dissolves.*
  - ***Saturated solution*** *– When no more salt dissolves, and excess salt settles at the bottom.*
- Warm another transparent container of water using a gas burner.
- Add salt to the warm water while stirring and observe that more salt dissolves compared to the room-temperature container.
- Explain that heating increases the movement of water molecules, creating more space for salt to dissolve.
- Reinforce the idea that warm water can dissolve more solute than cold water, showing that solubility depends on temperature.
- Ask students to relate this to everyday examples, such as how sugar dissolves more easily in hot tea or coffee.
- Conclude the activity by explaining that solubility depends on the amount of solute a liquid can dissolve and is influenced by factors like temperature. Warmer water allows more solute to dissolve, demonstrating why substances like sugar dissolve faster in hot tea.

Activity 3 Understanding Tyndall Effect

35 mins

Materials Required

Honey, Milk, Wheat Flour, Spoons, Small transparent containers, Torch

Instructions

- Divide students into groups of 4-5 and provide each group with three transparent containers.
- Instruct each group to fill their containers with equal amounts of water (about half-full).
- Guide students to prepare three different mixtures:
  - ***Container 1 (Homogeneous Solution - No Tyndall Effect)****: Add one spoon of honey and stir well until it completely dissolves.*
  - ***Container 2 (Colloidal Solution - Shows Tyndall Effect)****: Add a small amount of milk to water and stir. The solution will appear slightly milky.*
  - ***Container 3 (Suspension - Visible Particles, No Clear Tyndall Effect)****: Add a spoon of wheat flour to water. Wheat flour does not fully dissolve and forms tiny particles that float around, making the water look cloudy.*
- Shine a torch from the side of **Container 1 (honey-water solution)** and observe how the light passes through without scattering.
- Shine the torch through **Container 2 (milk-water mixture - colloid)** and observe how the light beam is visible as a glowing path inside the liquid.
- Explain that this is the **Tyndall effect**, which happens because tiny milk particles scatter the light.
- Shine the torch through **Container 3 (wheat flour-water suspension)** and observe:
  - If the torch is shined immediately, some scattering of light may be observed.
  - However, unlike the colloidal mixture (milk + water), the light beam does not pass through smoothly. Instead, the mixture appears uneven, and the scattering is not uniform.
- Explain that this happens because wheat flour particles are much larger than colloidal particles and do not remain evenly distributed in the liquid.
- Ask students to think about the Tyndall effect and discuss where they have seen this phenomenon in daily life, such as sunlight passing through mist or a beam of light visible in a dark room with dust particles.
- Conclude the activity by explaining that the **Tyndall effect** is a characteristic property of colloids and helps differentiate them from true solutions and suspensions.

Assessment

35 mins

Choose the correct answer:

1. Which of the following mixtures will show the Tyndall effect?
   a) Salt solution
   b) Sugar solution
   c) Milk
   d) Pure water
2. Which method is used to separate a mixture of salt and water?
   a) Filtration
   b) Sedimentation
   c) Evaporation
   d) Magnetic separation
3. The solubility of sugar in water increases when:
   a) The temperature decreases
   b) More water is added
   c) The solution is stirred and heated
   d) The water is cooled down
4. Which of the following is an example of a colloid?
   a) Soda water
   b) Blood
   c) Copper sulphate solution
   d) Sand in water
5. A student dissolves some solid substance in water, and no residue is left after stirring. This indicates the substance forms:
   a) A suspension
   b) A colloid
   c) A heterogeneous mixture
   d) A true solution
6. What is a heterogeneous mixture? Give one example.

   _____
   _____
   _____

7. Why does a solution of salt in water not show the Tyndall effect?

   _____
   _____
   _____

8. How is an element different from a compound? Give one example of each

   _____
   _____
   _____
   _____

9. How would you differentiate between a physical change and a chemical change? Give one example of each.

_____
_____
_____

10. Lalboi, a student from Shillong, visited a roadside tea stall on a rainy evening. He noticed that when the tea seller added sugar to his black tea, it dissolved completely, making the tea sweet. Later, while walking home, Lalboi saw car headlights illuminating tiny dust particles in the misty evening air. Based on these observations, answer the following:

    a) Why does sugar dissolve completely in tea while wheat flour makes water cloudy?

    b) What scientific phenomenon is responsible for the tiny dust particles being visible in the car headlights? Explain why this happens.

_____
_____
_____
_____
_____
_____
_____
_____

Answer Key

1. c)
2. c)
3. c)
4. b)
5. d)
6. A heterogeneous mixture is a mixture in which the components do not mix uniformly and can be seen separately. Example: A mixture of mud and water.
7. A salt solution is a true solution in which the salt particles completely dissolve in water, making the solution transparent. Since the particle size is very small (less than 1 nm), it does not scatter light and hence does not show the Tyndall effect.
8. An element is made of only one kind of atom and cannot be broken down further, like oxygen (O_2). A compound consists of two or more elements chemically combined in a fixed ratio, like water (H_2O).
9. A physical change alters appearance without forming a new substance, like ice melting. A chemical change creates a new substance with different properties, like burning wood, which forms ash and smoke.
10. Lalboi's observations can be summed up as –
    a) Sugar dissolves in tea because it forms a homogeneous solution, while wheat flour forms a suspension, making water cloudy. This is due to differences in solubility and particle size.
    b) The Tyndall effect is responsible for making tiny dust particles visible in the car headlights. It occurs when light is scattered by small particles suspended in air.

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Name of the School:	**UDISE:**
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Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: Is Matter Around Us Pure ?		
		Level 1	Level 2	Level 3

Chapter 5 : The Fundamental Unit of Life

Activity 1 Osmosis In Action

35 mins

Materials Required

Potatoes, 2 bowls, Salt, Water and Spoon

Instructions

- Introduce the concept of osmosis by explaining how water moves in and out of cells through a thin membrane.
- Divide the class into groups of 4-5 students and distribute materials.
- Provide each group with one potato cut into two equal halves.
- Instruct students to place one potato half in **Bowl A**, filled with plain water.
- Instruct students to place the other potato half in **Bowl B**, filled with saltwater (prepared by mixing 3-4 spoons of salt in water).
- Allow the potatoes to sit undisturbed for 15 minutes.
- After 15 minutes, ask students to touch and observe the changes in both potato halves.
- Guide students to record their observations:
  - The potato in **plain water (Bowl A)** becomes swollen and firm as water moves into its cells.
  - The potato in **saltwater (Bowl B)** shrinks and becomes soft as water moves out of its cells.
- Facilitate a discussion by asking:
  - Why did the potato in saltwater shrink?
  - Why did the potato in plain water swell?
- Connect osmosis to real-life examples by asking:
  - Why do plants wilt when they do not get water?
  - Why do people feel thirsty after eating salty food?
  - Why do vegetables release water when salt is sprinkled on them?
  - How do pickles shrink when stored in saltwater?
- Conclude the activity by explaining that osmosis is the movement of water through a semi-permeable membrane from a region of lower solute concentration to a region of higher solute concentration, and it plays a crucial role in maintaining water balance in living organisms.

Activity 2 Cell City – Comparing a Cell to a City

35 mins

Materials Required

Notebook, Pencil, Crayons or Colour Pencils

Instructions

- Ask students:
  - What are some important places in a city?
  - Why do we need these places?
  - Can we match these places' functions to a cell?
- Instruct students to draw a simple city map in their notebooks.
- Guide students to colour different parts of the city:
  - **City Hall – Blue** (Controls everything)
  - **City Wall/Gate – Brown** (Decides who enters/exits)
  - **Power Station – Yellow** (Provides energy)
  - **Food Factory – Green** (Makes food from sunlight)
  - **Storage House – Red** (Stores water)
- Ask students to compare these city parts with cell organelles and label them on their city map:
  - **City Hall → Nucleus** (Controls all functions of the cell)
  - **City Wall/Gate → Cell Membrane** (Regulates entry and exit of substances)
  - **Power Station → Mitochondria** (Produces energy for the cell)
  - **Food Factory → Chloroplast** (Makes food using sunlight, present only in plant cells)
  - **Storage House → Vacuole** (Stores water, nutrients, and waste)
- Instruct students to write one sentence explaining the function of each part.
- Facilitate discussion by asking:
  - What is the most important part of the city?
  - What happens if the Power Station stops working?
  - What happens if there is no city gate?
  - Why do only plant cells have a food factory (Chloroplast)?
- Conclude the activity by reinforcing that a cell functions like a city, with different organelles performing specific roles to keep it alive and working efficiently.

Activity 3 Understanding Cell Structures

35 mins

Materials Required

Notebook and Pencil

Instructions

- Divide the students into groups and assign each student an organelle with a specific action to perform.
  - **Nucleus (Leader)**: Gives instructions to other students.
  - **Mitochondria (Energy Provider)**: Walks around clapping hands to "generate energy."
  - **Cell Membrane (Gatekeeper)**: Decides who can enter or leave the play area.
  - **Vacuole (Storage Unit)**: Holds a bag filled with objects (representing water and food).
- Instruct the class to work together to "run" as a functional cell, demonstrating how different organelles interact.
- Read out riddles, and ask students to guess the organelle:
  - *"I am the control centre, like your brain. Who am I?" (Nucleus)*
  - *"I provide energy, just like food. Who am I?" (Mitochondria)*
  - *"I store things for later, like a fridge. Who am I?" (Vacuole)*
- Conclude the activity by emphasising that just like in a real cell, each organelle has a specific role, and they must work together for the cell to function properly.

Assessment

35 mins

Choose the correct answer.

1. Which of the following organelles is known as the 'powerhouse of the cell'?
   a) Nucleus
   b) Mitochondria
   c) Ribosome
   d) Vacuole
2. The cell membrane is ____.
   a) Freely permeable
   b) Selectively permeable
   c) Impermeable
   d) Completely permeable
3. Which of the following structures is found only in plant cells?
   a) Mitochondria
   b) Ribosomes
   c) Chloroplast
   d) Golgi apparatus
4. Which organelle is responsible for packaging and transporting proteins in the cell?
   a) Endoplasmic Reticulum
   b) Golgi Apparatus
   c) Lysosome
   d) Nucleus
5. Which of the following statements about prokaryotic cells is correct?
   a) They have a well-defined nucleus
   b) They do not have membrane-bound organelles
   c) They have mitochondria
   d) They are larger than eukaryotic cells

Answer the following questions in brief.

6. Why is the plasma membrane called selectively permeable?

   _____
   _____
   _____

7. What will happen to a plant cell when placed in a hypertonic solution?

   _____
   _____
   _____

8. Differentiate between prokaryotic and eukaryotic cells with one example of each.

_____
_____
_____

9. Explain the role of lysosomes in a cell. Why are they called 'suicidal bags'?

_____
_____
_____

10. Draw a neat labelled diagram of a plant cell. Explain any three differences between plant and animal cells.

_____
_____
_____

Answer Key

1 a) Mitochondria

2. b) Selectively permeable

3. c) Chloroplast

4. b) Golgi Apparatus

5. b) They do not have membrane-bound organelles

6. The plasma membrane is called selectively permeable because it allows only certain molecules to pass in and out of the cell while preventing others from doing so.

7. When a plant cell is placed in a hypertonic solution, it loses water through osmosis, causing the cell membrane to shrink away from the cell wall. This process is called plasmolysis.

8. Difference between Prokaryotic and Eukaryotic Cells:

Feature	Prokaryotic Cell	Eukaryotic Cell
Nucleus	Absent	Present
Organelles	No membrane-bound organelles	Membrane-bound organelles present
Example	Bacteria	Plant and animal cells

9. Role of Lysosomes:
   - Lysosomes contain digestive enzymes that break down waste materials, old cell parts, and foreign substances.
   - They help in removing harmful materials from the cell.
   - They are called 'suicidal bags' because they can burst and release digestive enzymes, leading to the destruction of the cell when it is damaged or old.

10. Diagram of a Plant Cell: (Students should draw a neat labelled diagram of a plant cell.)

    Differences between Plant and Animal Cells:

Feature	Plant Cell	Animal Cell
Cell Wall	Present	Absent
Chloroplast	Present	Absent
Vacuole	Large and central	Small or absent

Learning Level Tracker

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Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: The Fundamental Unit of Life		
		Level 1	Level 2	Level 3

Chapter 7: Motion

Activity 1 Map it Out!

35 mins

Materials Required

Measuring tape/Ruler, Stopwatch, Masking tape/Chalk, Chairs/Books/Bottles

Instructions

- Begin this activity after explaining the initial concept of Speed and Velocity.
- Create two tracks in the classroom floor or in any open space. One track will be a Straight Track without any obstacles and the other track will be Zigzag with obstacles like-chairs/books/bottles etc.
- Divide the students in 4-5 groups.
- Ask one student from each group runs through the straight track from start to end while another student runs through the zigzag track.
- Ask other students to measure the distance, displacement and time using a measuring tape and stopwatch for both tracks.
- Instruct each group to calculate and compare the speed and velocity and highlight that the distance travelled is longer for zigzag track, but displacement will be the same, thus speed changes but velocity might be similar.
- Lastly ask each group to discuss and draw a simple map of a town/village showing places like- Home, School, Market, Crossing, Friend's house etc.
- Then ask them to create a Day Journey e.g., Home → School → Market → Friend's House → Home and measure the distance travelled along the roads using ruler. Then find the total distance covered and the displacement.
- Conclude the activity by asking some interesting questions like- if they went Home → Friend's House only what would be the displacement and distance etc.

Activity 2 Rolling a Race!

35 mins

Materials Required

Small balls, Stopwatch, Measuring tape/Ruler, Big Cardboard/Wooden Board

Instructions

- Divide students into 3 groups.
- Distribute the materials (ball, stopwatch, measuring tape/ruler and cardboard/wooden board) to each group.
- Instruct each group to create a simple ramp by placing one end of a cardboard/wooden board on books and other end on the floor.
- Ask each group to mark distances (0.5 m, 1 m, 1.5 m, 2 m etc.) along the ramp using measuring tape/ruler.
- Place a ball at the top of the ramp and ask them to let it roll down, timing how long it takes to reach each marked distance.
- Ask them to repeat the previous step three times for accuracy and create a table to note down all the data.

Distance (m)	Time (s)	Speed (m/s)	Acceleration (m^2/s)

- Conclude the activity by discussing is the speed constant or increasing? Highlight that if an object starting from rest and moving- is an Acceleration, also if an object speeding up or slowing down- is an Acceleration. Also explain how acceleration involves in our daily life.

Activity 3 Car on a Circular Track

35 mins

Materials Required

Toy car, Chalk/Rope/Tape, Stopwatch, Measuring Tape/Ruler

Instructions

- Divide the students into 3-4 groups.
- Instruct each group to create a circular track of 2-3 metres in diameter using chalk/rope/tape.
- Ask one student from each group to place a toy car at the starting point and push it so that it travels along the circular path at a constant speed.
- Other students will record the time for 1 complete revolution.
- Ask other students to measure the circumference of the track and calculate the speed.
- Discuss when the car moves at constant speed, it accelerates because the direction changes continuously.
- Conclude the activity by a question- What forces keep the car moving in a circle?

Assessment

35 mins

Choose the correct answer:

1. If a car travels 100 km in 2 hours, its average speed is:
   a) 20 km/h
   b) 25 km/h
   c) 50 km/h
   d) 200 km/h
2. An object moving along a circular path has:
   a) Constant velocity
   b) Constant speed but changing direction
   c) Constant acceleration
   d) Uniform motion
3. Acceleration is:
   a) Always positive
   b) A change in position
   c) A change in velocity per unit time
   d) Equal to speed/time
4. An object is thrown vertically upwards. At the highest point, its:
   a) Speed is maximum
   b) Acceleration is zero
   c) Speed is zero
   d) Speed and acceleration both are zero
5. When a body moves with uniform acceleration, its velocity-time graph is:
   a) Curved line
   b) Zigzag line
   c) Horizontal line
   d) Straight line
6. Write the SI unit of speed.
7. What does the area under a velocity-time graph represent?
8. A bus starts from rest and accelerates uniformly at 2 m/s^2 for 5 seconds. Find its final velocity.
9. An object covers 10 m in the first second, 20 m in the second, and 30 m in the third. Is the motion uniform? Why?
10. A car travels from town A to town B, a distance of 100 km, in 2 hours. It then returns from town B to town A in 3 hours.
    a) What is the average speed of the entire journey?
    b) What is the average velocity of the entire

Answer Key

1. c)
2. b)
3. c)
4. c)
5. d)
6. m/s (metre per second)
7. Displacement or distance
8. $v = u + at = 0 + 2 \times 5 = 10m/s$
9. No, because equal distances are not covered in equal time intervals.
10. **a)** Total distance = 100 + 100 = 200 km
    Total time = 2 + 3 = 5 hours
    Average speed = 200/5 = **40 km/h**

    b) Total displacement = 0 (start and end point same)
    Average velocity = 0/5 = **0 km/h**

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
		Chapter: Motion		
Roll No.	Name of the Student	Level 1	Level 2	Level 3

Chapter 8: Force and Laws of Motion

Activity 1 Newton's first law with rolling ball

35 mins

Materials Required

Small ball, cardboard/wooden board, smooth and rough surface

Instructions

- Divide students into 4-5 groups.
- Distribute each group a small ball and cardboard/wooden board as a ramp. Instruct students to use classroom floor as a smooth surface and carpet/doormat as rough surface.
- Instruct the groups to set the cardboard/wooden board as a ramp at a small angle.
- Ask each group to place the ball at the top of the ramp and roll it down.
- Encourage all the students to observe how long the ball keeps moving on the smooth surface (classroom floor) after leaving the ramp. Ask the students to write down their observations.
- As a next step, instruct each group to place a rough surface (carpet/doormat) just below the ramp.
- In a similar way, ask each group to roll down the ball from the top of the ramp.
- Encourage all the students to observe how long the ball keeps moving on the rough surface (carpet/doormat).
- Now ask each group to compare their observations with Newton's first law of motion.
- Highlight that, here on a rough surface, the ball stops sooner than the smooth surface because of the friction (external force). Without friction the ball would keep moving forever.

Activity 2 Balloon Rocket Race

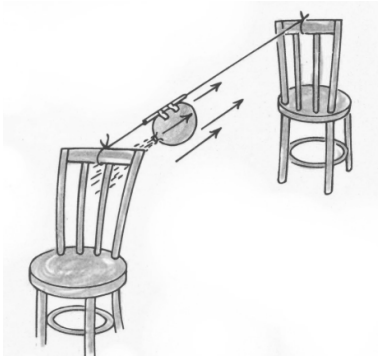
35 mins

Materials Required

Balloons (small, medium, large), strong straws, string (3-5 metre), tape, stopwatch

Instructions

- Divide students into 4-5 groups. Maintain at least 5 persons in each group.
- Distribute the materials to each group and explain the role of each student in groups.
    - One student will tie one end of the string to a chair or doorknob and one student will tie the other end tightly with his/her hand.
    - Another student will thread a straw onto the string.
    - One student will blow up a balloon without tying it and tape it firmly to the straw holding the balloon's opening.
    - The remaining student will write down all the observations.



- For the 1st trial, use the small sized balloon and inflate it about half. Ask one student to hold the balloon at the starting line without letting air escape.
- Start the stopwatch and release the balloon. Ask them to measure the time how long it takes to reach the end of the string along with the distance.
- For the 2nd trial, use the medium sized balloon and inflate it fully.
- Repeat the step of release of balloon and record the time and distance covered.
- For the 3rd trial, use the large sized balloon and repeat the steps.
- Ask each group to create a table and record the observation data.

Trial	Balloon size	Distance	Time	Speed
1	Small half air			
2	Medium full air			
3	Large full air			

- Highlight that the air pushing out force causes acceleration. So that more air will be greater force and greater acceleration.
- Conclude the discussion with examples of daily life situations related to Newton's 2nd law.

Activity 3 Coin Flick Experiment

35 mins

Materials Required

6 identical coins, two rulers

Instructions

- Divide the students into 4-5 groups.
- Distribute 6 identical coins and two rulers to all groups. Otherwise ask students to arrange identical coins.
- Ask students to place five coins in a straight line, touching each other between the two rulers.
- Then ask the groups to place the sixth coin at one end of the line.
- Instruct each group to flick the sixth coin towards the line of five coins and observe the motion of the coins, particularly the one at the opposite end.
- Ask students why the coins move in different direction.
- Conclude the discussion by explaining that the flicked coin transfers its force through the line, causing the last coin to move. This demonstrates that the force exerted on the first coin, i.e. action results in an equal and opposite force on the last coin, i.e. reaction according to the Newton's third law.
- Lastly, if time and circumstances permit, extend the discussion by asking students to toss two or three coins simultaneously and observe the outcomes.

Assessment

35 mins

1. Force is defined as:
   a) Mass × Volume
   b) Mass × Acceleration
   c) Work / Time
   d) Energy × Time
2. According to Newton's First Law, a body at rest will stay at rest unless:
   a) It is heavy
   b) An unbalanced force acts on it
   c) It changes its mass
   d) It is heated
3. The SI unit of force is:
   a) kg
   b) m/s
   c) N
   d) J
4. The inertia of an object is directly proportional to its:
   a) Volume
   b) Speed
   c) Mass
   d) Weight
5. When the net force on an object is zero, it:
   a) Must be moving
   b) Must be at rest
   c) Has zero acceleration
   d) Will always rotate
6. Define inertia.
7. State Newton's Third Law of Motion.
8. Explain why passengers tend to fall forward when a moving bus suddenly stops.
9. A force of 10 N is applied on a body of mass 2.5 kg. What is the acceleration produced?
10. Why do athletes often run some distance before taking a long jump? Explain the concept involved.

Answer Key

1. b
2. b
3. c
4. c
5. c
6. Inertia is the tendency of an object to resist any change in its state of motion or rest.
7. *For every action, there is an equal and opposite reaction."*

   This means that when one object applies a force on another, the second object applies a force of the same strength in the opposite direction on the first object.
8. Due to inertia, the passengers' bodies tend to continue moving forward even though the bus stops.
9. $a = F / m = 10 / 2.5 = 4\ m/s^2$
10. Running adds initial velocity, which increases momentum and thus helps cover a longer distance during jump due to inertia and Newton's First Law.

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Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: Force and Laws of Motion		
		Level 1	Level 2	Level 3

Chapter 3: Atoms and Molecules

Activity 1 Find your Atoms!

35 mins

Materials Required

Name Cards labelled with H, O, C, N, K, S etc., String

Instructions

- Prepare Name Cards labelled with H, O, C, N, K, S etc. Cover all the symbols of elements in the cards and if required seek help from students to prepare.
- Now distribute the Name Cards to each student randomly so that each student becomes an atom!
- Ask students to roam into the classroom/open field holding the Atom Name Cards.
- Now teacher will call out some compounds or statements like- “Water!” or “A Greenhouse gas!” or “Salt!”.
- Ask students to find out the right partners and form the Molecule using Name Cards and string to make a “bond”!
- After formation of the Molecule, groups must explain their Molecule- number and types of atoms involved, difference or similarities between the atoms. Teacher will help students in this discussion.

Activity 2 Simulation with Mass balance

35 mins

Materials Required

Cutouts of coloured paper atoms – H, O, C etc., Reaction Cards

Instructions

- Start the activity discussing some interesting facts like- Can you tell us where the sugar actually goes when it dissolves in water? Based on their response extend the discussion.
- Before starting the activity prepare some coloured paper atoms and Reaction Cards. Using coloured chart papers, prepare paper atoms of H, O, C, etc. Ask some students to help in making Reaction Cards.
- Now distribute the coloured paper atoms to each student randomly so that each student becomes an atom!
- Ask students to roam into the classroom/open field holding the coloured paper atoms.
- Then call out some examples and ask students to form this group accordingly:

  4 Hydrogen atoms (2 H_2)
  2 Oxygen atoms (1 O_2)
- Ask students to combine them to form 2 H_2O molecules.
- Ensure that no atoms are left unused or added externally.
- Now draw a Balance Sheet on the blackboard and ask students to copy the same in their notebooks and fill up the data based on their observation.

Atom	Before reaction	After reaction
H	4	4
O	2	2

- Repeat the steps with some other examples of reaction and compounds.
- Conclude the discussion highlighting here Mass is conserved because atoms are conserved! Help students to visualize that molecules can be changed but atoms remain.
- Extend this activity with some real reaction if time and situation permit and ask students to observe and prove the Conservation of Mass concept.

Activity 3 Tic, Tac, Toe

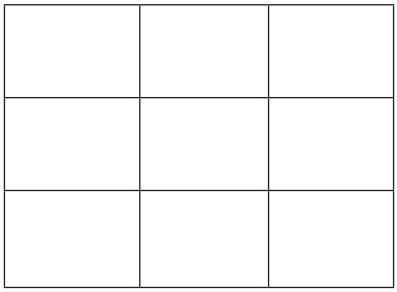
35 mins

Materials Required

Coloured Chalks

Instructions

- Draw the below figure on the blackboard.



- Divide the whole class into two teams and distribute coloured chalk to each team.
- Conduct a toss to decide which team will get the first chance to start the game.
- After toss, ask the team to send one of its members to the board who will write a symbol of an ion in any of the boxes.

Na^+		

- Now, ask the other team to send one of its members to the board who will write a symbol of another ion in one of the remaining boxes.
- If first team decides to place a cation, the next team has to add anions.
- The aim of each team is to make a vertical or horizontal or diagonal sequence of three Cations or three Anions!
- Each team will try to prevent the opposite team from doing so.
- Declare the winner who will be able to write a correct sequence. A correct sequence means that the symbols and their charges are correct.
- Conclude the game by highlighting that it will help students to learn and remember the names and symbols of elements along with their charges/valency.

Assessment

35 mins

Answer the following:

1. The atomicity of phosphorus is:
   a) 1
   b) 2
   c) 4
   d) 4
2. The molecular formula of water is:
   a) H_2
   b) HO
   c) H_2O
   d) H_2O_2
3. Avogadro number is:
   a) 6.022×10^{22}
   b) 6.022×10^{23}
   c) 6.022×10^{24}
   d) 6.022×10^{26}
4. Which of the following is a triatomic molecule?
   a) O_2
   b) N_2
   c) H_2O
   d) He
5. The formula unit mass of NaCl is:
   a) 35.5 u
   b) 58.5 u
   c) 23 u
   d) 60 u
6. What is the chemical formula of ammonia?
7. Write the name of the compound formed by sodium and chlorine.
8. State the law of conservation of mass.
9. What is meant by a mole?
10. Calculate the number of molecules in 36 grams of water (H_2O).

Answer Key

1. d)
2. c)
3. b)
4. c)
5. b)
6. NH_3
7. Sodium chloride (NaCl)
8. Mass can neither be created nor destroyed in a chemical reaction. The total mass of the reactants is equal to the total mass of the products.
9. A mole is the amount of substance that contains 6.022×10^{23} particles (atoms/molecules/ions). It is the SI unit of quantity of substance.
10. Molar mass of H_2O = 18 g/mol

    Number of moles = 36 / 18 = 2 mol

    Molecules = $2 \times 6.022 \times 10^{23}$ = **1.204×10^{24} molecules**

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Name of the School:	**UDISE:**
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Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: Atoms and Molecules		
		Level 1	Level 2	Level 3

Chapter 4: Structure of Atom

Activity 1 Human Bohr Model

35 mins

Materials Required

Chalks/Quicklime powder, Placards

Instructions

- Before starting the activity, introduce first that "Electrons revolve in discrete orbits around the nucleus. These orbits are labelled as K, L, M, N and each has a fixed energy. Maximum number of electrons can be determined by the formula $2n^2$, where n is the orbit number."
- Draw six circles with chalk or quicklime powder in an open space or classroom.

- Prepare 20 placards with 'electron' written on them and mark the innermost circle as 'Nucleus'. Also mark the circles as K, L, M, N representing atomic orbits.
- Divide the class into two teams and a toss will decide which team will play the game first. When first team is playing the game, second team will stand outside the circle.
- Keep all the placards at the nucleus where a student representing nucleus will pick one of the placards.
- Play a music or clap and instruct the students from the first team to run in the outermost circle (not marked as K, L, M, N).
- After some time stop the music or clapping, ask the nucleus to show the placard which he/she picked up representing the atomic number of the atom and announce the number aloud.
- Instruct the students running in the outermost circle to arrange themselves in the circles marked as K, L, M, N according to the electronic configuration of the atomic number announced. Ask the team to name the element.
- Each team need to arrange themselves in correct configuration and name the element properly. If they will not be able to answer correctly the second team will get the chance to respond.
- In the next round, the second team will play, and the rules will remain the same. The placard once used will be removed from the pile.
- Conclude the activity by comparing this human model with Bohr's model that gives an idea of the structure of an atom and the relationship between atomic number and number of electrons.

Activity 2 Valency Number Line Walk

35 mins

Materials Required

Chalk, Cards labelled as “Lose” and “Gain”

Instructions

- Before starting the activity, revisit that “Valency is the number of electrons an atom needs to lose, gain or share to become stable. It determines how atoms bond with each other.”
- Draw a Number line (1-20) on the classroom floor. Place “Lose” and “Gain” cards at the left and right side of the number line respectively.
- Divide students into two teams and a toss will decide which team will play first.
- Give the first team an atomic number (e.g. 11 for Sodium) and ask a student from that team to walk at the corresponding spot on Number line.
- Ask the team to determine the Valence electron of the element given using shell knowledge.
- If the electrons of outer shell < 4, then ask students to walk towards “Lose” card and if the electrons of outer shell > 4, then ask students to walk towards “Gain” card.
- For example, “If a team get Sodium, which has 1 valence electron, then the student will walk towards “Lose” card, i.e. it will lose 1.”
- If time permits, extend the discussion why atoms lose/gain electrons to form compounds.

Activity 3 Isotope Roleplay

35 mins

Materials Required

Red coloured paper cut (Proton), Green coloured paper cut (Neutron), Yellow coloured paper cut (Electron), Chalk

Instructions

- Before starting the activity, briefly explain that "All atoms of the same element have the same number of protons. Atoms of the same element that have different numbers of neutrons are called *isotopes*. Since the number of neutrons differs, their *mass numbers* are also different."
- Select three students to act as Hydrogen isotopes. Give them name tags of: ^{1}H- Protium, ^{2}H- Deuterium and ^{3}H- Tritium.
- Then assign more students as: Protons (red), Neutrons (green) and Electron (yellow).
- One by one, ask students to build the isotopes with help of other students. Teacher will help students in this process.

  For example, to build ^{1}H- Protium: 1 student (proton) stands in the nucleus (circle), 0 neutrons and 1 electron stands outside the circle (orbit)
- In similar way, ask students to build Deuterium, Tritium and other isotopes of any element.
- Lasty encourage students to discuss the characteristics of each isotope collectively.

Assessment

35 mins

Answer the following:

1. The maximum number of electrons in the outermost shell of an atom is:
    a) 2
    b) 8
    c) 18
    d) 32
2. The mass of an electron is approximately:
    a) Equal to that of a proton
    b) 1/2000 times that of a proton
    c) Double the mass of a neutron
    d) Same as a neutron
3. Which of the following scientists proposed the nuclear model of the atom?
    a) J.J. Thomson
    b) Neils Bohr
    c) Ernest Rutherford
    d) Dalton
4. Which particle is present in the nucleus of an atom?
    a) Electron
    b) Proton
    c) Neutron
    d) Both b and c
5. Isotopes are atoms of the same element having:
    a) Same atomic mass but different atomic numbers
    b) Same number of neutrons
    c) Different number of electrons
    d) Same atomic number but different mass numbers
6. Who discovered the neutron?
7. Write the electronic configuration of oxygen.
8. Write two postulates of Bohr's model of the atom.
9. Write the number of protons, electrons, and neutrons in Cl-35 and Cl-37, if the atomic number of Cl is
10. What are valency and valence electrons? How is valency determined?

Answer Key

1. b)
2. b)
3. c)
4. d)
5. d)
6. James Chadwick
7. 2, 6
8. Electrons revolve in fixed circular orbits (shells) around the nucleus.
   Electrons do not radiate energy while revolving in these orbits.
9. **Given:**
   - **Atomic number of Chlorine (Cl)** = 17
     ⇒ So, **Protons = 17**
     ⇒ In a neutral atom, **Electrons = 17**

     For Cl-35 (Mass number = 35):
   - **Protons** = 17
   - **Electrons** = 17
   - **Neutrons** = Mass number − Atomic number = 35 − 17 = **18**

     For Cl-37 (Mass number = 37):
   - **Protons** = 17
   - **Electrons** = 17
   - **Neutrons** = 37 − 17 = **20**

10. **Valence electrons** are electrons in the outermost shell.
    Valency is the combining capacity of an atom.
    Valency = Number of electrons gained, lost, or shared to complete octet.
    Example: Oxygen (2,6) gains 2 electrons → valency = 2

Learning Level Tracker

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Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: Structure of Atom		
		Level 1	Level 2	Level 3

Chapter 6 : Tissues

Activity 1 Tissue Hunt form local samples

35 mins

Materials Required

Banana stem, coconut husk, soft leafy plant, betel nut stalk

Instructions

- Divide students into 4 groups and ask each group to find out or arrange one sample from their surroundings. For example- Group 1 will carry Banana stem, Group 2 will carry Coconut stem, Group 3 will carry Soft leafy plant and Group 4 will carry Betel nut stalk.
- Ask each group members to touch and bend their sample part and record their observations in an Observation Sheet.
- For example: In Banana stem- soft and spongy → Parenchyma

  In Coconut husk- hard and fibrous → Sclerenchyma
- Guide each group to identify and explain probable tissue types.
- To extend this discussion teacher may ask some questions like- “Which tissue supports flexibility in leaf stalk?”, “How does banana stem store water?” etc.
- If time permits, encourage students to write one fact about a tissue on a leaf-shaped cut-out and pin all the cut-outs on “Tissue Tree” chart for revision and visual reinforcement.

Activity 2 Build a Body!

35 mins

Materials Required

Chart Papers, scissors, glue, Cut-outs/Drawings of animal tissue types

Instructions

- Divide students into 4 groups, naming them as 4 types of Animal Tissues- Epithelial, Connective, Muscular & Nervous.
- Distribute the materials to all groups.
- Ask each group to create a body diagram using the materials and based on their group name.
- For example: Group 1 will mark skin and intestinal lining as Epithelial tissue, Group 3 will show muscles in any local animal's leg as Muscular tissue.
- Encourage the groups to label the tissue collage and connect structure to function.
- If time permits encourage for a group presentation discussing difference between tissues or any other points.

Activity 3 Tissue Dice Game

35 mins

Materials Required

Two DIY dice (one dice with tissue names only and another dice with terms like- function/location/types etc.)

Instructions

- Begin the activity saying that "Today we'll revise whole the lesson in a different way! We'll play a game and try to revisit the different characteristics and functions of Plant and Animal tissues."
- Before the activity, prepare two DIY dice. In one dice, write Plant & Animal tissue names only and in another dice write their function/location/types etc.
- Divide the students in two teams.
- Call out one team in front of the classroom and ask them to roll both the dice.
- For example: After roll both the dice, one dice shows "xylem" and other shows "function".
- Then ask the team to share and discuss the "function of xylem" with the classroom.
- Similar steps will be followed for the other team and next rounds.
- To consolidate the discussion, assign one or two students from each team to take notes and share with the classroom.

Assessment

35 mins

Answer the following:

1. The function of Xylem is:
   a) Transport of food
   b) Transport of water
   c) Photosynthesis
   d) None of these

2. Cardiac muscles are:
   a) Involuntary and striated
   b) Voluntary and unstriated
   c) Involuntary and unstriated
   d) Voluntary and striated

3. Which of the following is a simple permanent tissue?
   a) Xylem
   b) Phloem
   c) Collenchyma
   d) Cambium

4. Parenchyma cells are:
   a) Dead
   b) Elongated and thick-walled
   c) Living and thin walled
   d) None of these

5. Which connective tissue connects muscle to bone?
   a) Ligament
   b) Tendon
   c) Cartilage
   d) Areolar

6. Which connective tissue connects bone to bone?

7. Name the tissue responsible for transport of foods in plants.

8. Write two functions of parenchyma tissue.

9. What are guard cells? What is their function?

10. Explain the three types of muscle tissue found in animals.

Answer Key

1. b)
2. a)
3. c)
4. c)
5. b)
6. Ligament
7. Phloem
8. Stores food and water
   In some plants (chlorenchyma), performs photosynthesis
9. Guard cells are specialized epidermal cells surrounding stomata. They regulate the opening and closing of stomata for gas exchange and transpiration.
10. **Skeletal (Striated)**: Voluntary, striated, attached to bones, helps in movement.
    Smooth (Unstriated): Involuntary, found in internal organs like stomach, intestine.
    Cardiac: Involuntary, striated, found only in heart, rhythmic contractions.

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
		Chapter: Tissues		
Roll No.	Name of the Student	Level 1	Level 2	Level 3

Chapter 9 : Gravitation

Activity 1 The Great Gravity and Air Resistance Race!

35 mins

Materials Required

One light ball and one heavier ball, one flat piece of paper.

Instructions

Part 1: Gravity's Constant Pull

- Hold up the two balls of different masses and ask students to think which of these balls do you think is heavier.
- Make them understand that weight is the force with which Earth's gravity pulls an object down towards its centre.
- Explain to the students that they will calculate the weight of these two balls and explore

  How gravity acts on them.
- Lead them towards the formula of force that is mass multiplied by acceleration. F = ma
- Now ask them to calculate the value of weight for each ball.
  - Ball 1(Lighter): State its approximate mass (e.g., 10g= 0.01 kg).
  - Ball 2 (Heavier): State its approximate mass (e.g., 100 g = 0.1 kg).
  - Guide students to calculate the weight by substituting the value of mass and acceleration due to gravity in the given formula. Taking the value of g approximately to 10 m/s^2

Quantity	Ball 1	Ball 2
Mass	10g = 0.01 kg	100g = 0.1 kg
Acceleration due to gravity	10m s^{-2}	10m s^{-2}
weight	0.01 x 10 = 0.1 N	1N

- Ask students to predict which ball will hit the ground first when dropped from the same height at the same time.
- Ask students to record their predictions in their notebooks.
- Now, drop both balls simultaneously from the same height and ask students to observe the moment they hit the ground.

  (Note for the teacher: You can also ask students to bring two balls with different masses and perform the activity independently under your supervision.)
- Ask them, "What did you observe? They both hit the ground at the same time! Why do you think this happened, even though the heavier ball has more weight?"
- Encourage them to share their answer with the whole class.
- Explain to them that both balls experience the same acceleration due to gravity (which is independent of mass).

- Conclude part 1 of the activity by discussing the following points:
  - This happens because both balls experience the same acceleration due to gravity (g), which is independent of their mass.
  - While the heavier ball does experience a greater gravitational force (more weight!), its greater mass also means it has more inertia (resistance to changes in motion).
  - These two effects perfectly cancel each other out, causing both objects to fall at the same rate.
  - Since air resistance is negligible for these solid, compact objects, they are essentially in free fall, meaning gravity is the only significant force acting on them.

Part 2: Effect of Air Resistance

- Now ask students to take a small ball and a flat piece of paper.
- Ask students to predict which will hit the ground first when dropped from the same height and at the same time.
- Ask them to drop the small ball and the flat piece of paper simultaneously from the same height and observe the result.
- Ask students, “What did you observe this time? The ball hit the ground first, didn't it? This is different from our balls! Why do you think the paper fell slower?"
- Accept the responses discuss why the ball touches the ground first.
- Conclude the activity by discussing the following points:
  - This time, a different force is playing a big role: air resistance. Unlike the compact balls, the flat piece of paper has a much larger surface area relative to its mass. This increased surface area means it 'pushes' more air as it falls, increasing the air resistance.
  - Forces on the Paper: "So, on the paper, two main forces are acting:
    - Force of gravity: Pulling it downward.
    - Air resistance: Pushing upward, opposing its motion, and slowing it down.

Activity 2 Floating and Sinking: Exploring Buoyancy!

35 mins

Materials Required

An empty plastic bottle, a plastic container or bucket (large enough to submerge the bottle), water, and an iron nail.

Instructions

- Divide the students into small groups of 4-5.
- Provide each group with an iron nail, an empty plastic bottle with its cap, and a clear container.
- Instruct each group to take the empty plastic bottle and ensure its mouth is tightly closed with its cap.
- Ask them to fill the container with water carefully and then gently place the capped bottle on the surface of the water. Ask them to observe what happens.
- Now, instruct students to carefully push the bottle down into the water until it is fully submerged. Then, tell them to release it and observe its behaviour closely.
- After observing, ask them to remove the bottle from the container.
- Next, ask them to gently place an iron nail on the surface of the water and observe what happens to it.

(Note for the teacher: Conduct this activity under your direct supervision to ensure safety and proper observation.)

- Ask students the following questions to encourage critical thinking and reflection. Encourage them to discuss their observations within their groups before sharing with the whole class:
  - What do you conclude from the activity?
  - Why doesn't the bottle stay immersed in the water after being released?
  - What happens to the iron nail? Why does it sink instead of floating?
- After students share their responses, guide them through the following points to consolidate their understanding:
  - **Buoyancy:** Explain that when an object is placed in a liquid, the liquid pushes up on the object with an upward force called buoyancy (or buoyant force).
  - **Why the bottle floats:** Discuss that the empty plastic bottle floats because the buoyant force pushing up on it is greater than its weight (the force of gravity pulling it down). This happens because the bottle, filled with air, has a very low overall density.
  - **Why the iron nail sinks:** Discuss that the iron nail sinks because its weight is greater than the buoyant force pushing up on it. This is because the iron nail is much denser than water
- Conclude the above activity by stating the fundamental principle that objects with a density less than that of a liquid float on the liquid. The objects with a density greater than that of a liquid sink in the liquid.

Activity 3 Archimedes' Principle: Measuring the Buoyant Force!

35 mins

Materials Required

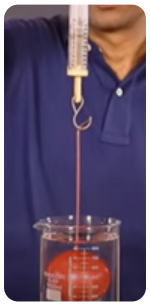
Small beaker, one large beaker, spring balance, heavy object (stone), string, electronic weighing machine, and water.

Instructions

Part A – Weight in air vs. water

- Tie the string to the object; hook it to the spring balance.
- Hold vertically and record the reading. → Weight in air (W_{air})
- Lower the object fully into the water without touching the sides or bottom.
- Record the new reading. → Apparent weight in water (W_{water})
- Calculate the buoyant force (F_B)

$$F_B = W_{air} - W_{water}$$



Part B – Weight of displaced water

- Place the small beaker on the balance and note its mass. → m_{empty}
- Put the large beaker full of water on the table; position the small beaker under its lip to catch overflow.
- Lower the same object (still on the spring balance) slowly into the full beaker until fully submerged; water will spill into the small beaker.
- When the dripping stops, remove the object and large beaker.
- Weigh the small beaker with water. → m_{total}
- Find mass of displaced water:

$$m_{water} = m_{total} - m_{empty}$$

- Convert to kilograms and find its weight (take g=10 ms^{-2})

$$W_{water} = m_{water} \times g$$

(Note for the teacher: Ensure that each spring balance is free of error.)

- Ask students the following questions to encourage critical thinking and reflection.
- Encourage them to discuss their observations and calculations with their group before sharing their answers with the class:
  - What was the value you calculated for Buoyant Force (F_B)?
  - What was the value you calculated for the Weight of the Displaced Water?
  - What do you notice about these two values? Are they similar, or very different?
  - What conclusion can you draw from comparing these two values?
- After students share their responses, guide them through the following points to consolidate their understanding:
  - Explain that this principle is fundamental to why things float or sink. If the buoyant force (the weight of the displaced fluid) is greater than the object's weight, it floats. If it's less, the object sinks.
  - Discuss how this principle applies to real-world examples like ships floating, submarines diving and surfacing, hot air balloons rising, and why we feel lighter in a swimming pool.

(Note for the teacher: Arrange the materials in advance.)

Assessment

35 mins

1. The image shows the revolution of the Moon around the Earth.

What is true for the force that keeps the Moon in its orbit around the Earth?

a) It changes the distance and velocity of the Moon at every point on its orbit.
b) It changes the direction and distance of the Moon at every point on its orbit.
c) It changes the direction and velocity of the Moon at every point on its orbit.
d) It changes the speed of rotation and direction of the Moon at every point on its orbit.

2. Which of the following statements is **true** regarding the SI units of the universal gravitational constant (G) and acceleration due to gravity (g)?

a) Both G and g have SI units, but they are different.
b) Only G has an SI unit.
c) Only g has an SI unit.
d) Neither G nor g has an SI unit.

3. What is true for thrust and pressure?

a) Pressure varies with area, while thrust remains constant.
b) Thrust varies with area, while pressure remains constant.
c) The magnitude of thrust is always greater than that of pressure.
d) The magnitude of pressure is always greater than that of thrust.

4. Why does a ship made of steel float, while a slab of steel sinks in water?

a) A ship has less mass than a slab of steel.
b) A ship has a lower average density than water due to its hollow structure.
c) A ship is made from a different kind of steel than a slab.
d) A ship moves faster on water, so it doesn't sink.

5. An object is put one by one in three liquids having different densities. The object floats with $\frac{1}{9}$, $\frac{2}{9}$, and $\frac{3}{9}$ parts of their volumes outside the liquid surface in liquids of densities d1, d2and d3, respectively. Which of the following statements is correct?

a) d1> d2> d3
b) d1 > d2 <d3
c) d1 <d2 >d3
d) d1< d2 <d3

6. An object has a mass of 163 kg. When the object is kept on a weighing scale, it exerts a force of 1.597×10^3 N. What is the value of acceleration due to gravity?

7. A $\frac{1}{2}$ kg sheet of tin sinks in water, but if the same sheet is converted into a box or boat, it floats. Why?

8. Two objects of masses m1 and m2 having the same size are dropped simultaneously from heights h1 and h2 respectively. Find out the ratio of time they would take to reach the ground. Will this ratio remain the same if

a) one of the objects is hollow and the other one is solid, and

b) Both of them are hollow, size remaining the same in each case. Give a reason.

9. Suppose the gravity of Earth suddenly becomes zero, then in which direction will the moon begin to move if no other celestial body affects it?
10. A cube of side 5 cm is immersed in water and then in saturated salt solution. In which case will it experience a greater buoyant force? If each side of the cube is reduced to 4 cm and then immersed in water, what will be the effect on the buoyant force experienced by the cube as compared to the first case for water? Give a reason for each case.

Answer Key

1. The correct option is (c)
2. The correct option is (a)
3. The correct option is (a)
4. The correct option is (b)
5. The correct option is (d)

   Let us find the LCM of the fractions of volumes outside the liquid surface in each other. $= \frac{1}{9} = \frac{2}{11} = \frac{3}{7}$

   LCM of the denominator is 693, and using this, the fractions can be written as follows:

   $\frac{77}{693} = \frac{126}{693} = \frac{297}{693}$

   This shows that the fractions are in ascending order. The density of the liquid determines the upward force it exerts on the item. The force exerted on an object is related to its density.

   As a result, the densities of liquids are presented in increasing order.
6. F = m. g

   $g = \frac{F}{m}$

   $g = \frac{1.597 \times 10^3}{163}$

   $g = 9.8\ m/s^2$
7. A tin sheet sinks because its density is greater than water's. However, when reshaped into a boat, its volume increases, lowering the overall density. This allows it to displace more water, generating a buoyant force that counteracts its weight. This principle is based on Archimedes' principle, which states that an object floats if it displaces water equal to its weight
8. We know that

   $v = u + at$

   Here v = 0 and a=g

   So, $0 = u + g\,t$

   $u = -\,g\,t$ $\quad (equation\ 1)$

   We also know $v^2 - u^2 = 2as$ $\quad (equation\ 2)$

   Here v = 0, $u = -gt$

   Case 1: Here v=0, u=-gt from equation (1) and $S=h_1$ and taking $t=t_1$

   Putting all the above values in equation (2)

   $h_1 = \frac{1}{2} gt1^2$ equation 3

case 2: similarly for S = h_2 and t = t_2

$h_2 = \frac{1}{2} gt2^2$ equation 4

Dividing equations (iii) and (iv), we get,

$$\frac{t_1}{t_2} = \sqrt{\frac{h_1}{h_2}}$$

The ratio will not change in either case because acceleration remains the same. In the case of free-fall, acceleration does not depend upon the mass and size of the body.

9. The circular motion of the moon around Earth is due to the centripetal force provided by the gravitational force of Earth. Therefore, when the gravity of Earth suddenly becomes zero, the moon will begin to move in a straight line in the direction in which it was moving at that instant. That is, the moon will move along the tangent to the circular orbit at that instant.
10. The cube will experience a greater buoyant force in saturated salt solution than in water, as the density of saturated salt solution is greater than that of water.

    As buoyant force = weight of liquid displaced by the object =V ρ g (ρ is the density of liquid). As each side of the cube is reduced to 4 cm from 5

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Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
		Chapter: Gravitation		
Roll No.	Name of the Student	Level 1	Level 2	Level 3

Chapter 10 : Work and Energy

Activity 1 Unpacking "Work" – A Scientific Approach

35 mins

Materials Required

Story text, notebook, and pen

Instructions

- Divide students into small groups of 3-4.
- Provide each group with the story text.
- Instruct students to read the story carefully and identify all the physical actions performed by Shyam where a force is applied to an object, and that object might move. Focus only on these types of actions, not mental efforts or internal bodily processes.
- Now ask them to use the two-column table, categorise each identified physical action as either "Work Done" or "No Work Done" according to the scientific definition.
- Ask them to justify their reasoning using scientific principles related to force and displacement (i.e., whether a force caused displacement in the direction of the force).

Story: Shyam and His Basketball Practice

Once upon a time, there was a boy named Shyam who loved playing basketball. Determined to improve his skills, he dedicated time every day after school to get better.

He began by planning his training: researching online for drills, reading books on strategy, and designing a high-protein diet. To improve his focus, he meditated daily, and to build stamina, he began running long distances.

As he practiced on the court, he applied force to the basketball, moving it over distances to enhance his shooting and dribbling skills. He would push the ball forward as he ran and lift it into the air to shoot. Sometimes, he would simply hold the ball and stand still, trying to visualise a perfect shot. One day, while practicing his shots, he observed how the ball moved through the air. His teacher later explained that in physics, the work done on the basketball depends on the force applied and the distance moved in the direction of that force:

Work = Force × Displacement

Shyam was fascinated and began applying this scientific understanding to improve his performance. He learned that focusing his force helped him to do more work on the ball, making his shots more effective.

(Note for the teacher: You can use or modify this story or substitute a similar context that's more relevant for your students.)

Physical Action from Story	Work Done/ No Work Done	Scientific Reasoning (Force & Displacement)
Example: Running long distances	*Work Done*	*Force applied by Shyam on the ground, resulting in his displacement in the direction of motion.*

- Ask each group to complete the table.
- After each group has discussed and filled their tables, invite a few groups to share one or two of their entries with the class, explaining their classification and scientific reasoning.
- Conclude the activity by discussing the following points:
  - Reinforce the scientific definition of work: Work is only done when a force causes an object to move a certain distance in the direction of the force.
  - Discuss why some actions that feel like effort aren't considered work in physics: Highlight examples from the story (e.g., holding the ball still, meditating, planning) where effort is exerted but there is no displacement of an object due to an applied force, or the force is perpendicular to the displacement.
  - Connect findings to the formula: Reiterate that Work = Force × Displacement (where displacement is in the direction of the force).
- Now ask these questions to deepen reflection and link concepts to students' experiences.
  - Do we need energy to perform work? Explain.
  - Can you give an example from your own life where force is applied but no work is done? Why does that happen?
- Revisit misconceptions and summarise core learning with students.

Activity 2 Understanding Kinetic Energy

35 mins

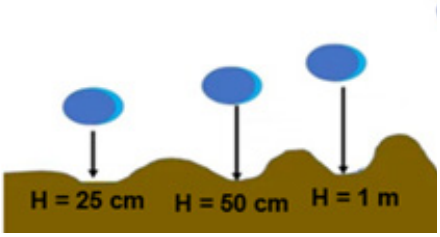
Materials Required

- Three balls of different masses
- A tray or container
- Sand
- Measuring tape or ruler
- Small blocks or books to create different ramp heights (optional)

Instructions

- Divide students into small groups of 3-4.
- Introduce the student to kinetic energy as the energy an object possesses due to its motion. Discuss how a moving object can do work.
- Ask them to take the tray and fill it with a thick layer of sand.

- Ask them to carefully smooth out the sand in the tray.
- Instruct them to take one of the balls and drop it into the sand from three different heights: (Remember the same ball has to be dropped from three heights so that the mass remains constant.)
  - First, drop it from 25 centimetres above the sand.
  - Next, drop it from 50 centimetres.
  - Finally, drop it from 100 centimetres.



- After each drop, ask them to carefully remove the ball and observe the depression it made in the sand.

  (Note for the teacher: You can also conduct this activity by using stone of different weight instead of ball.)
- Ask students to use their ruler to measure the depth of that indentation and note it down in their notebook in the following tabular form.

Height of drop	Depth of depression

- Now discuss the following questions with students:
  - What do you notice about the depth as you drop the ball from higher points?
  - How does the ball's speed change as it falls from different heights, and how might that relate to the dent it makes?
- Discuss the responses and again ask them to smooth the sand surface.
- Ask three students from each group to take all three balls of different masses and drop them all from the same height (50 centimetres) onto the sand.
- Ask them to carefully observe and compare the depths of the depressions created by each ball this time.
- Again, ask students the following question:
  - What does this tell you about how the mass of an object affects its ability to make a dent, even when dropped from the same height?
  - Out of three different balls, which one created the deepest depression when dropped from the same height? What does that tell you about its energy?
  - Based on our activity, how do you think kinetic energy is related to how fast an object is moving (its speed)? And how is it related to how heavy an object is (its mass)?
- Encourage them to share their observations and thoughts.
- Conclude the activity by discussing the following points:
  - Objects in motion possess kinetic energy.
  - Both the speed (how fast something is going, which was influenced by our drop height) and the mass of an object directly affect its kinetic energy and, therefore, its ability to do work, like making that impression in the sand

(Note for the teacher: Inform students in advance to bring these materials for the classroom activity or arrange the materials yourself if needed.)

Activity 3 Energy Transformations

35 mins

Materials Required

Colourful clay and colour

Instructions

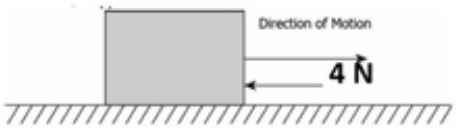
- Divide students into small groups (4-5 students each).
- Now, assign each group one of the phenomena topics.
- Inform them that for each topic, they have to do the following tasks:
  - Identify energy forms: Discuss and list the specific forms of energy present at the beginning and end of the process.
  - Track Transformations: Draw a clear diagram illustrating how energy changes from one form to another throughout the phenomenon.
  - Connect to conservation: Consider whether any energy is created or destroyed in this process. Discuss and answer this question as a group.
- Now provide students with the following topics:
  - Photosynthesis: "How do green plants convert sunlight into food energy?"
  - Mechanical Work: “When we move a heavy box, what energy transformations occur?"
  - Air movement: “What causes wind, and what energy forms are involved in its movement?"
  - Fossil fuel formation: "How does ancient plant matter become coal or petroleum, and what energy transformations take place?
  - The water cycle: “What energy drives water from oceans to clouds, and then back to the Earth as rain or snow?"
- Inform them that each group have to create a visual model on a white sheet to show their energy transformation pathway.
- Motivate students to use different colours to represent different energy forms.
- Ask them to highlight any points where energy might seem to “disappear” (usually by transforming into heat or sound, which are often less useful forms for the primary purpose of the process).
- Encourage them to present their topic to the whole class and facilitate a class discussion
- Ask students: "What common pattern did you notice across all five processes we investigated?" Guide students toward understanding that energy is always conserved—it changes form but is never truly created or destroyed.
- Consolidate the activity by discussing the following points:
  - Energy is constantly changing forms. It might start as light energy and become chemical energy in a plant. It might be chemical energy in our bodies that converts into kinetic energy as we move a box.
  - Discuss Law of Conservation of Energy: It states that energy cannot be created or destroyed; it can only be transformed from one form to another. Sometimes it shifts into less useful forms, like heat, but the total amount always stays the same.

  (Note for the teacher: Inform students a day before conducting this activity to bring a white sheet, colours, and colourful clay.)

Assessment

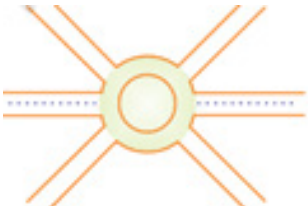
35 mins

1. Which of these is an example of scientific work done?
   (a) Standing with a load of 2kg on the head for 5 minutes
   (b) Playing video games when sitting on a sofa
   (c) Sitting on a chair and reading a book
   (d) Climbing stairs of a bridge
2. A force of 40N acts on an object. It causes a displacement of 800 cm in the direction of the force. What would be the work done in Nm on the object?
   (a) 5
   (b) 20
   (c) 200
   (d) 320
3. An object is moving with a uniform velocity along a particular direction. A retarding force of 4N, is applied in the direction as shown.



   The object stops after a displacement of 5m. What is the work done by the retarding force?
   (a) -4J
   (b) 4j
   (c) -20J
   (d) 20 j
4. What would be the kinetic energy possessed by an object of mass '2m' and moving with a uniform velocity, 'v'?
   I. $\frac{1}{2}mv^2$
   II. mv^2
   III. $2mv^2$
   IV. $4mv^2$
5. A 50 kg skydiver jumps from a height of 20 m. What would be his kinetic and potential energies when he is halfway down? Assume g=10m/ s.
   (a) KE = 5,000 J; PE = 5,000 J
   (b) KE = 0 J; PE = 10,000 J
   (c) KE = 10,000 J; PE = 0 J
   (d) KE = 10,000 J; PE = 10,000 J
6. A roller coaster car of mass 500 kg starts from rest at a height of 45 m. Assuming no friction, calculate:
   a) The potential energy at the top
   b) The kinetic energy at the bottom
   c) The velocity of the car at the bottom
   d) If the actual velocity measured is less than calculated, explain why.

7. A boy is moving on a straight road against a frictional force of 5 N. After travelling a distance of 1.5 km, he forgot the correct path at a roundabout of radius 100 m in the given image. However, he moves on the circular path for one and a half cycles, and then he moves forward up to 2.0 km. Calculate the work done by him. (Take π=3.14)



8. Can any object have momentum even if its mechanical energy is zero?
9. The power of a motor pump is 2 kW. How much water per minute can the pump raise to a height of 10 m? (Given g = 10 m s^{-2})
10. A man weighing 60 kg climbs a staircase of 20 steps, each 0.25 m high. Calculate the work done by him. (Assume g = 10 m/s^2)

Answer Key

1. d) Climbing stairs of a bridge
2. d) 320 Nm
3. c) – 20 J, as retarding force is applied.
4. b) mv^2
5. a) KE = 5,000 J; PE = 5,000 J

   The $_{initial}$ potential energy is given by:

   PE initial = mgh

   = 50 kg × 10m/s^2 × 20m

   = 10000 J

   The potential energy at the halfway point is given by:

   PE $_{halfway}$ = mgh/2

   PE $_{halfway}$ = 5000 J

   Using conservation of energy:

   PE $_{initial}$ = PE $_{halfway}$ + KE $_{halfway}$

   KE $_{halfway}$ = PE $_{initial}$ - PE $_{halfway}$

   = 10000 J - 5000 J

   KE $_{halfway}$ = 5000 J
6. a) Use the formula for potential energy: PE = mgh

   PE = 500 kg × 9.8 ms-2 × 45m

   PE = 220500J

   b) Apply the conservation of energy: KE $_{bottom}$ = PE $_{top}$

   Therefore, the kinetic energy at the bottom is KE $_{bottom}$ = 220500 J

   c) Use the formula for kinetic energy = $\frac{1}{2}mv^2$

   Rearrange the formula to solve for velocity: $v = \sqrt{\frac{2kE}{m}}$

   Substitute the values: $v = \sqrt{\frac{2(220500\ J)}{500\ kg}}$

   : $v = \sqrt{882}$ m/s

   d) The potential energy at the top is 220500 J, the kinetic energy at the bottom is 220500 J, and the velocity at the bottom is approximately 29.7 m/s. The actual velocity is less due to air resistance.
7. Total distance = 1500 m + 2000 m+ (1.5×2 πr)

   = 3500m +(1.5 ×2 ×3.14 ×100)

   = 3500m + 942m= 4442m

   Now, calculating the total work done, W = F × S = -5 ×4442m = -22210 J.
8. Mechanical energy is defined by both potential energy and kinetic energy. So, if mechanical energy is zero, this implies that kinetic energy is zero, thus momentum is also zero.
9. From the question, we know that P = 2 kW

   Work done by the pump in raising 'm' mass of the water to a height of 10 m is, $W = mgh$

   $W = m \times 10 \times 10$

   W = 100m

The pump can raise to a height of 10 m. We know that $P = \frac{w}{t}$

$P = \frac{w}{1\ minute}$ $= \frac{w}{60\ seconds}$

$2000 = \frac{100m}{60}$

m = 1200kg

Hence, 1200 kg of water can be raised per minute by the pump to a height of 10 m.

10. To calculate the work done by the man while climbing the staircase, we can use the formula for work done against gravity, which is given by: W = mgh

where: - W is the work done, - m is the mass of the man (60 kg), - g is the acceleration due to gravity (10 m/s²), - h is the total height climbed. First, we need to calculate the total height climbed. The height of each step is 0.25 m, and there are 20 steps, so the total height h is:

h=20 steps × 0.25 m/step=5 m

Now we can substitute the values into the work formula:

W=mgh

W= 60 kg×10 m/s²×5 m

W=3000 J

Therefore, the work done by the man is 3000 Joules.

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: Work and Energy		
		Level 1	Level 2	Level 3

Chapter 11 : Sound

Activity 1 The Vibrating Ruler – Sound from Vibrations

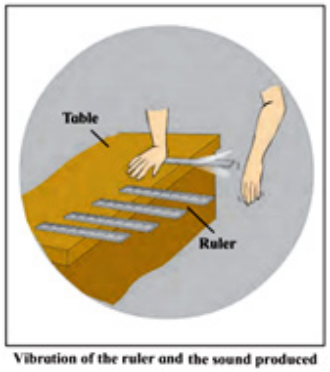
35 mins

Materials Required

A long plastic or metal ruler (at least 30cm) and a table

Instructions

- Conduct the activity in such a way that students perform it in pairs.
- Provide each group with the materials required.
- Instruct students to take out the ruler and place it flat on the table.
- Now ask them to push about two-thirds of the ruler off the edge of the table, so a significant portion is hanging over.



Vibration of the ruler and the sound produced

- Ask them to make sure the remaining one-third is firmly pressed down on the table with one hand. This hand will act as your anchor.
- Ask students to gently pull down the free end of the ruler that's hanging off the table, and then quickly release it.
- Ask them: "What do you observe? What do you hear?
- Encourage them to share their observations.
- Now, instruct them to try to make the ruler vibrate faster or slower by changing how much of it hangs off the table.
- Again, ask them to observe how the sound changes.
- Finally, ask them to try to stop the vibration of the ruler with their hand while it's still making sound.
- Ask them to observe what happens to the sound.
- Now ask these questions to deepen reflection and link concepts to students' experiences.
    - What did you see the ruler doing when it made a sound?
    - What happened to the sound when the ruler stopped moving?
    - Based on this activity, how do you think sound is produced?
    - Did the sound change when the ruler vibrated faster or slower? What characteristic of sound do you think this relates to?

- Encourage them to share their observations and thoughts with the whole class.
- Conclude the activity by discussing the following points with students:
  - Sound is produced by vibrations.
  - When the ruler vibrates rapidly, it creates disturbances in the air around it, which our ears perceive as sound. When the vibrations stop, the sound stops.

Activity 2 Investigating the Reflection of Sound

35 mins

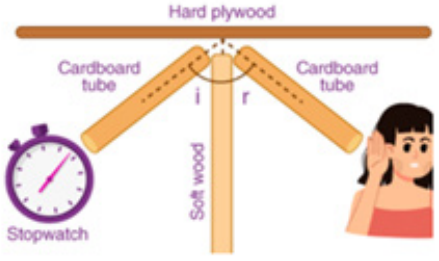
Materials Required

- 2 identical cardboard or plastic tubes (paper towel rolls)
- 1 piece of cardboard (flat and smooth like a book)
- A small ticking clock
- Protractor
- Soft wood block or sponge (to hold pipes steady)

Instructions

- Conduct this activity in such a way that each student is involved in the participation.
- Place the piece of cardboard vertically to act as a reflecting surface.
- Now, arrange the two tubes in a 'V' shape with their ends pointing toward the cardboard.
- Place the softwood or sponge at the base to stabilise the setup.
- Keep the ticking clock near the open end of one tube (Tube A), facing the cardboard.

  (Note for the teacher: You can conduct this activity as described, or make it more engaging by allowing students to perform each step themselves using the provided materials.)
- Now call students one by one and ask them to place their ear at the open end of the second tube (Tube B), which is angled on the opposite side.
- Instruct them to slightly adjust the angles of the tubes and the cardboard until sound from the clock is heard clearly through the second tube.



- Ask them once you've found the clearest sound, use your pencil to draw a line along the base of both tubes on the cardboard

  (Note for the teacher: Place a soft cloth or towel around the clock and the base of the 'sound sender' tube to help block any direct sound from reaching your ear. We want to hear only the sound that reflects off the cardboard.)

- Ask them to mark the exact point on the cardboard where the sound seems to be hitting and reflecting.
- Now, ask them at the point where the sound reflected, draw a line perpendicular to the reflecting surface (your cardboard). This line is called the 'Normal'.
- Ask them to use a protractor to measure the angle of incidence (from the source to the cardboard) and the angle of reflection (from the cardboard to the listener).
- Ask them to record and compare the two angles.
- Guide students to observe that the angle of incidence is approximately equal to the angle of reflection.
- Write the following questions on the board and discuss them with the whole class:
  - What did you observe when the angle of the pipes was changed?
  - Why do you think you could hear the clock better at certain angles?
  - Can you think of any places or devices where sound reflection is useful?
  - How is this experiment similar to how we observe light reflections in mirrors?
- Conclude the activity by asking each group to share what they learnt about the reflection of sound.

  (Note for the teacher: Arrange the materials yourself if needed.)

Activity 3 Sound Check: Investigating Echoes, Absorption, and Reflection

35 mins

Materials Required

Empty metal tin can, duct tape, small items (coins, marbles, pebbles, wooden blocks), soft cloth or towel

Instructions

- Conduct the activity in such a way that students perform it in pairs.
- Ask students to take the metal tin can and tape its rim to cover the sharp edges.

  (Note for the teacher: Ensure that the class is quiet while conducting the activity.)
- Instruct one student from each pair to speak into the can and the other student to listen closely for any sound reflection or echo.
- Ask them to observe the quality of sound: sharp, metallic, or prolonged.
- Ask them to drop small items into the uncovered can one at a time.

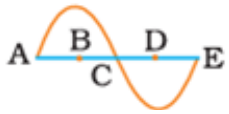
- Ask them to record the sound made as the item hits the bottom.
- Now, discuss what causes the “ringing” or echoing effect inside the can with students.
- Now ask them to cover the can with a thick cloth towel and repeat the drop test with the same items.
- Ask each pair to listen carefully and compare the sound with the previous test.
- Discuss the following questions with students:
  - What difference did you observe in the sound before and after covering the can?
  - Why does a soft material reduce the echo or reverberation?
  - What materials in our environment reflect sound? Which one absorbs it?
  - How can this experiment help in designing a better classroom?
- Conclude the activity by discussing the following points with students:
  - Sound travels as waves. When these waves hit a hard surface (like the inside of a can), they bounce back — that’s called reflection. This creates an echo or a ringing sound.
  - When you cover the can with a soft material, the sound waves get absorbed, not reflected. That’s why the sound becomes softer or duller — this is how soundproofing works in real life.

  (Note for the teacher: Inform students to bring these materials for the activity or arrange the materials yourself if needed.)

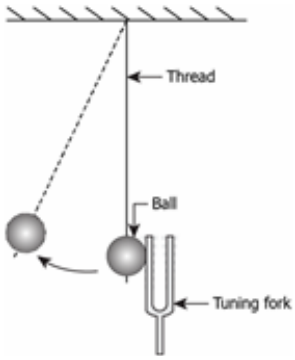
Assessment

35 mins

1. In which of the following media does sound travel fastest?
   a) Air
   b) Water
   c) Steel
   d) Vacuum
2. Which sound wave is used in SONAR?
   a) Radio waves
   b) Ultrasonic waves
   c) Infrasonic waves
   d) Audible sound waves
3. In the given image, what is the value of half a wavelength?

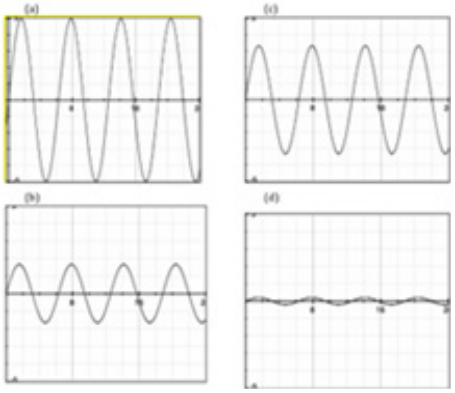


   a) AB
   b) BD
   c) DE
   d) AE
4. The image shows a setup consisting of a tuning fork and a metallic ball suspended using a thread.



   What happens when the metallic ball hits the turning fork?
   a) The tuning fork vibrates the ball to produce sound.
   b) The tuning fork vibrates to and fro to produce sound.
   c) The tuning fork and the ball vibrate together to produce sound.
   d) The tuning fork generates heat by vibrating to and fro.

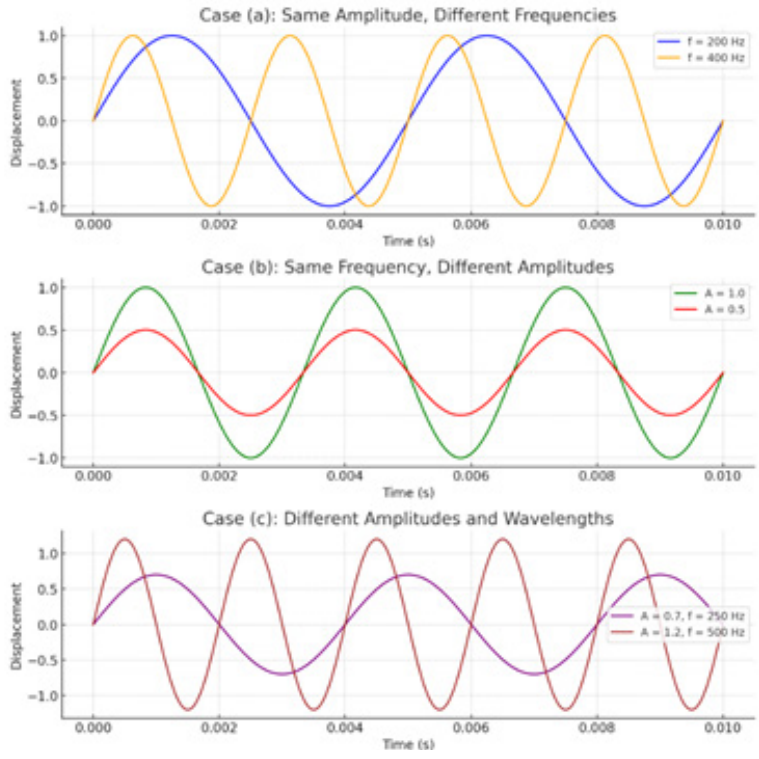
5. A pianist is playing several notes which was graphed by a scientist. The scientist has been told that the loudest notes have the highest amplitude. Among the following notes which one is the loudest note?



   a) a
   b) b
   c) c
   d) d

6. Why do we hear the sound produced by the humming bees, while the vibrations of a pendulum are not heard?
7. Explain how defects in a metal block can be detected using ultrasound.
8. Why are the ceilings and walls behind the stage of good conference halls or concert halls made curved?
9. Represent graphically by two separate diagrams in each case.
   I. Two sound waves have the same amplitude but different frequencies.
   II. Two sound waves having the same frequency but different amplitudes.
   III. Two sound waves with different amplitudes and wavelengths.
10. Establish the relationship between the speed of sound, its wavelength, and frequency. If the velocity of sound in air is 340 m/s, calculate
    a) Wavelength when the frequency is 256 Hz.
    b) frequency when the wavelength is 0.85m.

Answer Key

1. c) Steel
2. b) Ultrasonic waves
3. b) BD.
4. b) The tuning fork vibrates to and fro to produce sound.
5. a) a
6. Bees generate sound by rapidly moving their wings, producing frequencies between 20 Hz and 20,000 Hz, which fall within the audible range. In contrast, a pendulum emits sound at frequencies below 20 Hz, making it inaudible to the human ear.
7. Ultrasonic waves are used to detect defects in metal blocks. Here's how it works:
   a) Sending Ultrasound waves: High-frequency sound waves (ultrasound) are sent into the metal block using a probe.
   b) Travelling through metal: These waves move through the metal smoothly if there are no defects.
   c) Reflected waves from defects: If there are cracks or holes in the metal, the ultrasound waves get reflected differently.
   d) Detection of defects: The reflected waves are picked up by a detector, and the time taken for reflection helps in locating the defect.
   e) Analysing the result: The pattern of reflected waves is studied to find out the size and position of the defect.
8. The ceiling and walls behind the stage of good conference halls or concert halls are curved to ensure the reflected sound reaches equally to all the audience.
9. 

10. Relationship between Sound speed, wavelength, and frequency

$$speed = \frac{distance}{time}$$

$$v = \frac{wavelength}{time}$$

Frequency = $\frac{1}{time}$

speed = $avelength \times frequency$

a) Wavelength = $\frac{speed}{frequency}$

= Wavelength = $\frac{340}{256}$

Wavelength is 1.32m

b) frequency = $\frac{speed}{wavelength}$

Frequency = $\frac{340}{0.85}$

= 400 Hz

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

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Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
		Chapter: Sound		
Roll No.	Name of the Student	Level 1	Level 2	Level 3

Chapter 12 : Improvement in Food Resources

Activity 1 Strategies to Improve Quality and Yield of Crops and Livestock

35 mins

Materials Required

Colour, notebook, and pencil.

Instructions

- Divide the class into three groups.
- Ask each group to nominate a group leader who will coordinate the activity.
- Prepare three chits, each containing one of the following topics:
  - (A) Crop variety improvement
  - (B) Crop production management
  - (C) Animal husbandry
- Invite the group leaders to come forward and draw one chit randomly. This will be their group's topic.
- Instruct the groups to research their assigned topic using their textbooks and other classroom resources.
- Encourage them to find key points, real-life examples, and relevant data or diagrams.
- Ask students to prepare a short group presentation (5-7 minutes) based on their topic.
- Encourage students' creativity! They can:
  - Create flashcards, posters, or models
  - Use role play or storytelling
  - Include a short quiz or question for the class
- Ask each group to come forward and present their topic to the class.
  (Note for the teacher: Ensure that all members of the group participate in the activity.)
- After each presentation, invite the rest of the class to ask questions or clarify doubts.
- Encourage meaningful discussion. Guide learners to provide logical explanations and correct misconceptions, if any.
- Facilitate the discussion by providing prompts or supporting questions.
  (Note for the teacher: Step in only when necessary to correct inaccuracies or deepen understanding.)
- Conclude the activity by summarising the three approaches.
- Highlight how these practices contribute to increased productivity and sustainability in agriculture.
- Appreciate the efforts of all groups for their creativity and teamwork.
- Write the following questions on the board and discuss them with students:
  - Which method do you think has the most long-term benefits and why?
  - How can farmers balance quantity and quality in production?

Activity 2 Roleplay on Methods of Animal Husbandry

35 mins

Materials Required

Paper, glue, and colours

Instructions

- Divide the class into two groups.
- Assign the following topics to each group:
  - Group 1: Poultry Farming and Cattle Farming
  - Group 2: Fish Production and Beekeeping
- Encourage students to divide roles (e.g., farmers, veterinarians, scientists, animals, buyers, etc.)
- Ask students to use textbooks and class notes to include accurate information.

  (Note for the teacher: Encourage student creativity, encourage students to incorporate dialogue, props (e.g., handmade signs or hats), or background sounds if available.)
- Provide each group 10 minutes for script writing and practice.
- Circulate among the groups to guide, clarify doubts, and ensure all members are involved. Ask each group to perform their roleplay in front of the class.

  (Note for the teacher: Ensure respectful listening and engagement from the class.)
- After each roleplay, facilitate a brief discussion by asking:
  - What techniques did the farmers in the play use to improve production?
  - What problems were shown, and how were they solved?
- Summarise the key learnings from both presentations. Reinforce the idea that animal husbandry contributes significantly to food security, income, and rural livelihoods when modern techniques are applied.
- Appreciate the creativity, teamwork, and knowledge displayed by both groups.

Activity 3 Grow It Better!

35 mins

Materials Required

Small pots or containers with holes at the bottom, soil, pre-germinated moong seedlings, water, markers, fertilisers, samples: Pot A: No fertiliser, Pot B: organic compost, Pot C: Urea (can use school-safe alternatives like soaked pulses water)

Instructions

- Divide students into small groups of 4-5.
- Begin the activity by briefly discussing how fertilisers help in the improvement of crop yield.
- Introduce the three types of nutrient inputs being tested: no fertiliser, organic, and chemical.
- Provide each group with 3 pots filled with equal amounts of soil.
- Ask students to label the pots as A (no fertiliser), B (organic), and C (chemical).
  (Note for the teacher: Provide students with pre-germinated seedlings to the students.)
- Ask each group to sow the same number of pre-germinated seedlings in each pot.
- Instruct students to add nothing in pot A, organic compost to pot B, and chemical fertiisers (For example Urea) to Pot C.
- Ask students to keep all these pots in sunlight to observe over a week and report the changes happening in these seeds.
- Ask students to observe and record the appearance of the plants (colour, leaf size, height).
- Write the following questions on the board and discuss them with students:
  - Which pot looks the healthiest now?
  - Which one do you think grows faster and why?
  - What are the pros and cons of using chemical vs. organic fertilisers?
- Conclude the activity by discussing the following points:
  - Importance of nutrients
  - Balanced use of fertilisers
  - Sustainable farming practices
  - Emphasise how even small differences in care can affect yield.

Assessment

35 mins

1. Which of these foods are rich in carbohydrates?
   (a) gram
   (b) wheat
   (c) soyabean
   (d) pigeon pea
2. Which combination of foods would provide a balanced diet?
   (a) pea, black gram, lentil, rice
   (b) rice, maize, millets, sorghum
   (c) rice, lentil, groundnut, vegetables, and fruits
   (d) soybean, groundnut, mustard, sunflower
3. Which of these crops requires more water to grow?
   (a) peas
   (b) gram
   (c) paddy
   (d) wheat
4. What is the main input used in organic farming to enrich the soil?
   (a) manure
   (b) fertilisers
   (c) herbicides
   (d) pesticides
5. A soil sample has adequate water holding capacity but is deficient in phosphorus and potassium. Which of these would improve the quality of crops grown in that field?
   I. Removing weeds
   II. Applying fertilisers
   III. Modifying the irrigation system
   IV. Growing two different crops at the same time.
6. State the difference between compost and vermi-compost.
7. What decides the quantity and quality of honey production in an apiary?
8. How are crops useful to us? What do they provide?
9. What are the factors for which the variety improvement of crops is done?
10. What are the different patterns of cropping?

Answer Key

1. b) Wheat
2. c) rice, lentil, groundnut, vegetables, and fruits
3. c) Paddy
4. a) manure
5. b) Applying fertilisers
6.

Compost	Vermi-compost
The compost is obtained by decomposition of organic waste like animal excreta, plant waste, etc., naturally due to decomposition by bacteria.	To hasten the process of decomposition, redworms (earthworms) are added to this organic matter to obtain compost.

7. For quality of honey: The pasturage, i.e., the kind of flowers available to the bees for nectar and pollen collection, will determine the taste of the honey. For the quantity of honey: Variety of bees used for the collection of honey. For example, *A. mellifera* is used to increase the yield of honey.
8. Crops provide us with food for our daily body nutrients. Carbohydrate for energy

   Requirement – Cereals such as wheat, rice, and maize.

   Protein for body building — Pulses like gram, lentil

   Fats for energy — Oil seeds like mustard, sunflower

   Vitamins and minerals — From vegetables, spices, and fruits

   Fodder crops — For livestock
9. (a) Higher yield: It increases the production of the crop.

   (b) Biotic and abiotic resistance: The Crop should be resistant to biotic factors like diseases, insects, pests, and abiotic factors like drought, salinity, heat, cold, frost, and waterlogging.

   (c) Change in maturity duration: Short-duration maturity allows farmers to grow more crops in a year and reduces the cost of crop production.

   (d) Wider adaptability: The Crop should be able to adapt to changing environmental conditions.

   (e) Desirable agronomic characteristics: The tallness and dwarfness of the crop. Dwarfness is required for cereals, so that fewer nutrients are consumed.
10. Different ways/patterns/systems of growing crops are:

    (a) Mixed cropping

    (b) Inter-cropping

    (c) Crop rotation.

    Mixed cropping: It is a method in which two or more crops grow simultaneously on the same piece of land. Examples: Wheat + grain, wheat + mustard, or groundnut + sunflower.

    This helps reduce risk factors and provides insurance against the failure of one of the crops.

    Inter-cropping: It is a method of growing two or more crops simultaneously on the same field in a definite pattern. A few rows of one crop alternate with a few rows of the second crop. Example, soyabean + maize or bajra + lobia

    Crop rotation: The growing of different crops on a piece of land in a preplanned succession is known as crop rotation. The availability of moisture and irrigation facilities decides the choice of crop to be cultivated after one harvest.

Learning Level Tracker

Keep a record of unit/chapter assessment results in the tracker.

As you conduct assessments based on the activities suggested, put a tick mark as per the following:

Level 1: Not able to solve problems and having difficulty comprehending the problem

Level 2: Solves most of the problems with external support

Level 3: Solves problems independently

Name of the School:	**UDISE:**
Block:	**District:**
Name of the Teacher:	**Assessment Date:**

Class: 9		Subject: Science		
Roll No.	Name of the Student	Chapter: Improvement in Food Resources		
		Level 1	Level 2	Level 3

Government of Meghalaya
Education Department

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