



Unit 1

Geography

Fundamentals of Geography

Topic :

Concept of Geography, Evolution and themes of Geography.

Relationships with other disciplines and Branches of Geography.

Periods : 4

Learning objectives :

Understand the importance of Geography. Describe the traditions and themes of Geography.

Know the branches of Geography.

Learning outcomes :

Realize the importance of Geography.

Compare the traditions of geography with themes of Geography.

Examine the evolution of Geography

List out the branches of Geography.

Teaching – Learning Materials :

Chart on Branches of Geography, and Map of the world.

Grouping the learners:

Transactional Strategy:

Teaching – learning activities:

Introduction:

Teacher Activity:

- Starts with pep talk on the scope of Geography.
- Tells a real story of a Geographer (Humboldt) who contributed to Geography.
- Narrates the values that Geography teaches us through its rich content.

Brain storming:

- Who is called as the Father of Geography?
- Why is Geography called as “the Mother of all sciences”?

Students:

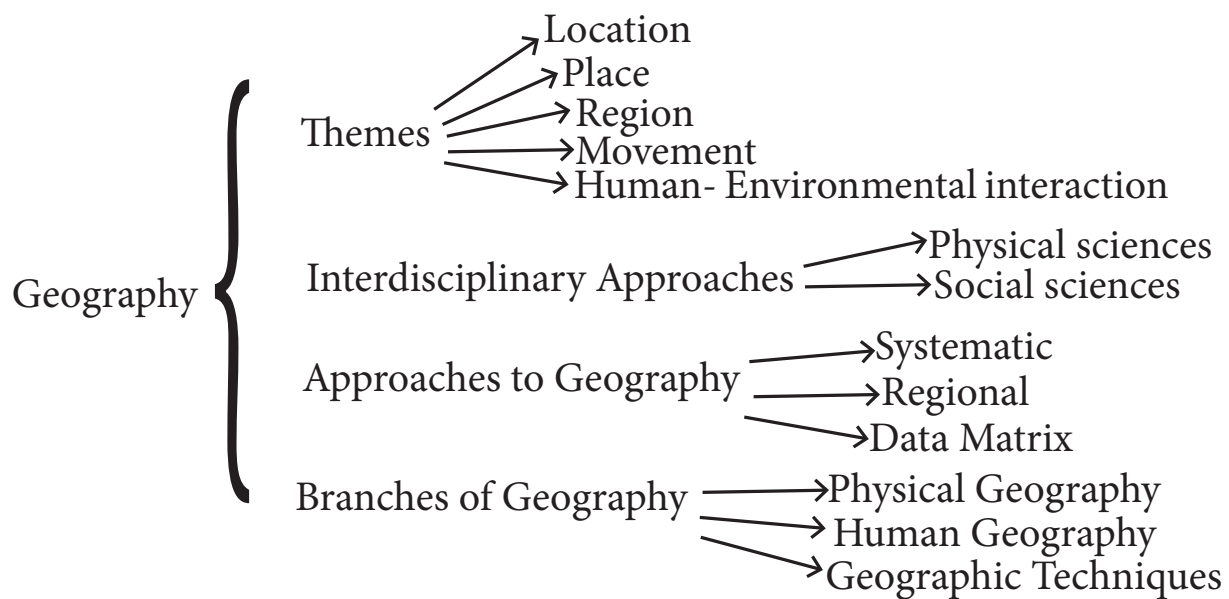
- Interact with teacher and extract more info from teacher, on the scope of Geography.

Development:

Teacher activity:

- Writes key terms and explains in detail the following:





Student activity:

- Collect the hints from the explanation.
- Interact with teacher and raise doubts if

Conclusion:

Teacher:

- Divides the students in to four groups namely Eratosthenes, Humboldt, Ratzel and Ritter and instructs them to compete in the quiz scheduled to be conducted.
- Facilitates the quiz program and maintains the discipline among the students.

Students:

- Sit as a team in a circle, discuss and respond to the questions tossed to them.
1. The term 'Geography' was coined by the Greek scholar
 - a. Eratosthenes
 - b. Ritter
 - c. Humboldt
 - d. Ratzel





2. The archaeological discovery of a Babylonian clay tablet map showing evolution of Geography that dates back to.
a. 500 BCE **b. 600 BCE** c. 300 BCE d. 200 BCE
3. All of the geographers have contributed to the development and enrichment of the Geography except,
a. The Romans b. The Arabs c. The Indians, **d. The Australians**
4. All of the given are from Greek school of Geography except,
a. Thales b. Aristotle **c. Humboldt** d. Eratosthenes
5. The book “Kosmos” was written by
a. Humboldt b. Ritter c. Ratzel d. Thales
6. All of the following are proponents of environmental deterministic school of thought except,
a. Mackinder b. Ellen Semple c. Huntington **d. la Blache**
7. Nomothetic approach in Geography was introduced by.
a. Humbolt b. Ritter c. Ratzel d. Eratosthenes
8. The first person to describe the phenomenon and cause of human-induced climate change, in 1800 was
a. Mackinder b. Ritter c. Ellen Semple **d. Humbolt**
9. Study of geographical aspects of origin, diffusion and distribution of various communicable diseases and health care planning.
a. Medical Geography b. Population Geography
c. Historical Geography d. Economic Geography
10. The practice of collecting, analyzing and presenting data that has a geographic or areal dimension, such as census data is known as.
a. Mathematical Geography b. Cartography
c. Statistical Geography d. Population Geography





11. All of the following are from German school of Geography except,
- a. Alexander Von Humboldt b. Carl Ritter
- c. Friedrich Ratzel **d. Mackinder**
12. The earliest map of the world was prepared by
- a. Ptolemy** b. Eratosthenes c. Thales d. Herodotus
13. The study of the origin, development and change of landforms is called
- a. Oceanography b. Hydrology
- c. Geomorphology** d. Climatology
14. The study of the realm of water and water cycle.
- a. Climatology b. Meteorology
- c. Hydrology** d. Geomorphology





Unit 2

Geography

The Solar System and the earth

Topic :

Theories of the earth's origin and origin of the universe

Star and Constellation

Solar System

Periods : 4

Learning objectives :

Understand the theories of the origin of universe.

Describe the sun and its family.

Know the special features of various planets.

Learning outcomes :

Know the Various aspects of the origin of the universe.

Identify the Planets and differentiate the planet and dwarf planet.

Understand the special features of the asteroids, comets and meteors.

Teaching – Learning Materials :

Origin of the Universe- Video.

The Solar System - Video and Chart
and Structure of the sun - Chart.

Grouping the learners:

Grouping the students into six as Star, Planet, Satellite, Asteroid, Comet and Meteor.

Transactional Strategy:

Teaching – learning activities:

Introduction:

Teacher Activity:

- Starts a lesson with a story related to the topic.
- Introduces the topic and sub topic. Shows the universe and planets with the help of video.

Motivation:

Brain storming:

- How big is the Universe? Have you ever thought what is beyond the Universe?

Student activity:

- Every group discusses about and responds to the above questions

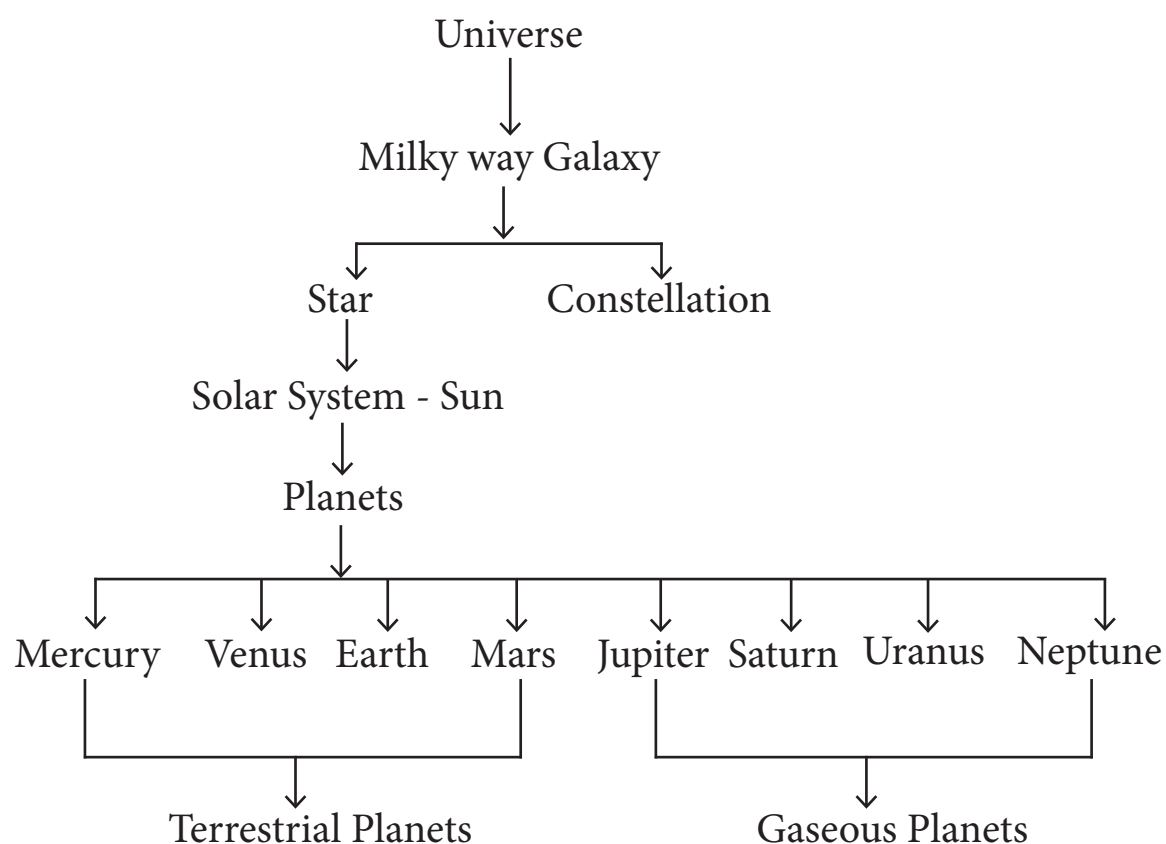
Teacher:

- Encourages the participants, adds a few facts – Twin planet and Titan.

Development:

Teacher:

- Writes and explains a few key terms showing in the charts of the universe and solar system.



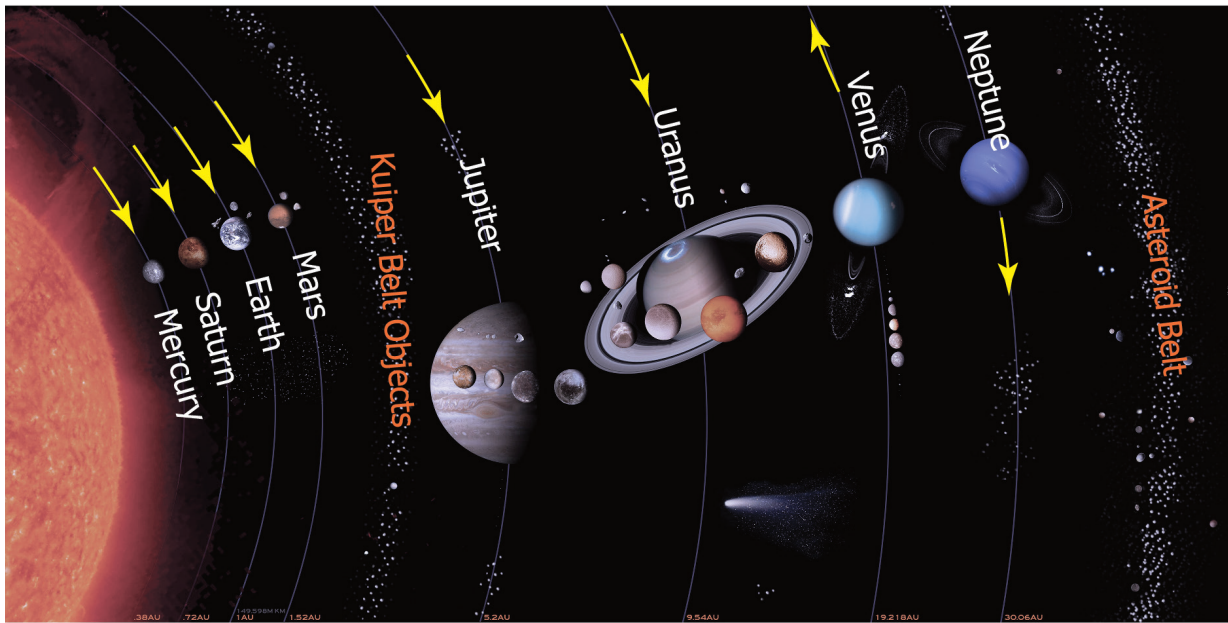
Satellites - asteroids - comets and meteors



Let us have a glance at the distance of the planets from the sun.....

Student:

- When asked, find out errors in the diagram of solar system.



Teacher:

- Encourages students to ask doubts if any.

Students:

- Collect hints in their notebook, interacts with and clarify their doubts about

Teacher:

- Divides the black board in eight columns, write title as given below and asks each group to try out its special features.

	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Size								
Distance from Sun in Million km								
Number of satellites								



Period of Revolution								
Period of Rotation								
Inner/Outer planet								

Students:

- One by one from each group, write their response in the space provided in the Black board

Teacher:

- Ensures that everyone takes part in.
- calls others to check and correct the responses made.

Conclusion :I

Teacher:

- Wraps up the lesson and prepares to conduct quiz.
- Divides students into six teams as mentioned above.
- Tosses questions to the teams and allots mock marks to their response.
- Appreciates the participants and encourages slow learners to participate in.

Students: Will answer the following questions.

1. Name the galaxy which belongs to the earth.

- a. Spiral Galaxies b. Elliptical Galaxies
- c. Irregular Galaxies d. linear Galaxies.

2. -----is the closest star to the sun

- a. Proxima Centauri b. Ursa Major
- c. Pole star d. Sirius





3. -----is known as blue planet
- a. The Venus b. The Mars
- c. The Earth** d. The Mercury
4. -----is the visible surface of the sun
- a. corona **b. photosphere**
- c. chromospheres d. Surface flow
5. ----- is the Giant Gas Planet.
- a. The Venus b. The Mars
- c. The Jupiter** d. The Earth
6. -----planet is the only planet whose average density is less than the water .
- a. The Uranus **b. The Saturn**
- c. The Neptune d. The Jupiter
7. Which Planet known as Earth's Sister?
- a. The Venus** b. The Mars
- c. The Jupiter d. The Saturn
8. Name the dwarf planet which lies between Mars and Jupiter.
- a. Ceres** b. Pluto
- c. Heumea d. Titan
9. Asteroids are found between the -----planets
- a. The Venus and the Mars b. The Jupiter and The Saturn
- c. The Mars and The Jupiter** d. The Mars and The Earth





Part 2

Geography

The Solar System and the Earth

10. -----is the rolling planet heavenly bodies.

a. The Uranus
Saturn

b. The

c. The Neptune
Mercury

d. The

11. Name the planet which has more number of satellites

a. The Venus
Mars

b. The

c. The Jupiter
Mercury

d. The

12. -----is the nearest to the earth

a. The Venus
Mars

b. The

c. The Jupiter
Saturn

d. The

1. Prepare the answer for part –III in the book exercise. Collect the information about the journey to space.

Assessment Activities:

1. Collect the information from the various newspaper about discovery of new planets , dwarf planets , asteroids and its related news or prepare a album related to solar system

Topic:

Shape and the size of the Earth.

Motions of the Earth and its results

Time Zones of the world

Learning objectives:

Understand the Shape and the size of the Earth.

Know the Motions of the Earth and its results.

Calculate the local time of a place.

Learning outcomes:

Estimate the Motions of the Earth and its results.

Know the Shape of the earth

1. Student as a reporter:

As informed by the teacher, one or two students from the each group stand before the class, act like news reporter or reader and brief about what they learned from the lesson taught. They may rise doubt, express about certain points that they are yet to understand or need better understanding.

Assignment:

Collect the information about





Learn to calculate the local time of a place.

Teaching – Learning materials:

Model of rotation and revolution of the or chart showing

Rotation and Revolution

Sky watch - rotation - video and chart - Time Zones

Grouping the learners:

Grouping the students into four namely Mercury, Mars, Jupiter and Neptune.

Transactional strategy:

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with observation of sun rise and its angles. Write the topic on the black board and its sub topics.

Motivation:

Brain storming:

Does the Sun rotate like the Earth? How is a planet held in an elliptical orbit?

Student activity:

- Every group discusses about and then responds to the above questions.

Development:

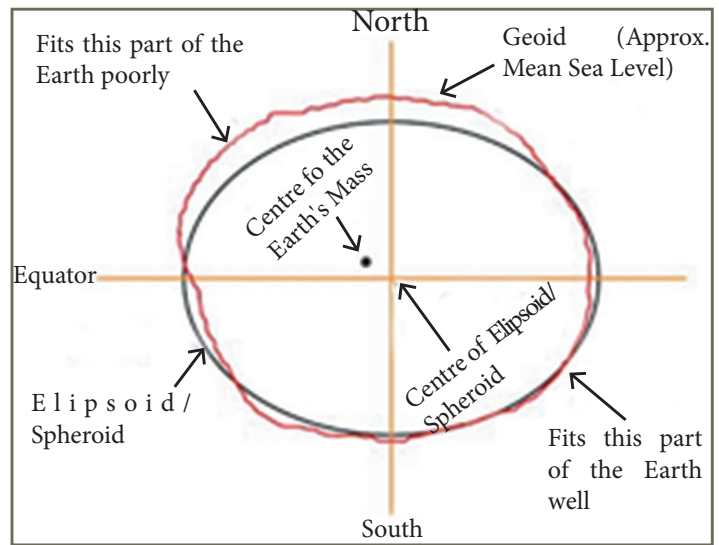
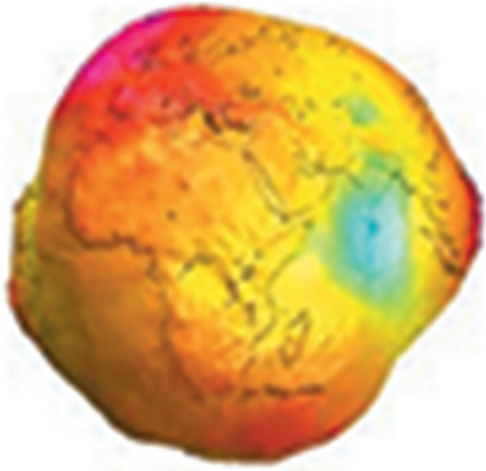
Teacher:

- Writes and explains a few key terms, displaying the flow chart, the shape and the size of the earth, rotation and revolution, earth's orbit , perihelion , aphelion, equinox and solstice.

Shape - Geoids:



GEOID SHAPE OF THE EARTH



C. Evidence of Earth's Shape

1. Photography from space reveal that Earth is Round

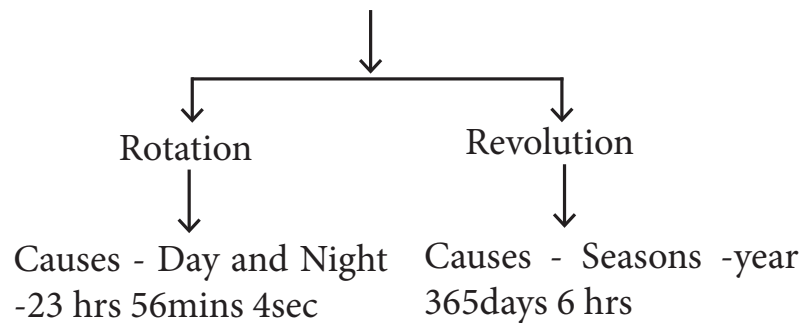


- ## 2. Observations of ships on the horizon



The gradual "appearance" or "disappearance" of a ship over the horizon is evidence that earth's surface is Curved

MOTIONS OF THE EARTH



TIME ZONES

[illegible]

International date line
Decreases 1hrs towards west for every 15° W
Greenwich meridian or prime meridian
Increases 1hrs towards East for every 15° E
International date line

Student:

When asked, do role play of how solar system with 8 planets move about.

- Teacher:**
- Show the pictures of shape of the earth- proof.
 - Explains rotation and revolution of the earth and the results.

- Students:**
- Take hints in their notebook and may ask the doubts about

- Teacher:**
- After discussion divides the black board into four columns, write title as given below and asks each group to try it out.

S.no	Motion of the earth	Speed	Results
1	Rotation		
2	Revolution		

II. Eclipses:

S. No	types of eclipse	Time of occurrence	Results
1	Partial solar eclipse		
2	Annular solar eclipse		
3.	Total solar eclipse		
4	Partial lunar eclipse		
5	Penumbral lunar eclipse		
6	Total lunar eclipse		

III. Calculate The Times:

180°W	165°	150°	135°	120°	105°	90°	75°	60°	45°	30°	15°	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°E
												Greenwich meridian or prime meridian												

Students:

one by one from each group, write their response in the space provided in the Black board



Teacher:

ensures that everyone takes part in. check and correct the responses made.

Conclusion:

Teacher:

Sum up the lessons taught in the class and conduct quiz or ask the oral questions.

Divides the students into four team as mentioned above.

Tosses questions to the teams and allot the marks to their response.

Appreciates the participants and encourages slow learners to participate in.

Students:

will answer the following questions.

1. ----- believed that the earth is a sphere.
a. Pythagoras b. Aristotle c. Eratosthenes d. Humbolt
2. ----- estimated the size of the earth
a. Pythagoras b. Aristotle **c. Eratosthenes** d. Ratzel
3. The earth takes----- to complete one revolution
a. 365days 6 hrs b. 366 days 6 hrs
c. 365 days 4 hrs d. 365 days 3 hrs
4. The Earth's axis is inclined at an angle of -----
a. 23 ½° b. 66 ½° c. 90° d. 45°
5. Tide is caused by ----- of the earth apart from gravitational pull of the sun and the moon
a. rotation b. revolution c. aphelion d. Galactic moment





6. The length of the day time at 90° north during winter solstice is -----
a. 0hrs 00mins b. 24 hrs c. 12hrs d. 6 hrs
7. The apparent movement of the sun is overhead Tropic of cancer
a. December-22 b. March-21 **c. June -21** d. September-23
8. -----Meridian is known as Sunday Monday line
a. 180° b. 90° c. 0° d. 60°
9. 180° Meridian is known as -----
a. Closest meridian b. prime meridian
c. International date line d. Equator
10. The space shuttle first flew into the earth's orbit
a. Columbia b. Atlantis c. Sputnik d. voyager 1

II.

2. Student as a reporter

As informed by the teacher, one or two students from the each group stand before the class, act like news reporter or reader and brief about what they learned from the lesson taught. They may rise doubt, express about certain points that they are yet to understand or need better understanding.

Assignment:

Find out the answer for multiple choice question in the text book exercise.

Assessment Activities:

1. Find out the answer with help of books , what would happen if the earth did not rotate ?
2. How many times does the earth rotate on its axis to complete one revolution?
3. Which meridian is known as the Sunday Monday line and why?





Unit 3

Geography

Endogenic Processes

Topic :

Lithosphere - Layers of the earth

Transactional strategy:

Teaching – learning activities:

Learning objectives :

Understand the classification of layers of the earth.

Describe the elements found in and the temperature variations in each layer.

Know the margins of each layer of the earth.

Introduction:

Teacher activity: starts with pep talks related to, introduces the topic “Lithosphere – Endogenic Processes”, writes the topic on the B.B and divides the Black Board into four columns for sub topics and explanatory hints to be written on.

Motivation:

1. Brain storming: Could we dig the earth right through and go? Did anybody try to go through the earth?

Learning outcomes:

Divide and differentiate the layers of the Earth.

Identify the elements found in and depth of each layer.

Reason out for naming margins of layers of the earth.

Student activity:

Every group discusses about and responds to the above question.

Teaching – Learning materials:

Diorama of Layers of the earth.
Chart, Video.

Teacher:

Appreciates the participants, adds a few facts – Kola super bore Hole (Russia), 12.3 km deep, took 24 years to dig and helped to define boundary between inner core and outer core.

Grouping the learners:

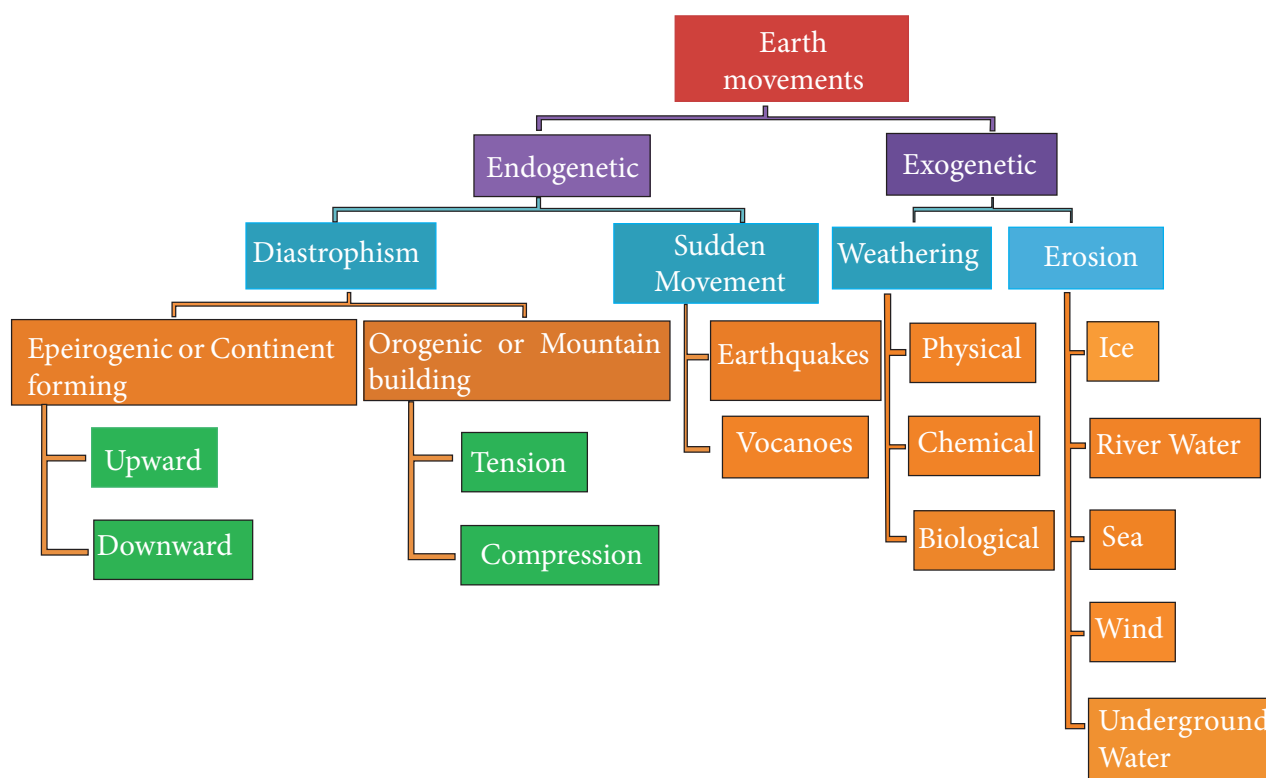
Grouping the students into four namely The Fold Mountains, the African Rift Valley, The Bhuj Earthquake and The Hawaii Volcano.

Development:

Teacher:

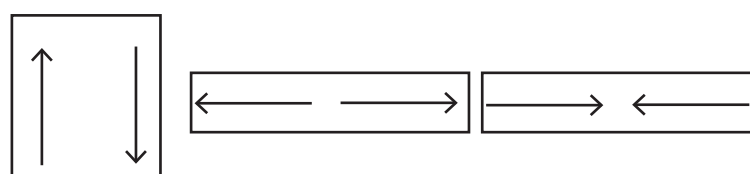
Writes and explains a few key terms displaying the flow chart of Earth's forces.





Student:

When asked, draws the suitable arrow marks to express the directions the continents move towards (upward, downward, tension and compression).



Teacher:

Shows the diorama of the interior of the earth, explains the divisions, elements found in, temperature, margins and depth of the layers and asks each group to remember one characteristic of each layer. Teacher encourages students to ask doubts if any.

Students:

Collect hints in their notebook, interacts with and may raise doubts about.

Teacher:

After discussion, divides the Black Board into four columns, writes title as given below and asks each team to try it out.



S.No	Layer of earth	Boundary	Depth	Elements	Any
1.					
2.					
3.					
4.					
5					
6.					

Students:

one by one from each group, write their response in the space provided.

Teacher:

ensures that everyone takes part in. calls others to check and correct the responses made.

Conclusion:

I

Teacher:

Wraps up the lesson by conducting quiz.

Divides the class into four teams as mentioned above.

Tosses questions to the teams and allots mock marks to their response.

Appreciates the participants and encourages slow learners to participate in.

Students:

will answer the following questions.

1. Which metal is most abundant in the earth's crust?

1. Calcium

2. Potassium

3. Aluminum

4. Iron





2. The core of the earth is also known as
 1. Lithosphere
 2. Mesosphere
 3. Barysphere
 4. Centrospheres
3. The lightest layer of the earth is
 1. Nife
 2. Sima
 3. Mantle
 4. Sial
4. What is the name of the layer that contains the uppermost mantle and crust?
 1. Asthenosphere
 2. Mesosphere
 3. Lithosphere
 4. Barysphere
5. This layer of Earth is solid Iron and Nickel
 1. Outer Core
 2. Mantle
 3. Inner Core
 4. Crust
6. This layer of Earth is the thickest part.
 1. crust
 2. outer core
 3. mantle
 4. inner core





7. Which layer of the earth has the earth's surface?
 1. Crust
 2. Mantle
 3. Outer Core
 4. Inner Core
8. From which layer of the earth does lava come from?
 1. Crust
 2. upper Mantle
 3. Outer Core
 4. Inner Core
9. Which layer of the earth is much thinner than the others?
 1. Crust
 2. Mantle
 3. Outer Core
 4. Inner Core
10. This layer of the earth is made up of soft rock that flows.
 1. crust
 2. lithosphere
 3. asthenosphere
 4. outer core
11. This part of the Earth has the greatest temperature
 1. crust
 2. mantle
 3. outer core
 4. inner core





12. In which layer do convection currents occur?
1. Asthenosphere
 2. Crust
 3. Lithosphere
 4. Inner core
13. Which layer of the Earth is the hottest? Why?
14. What is the major difference between the outer core and inner core?
15. Why is the inner core solid?

Answers:

- | | | | |
|---------------|-------------------|----------------|-------------------|
| 1. Aluminum | 2. Barysphere | 3. Sial | 4. Asthenosphere |
| 5. Inner Core | 6. inner core | 7. Crust | 8. Outer Core |
| 9. Crust | 10. Asthenosphere | 11. inner core | 12. Asthenosphere |

13. The inner core is the hottest layer of the earth. It is due to the fact that the temperature increases towards the interior of the earth at the rate of 1°C for every 32 meter.

- | 14. <u>Outer core</u> | <u>Inner core</u> |
|--------------------------------------|-----------------------|
| 1. Liquid state | 1. Solid state |
| 2. Not hotter than inner core | 2. The hottest of all |
| 3. Extended between 2900 and 5150 km | 3. 5150 – 6370 km |

15. Inner core is solid due to high pressure from all sides and extreme temperature.

II.

3. Student as a reporter

As informed by the teacher, one or two students stand before the class, act like news reporter and brief about what they learned from the lesson taught. They may raise doubt, express about certain points that they are yet to understand or need better understanding.



Assignment

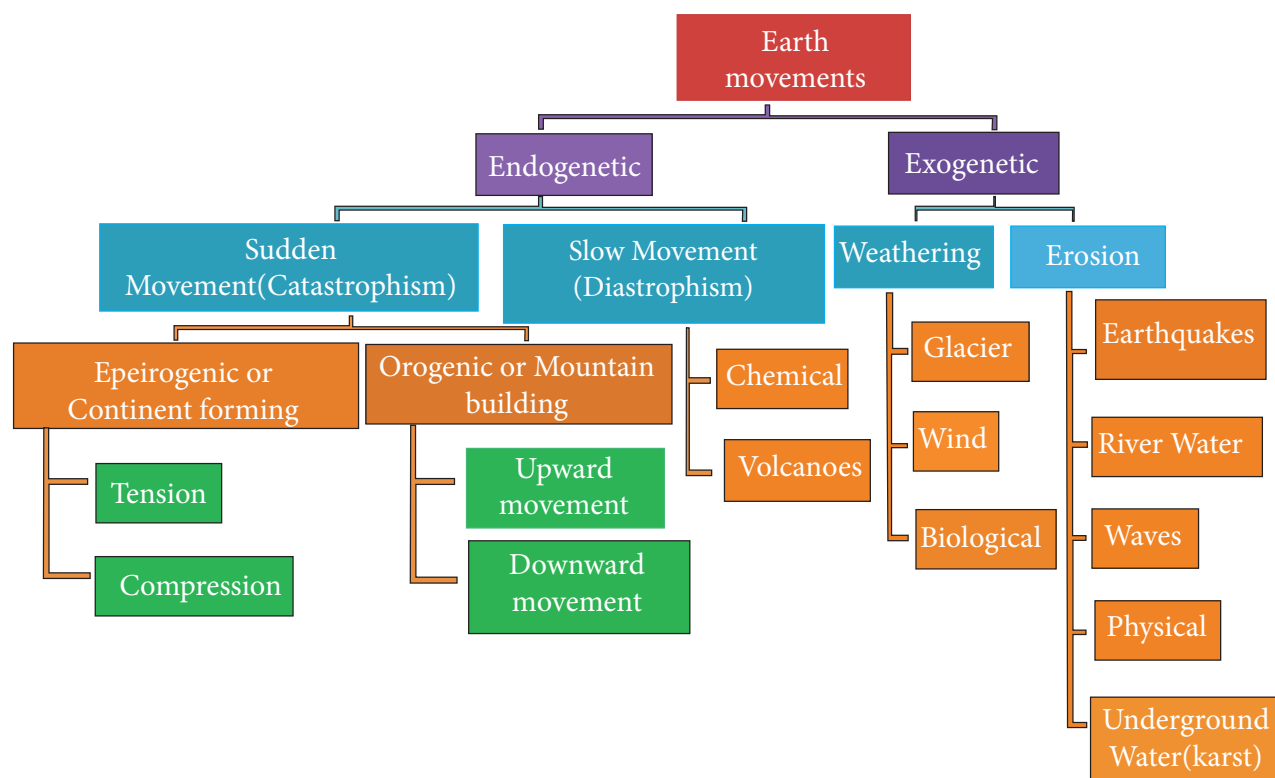
Prepare a set of 15 questions as

2. Match the following
3. Multiple Choice Questions
4. Any two HOT questions

Assessment Activities

- I. Worksheet on Lithosphere – layers of the earth.

Put (×) on the Key words which are misplaced in the infogram and write the correct key words in places.





Part 2

Geography

Endogenic Processes

Topic:

Continental Drift and Plate boundaries

Periods: 3

Learning objectives :

Understand the continental drift theory.

Describe evidences put forward to support continental drift theory.

Know the plate margins.

Learning outcomes:

Identify the geological positions of the continents at different periods.

Evaluate the evidences supporting continental drift theory.

Identify the types of plate margins and understand the impacts of them.

Teaching – Learning materials:

Diorama of plate margins of the earth, Chart, Video.

Grouping the learners:

Grouping the students into four namely The Fold Mountains, The African Rift valley, The Bhuj earthquake and The Hawaii Volcano.

Prior instruction to the students:

You will collect the explanatory hints, frame questions and at the conclusion point each team will ask a set of 10 one word questions to other group, for an instance, team Fold Mountains would ask to the African Rift Valley which in turn would ask the Bhuj Earthquake and so on.

Transactional strategy:

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with recalling of the lesson already taught –Lithosphere – layers of the earth, introduces the topic “Continental drift theory and plate margins”, writes the topic on the blackboard and divides the blackboard into four columns for sub topics – Continental drift theory, evidences, plate margins and explanatory hints to be written on.

Motivation:

Brain storming:

Do the continents move?

Student activity:

- Every group discusses about and responds to the above question.



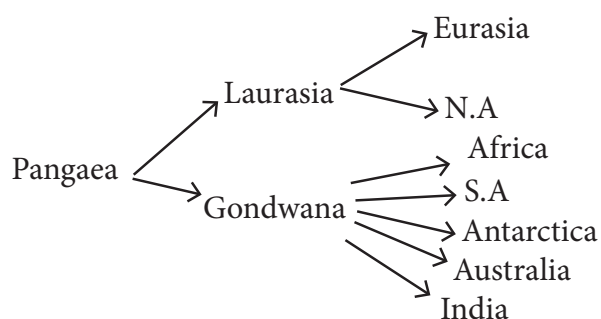
Teacher:

- Asks “when look at the world map which two continents seem to closely fit together?”, appreciates the participants who discuss about, adds a few facts – Silfra rift, Thingvellir park, Iceland where boundary between two plates can be seen.
- Teacher plays video for 2 minutes.

Development:

Teacher:

- Writes and explains a few key terms – Pangaea, Panthalassa, Gondwana, Laurasia, Tethys Sea, Plate margins.
- Gives a brief account of Alfred Wegener.



- Teacher applies Socratic Method throughout teaching -learning process to nag the minds.
- Plays the video of how India split from Africa and moved to north to form the Himalayas.
- Displays the image of a Fern tree and Mesosaurus fossil. Shows on the world map the location of fossils extracted from.

Teacher Activity:

- Explains the characteristics and types of plates using the PPT in smart class.
- Divides the students into continental plates and oceanic plates as one kind and major plates and minor plates as another kind.
- Teacher gives the names of plates to the students.

Students:

- Looking at the map of plate boundaries pair themselves and identify whom each one collides or move away from or move side by side.
- Play the puzzles of assembling the scrambled pieces of different plates.

Teacher:

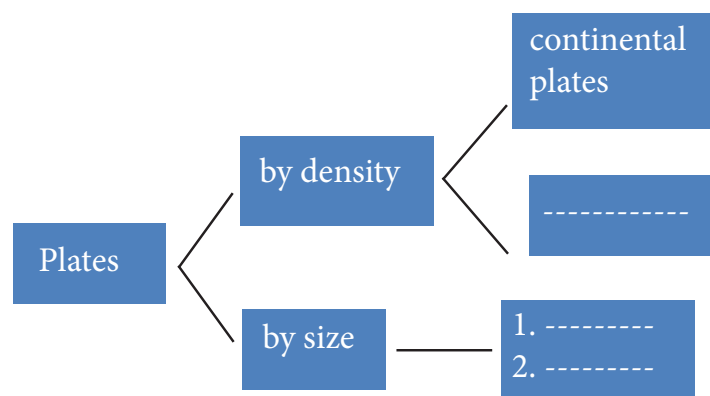
- Appreciates the students to participate in the puzzle.
- Encourages students to ask doubts if any.
- Divides the blackboard into three as divergent, convergent and transform margins and elucidates the characteristics and differences among them.
- Explains the terms – subduction zone, suture zone, trench, Fold Mountains, etc, associated with plate margins.

Students:

- Collect hints in their notebook, interacts with and may raise doubts about.

Teacher:

- After discussion, draw the mind map of plates and plate margins.
- Asks each team to try it out.



S .No	Plate Margin	Direction plates move in	Features associated	Examples	Remarks
1.					
2.					
3.					

Students:

One by one from each group, writes their response in the space provided.

Teacher:

- Ensures that everyone takes part in. calls others to check and correct the responses made.

Conclusion:

Teacher:

- Wraps up the lesson by briefly recalling the important components taught.
- Acts as a facilitator allowing the students to conduct quiz among them.
- Appreciates the participants and encourages slow learners to participate in.

Students:

- Form into four groups as already names. Have a set of 10 questions – 7 MCQs, one Brain storming question, One HOTS question and distinguish question.
- One group would ask to another in wise versa.

Teacher:

- Maintains discipline among the students.
- Allots mock marks and appreciates the participants.

Part 3

Geography

Endogenic Processes

Topic :

Convection cell – Fold – Fault.

form.

Correlate the folding process and the formation of Fold Mountains.

Learning objectives :

Understand the conventional cell and its resultant features.

List the types of fault and find out the features associated with.

Describe fold and its types

Teaching – Learning materials:

Know the fault, types and its characteristics.

Diorama of folds and faults, Chart, Video.

Learning outcomes:

Identify the reason of what causes the convection cell to

Grouping the learners:

Evaluate how different types of fold

Grouping the students into four namely The Fold Mountains, The African Rift valley, The Bhuj earthquake and The Hawaii Volcano.

Prior instruction to the students:

Being in a group you will add one point in favour of the title allotted to you when a student from the other group adds one point .

Transactional strategy:

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with recalling of the lesson already taught – Continental drift-plate margins.
- Ask a few questions from already taught:
- 1. Who proposed the continental drift theory?
- 2. Why do continents move?
- 3. Edges of which two continents geologically have similar structure?
- 5. Wadati – Beniof zone - Define.
- Introduces the topic “Folds and Faults”.

Student activity:

Every group discusses about and responds to the above question.

Teacher:

- Writes the topic on the blackboard and divides the blackboard into columns for sub topics – Fold –types of fold, Fold

Mountains; Faults –types of fault and explanatory hints to be written on.

Motivation:

Brain storming:

Why are the Fold Mountains located in the edge of the continents? What do they indicate about?

Student activity:

Every group discusses about and responds to the above question.

Teacher:

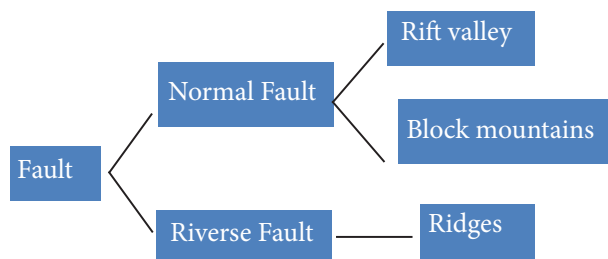
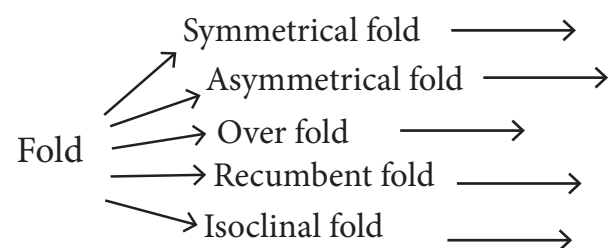
- Teacher plays video of how folding process forming the Himalayas.

Development:

Teacher:

- Writes and explains a few key terms – Folds and Faults

Gradient of limb:





- Teacher applies Socratic Method throughout teaching -learning process to nag the minds.
- Plays the video of how The African Rift Valley formed.

Teacher Activity:

- Explains the characteristics and types of folds and faults.

Students:

- Make note of how each fold is different from other.
- Take hints on Fault and its types with associated features.

S .No	Types of fold	Gradient of limb	Image of folds
1.	Symmetrical fold		
2.	Asymmetrical fold		
3.	Over fold		
4.	Recumbent fold		
5.	Isoclinal fold		

Students:

One by one from each group, write their response in the space provided.

Teacher:

- Ensures that everyone takes part in. calls others to check and correct the responses made.





Conclusion:

Teacher:

- Wraps up the lesson by briefly recalling the important components taught.
- Divides the class into 1. Symmetrical fold vs. Asymmetrical fold
 - 2. Over fold vs. Recumbent fold
 - 3. Normal fault vs. Reverse fault
 - 4. Rift valley vs. Block Mountains.
- Each title has two teams debating for and against. Available points can put forward for supporting their title. One student – one point allocation is preferable.
- Appreciates the participants and encourages slow learners to participate in.

Teacher:

- Maintains discipline among the students.
- Allots mock marks and appreciates the participants.

Assignment :

Four teams will prepare each one set of MCQs from the title: Continental drift , Plate margins, Fold and Fault.

Students:

- Take part in the debate as directed by the teacher.

Part 4

Geography

Endogenic Processes

Topic :

Earthquake and Volcano.

Learning objectives :

Understand the cause, effects and distribution of earthquake.

Explain volcano, its types, distribution and impacts.

Learning outcomes:

Reason out how earthquake and volcano are caused.

Exam the areas of occurrence and its impacts.

Correlate soil fertility and volcanic eruption.

List the intrusive volcanic rocks.





Teaching – Learning materials:

Diorama of folds and faults, Chart, Video.

Grouping the learners:

Grouping the students into active volcano, dormant volcano and extinct volcano.

Prior instruction to the students:

As informed earlier students prepare as a group and present individually their respective title in the class. Rest of the class will interact and debate with the presenters on the topic presented.

Transactional strategy:

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with recalling of the lesson already taught – Fold and Fault
- Ask a few questions from already taught:
 1. What is the difference between symmetrical fold and asymmetrical fold?
 2. Name any four Fold mountains.
 3. Say any two differences between normal fault and reverse fault.
 5. Write a note on the African Rift valley.

Student activity:

Every group discusses about and responds to the above question.

Teacher:

- Introduces the topic “Earthquake and Volcano”.
- Writes the topic on the blackboard and divides the blackboard into columns for sub topics – Earthquake – measurement, areas of occurrence, impacts and Volcano – kind of eruption, kind of volcano, distribution of volcano and impacts and explanatory hints to be written on.

Motivation:

Brain storming:

Do you know where does the earthquake occur the most often? Why?

Student activity:

Every group discusses about and responds to the above question.

Teacher:

- Narrates the 2004 Tsunami associated with underwater earthquake.
- Teacher plays the video of the 2004 Tsunami.
- Plays the video of Hawaii volcano, 2018.





Development:

Teacher:

- Writes key points: Earthquake – parts, seismic waves and types and Volcano – types of eruption and kind of volcano.
- Plays the video of Nepal 2015 earthquake and how to measure the earthquake.
- Shows the diagram of intrusive volcanic structure.
- Invites the participants one by one to come forward and present the given topics:
 1. Seismic waves – primary waves
 2. Secondary waves
 3. Surface waves – Love waves and Rayleigh waves.
 4. Measuring earthquakes – Richter scale and Mercalli scale
 5. Causes and effects of the earthquake
 6. Distribution of earthquakes

Students:

As directed by the teacher in advance, come and present the topic one by one. They use teaching materials prepared. Others interact well with the presenter by asking them a few questions/ doubts.

II.

Teacher:

- explains the word volcano, its origin and myth.

- Draws the volcano, labels it and explains in detail.
- Narrates the Eruption of Krakatau volcano, 1883.
- Explains causes of volcano. Before explaining types of volcano, names the groups as active volcano (A.V), dormant volcano (D.V) and extinct volcano (E.V).
- Explains about shield volcano, composite cone volcano, cinder cone volcano and lava dome volcano.

Students:

- Collect hints and prepare to present as a news reporter during wrap up.

Teacher:

- Divides the class into two major groups and inform them to prepare for a debate on the topic: Volcanic eruption is boon or bane?
- Writes important points delivered by the presenters on the blackboard.
- Will appreciate the participants and encourage passive learners also to involve in.

Students:

- From each group at least 5 students will participate in the debate.
- One from a group will debate followed by one from other group.



Conclusion:

Teacher:

- Prepares the worksheet and asks the students to work out.
- Allots mark for the worksheet.

Students:

- Try the worksheet individually and submit to the teacher.

Worksheet -1 Write the fold mountains, from the box, on the world map





Unit 4

Geography

Exogenic Processes

Topic :

Weathering and Mass wasting.

Learning objectives :

Understand the weathering process and mass wasting.

Elucidate the types of weathering and mass wasting.

Periods : 4

Learning outcomes:

Differentiate physical weathering from chemical weathering.

Evaluate how mass wasting process reshapes the surface of the earth.

Identify the types of mass wasting occurring at different conditions.

Teaching – Learning materials:

Diorama of landforms, Chart, Video.

Grouping the learners:

Grouping the students into four namely The Amazon, The Gangotri, The Yardang and The Lagoon.

Prior instruction to the students:

You will collect the explanatory hints, frame questions and at the conclusion

point each team will ask a set of 10 one word questions to other group, for an instance, team The Amazon would ask to The Gangotri which in turn would ask to The Kras and so on.

Transactional strategy:

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with pep talk, introduces unit .II. Exogenic Processes - the topic “Weathering and Mass wasting”.
- Writes the topic on the blackboard and divides the blackboard into four columns for sub topics – Weathering – physical, chemical and biological weathering, Mass wasting – fall, slide and flow and explanatory hints to be written on.

Motivation:

Brain storming:

You might have seen “the Stone of Sky God” at Mahabalipuram? What made it to get its shape? Guess how many years it might have taken to get such a shape. Think about how it is standing balanced.

Student activity:

Every group discusses about and responds to the above question.



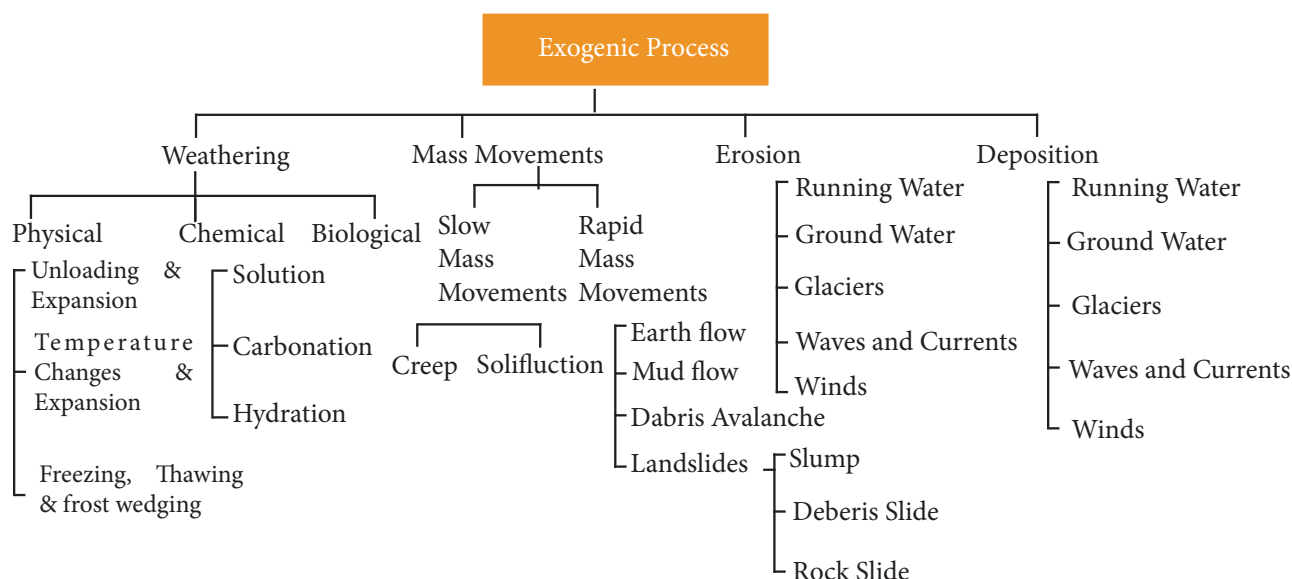
Teacher:

- Distinguishes between endogenic and exogenic process briefly.

Development:

Teacher:

- Writes and explains a few key terms: Weathering – Physical, chemical and biological; Mass wasting – fall, flow and slide.



- Teacher applies Socratic Method throughout teaching -learning process to nag the minds.
- Explains thermal weathering and frost wedging. Calls any two groups/ individuals to debate on thermal weathering vs. frost wedging.
- Asks why onion weathering is called so?
- Explains to the students how to do a story telling: I am a River
- Any two groups/ individuals debate on thermal weathering vs. frost wedging.
- Discuss and respond to why onion weathering is called so.

Students:

Teacher Activity:

- Explains the types of mass wasting using the PPT in smart class.
- Divides the students into flow, fall and slide of rocks.

- Collect hints in their notebook, interacts with and may raise doubts about.

Conclusion:

Teacher:

- Wraps up the lesson by briefly recalling the important components taught.

- Acts as a facilitator allowing the students to have debate on.
- Appreciates the participants and encourages slow learners to participate in.
- Forms groups to distinguish:
 1. Physical weathering vs. chemical weathering.
 2. Thermal weathering vs. frost wedging
 3. Block disintegration vs. granular disintegration
 4. Oxidation vs. Carbonation
 5. Rock fall vs. Rockslide
 6. Debris flow vs. Mudflow

Students:

One by one from each group, will distinguish the following.

Physical weathering vs. chemical weathering.	Thermal weathering vs. frost wedging	Oxidation vs. Carbonation	Rock fall vs. rockslide	Debris flow vs. mudflow	Block disintegration vs. granular disintegration
1.					
2.					
3.					
4.					
5.					
1.					
2.					
3.					
4.					
5.					

Teacher:

- Writes the hints of what students describe about.
- Ensures that everyone takes part in.

Students:

- Narrate the story of a river focusing on the characteristics in three stages.
- Three students can share it and narrate it.

Teacher:

- Maintains discipline among the students.
- Allots mock marks and appreciates the participants.

Assignment:

- Read the worksheet carefully and write the key words and appropriate description.
-





Part 2

Geography

Endogenic Processes

Topic:

Work of River, glacier, ground water and sea waves.

Periods : 8

Learning objectives :

Understand the work and landforms made by river, glacier, groundwater and sea waves.

Elucidate the types of landforms made by external forces.

Learning outcomes:

Differentiate work of a river from that of wind.

Evaluate how external forces reshape the surface of the earth.

Identify the landforms made underground.

Teaching – Learning materials:

Diorama of landforms, Chart, Video.

Grouping the learners:

Grouping the students into four namely The Amazon, The Gangotri, The Kras, The Yardang and The Lagoon.

Prior instruction to the students:

you will collect the explanatory hints, frame questions and at the conclusion point each team will ask a set of 10 one word questions to other group, for an instance, team The Amazon would ask to The Gangotri which in turn would ask to The and so on. Prepare to present a story telling on river, ground water and glacier.

Transactional strategy:

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with pep talk, introduces unit .IV. Exogenic Processes - the topic “Gradational Processes”.
- Writes the topic on the blackboard and divides the blackboard into four columns for sub topics: River, Wind, Glacier, Underground water and Sea waves and explanatory hints to be written on.

Brain storming:

Where is the deepest Canyon in the world?

Do you believe that the river Colorado is older than the Rockies?



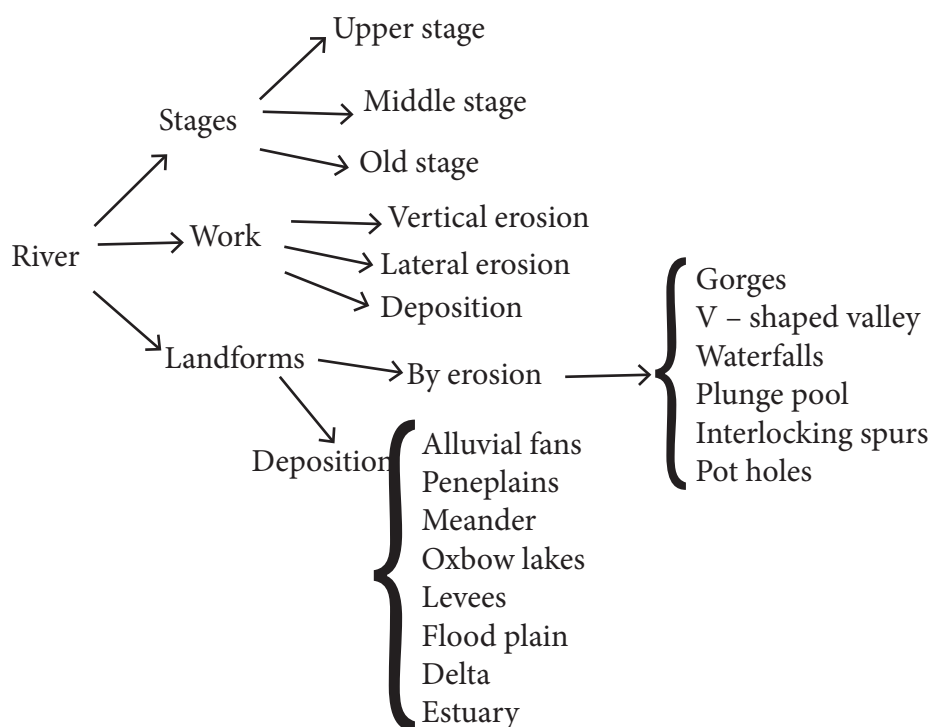
Student activity:

Every group discusses about and responds to the above question.

Development:

Teacher:

- Writes and explains a few key terms: River, Wind, Glacier, Underground water and Sea waves.



- Applies Socratic Method throughout teaching -learning process to nag the minds.
- Explains stages, work and landforms made by river. Calls any two groups/ individuals to debate on upper stage vs. lower stage of a river.
- Asks why vertical erosion is dominant in the upper stage?
- Explains to the students how to do a story telling: I am ground water and I make wonderland!
- Story telling: I am a glacier and I make Icy land!

Students:

Teacher Activity:

- Explains the work of a river, wind, glacier, ground water and sea waves using the PPT in the smart class.
- Any two groups/ individuals will present a story telling.1: I am ground water and I make wonderland!
- Story telling.2: I am a glacier and I make Icy land!

- Discuss and respond to why onion weathering is called so.
- Collect hints in their notebook, interacts with and may raise doubts about.

Conclusion:

Teacher:

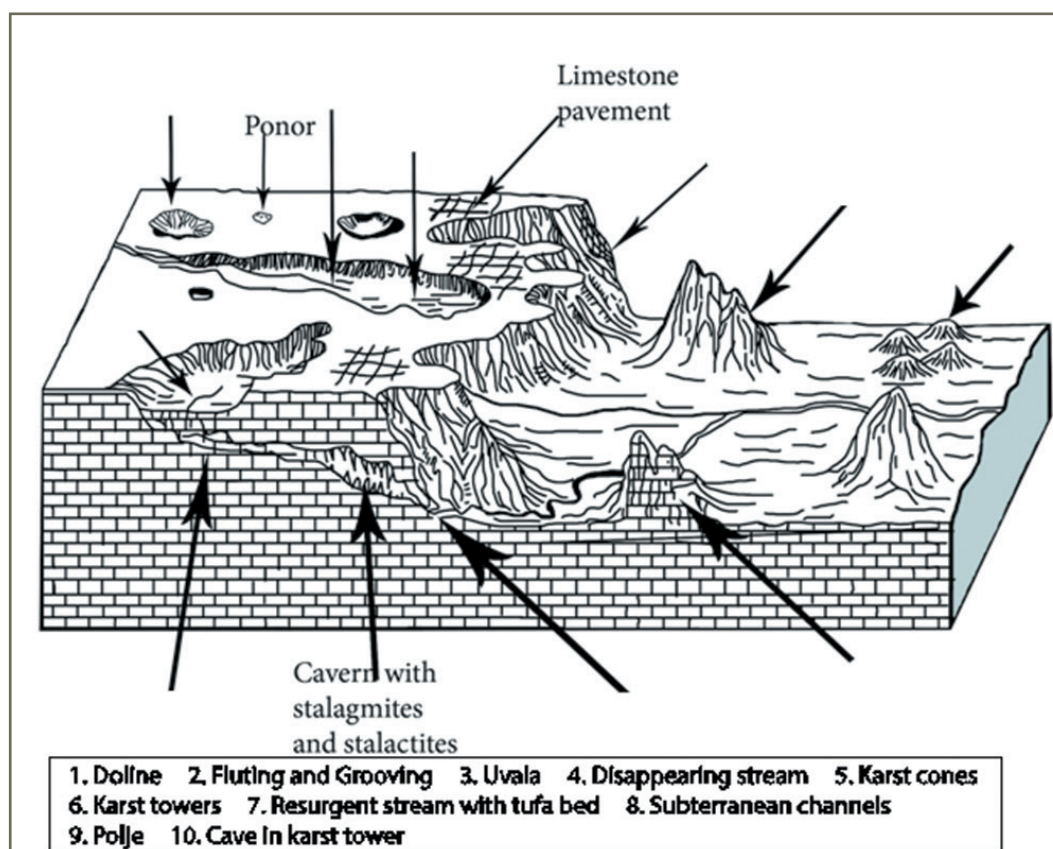
- Wraps up the lesson by briefly recalling the important components taught.
- Acts as a facilitator allowing the students to have debate on “why is the river most prominent external agent of all?”
- Appreciates the participants and encourages slow learners to participate in.

Students:

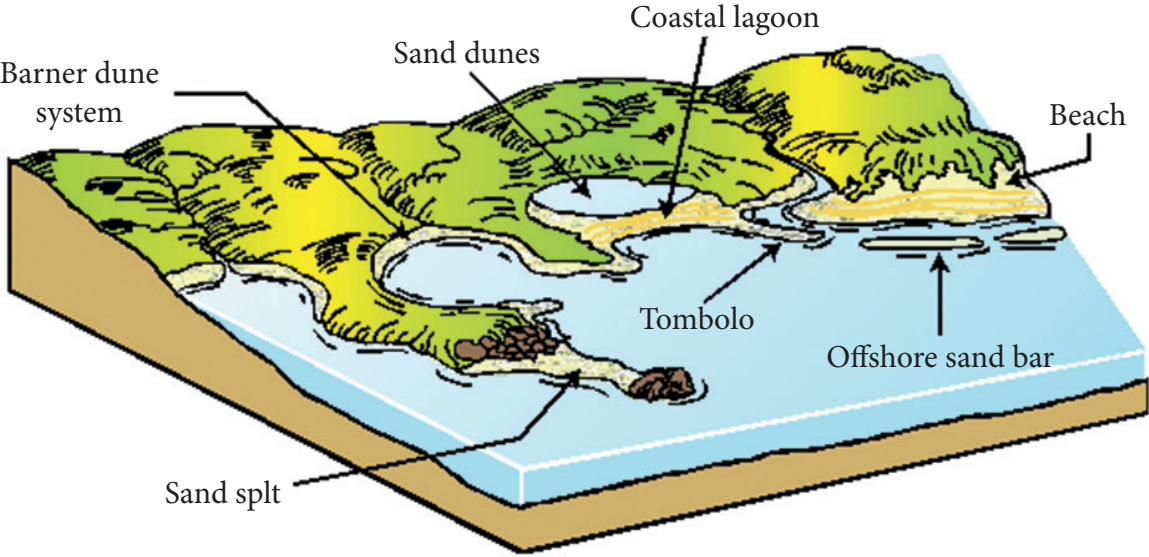
as a group will discuss and express their views on the importance of river as an external force.

Assessment Activity:

Write the key words in space provided from the box.



Identify key words which are wrongly labeled and rewrite them.



Assignment:

Fill in the space provided in the worksheet.

External force	Kind of work	Ways erosion carried out by	Landforms by erosion	Landforms by deposition	Superlatives/ Epithets
River	Erosion	-----	1.	1.	World's longest river is _____ _____
	-----	Corrosion	2.	2.	
	-----	-----	3.	3.	
		-----	4.	4.	
			5.	5.	
			6. grooves	6.	
			7.	7. Estuary	
			8.	8.	
			9.		
Glacier	1.	1.	1.	1.	World's largest glacier is _____ _____
	2.	2.	2.	2.	
	3.		3.	3.	
			4.	4.	
			5. Horn	5. Kames	
			6.		
			7.		
			8.		



Ground water	1. 2. 3.		1. 2. 3. 4. 5. 6.	1. 2. 3. 4.	W o r l d ' s longest cave is _____ _____
Wind	1. 2. 3.	1. 2. 3. Attrition	1. 2. 3. 4.	1. 2. 3.	
Wave	1. 2. 3.	1. 2. 3. Corrosion 4.	1. 2. 3. 4. 5. 6. 7. stump	1. 2. 3. 4. spit 5.	World's longest beach is _____ _____





Unit 5

Geography Hydrosphere

Topic :

Hydrological cycle

Learning objectives :

Understand the importance of hydrosphere.

Describe the difference between ocean and seas.

Know the evolution of oceans, ocean reliefs, temperature, salinity and ocean movements.

Learning outcomes:

Reason out different names for the sea.

Identify the relief features of world oceans.

Appreciate the ocean movements and their influence on the earth's climate.

Teaching – Learning materials:

Diorama of ocean relief, chart, video lessons.

Grouping the learners:

- Students will be divided in to four groups namely a) Freshwaters b) Groundwater c) cryosphere d) ocean water.

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with probing questions; like:
 - Why do we call the earth as blue planet?
 - Introduces the topic 'Hydrosphere'. Writes the topic on the black board and divides the blackboard into four columns for subtopics and explanatory hints to be written on.

Motivation:

Take a look at the map. I have given different colors for different types of water.

- What do you think the reason could be for different colors?
- Show me the widespread color and explain why?

Student activity:

- Each group discusses the questions and responds to it

Teacher:

Appreciates the participants and adds information to it.

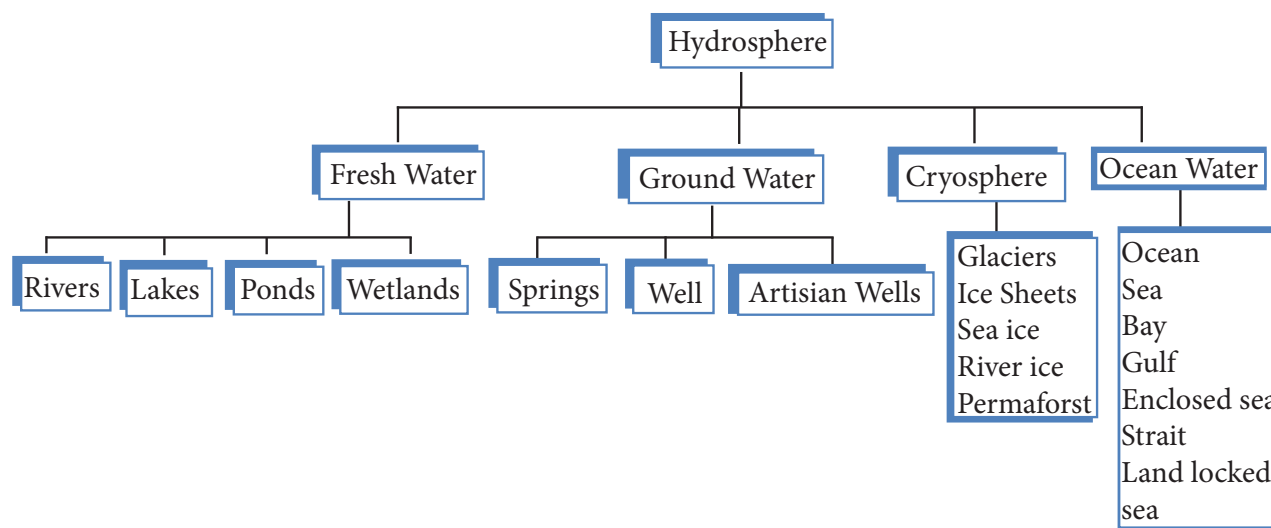
Transactional strategy



Development

Teacher:

Writes and explains a few key terms displaying various water bodies of the earth.



Students:

Collect hints in their note book, interacts with teacher and may raise doubts.

Teacher:

After discussion, divides the blackboard into four columns and writes title as given below.

S. No	Distribution of earth's water	Fresh water	Ground water	cryosphere	Ocean water
1.					

Student:

One by one from each group writes their response in the space provided

Teacher:

- Ensures that everyone takes part in the discussion and encourages the correct responses.



Conclusion

Teacher:

- 1) Wraps up the lesson by conducting quiz
- 2) Divides the class in to four teams as mentioned above.
- 3) Tosses question to the teams and allots mock marks to their response
- 4) Appreciates the participants and encourages slow learners to participate

Student:

will answer the following questions

- 1) Longest river in the world
 - a) River Amazon
 - b) River Nile
 - c) River Ganga
 - d) River Yangtze
- 2) World water day is held annually on?
 - a) April 22
 - b) March 22
 - c) October 22
 - d) January 22
- 3) The upper part of the saturated zone of the aquifer is called?
 - a) Groundwater
 - b) Water table
 - c) Rock table
 - d) Saturated point





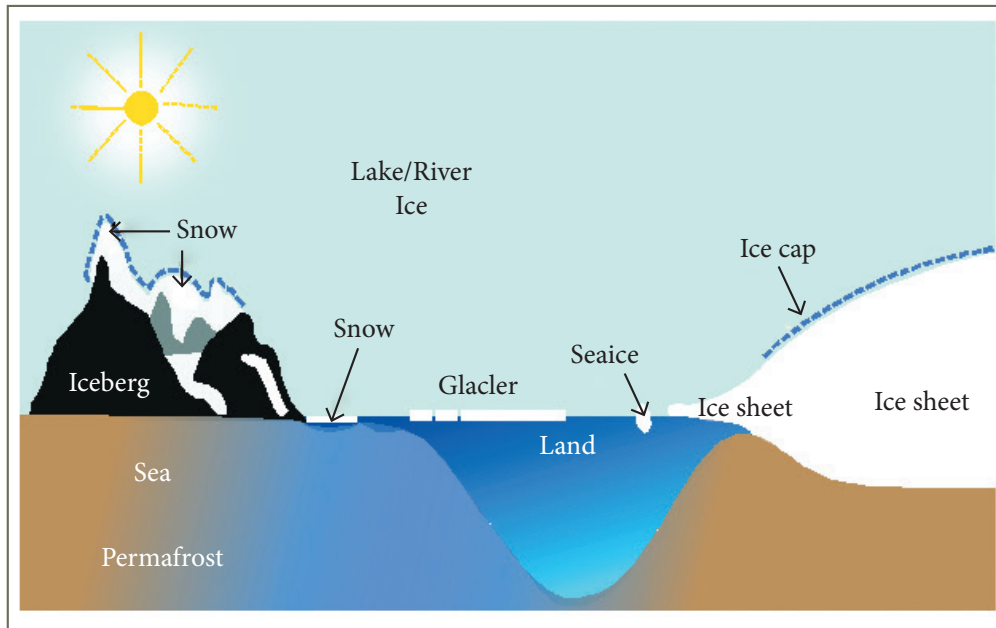
- 4) Which two seas The Suez Canal is connecting?
 - a) Caspian and black sea
 - b) Mediterranean sea and red sea
 - c) Red sea and Arabian sea
 - d) Red sea and black sea
- 5) The shore lies between backshore and rear shore is called?
 - a) Offshore
 - b) Foreshore
 - c) High tide area
 - d) Low tide area
- 6) Which is the largest river system in United States?
- 7) Which is deepest fresh water lake in the world?
- 8) What is the name for a narrow channel of water connecting two layer bodies of water?
- 9) Oceanic crust is made up of what materials?
- 10) Which is the largest ocean of the world?
- 11) Which organization gives information about sea surface temperature, fish aggregation?

Answers:

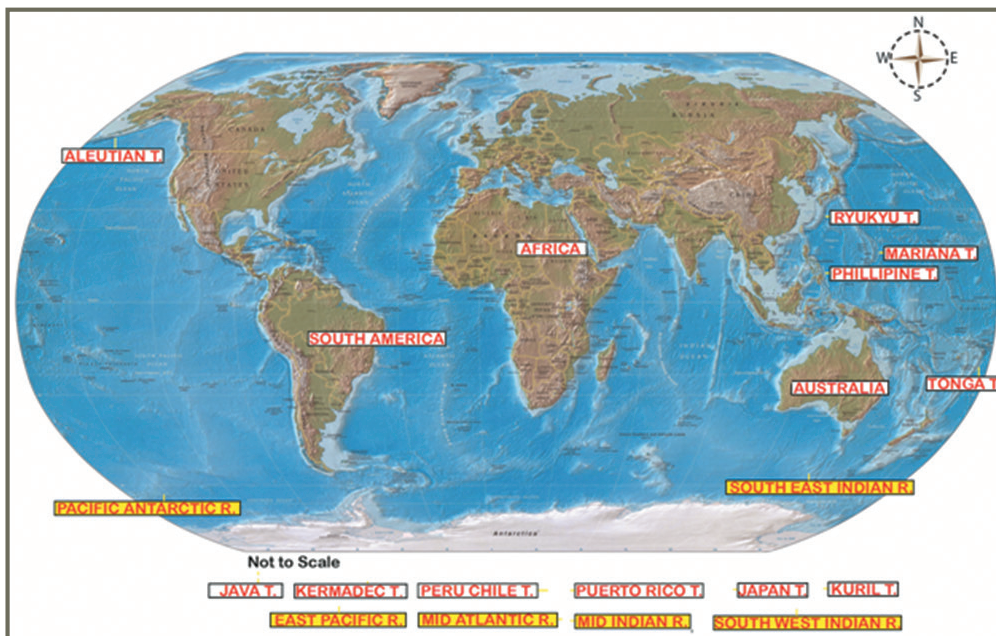
- 1) River Nile
- 2) March 22
- 3) Water table
- 4) Mediterranean sea and red sea
- 5) Fore shore
- 6) Mississippi – Missouri



- 7) Lake Baikal
- 8) Strait
- 9) Basalt rock
- 10) Pacific ocean
- 11) INCOIS – Indian National Centre for ocean information services



II. Map work: label the trenches, given in the box, on the world map.





Part 2

Geography Hydrosphere

Topic:

Transactional strategy

5.8 Relief of Oceans

Learning objectives :

- Understand the evolution of oceans and world ocean relief features
- Describe ocean temperature and factors affecting it
- Know salinity of the ocean and factors affecting it

Learning outcomes:

- Divide the ocean floor based on the depth
- Identify various relief features of the ocean floor
- Reason out the difference in the names of the relief features.

Teaching learning material:

Diorama of relief of the ocean floor, clay model and fish tank.

Grouping the learners

Divides the students into eight groups namely, Continental shelf, Continental slope, Continental rise, Abyssal plain, Mid oceanic Ridges, Ocean trenches, island and sea mount.

Teaching – learning activities

Introduction

Teaching activity – Starts with related pep talks to introduce the topic ‘relief of ocean floor’, writes the topic on blackboard and divides the blackboard into eight for sub topics and explanatory hints to be written on.

Motivation

Brain storming

- Could we find waves everywhere in a sea?
- Why all the petroleum fields are found near the seashore? (Showing in the world map)
- Have you been to the beach?
- Have you noticed any interesting things in the sea shore?

Teacher:

Appreciates the participants, adds few facts like Kalpakkam, Tramway (India), Gulf countries and the reason for all oil fields situated in the continental shelf area.

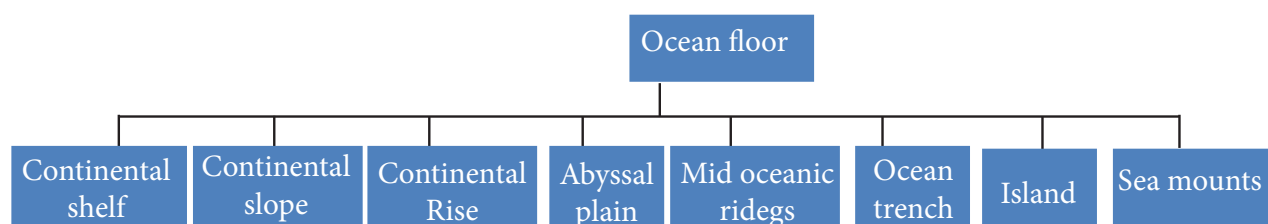
Development:

Teacher:

Writes and explains a few key terms



by displaying the flow chart of the ocean floor.



Teacher:

Shows the diorama of the ocean floor and asks each group to remember one characteristics of each relief. Teacher encourages students to ask doubts if any.

Students:

Note down hints in their note book, interacts with teacher and may raise doubts.

Teacher:

After discussion, divides the Black Board in to seven columns and writes title as given below and asks each team to try it out.

S. No	Relief of oceans	Pacific ocean-Bottom relief	Atlantic ocean-Bottom relief	Indian Ocean-Bottom relief	Arctic ocean-Bottom relief	Southern Ocean – Bottom relief
1	Continental shelf					
2	Continental Slope					
3	Continental Rise					
4	Abyssal plain					
5	Mid oceanic ridges					
6	Ocean trenches					
7	Island					
8	Sea mount					



Students:

Each one from their respective group writes their response in the space provided.

Teacher:

Ensures that everyone takes part in, request others to check and correct the responses made.

Conclusion:

Teacher:

- Wraps up the lesson by conducting quiz.
- Divides the students in to four teams as mentioned above.
- Tosses the questions to all the teams and allots marks to their responses.
- Appreciates the participants and encourages slow learners to participate in.

Students will answer the following questions:

- 1) The configuration of an ocean floor is shown with the help of a
 - a) Contour map
 - b) Toposheet
 - c) Hypso metric curve
 - d) Isotherms
- 2) World famous fishing grounds are situated in
 - a) The continental shelf
 - b) The continental slope
 - c) The deep sea plain
 - d) The continental rise





- 3) A trench forms along the
 - a) Divergent boundary
 - b) Convergent boundary
 - c) Mid oceanic boundary
 - d) Continental boundary
- 4) The coral islands are formed by the
 - a) Sea weeds
 - b) Shell of sea borne dead animals
 - c) Calcium deposits
 - d) Coral polyps
- 5) The ring of fire is situated in the
 - a) Pacific ocean
 - b) Atlantic ocean
 - c) Indian ocean
 - d) Southern ocean
- 6) The temperature of the sea surface is highest near
 - a) Poles
 - b) Equator
 - c) Few degrees to north of equator
 - d) Middle latitudes
- 7) What is the name of the line drawn to join places which has equal salinity?
 - a) Isobar
 - b) Isohaline
 - c) Isohytes
 - d) Isotherm



Answers

- 1) Hypsometric curve
- 2) The continental shelf
- 3) Convergent boundary
- 4) Coral polyps
- 5) Pacific Ocean
- 6) Few degrees to north of equator
- 7) Isohaline

Part 3

Geography Hydrosphere

Topic:

Ocean Movements

Periods: 4

Learning objectives :

Understand cause and distribution of waves, tides and currents.

Describe climatic impacts of El Nino and La Nina.

Know the distribution of the major ocean currents.

Learning outcomes:

Identify and distinguish types of tides.

Locate major ocean currents on the world map.

Reason out why El Nino and La Nina have greater impact on climate.

Teaching – Learning materials:

Physical map of the world, Chart, Video.

Grouping the learners:

Grouping the students into four namely The Gulf Stream, The Labrador current, Kuroshio Current, Oyashio Current and The North Atlantic Drift.

Transactional strategy

Teaching – learning activities:

Introduction:

Teacher activity:

- Starts with pep talks related to and introduces the topic “Ocean Movements”, writes the topic on the Black Board and divides the Black Board into four columns for sub topics;- Waves, Tides and Currents and explanatory hints to be written on.

Motivation:

2. Brain storming:

- How is water body held to the earth's surface?
- How do Ocean Waters move about?

Student activity:

- Every group discusses about and responds to the above question.

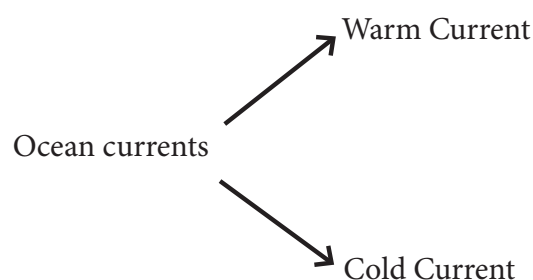
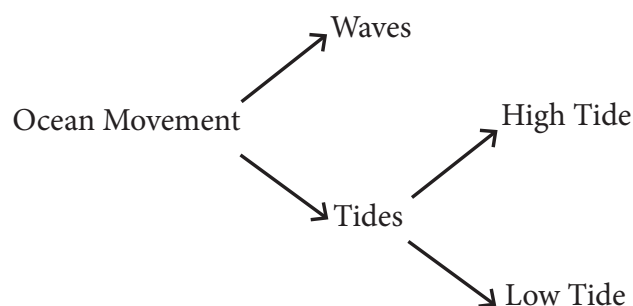
Teacher:

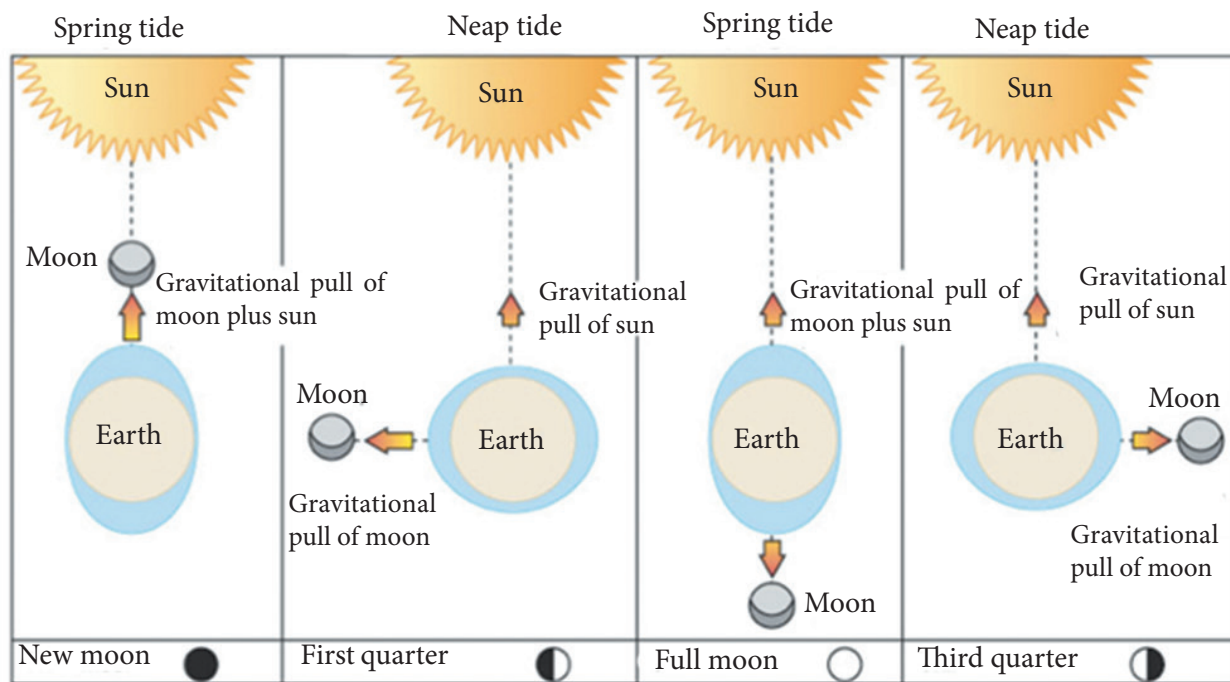
- Appreciates the participants and adds a few facts;- water is held to the earth's surface due to gravity.

Development:

Teacher:

- Writes and explains a few key terms such as waves, tides and ocean currents using mind map.
- Explains the factors affecting ocean movements;- gravity, friction, distribution of continents and coriolis effect.





Student:

- When asked, one by one student come and write the position of the Sun, Moon and earth during high and low tide.

Teacher:

- Displays the chart of the world's ocean currents and explains the causes, types and position of Ocean currents. Teacher encourages students to ask doubts if any.

Students:

- Collect hints in their notebook, interacts with and may raise doubts about.

Teacher:

After discussion, divides the Blackboard into columns, writes title as given below and asks each team to try it out.

S.No	Ocean Current	Warm/Cold	Ocean currents Confluence	Gyre	Impacts
1.	Gulf Stream				
2.	Labrador				
3.	Kuroshio				
4.	Oyashio				



5	Aleutian				
6.	Kuril				
7.	North Atlantic drift				
8.	Canary				
9.	North Equatorial Current				
10	El Nino				

Students:

One by one from each group, write their response in the space provided.

Teacher:

- Ensures that everyone takes part in. calls others to check and correct the responses made.

Conclusion:

Teacher:

- Wraps up the lesson by conducting quiz.
- Divides the class into four teams as mentioned above.
- Appreciates the participants and encourages slow learners to participate in.

II.

4. Student as a reporter

As informed by the teacher, one or two students stand before the class, act like news reporter and brief about what they learned from the lesson taught. They may rise doubt, express about certain points that they are yet to understand or need better understanding.

Assignment

Prepare a set of 15 questions as

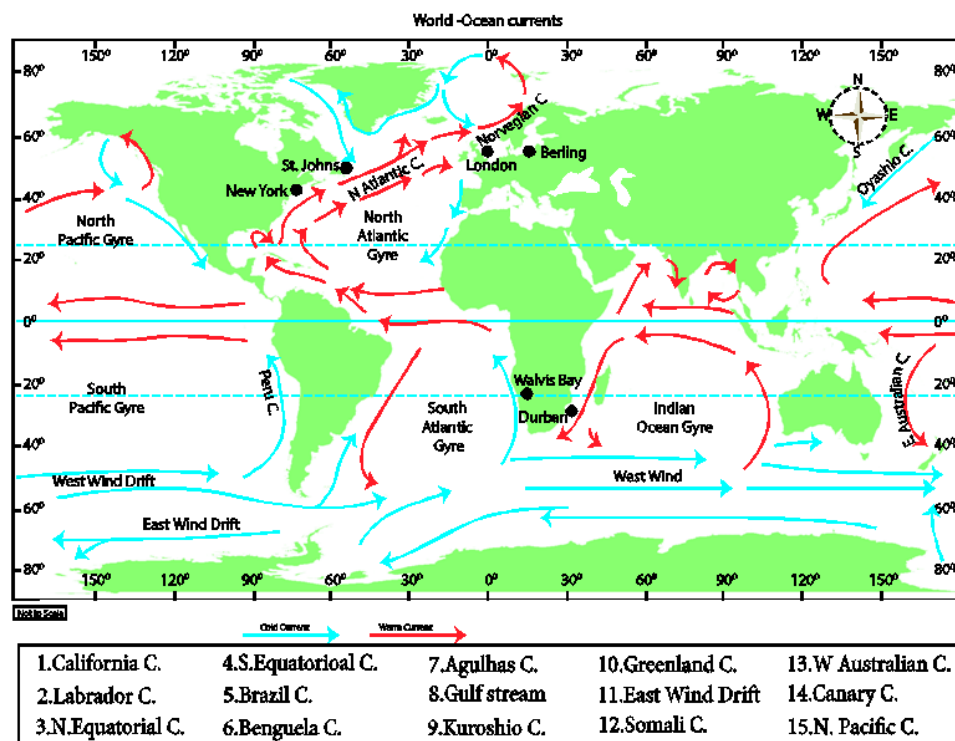
5. Match the following
6. Multiple Choice Questions
7. Any two HOT questions



Assessment Activities

III. Worksheet on Ocean currents.

Write the ocean currents, given in the box, in their respective positions on the world map.





Unit 6

Geography

Atmosphere

Topic :

Composition and layers of atmosphere

Teaching Learning objectives:

- Distinguish between weather and climate, and provide examples of variation in both.
- Describe the composition of the Earth's atmosphere.
- Demonstrate an understanding of how humans are affecting the ozone layer and contributing to the greenhouse effect.
- List various normal and severe weather conditions and what causes them.

Teaching learning outcomes:

- Students will explore the five structural layers of the atmosphere and the gaseous compositional make-up of Earth's atmosphere.
- Students will become familiar with ozone in the troposphere and how it is different from ozone in the stratosphere

Teaching Learning materials:

- Books, Chart, Videos

Grouping the learners:

Grouping the students into four namely Troposphere, Stratosphere, Mesosphere and Exosphere

Transactional strategy

Introduction:

Teacher:

- Starts with pep talk on weather. Have you heard people in the countryside saying that “when ants march in a straight line, it is going to rain”. “When sheep collect and huddle, tomorrow will puddle”.
- Asks students to say if they know some.

Brain storming:

Why nitrogen content is the highest in the atmosphere?

Students:

- Discuss in group and respond to the above question.

Teacher:

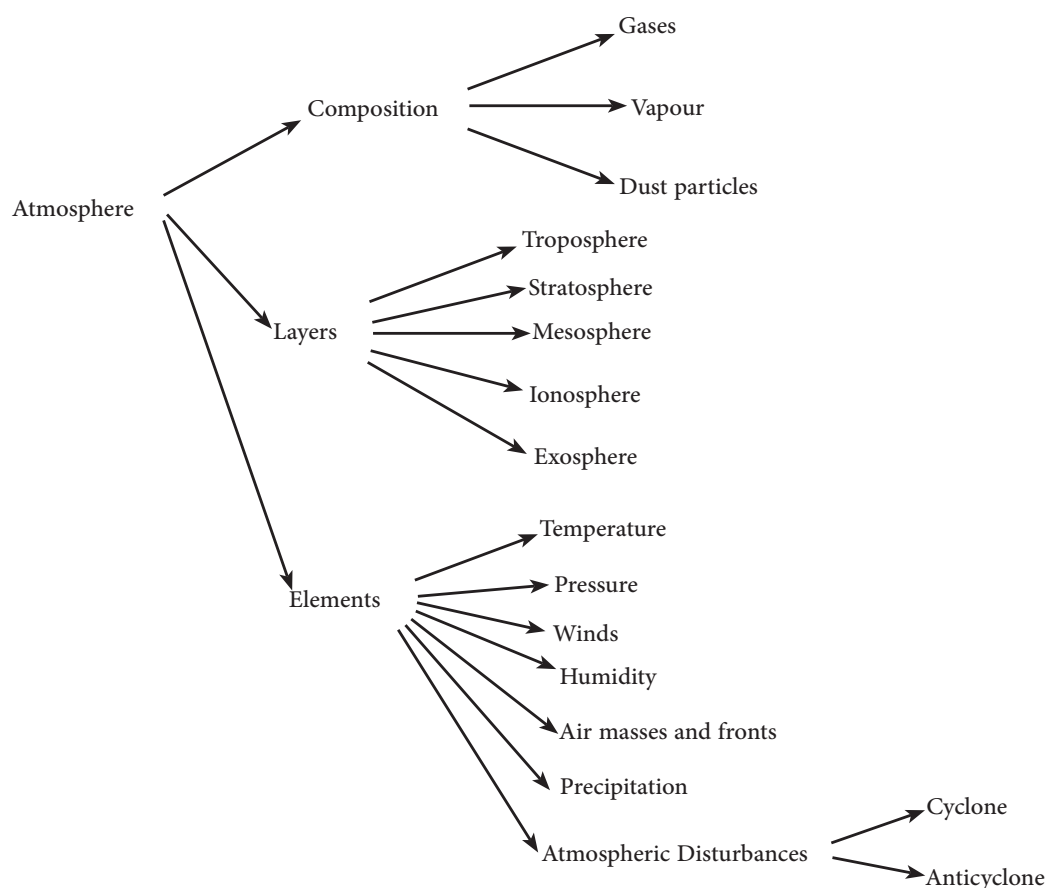
- Listens to their response and adds that as Nitrogen is not incorporated in to solid earth, it remains the highest in content.

Development:



Teacher:

- Explains the key terms and writes the hints on the black board.
- Instructs the students to gather the points in their notebook and prepare for the activity to be done as a group. The worksheet given below will be filled in by individual participants one by one.



Conclusion:

Student:

- Come forward to the black board and fill in each column one by one.

Teacher:

- Gives equal opportunity to all students. Allots mock marks to the groups.

Layers of the Atmosphere	Estimated altitude from the ground	Estimated Temperature	Change in temperature	Phenomena	Transition zone
Troposphere	km				



Stratosphere	Km		increase	A i r p l a n e , w e a t h e r b a l l o o n	
Mesosphere	85 km	-90°	Meteors		
Thermosphere	Km	°			
Exosphere	400 to 1600 km	°		Merges with the space	

Assessment activity - Quiz

- Which of the following is NOT a major component of the atmosphere?
 - Nitrogen
 - Oxygen
 - Ozone**
 - Argon
- The earth's atmosphere is divided in layers on the basis of
 - Weight
 - Pressure
 - Temperature**
 - Energy
- Ionosphere, the layer of atmosphere is part of the
 - Thermosphere
 - Mesosphere**
 - Troposphere
 - Exosphere
- Which is the nearest layer to earth?
 - Troposphere**
 - Thermosphere





- (c). Mesosphere
- (d). Exosphere
5. The two most common gases in the atmosphere.
- (a). Nitrogen and Oxygen**
- (b). Oxygen and trace gases
- (c). Carbon Dioxide and Nitrogen
- (d). Nitrogen and trace gases
6. What is the function of the ozone layer?
- (a). to allow UV rays to get to Earth
- (b). to block UV rays from getting to Earth**
- (c). To keep oxygen in
- (d). to allow meteors to get to Earth
7. This is the layer where meteors, or shooting stars burn up.
- (a). Troposphere
- (b). Stratosphere
- (c). Mesosphere**
- (d). Thermosphere
8. Satellites orbit this layer of the atmosphere.
- (a). Stratosphere
- (b). Exosphere**
- (c). Thermosphere
- (d). Troposphere
9. Why UV radiation is higher in summer?
- (a) The Sun is closer to planet earth so UV rays have a shorter distance to travel to reach us.**





(b) There is more ozone in the atmosphere during summer.

(c) The sun is particularly busy in summer

(d) None of these

10. Which of the following is a prime health risks associated with greater UV radiation through the atmosphere due to depletion of ozone layer?

(a) Damage to digestive system

(b) Increased liver cancer

(c) **Increased skin cancer**

(d) Neurological disorder

3. Match each layer with its description

Column A	Column B
A. Troposphere	a. Reflect back radio waves and help in wireless communication.
B. Stratosphere	b. Closet to earth, where almost all weather is created.
C. Mesosphere	c. Furthest from earth and hosts the more satellites.
D. Thermosphere	d. Meteors falling from the space get burned in this layer.
E. Exosphere	e. Hosts a few clouds and the ozone layer.

Answers: A. b B. e C. d D. a E. c





Part 2

Geography Atmosphere

Topic:

Temperature and Heat budget

Periods: 4

Teaching learning objectives:

To understand sources of heat energy on the earth.

Know why solar radiation decreases with latitude.

To understand how heat is transferred between objects by different means of radiation, conduction and convection.

Learning outcomes:

Students will learn how Greenhouse gases temporarily trap heat within Earth's atmosphere and warm up our planet.

Judge the change in the heat budget caused by man induced factors.

Teaching-Learning materials:

Thermometer, charts, water, glass,

Introduction:

Teacher:

- Introduces the sub topics: Temperature distribution and heat budget.
- Recalls the previously taught lesson;-

composition and structure of the atmosphere.

Brain storming:

The hottest place (Al Zizia, Libya) is not located in the Equatorial region where though sun's rays fall vertically and concentrate over smaller areas. Why?

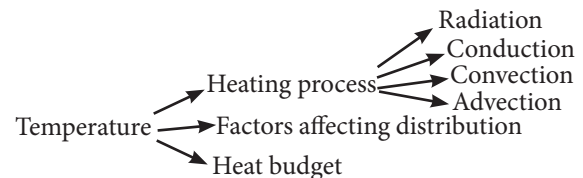
Students:

- Discuss in group and respond to the above question.

Development:

Teacher:

- Explains the key terms:



Students

- Collect hints from explanation.
- When asked, fill in the space provided in the heat budget chart.

Conclusion :

Teacher:

- Calls any one or two students to act like a reporter narrating the heat budget and





giving some inferences on.

Student/s:

- Come over to the blackboard and narrate how balance the heat budget should be and what if not.
- Discuss among them about the cause and effect of change in the heat budget.

Assessment - Quiz

1. In which of the following processes is heat transferred directly from one molecule to another?

a. Conduction

b. Convection

c. Radiation

d. All of the above

2. Which one among the following waves is called waves of heat energy?

a. Radio waves

b. Infrared waves

c. Ultraviolet waves

d. Microwaves

3. The surface of Earth that lies between the Tropic of Cancer and the Tropic of Capricorn is called

a. North Temperate Zone

b. Frigid Zone

c. South Temperate Zone

d. Torrid Zone



4. What generally happens to air temperature as we move from the equator to the poles?

(a) **Decreases**

(b) Increases

(c) Remains constant

(d) None of the above

5. What is the full form of ITCZ

(a) International Tropical Convergence Zone

(b) Interstate Tropical Convergence Zone

(c) International Tropical Convergent Zone

(d) **Inter Tropical Convergence Zone**

Part 3

Geography Atmosphere

Topic :

Heat zone, pressure and winds

Periods: 4

Learning objectives :

understand the heat zones of the world.

Describe the relationship between the pressure and wind systems. Know various types of winds

Learning outcomes:

divide the earth into heat zones and differentiate them from one another.

judge the relationship between pressure and winds.

Divide and differentiate the pressure belts and wind systems.

Introduction

Teacher:

- Recalls the previous lesson;- Temperature and heat budget.
- Asks a few questions: 1.Why is latitude the most dominant factor affecting the distribution of temperature?
- Introduces the sub topics;- heat zones, pressure and wind systems, rain storming:
- Why are the sun's rays vertical at noon and slanting in the morning and evening?

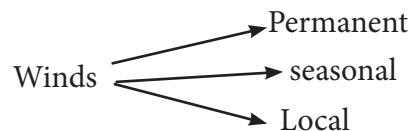
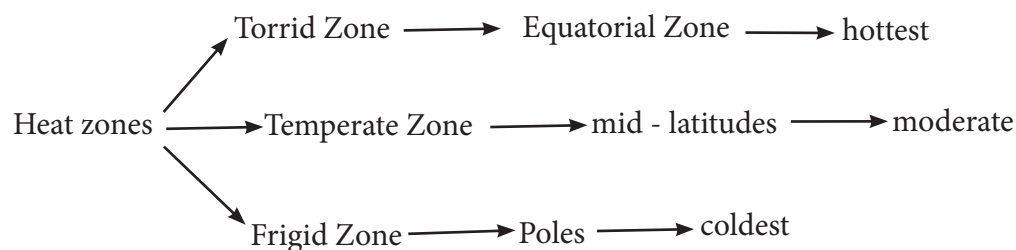
Students

- Discuss in group and respond to the question.

Development

Teacher

- Explains the key terms and writes the hints on the black board.



- Elucidates the difference among the planetary winds, seasonal winds and local winds in their origin, distribution and impact.
- Explains the case study of Mawsynram, the wettest place in the world.



Students:

- Collect hints to take part in the assessment activity which will follow.
- Interact with the teacher and may raise doubts.

Conclusion

Teacher

- Divides the class into teams namely E.LPB (Equatorial Low pressure Belt), S.HPB (Subtropical High Pressure Belt), S.PLB (Sub Polar Low Pressure Belt) and P.HPB (Polar High Pressure Belt).
- Asks each to explain how the respective pressure belt and wind system associated with are formed.
- Encourages the other teams to interact with and raise doubt on.

Students

- Discuss as a team and represent one or two peer leaders to explain how the pressure belt is formed.
- As a group, they explain about the heat zones of world. Other groups ask how and why heat zones vary from one another.

Part 4

Geography

VI Atmosphere

Topic :

Humidity, condensation, clouds, air masses and fronts and precipitation.

Periods 6

Learning Objectives

Understand humidity, condensation, clouds and precipitation.

Describe the air masses and fronts.

Identify the types of clouds and precipitation.





Learning outcomes:

Differentiate absolute humidity from relative humidity.

Evaluate the link between humidity and condensation.

Divide the clouds into various types based on form, altitude and appearance.

Classify the air masses and fronts.

Transactional strategy

Introduction

Teacher:

- Recalls the previously taught lesson and gives a small worksheet as a warm up activity.
- Asks the students to read the key terms, find out and connect with arrow marks the appropriate description from the given.

Students:

- Each student will connect one point from the given.

Bora – hot and dry wind ,India and Pakistan

Chinook – dry northerly across Central Africa

Fohn- south easterly from North Africa to eastern Mediterranean.

Harmattan- warm dry southerly off the alps.

Khamsin – strong winds from north east in the eastern U.S.A.

Nor'easter –strong dry wind in Sahara.

Pampero – warm dry westerly off the Rocky Mountains

Simoom-wind in the eastern slope of the Andes.

Sirocco – North easterly from eastern Europe to Italy

Zonda Wind-strong wind in pampas

Loo – southerly from North Africa to southern Europe.



Brain storming

Which part of the world may have the highest humidity? Why?

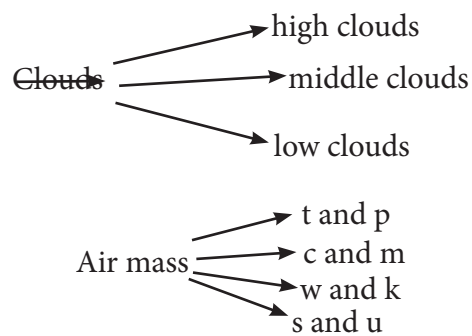
Students

- Discuss in group and respond to the question.

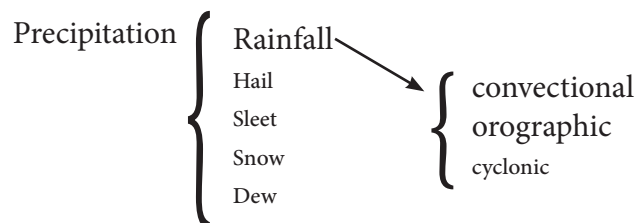
Development

Teacher

- Elucidates key terms and writes sub topics on the black board. Evaporation → condensation → precipitation



Fronts → warm and cold



Conclusion

Teacher

- Wraps up the lesson and asks a few questions to the students.
- Conducts quiz to the learners.

Students

- As teams, they participate in the quiz.
1. Amount of moisture that air can hold at certain temperature is called
 - a. Condensation
 - b. Humidity**
 - c. Evaporation
 - d. precipitation



2. When absolute Humidity increases the Relative Humidity(RH)
a. Increases b. Decreases c. Remains same d. Not related to.
3. One among the following is not a high cloud.
a. Cirrus b. Cirro cumulus **c. Nimbo stratus** d. Cirro stratus
4. These are denser clouds and have watery look
a. Altostratus **b. Altocumulus** c. Cirrocumulus d. Cirrus
5. The rainfall which is caused by a chemical reaction of compounds like sulfur dioxide and Nitrous oxide that are released into the air.
a. Orographic rain **b. Acid rain** c. Convectional rain d. Cyclonic rain
6. When precipitation occurs at sub zero temperature, the water droplets crystallize and fall as ice pellets with the size of 5 to 50 mm. It is
a. Hail b. Sleet c. snow d. dew
7. Precipitation occurs at below freezing point and falls as thin ice flakes or powdery ice, called as '
a. Hail **b. Snow** c. Dew d. Sleet
8. A line joining points of equal rainfall on a map in a given period.
a. Isoneph b. Isobars c. Isotherms **d. Isohyets**
9. The rain from a cloud burst is usually heavier with a fall rate equal to or greater than.
a. 100 mm per hour b 200 mm per hour
c. 50 mm per hour d. 150 mm per hour
10. The eye of a cyclone is a calm region with
a. sudden rainfall b. heavy rainfall **c. no rainfall** d. low rainfall





Unit 7

Geography

Biosphere

Sub Topics:

Introduction

Ecosystem

Biomes of the Earth

Biodiversity

Endangered Species

Conservation of bio-diversity

Unit : VII Biosphere

Lesson : 1

periods : 13

Topics : Ecosystem, Biomes of the Earth

Learning Objectives

know the terms such as ecosystem, biosphere, Food Chain, Food web, Hotspot.

Understand the interaction among the living things and with the environment.

Identify the difference between food chain and food web.

Describe the biotic components.

Expected Learning Outcomes:

1. Students are able to understand the different trophic levels and energy flow.
2. Differentiate between the different trophic levels and the animals that belong to each.
3. The understanding of relation between biomes and climate becomes essential.



4. To relate biotic components with the various biomes of the earth.
5. To think and realize the similarities and the differences between various consumers.
6. Paves a path to move from global to local.
7. Contribute numerous examples especially from their neighborhood.

Teaching–Learning Material:

Globe, Atlas, Charts, Models, Maps

Audio-visuals on ecosystem, different biomes of the earth bio-diversity, Red list.

Transactional Strategies

Introduction

Teacher:

- Recalls the previously taught lesson – forms of precipitation and Types of rainfall – Orographic rainfall, Convectional rainfall and frontal / Cyclonic rainfall.
- Asks the students to work out the worksheet given on the black board. Identify the inappropriate characteristics and put (×) on.

Forms of Precipitation	Characteristics	Types of Rainfall	Characteristics
Rainfall	Diameter of droplet less than 0.5 mm.	Orographic Rainfall	1. Caused by the heat.
Hail	Ice pellet with size of less than 5mm.		2. Caused by land barrier.
Sleet	Ice pellet less than 5 mm in diameter.	Convectional Rainfall	1. Called as 4 'O' clock evening rainfall.
Snow	Occurs at above freezing point.		2. Called as 4 'O' clock morning rainfall.
Dew	Condensed water droplets clinging on grasses, leaves, etc.	Cyclonic Rainfall	1. Caused by cyclonic activity.
			2. Associated with Cirrus clouds.

Students:

- One by one take the chalk, go to the black board and put their response there.

Teacher – students

- Discuss together on the response made by the participants.

Teacher:

- Introduces the Unit. VII Biosphere and writes key terms on the black board for discussion.

Development

Teacher

- Explains the following and discusses with the students.
- Ecosystem:
 - Producers, consumers, decomposers, detritivores
 - Autotrophs, heterotrophs,
 - Food web, energy flow, trophic levels
 - Bio-geo-chemical cycles.

Brain storming: what makes the taiga the largest terrestrial biome in the world?

Biomes of the Earth:

- Aquatic
- Terrestrial Biomes
- Wetlands
- Coral reefs

Students:

- Collect hints of the lesson and interact with the teacher.
- Respond to the questions tossed to them.

Conclusion:

Teacher

- Wraps up the lesson and asks the students to work out the activity given below.

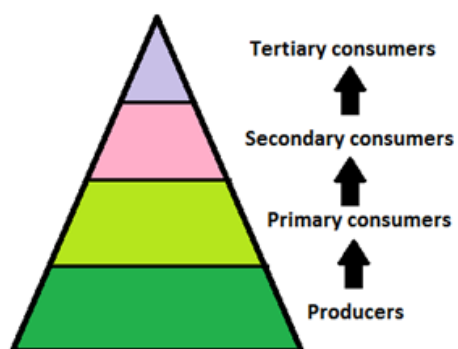
Students

- Will do the activity individually and submit to the teacher.

Student Activity 1:

Give at least two examples for each trophic level in each biome.

Biome Trophic Level	Equatorial rain forest	Savannah	Tropical grasslands	Temperate grasslands	Hot Deserts	Taiga	Tundra
Tertiary Consumer							
Secondary Consumer							
Primary Consumer Producer							



Primary Consumer							
Producer							



Unit 7

Geography

Biosphere

Unit : VII

Lesson : 2

Periods : 13

Topics : Biodiversity

Endangered Species

Conservation of bio-diversity

Learning objectives : Understand the biodiversity hotspots.

Explain the listed endangered species at national and global level.

Realize the methods of conservation of biodiversity.

Learning outcomes :

1. Students are excited about the play type approach.
2. Nurtures competitive spirit.
3. Recall the names of critically endangered species.
4. Kindles the inquisitiveness.
5. Able to differentiate between critically endangered and the other species.
6. Reinforces the knowledge of important species.

Teaching – learning materials: Chart of endangered species in Tami Nadu, India and world separately made, India map of endangered species, biodiversity hotspots, Video of biodiversity hotspots.

Introduction

Teacher:

- Introduces the topics - Biodiversity





Endangered Species

Conservation of bio-diversity

Brain storming: Which specie tops in the Red List and why?

Students:

- Discuss in group and respond to the question asked.

Development

Teacher

- Explains the following and writes hints on the black board.
- Asks questions throughout the discussion to gain the attention of the students.

Bio-diversity : Genetic, Species diversity, endemism, exotic,
Cosmopolitan, Hotspots, Conservation International,

Endangered Species: Extinct, Critically endangered,
IUCN, Red list, vulnerable

Conservation : In-situ, Ex-situ, Biosphere Reserve, Wild life
Sanctuary, National Parks, poaching, Man and Biosphere
Program, GIS.

Students

- Interact with the teacher during discussion and collect the hints written on the black board.

Conclusion

Teacher

- Briefly recalls the lesson taught and asks the students to write the biosphere reserves in the respective places marked with symbols on the map of India given below.



Students

- Will work out the activity given below individually. writes the keywords in their appropriate place on the map from the index.

Student Activity 2:



1. Find out the hidden Critically Endangered Species of fauna from the table below. the names are found across, down and diagonal up and down.

A	X	D	I		S	T	H	I	J	S	W	G	E	A	P	M	R	B	D	O
C	M	A	L	A	B	A	R		C	I	V	E	T	G	I		B	C	D	L
	C	N	H	Q	S	D	H	V	L	B	C	D		A	J			R		M
L	X	B		R	S	E		T	V	I		C	P		U	C	A	U	Y	R
H	W	D	N	A	V	U	G	F	D	R	O	T	R	G	N	T	A	C	C	X
T	S	K	M	S	P	Q	D	I	S	I	R	N		M	S	P	L		G	F
I	B	L	H	I	M	A	L	A	Y	A	N		Q	U	A	I	L	T	M	U
F		O		A	S	C		K	B	N	D		B		F	S	I	F		I
O	U	D	U	T	I	A	K	U	O	C	F	N		D	B	Z	R	S	I	P
	G	Z	H	I	D	M		S	L	R	N	P	S	F	R	E	O	C	T	Y
F	A	Y	I	C	X		L	Y	Z	A	R	G	U	K	G	X	G	B	J	G
J	N	B	T		B	D	J	L	I	N	S	F	F	W	J	C		Z	T	M
R	G		G	C	V	E		D	X	E	I	R	G	J	K	V	N	V	S	Y
S	E	B	H	H	G	L	N	U	M	M	J	W	K		T	P	R	W	C	
	S	R	A	E	R	I		R	H	B	C	Q	B	N			E	R	I	H
T		J	R	E	Y	A		Y	K	U	G	E	L		P	D	T			O
V	S	C	I	T		T	F	C	K	A	S	H	M	I	R	T	S	T	A	G
I	H	W	A	A	Y		O		C	R		E	Z		S	O	A	S	U	R
	A	E	L	H	Z	N	S	B	W		N	D	Y	J	H	D	E	N	T	T
	R	S	D	U		O	A	E	Z	H		F	C	L	Z		R	A		G
G	K		J		K	I	C	D		R	O	A	A	P	V	M		W	P	
Q	R	L	O	O	M	L	M	F	E	P	Q	X	A	E	Z	O	T	F	K	A

Student Activity: 3

Match the following

	Column A		Column B
1	Permafrost Tundra	a	Eastern Himalayas
2	BhairodevDakavSonchuri	b	Prof. Norman Myers
3	Eastern Gorilla	c	Tiger reserve
4	Silent Valley	d	Kyzyl-Kum desert
5	Mudumalai	e	Chamba, Himachal Pradesh
6	Asiatic Cheetah	f	Northern Russia and Canada
7	Hot Spot	g	E.O. Wilson
8	Environmentalist	h	Rajasthan
9	Entomologist	i	National Park
10	Kashmir Stag	j	Largest living Primate



Unit 8

Geography

Natural Disasters – Public Awareness for Disaster Risk reduction.

Topic :

Earthquake, landslide, cyclone, drought and lightning.

Periods : 4

Learning objectives :

Understand the role of community to be aware of natural disasters.

Describe the rules of action for natural disasters.

Learning outcomes:

Learn and practice rules of action for natural disasters.

Extend help towards the needy when disasters strike.

Pass on the skills of how to be resilient during disasters to others.

Teaching – Learning materials:

Video.

Grouping the learners:

Grouping the students into Coordination committee, Rescue team, First Aid Team, Information Team and food arrangement Team.

Prior instruction to the students:

As informed earlier students prepare as a group and present individually their respective title in the class. Rest of the class will interact and debate with the presenters on the topic presented.

Transactional strategy

Teaching – learning activities:

Introduction:

Teacher activity:

Brain storming:

- What to do to escape from lightning?
- Who all help us during a disaster?

Student activity:

Every group discusses about and responds to the above question.

- Narrates the 2004 Tsunami associated with underwater earthquake.
- Teacher plays the video of the 2004 Tsunami.
- Plays the video of Hawaii volcano, 2018.



Teacher:

- Introduces the topic “Natural disasters – public awareness for disaster risk reduction”.
- Writes the topic on the blackboard and divides the blackboard into columns for sub topics – Earthquake, landslide, cyclone, flood, drought and lightning and explanatory hints to be written on.

Development:

Teacher:

- Explains disaster and its types and disaster management briefly.
- Elucidates the school committee for disaster management.
- Divides the class into three as action committee for 1. Before disaster, 2. During disaster and 3. After disaster.
- Informs the team to prepare and present the content allotted for each team.

Students:

As directed by the teacher in advance, come and present the topic one by one. They use teaching materials prepared. Others interact well with the presenter by asking them a few questions/ doubts.

Team 1 Will present the rules of action during earthquake.

Role play: the team members may be 4 or 5, will display Mock Drill “Drop! Cover! And Hold! for earthquake.

Team 2 will present the rules of action after earthquake. Every one expresses a few rules of action during earthquake.

Team 3 will present the rule of action during landslide.

Team 4 will explain the rules of action after landslide.

Team 5 Will present the rules of action before cyclone.

Team 1 will present the rules of action during cyclone.

Team 2 will present the rules of action after cyclone.

Teacher: Add more info related to.

Conclusion:

Teacher:

- Divides the class into 2 groups and allots the topics for discussion.
- Informs the students collect from memory of their experience with disasters.

Students:

- One group will talk about the Dos and the other group will talk about the Don'ts as the rule of action for disasters; - Earthquake, Landslide and cyclone.

Assignment

- Prepare a check list of items to be kept with before cyclone/ flood/ earthquake.



Unit 8

Geography

Natural Disasters – Public Awareness for Disaster Risk reduction

Topic:

Flood, Drought and lightning.

Periods : 4

Learning objectives :

Understand the role of community to be aware of natural disasters.

Describe the rules of action for natural disasters.

Learning outcomes :

Learn and practice rules of action for natural disasters.

Extend help towards the needy when disasters strike.

Pass on the skills of how to be resilient during disasters to others.

Teaching – Learning materials:

Video and PPT

Grouping the learners:

Grouping the students into Coordination committee, Rescue team, First Aid Team, Information Team and food arrangement Team.

Prior instruction to the students:

As informed earlier students prepare as a group and present individually their

respective title in the class. Rest of the class will interact and debate with the presenters on the topic presented.

Transactional strategy

Teaching – learning activities:

Introduction:

Teacher activity:

Brain storming:

- How to identify whether drought has set in?

Student activity:

Every group discusses about and responds to the above question.

Teacher:

- Narrates the Somali drought and the plight of people. Adds how drought has hit Tamil Nadu agriculture.
- Teacher plays the video of Somali drought.
- Introduces the topic “Flood, Drought and Lightning”.
- Writes the topic on the B.B and divides the B.B into columns for sub topics –flood, drought and lightning and explanatory hints to be written on.





Development:

Teacher:

- Narrates the Adyar flood, 2015 and the rescue service rendered by helping hands briefly.
- Explains the rule of actions for flood, drought and lightning.
- Informs about the essential things to be kept with when flood and drought affect us.
- Instructs to four or five students to demonstrate mock for lightning.

Students :

Role play: the team members may be 4 or 5, will display Mock Drill for lightning.

Team 1 will present the rules of action after earthquake. Every one expresses a few rules of action during earthquake.

Team 2 will present the rule of action during flood.

Team 3 will explain the rules of action after flood.

Team 4 Will present the rules of action before drought.

Team 5 will present the rules of action during lightning.

Team 2 will present the rules of action after cyclone.

Teacher:

Add more info related to.

Conclusion:

Teacher:

- Divides the class into 2 groups and allots the topics for discussion.
- Informs the students recollect from memory of their experience with disasters.

Students:

- One group will talk about the Dos and the other group will talk about the Don'ts as the rule of action for disasters;- flood and lightning.

Assignment:

- Prepare a check list of items to be kept with before drought/ flood/ lightning.



Unit 9

Geography

Maps and Scale

Topic :

Answer - R.F. 1 : 1000000 or 1 /1000000

Page : 244

b. 1:5,00,000

Topic: Scale

1 cm represents 5 km

Learning outcomes:

Solution

Gaining the skill to convert the scale expressed in one to another form.

Step 1.

$$1 \text{ km} = 100000 \text{ cm}$$

Acquaint well with the usage of scale in maps.

Step 2

$$5 \text{ km} = 100000 \times 5$$

Exercise : 1. Convert statement of scale to R.F. Solution: page 246

$$= 500000 \text{ cm}$$

a. 1:10,00,000

Step 3

Covert the statement into R.F.

$$1 : 500000/1$$

1 cm represents 10 km

Answer - R.F. 1 : 500000 or 1 /500000

Solution

c. 1:1,00,000

Step 1.

1 cm represents 1 km

$$1 \text{ km} = 100000 \text{ cm}$$

Solution

Step 2

Step 1.

$$10 \text{ km} = 100000 \times 10$$

$$1 \text{ km} = 100000 \text{ cm}$$

$$= 1000000 \text{ cm}$$

Step 2

Step 3

$$1 \text{ km} = 100000 \times 1$$

$$1 : 1000000/1$$





$$= 100000 \text{ cm}$$

Step 3

$$1 : 100000 / 1$$

Answer - R.F. $1 : 100000$ or $1 / 100000$

d. $1:50,00,000$

1 cm represents 50 km

Solution

Step 1.

$$1 \text{ km} = 100000 \text{ cm}$$

Step 2

$$50 \text{ km} = 100000 \times 50$$

$$= 5000000 \text{ cm}$$

Step 3

$$1 : 5000000 / 1$$

Answer - R.F. $1 : 5000000$ or $1 / 5000000$

e. $1: 100,00,000$

1 cm represents 100 km

Solution

Step 1.

$$1 \text{ km} = 100000 \text{ cm}$$

Step 2

$$100 \text{ km} = 100000 \times 100$$

$$= 10000000 \text{ cm}$$





Step 3

1 : 10000000/1

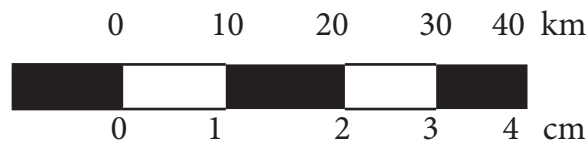
Answer - R.F. 1 : 10000000 or 1 / 10000000

2. Convert R.F into Statement of Scale

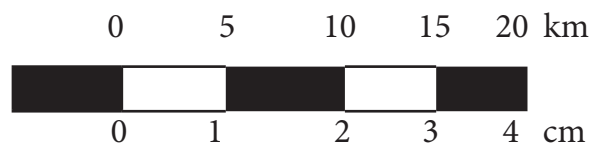
- a. One cm to 1 km.
- b. one cm to 0.5 km
- c. One cm to 2.5 km
- d. One cm to 50 km
- e. One cm to 0.3 km

3. Construct a graphical scale for the following

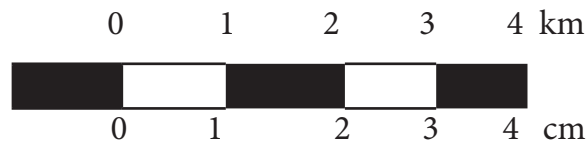
a.



b.

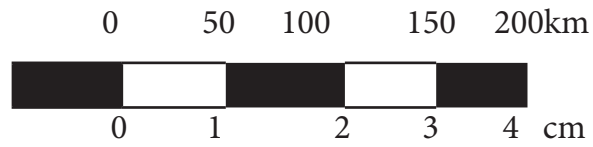


c.

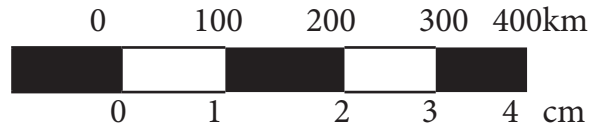


d.





e.



Solution

Unit X Representation of Relief Features and Climatic Data

Page : 259

Learning outcomes: gaining the skill to draw cross section of contour profile and identify the landforms.

Exercise : 1. Match the following

Solution:

1. B
2. E
3. D
4. C
5. F
6. A

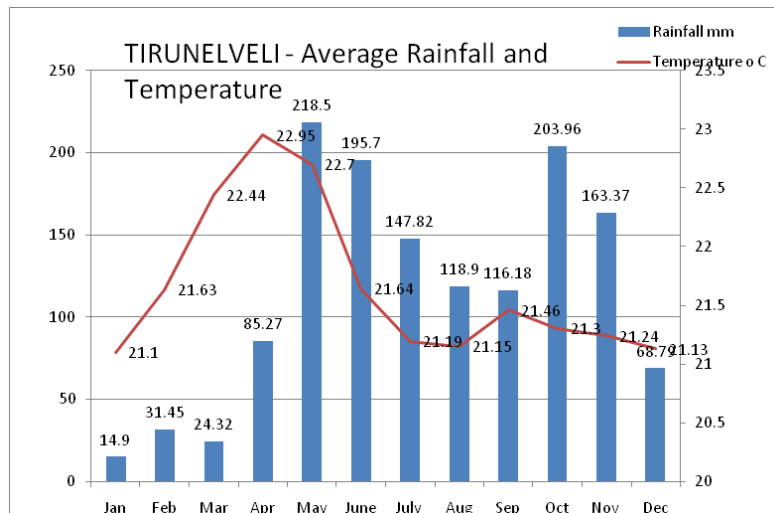
Solution: page 263. Exercise: Draw climatic data diagram for the following data.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Rainfall mm	14.9	31.45	24.32	85.27	218.5	195.7	147.82	118.9	116.18	203.96	163.37	68.79





Temp°	21.1	21.63	22.44	22.95	22.7	21.64	21.19	21.15	21.46	21.3	21.24	21.13
C												



Unit 10

Geography

Unit X Representation of Relief Features and Climatic Data

Solution

Page : 259

Learning outcomes: gaining the skill to draw cross section of contour profile and identify the landforms.

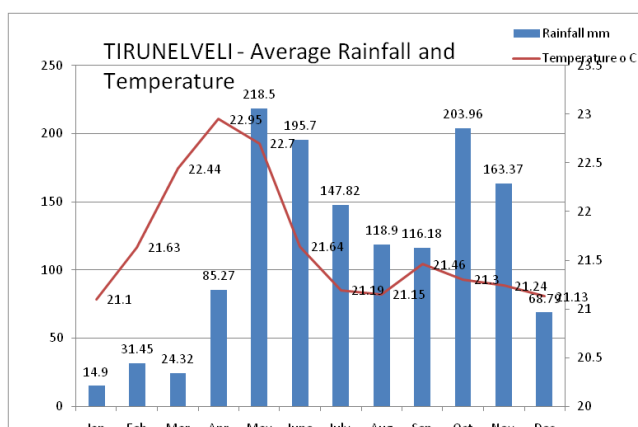
Exercise : 1. Match the following

Solution:

1. B
2. E
3. D
4. C
5. F
6. A

Solution: page 263. Exercise: Draw climatic data diagram for the following data.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Rainfall mm	14.9	31.45	24.32	85.27	218.5	195.7	147.82	118.9	116.18	203.96	163.37	68.79
Temp °C	21.1	21.63	22.44	22.95	22.7	21.64	21.19	21.15	21.46	21.3	21.24	21.13





Unit 12

Geography

Weather Map

Identifying Sub units:

Introduction

Weather Elements and instruments to measure them

Advanced techniques in Measuring Weather Elements

Weather Symbols and Station Model

Learning Objectives:

Understanding Weather Maps

Weather Forecasting

Tracking of Cyclones

Identify Key Terms /

Concepts in each sub-unit:

Thermometer, barometer, Altimeter, Anemometer,

Hygrometer, ceilometers, knot, okta, rain gauge.

Weather radars, Radiosonde, Weather satellites

METSAT-1/ KALPANA -1,
OCEANSAT-2, INSAT -3D
SCATSAT-1

3. Weather conditions, sea conditions, station model, isobars

4. IMD, pressure gradient, wind velocity, cloud cover

5. NWP, AWIPS,

6. Doppler radars, deep depression,

Teaching-Learning Material:

Books, Globe, Atlas

Charts, Weather symbols

Weather Maps for different seasons

INSAT images of Indian weather from Newspapers

Instruments for measuring weather elements /Pictures –

Thermometer, barometer, rain gauge, wind anemometer, windvane,

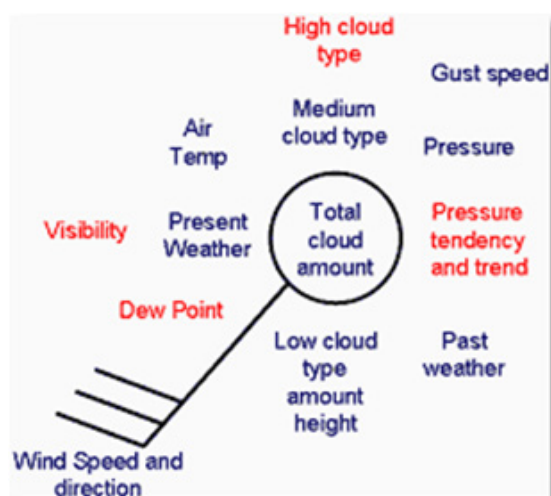
Audio-visuals on extreme weather phenomena

Teaching-Learning Activities:

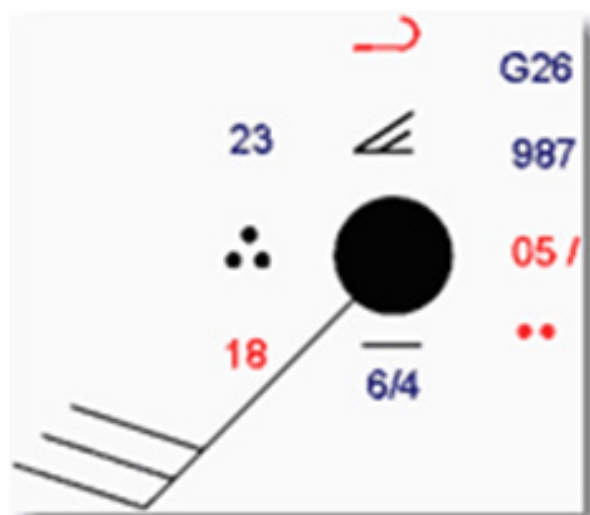
Student Activity 1

Follow the guideline to create a station model for your town for a day.

Synoptic Charts and Station Model:



Example:



Expected learning outcomes:

Student Activity 2:

Draw neat symbols for the given weather elements.

S. No	Name of the elements	Representation of symbols
1.	Pure Air	
2.	Haze	
3.	Mist	
4.	Fog	
5.	Drizzle	
6.	Rain	
7.	Snow	



Expected learning outcomes:

Assignments:

1. Prepare a station model with the following weather parameters
 - a. Dry Bulb temperature is 22° C
 - b. Dew point is 18° C
 - c. Barometric Pressure reduced to mean sea level standard gravity is 998mb
 - d. Total cloud amount is 5 oktas
2. Prepare a small project on the Okchi cyclone with the help of available news clips, pictures, satellite images etc.