

Class:8	Subject: SST - Geography	Topic: Minerals and Power Resources
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SUMMARY SHEET		
Pedagogical Approach: Student – led		
Learner Previous Knowledge	N.A.	
Target Knowledge for this Topic	Introduction to minerals which is a naturally occurring substance. Types of minerals: Metallic, Non-Metallic, Extraction of minerals. Distribution of minerals: Asia, Europe, North America, South America, Africa, Australia, Antarctica Distribution in India: Iron, Bauxite, Mica, Copper, Manganese, Limestone, Gold, Salt. Uses of Minerals. Conservation Of Minerals Power Resources: Conventional (Firewood, Coal, Petroleum, Natural Gas, & Hydel Power) And Non-Conventional Sources of Energy (Solar, Wind Tidal, Nuclear, Geothermal & Biogas).	
Learning Goals		
More Complex Learning Goal- Students will be able to compare and contrast the distribution of minerals and its use across the world.		
Target Learning Goal- Students will be able to explain the properties and types of minerals.		
Simpler Learning Goal- Students will be able to describe the importance of minerals across the world		
Period No.	Lesson Objectives	Teaching Learning Materials Required
1	Students will understand the importance and occurrence of minerals.	- Entry Card (for each student): (Annexure 1A) - Handout Annexure 1B - Handout Annexure 1C - Worksheet (Reference: Annexure 1D)
2	- Students will be able to describe different types of minerals - Explain how minerals are used by different industries in the development of the economy of a country	- Flow Chart - Activity sheet (Reference: Annexure 2B)

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3	Trace the Distribution of minerals in the world and also in India.	- Mineral Cards (Reference: Annexure 3A) - Political Maps of World and India.
4	- Identify and explain the Power resources. - Categorize different types of power resources.	Worksheet (Reference: Annexure 4A)
5	Students will be able to describe Coal and petroleum as conventional sources of energy	Worksheet (Reference: Annexure 5A)
6	Students will be able to describe Natural Gas and Hydel Power as conventional sources of energy	- Handout (Reference: Annexure 6A) - Worksheet (Reference: Annexure 6C)
7	Students will be able to describe Wind and Solar energy as Non-conventional sources of energy.	Worksheet (Reference: Annexure 7C)
8	Students will be able to describe Geothermal and Nuclear energy as Non-conventional sources of energy.	- Handout (Reference: Annexure 8A) - Worksheet (Reference: Annexure 8B)
9	Students will be able to describe biogas and tidal energy as Non-conventional sources of energy	- Image Annexure 9A - Handout Reference: Annexure 9B - Worksheet (Reference: Annexure 9C)

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Lesson Plan 1

Lesson Objectives

At the end of this lesson students will be able to:

- Students will understand the importance and occurrence of minerals.
- Explain how minerals are used in the development of the economy of a country.

Teaching Learning Materials required

- Entry Card (for each student): (Annexure 1A)
- Handout Annexure 1B
- Handout Annexure 1C
- Worksheet (Reference: Annexure 1D)

Details of Teaching Learning Experience

Seating Arrangement: In 4 groups

Lesson Beginning <u>Time:</u> 10 minutes <u>Purpose:</u> Introduce topic	<u>Entry Card</u> • Distribute entry cards to each group. (Reference: Annexure 1A) • Let students study the entry cards and come up with answers. • Based on their response, arrive at a conclusion that just as these things are made up of no. of things similarly rocks are made up of different minerals. • Let students exemplify from where we get minerals.
Lesson Middle <u>Time:</u> 20 minutes <u>Purpose:</u> Develop conceptual understanding	<u>Discussion</u> • Let the students understand the importance of minerals. • Ask them to look around the objects in classroom. List few on board. • Ask them to name the objects they are made up of. • Let students recall the materials different objects are made up of. • Distribute Annexure 1B, ask students to look at the picture and identify the minerals in them. • Share Annexure 1C. Let the students read and analyse how far they are correct. Ask them to find out the minerals of other left over objects in Annexure 1B. • Ask students to discuss and write down the properties of minerals in their note books.
Lesson End <u>Time:</u> 10 minutes <u>Purpose:</u> Finish up	<u>Finish Up</u> • Distribute the worksheet (Reference: Annexure 1D) to each student and asked them to find out correct answers. Give it as a Home Assignment.

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Annexure 1A- Entry Card (Group A)

Explore

Give them a piece of Cake. Ask them to list the things with which it is made up of. Discuss in your groups. And list down.

(Group B)

Explore

Give them a piece of idli. Ask them to list the things with which it is made up of. Discuss in your groups. And list down.

(Group C)

Explore

Give them a cup of tea. Ask them to list the things with which it is made up of. Discuss in your groups. And list down.

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(Group D)

Explore

Give them a piece of rock. Ask them to list the things with which it is made up of. Discuss in your groups. And list down.

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Annexure 1B



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Annexure 1C

1. Minerals used to make stainless steel cutlery

Magnetite and goethite are minerals that contain a lot of iron and are used to make steel. Steel is mixed with chromium to stop it from rusting. Chromium comes from the mineral chromite.

Together, these minerals make stainless steel:

- a. Strong
- b. Rigid
- c. Hard
- d. Rustproof



2. Minerals used to make pencils and paints a mixture of clay and graphite makes up the 'lead' in pencils.

Graphite is:

- a. Soft
- b. Easily powdered
- c. Opaque (not see-through)



Lead comes from a mineral called galena. It is not used in paints any more - titanium is used instead.

3. **The mineral you can eat - salt!**

Halite is the edible mineral. You eat it every day and it is a vital part of your diet.

Halite:

- a. Is soft
- b. Breaks up easily
- c. Dissolves in water
- d. Is salty!!!



4. **Minerals used to make aeroplanes**

Aeroplanes and spacecraft are made of aluminium and titanium. Aluminium comes from a material called bauxite. Titanium comes from the minerals rutile and ilmenite.

Both metals are:

- a. Strong
- b. Lightweight
- c. Rigid



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Annexure 1D

Estimated life expiry of mineral depends on:

- Size of the reserve
- Rate at which we are using it.

Resource	Expected life expiry	Uses
Coal		
Copper		
Iron		
Lead		
Natural Gas		
Oil		
Silver		
Tin		
Uranium		

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Lesson Plan 2

Lesson Objectives

At the end of this lesson students will be able to:

- Students will be able to describe different types of minerals

Teaching Learning Materials required

- Flow Chart
- Activity sheet: (Annexure 2B)

Details of Teaching Learning Experience

Seating Arrangement: Normal

Lesson Beginning <u>Time:</u> 15 minutes <u>Purpose:</u> Activate prior knowledge	<u>Flow Chart</u> • Ask the students to voluntarily come in front and draw a flow chart of types of minerals on the board. • Assist them in drawing the flow chart. • Ask students to draw this flow chart in their note books.
Lesson Middle <u>Time:</u> 15 minutes <u>Purpose:</u> Develop conceptual understanding	<u>Activity Sheet</u> • Distribute the Activity sheet (Reference: Annexure 2B) to each student. • Ask students to read the instructions carefully in the activity sheet and start doing it in class. • Let them discuss it with their peer mates. • After they finish listing the things ask them to find out the minerals present in the items listed.
Lesson End <u>Time:</u> 10 minutes <u>Purpose:</u> Finish up	<u>Finish Up</u> • Let them take the activity sheet home and search for the related pictures • Students may paste the pictures in the space provided in the sheet.

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Annexure: 2B

Instructions:

- List down the things made of minerals which you see or use daily in your life.
- Name the mineral present in each item.
- Collect pictures of these items and paste them in the activity sheet.
- Divide them into metallic and non-metallic minerals in table given below.

Table 1

Items	Minerals Found	Paste Pictures

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Table 2

Metallic Minerals	Non-Metallic Minerals

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Lesson Plan 3

Lesson Objectives

At the end of this lesson students will be able to:

- Trace the Distribution of minerals in the world and also in India.

Teaching Learning Materials required

- Mineral Cards (Reference: Annexure 3A)
- Political Maps of World and India

Details of Teaching Learning Experience

Seating Arrangement: Normal

Lesson Beginning <u>Time:</u> 15 minutes <u>Purpose:</u> Activate prior knowledge	Mineral Cards • Distribute mineral cards (Reference: Annexure 3A) to the students. • Let them trace out areas of the world with different mineral resources. • Ask them to make a table of minerals and the areas where they are found in their note books.
Lesson Middle <u>Time:</u> 15 minutes <u>Purpose:</u> Develop conceptual understanding	Map • Ask students to take out political maps of World and India. • Also ask them to open atlas to check the countries where they will mark the minerals. • Write these down on the board: • On the political map of world mark the following: 1. Iron ore mark its leading producer countries in the world. 2. Gold – Largest producing country. 3. Mark the country with no known deposits. 4. Producer of bauxite in the world. • On the outline map of India mark the following: a. Iron deposit b. Bauxite c. Copper d. Salt e. Mica
Lesson End <u>Time:</u> 10 minutes <u>Purpose:</u> Recap student learning	Finish Up • Collect maps for review.

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Annexure 3A

Mineral Cards

Copper



Copper : Jharkhand, Andhra Pradesh, Gujarat, Karnataka, Rajasthan, Madhya Pradesh, Uttar Pradesh, Sikkim.

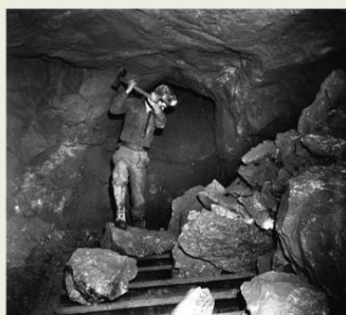
Zinc & Lead



Lead and Zinc: Rajasthan, Jharkhand, Gujarat, West Bengal, Andhra Pradesh, Meghalaya, Sikkim.



Coal



Coal : Bihar-Bengal-Jharkhand coal belt, Madhya Pradesh, Chhattisgarh, Orissa, Maharashtra, Andhra Pradesh.

Nickel



Nickel : Orissa, Jharkhand .

Graphitized Petroleum Coke



Petroleum : Assam, Gujarat, Maharashtra

Manganese



Manganese : Maharashtra, Madhya Pradesh, Goa, Orissa, Karnataka, Rajasthan.

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Lesson Plan 4

Lesson Objectives

At the end of this lesson students will be able to:

- Identify and explain the Power resources.
- Categorize different types of power resources.
- Identify their advantages and disadvantages.

Teaching Learning Materials required

- Worksheet (Reference: Annexure 4A)

Details of Teaching Learning Experience

Seating Arrangement: Groups of 4

Lesson Beginning <u>Time:</u> 15 minutes <u>Purpose:</u> Introduce the topic	<u>Introduction</u> • There are several types of energy sources that are used every day. • Ask students on a piece of paper, write a list about what you think of when you hear the word energy. • Let the students share their list of ideas with others. • Lead students to the understanding: Energy is the capacity or power to do work. • On the other side of your piece of paper, with your small group, create a list of different sources of energy that are used on a daily basis. <u>Class Discussion</u> • Where do we get our energy from? • How do we get heat or light in our classroom? • How is the water in your house heated? • Let students discuss this with their group. • Let one person from each group share the list of different energy sources that their group thought of. • List each response on the board. List of energy sources coal oil hydro (rivers) wind solar natural gas food batteries water wood geothermal
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	nuclear
Lesson Middle <u>Time</u> : 15 minutes <u>Purpose</u> : Develop conceptual understanding	<u>Flow Chart</u> • Draw a flow chart on the board to make students understand about the two types of power resources • Ask them to draw the flow chart in their notebooks.
Lesson End <u>Time</u> : 10 minutes <u>Purpose</u> : Finish up	<u>Finish up</u> • Categories the above list into conventional and non-conventional sources of energy in the worksheet (Reference: Annexure 4A) provided.

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Annexure 4A

Conventional Sources	Non-Conventional Sources

Mention advantages and disadvantages for each of the following: (one each)

1. Oil
2. Natural Gas
3. Hydel Power
4. Coal
5. Solar Energy
6. Wind Energy

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Lesson Plan 5

Lesson Objectives

At the end of this lesson students will be able to:

- Students will be able to describe Coal and petroleum as conventional sources of energy

Teaching Learning Materials required

- Worksheet (Reference: Annexure 5A)

Details of Teaching Learning Experience

Seating Arrangement: Normal

Lesson Beginning <u>Time:</u> 10 minutes <u>Purpose:</u> Introduce the topic	Discussion • Show them few images of Coal or real piece of coal. • Let them discuss about coal with their peer group. • Ask them why it is called a conventional source of energy. • Distribute the worksheet (Reference: Annexure 5A) and ask students to attempt I part of the worksheet.
Lesson Middle <u>Time:</u> 15 minutes <u>Purpose:</u> Develop conceptual understanding	• Show them the images of petrol. • Let them discuss about petrol with their peer group. • Ask them why it is called a conventional source of energy. • Distribute the worksheet (Reference: Annexure 5A) and ask students to attempt II part of the worksheet
Lesson End <u>Time:</u> 15 minutes <u>Purpose:</u> Finish up	Finish Up • Collect the worksheet for review.

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Skill – Research and evidence

Annexure 5A

Part I



1. Identify the given picture and answer the following:

- Name the mineral in the given picture.

- How it is formed?

- Mention the areas where it is found.

World:

India:

- Where it is used?

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Annexure 5A

Part II



2. Identify the given picture and answer the following:

- Name the mineral in the given picture.

- What are its By Products?

- Mention the areas where it is found.

World:

India:

- Where it is used?

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Lesson Plan 6

Lesson Objectives

At the end of this lesson students will be able to:

- Students will be able to describe Natural Gas and Hydel Power as conventional sources of energy

Teaching Learning Materials required

- Handout (Reference: Annexure 6A)
- Worksheet (Reference: Annexure 6C)

Details of Teaching Learning Experience

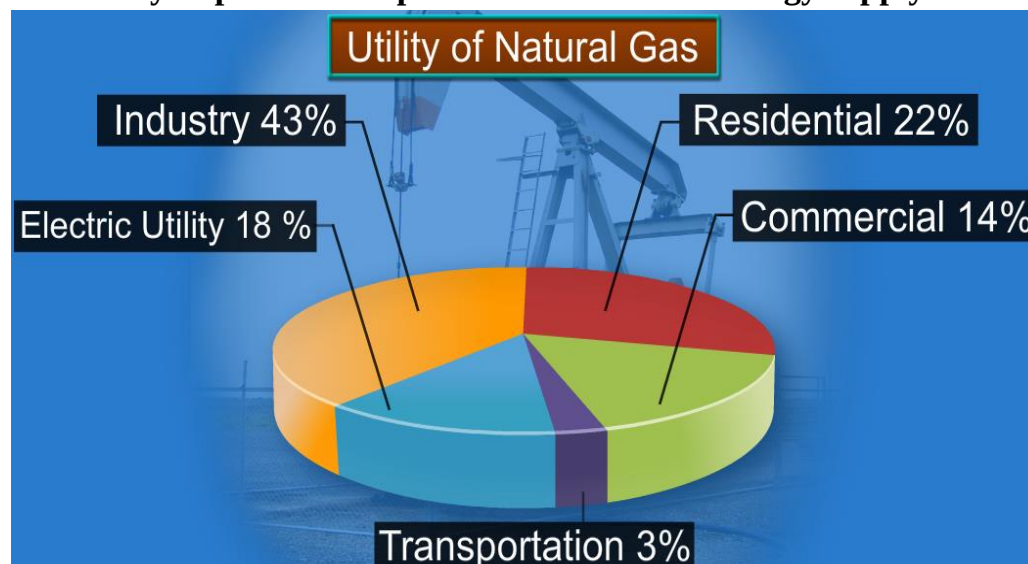
Seating Arrangement: Normal

Lesson Beginning <u>Time:</u> 10 minutes <u>Purpose:</u> Introduce the topic	Handout • Distribute handouts (Reference: Annexure 6A) to student • Let them read the hand out carefully. • Discuss with the students what they have read in the handout. • Call few in front to write on the board the areas in which they are found.
Lesson Middle <u>Time:</u> 15 minutes <u>Purpose:</u> Develop conceptual understanding	Discussion • Distribute Worksheet 6 B. ask them to complete the worksheet studying the picture. • Let them understand the importance of hydel power. • Let them discuss with the class • Ask them few questions to enhance their learning capability. ○ What is hydel power? ○ How it is produced? ○ What is the source of hydro power? • Let students brainstorm and answer the questions. • Distribute Worksheet (Reference: Annexure 6C) to each student.
Lesson End <u>Time:</u> 15 minutes <u>Purpose:</u> Finish up	<u>Finish up</u> • Finish up. • Collect both worksheets to review.

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Annexure 6A

Natural gas is another fossil fuel, like coal and petroleum. It is a non-renewable fuel. It is a very important component of the world's energy supply.



Natural gas is one of the most useful, clean and safe energy sources. It is a colourless and odourless gas. In its pure form and is made up of many gases of which methane is the most prominent. The chemical formula for methane is CH_4 .

When natural gas burns, it gives off a great deal of energy. And unlike other fossil fuels it does not leaves any ash.

It produces very little air pollution, as methane burns almost completely. It is one of the cleanest burning fuels and produces mostly heat, carbon dioxide and water vapour. Thus, it is said that it contributes to a cleaner and greener environment.

Natural gas is odourless. To detect gas leaks, a harmless but pungent odorant that smells like rotten eggs is added to it, as a safety measure. It can be smelt in case of even a small leak. When natural gas is mixed with the correct amount of air and ignited, this colourless, invisible gas burns with a clean, blue flame.

Natural gas is measured in British Thermal Units (BTU).

About 2,500 years ago, the Chinese discovered that natural gas could be burned.

They used bamboo to pipe it from shallow wells and burned it to boil seawater. This

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way they made water drinkable and separated the salt.

Natural gas is compressed to a high pressure and stored in hard cylindrical or spherical containers, for distribution. It is then known as Compressed Natural Gas or CNG.

CNG is also distributed to homes and industries through pipes.

In India, such a network of pipelines exists in Vadodara in Gujarat and some parts of Delhi.

CNG is now used as a fuel for transport vehicles – from light duty trucks, auto rickshaws and taxi cabs to delivery vans and heavy duty vehicles like buses.

Uses:

Natural gas is useful for cooking foods.

It is also useful to run central heating and cooling systems and cloth dryers.

It

Annexure 6 B

Hydel Power



Let students see the image carefully and answer the following questions:

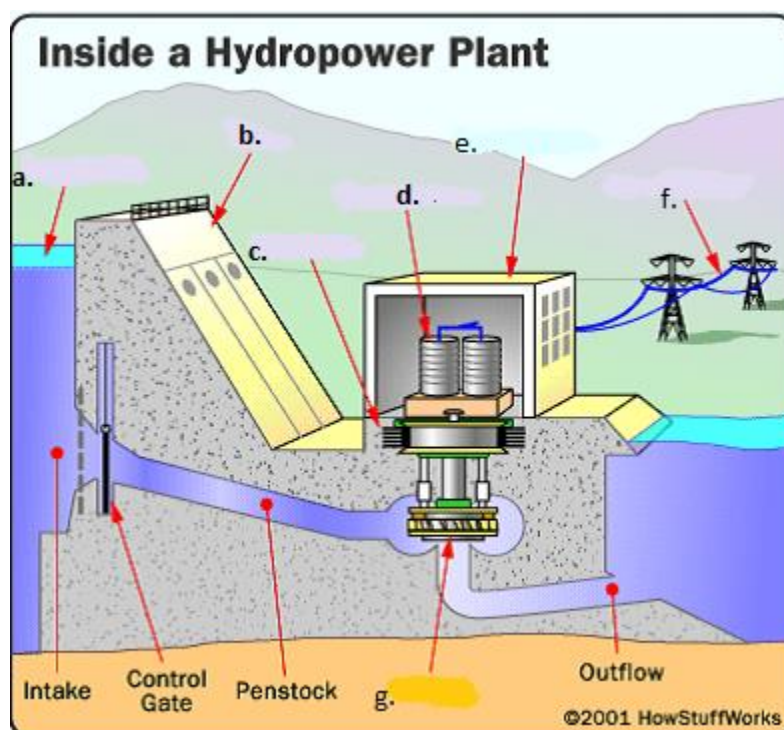
- What do you see in the picture?
- Why do you think such thing is designed?
- Do you think it has any advantage?
- List the drawbacks which may occur due to constructing this.
- Can you name some of these in India.

Name: _____

Skill – Research and evidence

Annexure 6C

In the given picture label the pointers a to g.



In the following table write the name of large hydel power projects along with the river on which it is built and also mention the areas benefited by it.

Hydro Power Project	Source (River)	Areas Harnessed

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Lesson Plan 7

Lesson Objectives

At the end of this lesson students will be able to:

- Students will be able to describe Wind and Solar energy as Non- conventional sources of energy.

Teaching Learning Materials required

- Video: A/V Device like a computer and projector; Video file (Reference: Annexure 7A)
- Video: A/V Device like a computer and projector; Video file (Reference: Annexure 7B)
- Worksheet (Reference: Annexure 7C)

Details of Teaching Learning Experience

Seating Arrangement: Normal

Lesson Beginning <u>Time:</u> 10 minutes <u>Purpose:</u> Activate prior knowledge	Introduction • Ask few introductory questions. • Let students brainstorm and discuss with the class • What is wind energy? • Have you ever seen a wind mill? • Can wind mill work throughout the year? • Where are wind mills normally located? • Give satisfactory answers and also correct them wherever they are wrong. • Let them understand use of wind mill as an important power resource. Video • Video: A/V Device like a computer and projector; Video file (Reference: Annexure 7A) • Show this video to the students • Let them further clear their doubts on wind energy
Lesson Middle <u>Time:</u> 15 minutes <u>Purpose:</u> Develop conceptual understanding	<u>Video</u> • Video: A/V Device like a computer and projector; Video file (Reference: Annexure 7B) • Show this video to the students • Let students understand solar energy • Distribute worksheet (Reference; Annexure 7C) to each student • Ask them to watch the video and complete the worksheet.
Lesson End <u>Time:</u> 15 minutes <u>Purpose:</u> Finish up	<u>Finish up</u> • Collect the worksheet for review.

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Annexure 7C

1. Give reason why the technology of solar energy does not works effectively in Alaska?

2. Which are the areas more benefitted by solar technology? Why?

3. Where is solar energy mostly used?

4. If I would like to put a wind turbine at my home. What steps should I follow?

5. Do wind turbine kill birds? Where should wind turbines be located?

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Lesson Plan 8

Lesson Objectives

At the end of this lesson students will be able to:

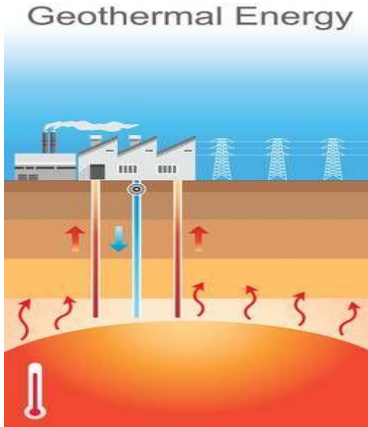
- Students will be able to describe Geothermal and Nuclear energy as Non- conventional sources of energy.

Teaching Learning Materials required

- Handout (Reference: Annexure 8A)
- Worksheet (Reference: Annexure 8B)

Details of Teaching Learning Experience

Seating Arrangement: Normal

Lesson Beginning <u>Time:</u> 10 minutes <u>Purpose:</u> Introduce the topic	Discussion - Ask them to name the three layers of the earth. - Can anybody answer what happens to the temperature when one goes deep inside the earth? - Let the students conclude that inside the earth there is excess heat. - Bring explanation to conclude that the heat inside the earth makes up geothermal energy.  - Explain students that this energy is used in various ways to produce electricity. - Let them discuss with their peer group.
Lesson Middle <u>Time:</u> 40 minutes <u>Purpose:</u> Develop conceptual understanding	Handout - Distribute the handout (Reference: Annexure 8A) to the students. - Let the students read the handout to develop an understanding of nuclear power plants.
Lesson End <u>Time:</u> 30 minutes <u>Purpose:</u> Finish up	Finish up - Distribute the worksheet (Reference: Annexure 8B) - Let the students complete the worksheet at home.

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Annexure 8A

Nuclear power

Nuclear power is the use of nuclear reactions that release nuclear energy^[5] to generate heat, which most frequently is then used in steam turbines to produce electricity in a nuclear power plant.

Nuclear fission power is a low carbon power generation method of producing electricity, and gives similar greenhouse gas emissions per unit of energy generated to renewable energy.

There is a social debate about nuclear power. Proponents, such as the World Nuclear Association and Environmentalists for Nuclear Energy, contend that nuclear power is a safe, sustainable energy source that reduces carbon emissions.

Nuclear power plants typically have high capital costs for building the plant, but low fuel costs. Although nuclear power plants can vary their output the electricity is generally less favorably priced when doing so. Nuclear power plants are therefore typically run as much as possible to keep the cost of the generated electrical energy as low as possible, supplying mostly base-load electricity.



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Annexure 8B

Find out names of largest Nuclear Power Plants in India:

Name	Areas

Find out names of largest Geothermal Power Plants in the world:

Name	Areas

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Lesson Plan 9

Lesson Objectives

At the end of this lesson students will be able to:

- Students will be able to describe biogas and tidal energy as Non-conventional sources of energy

Teaching Learning Materials required

- Image Annexure 9A
- Handout Reference: Annexure 9B
- Worksheet (Reference: Annexure 9C)

Details of Teaching Learning Experience

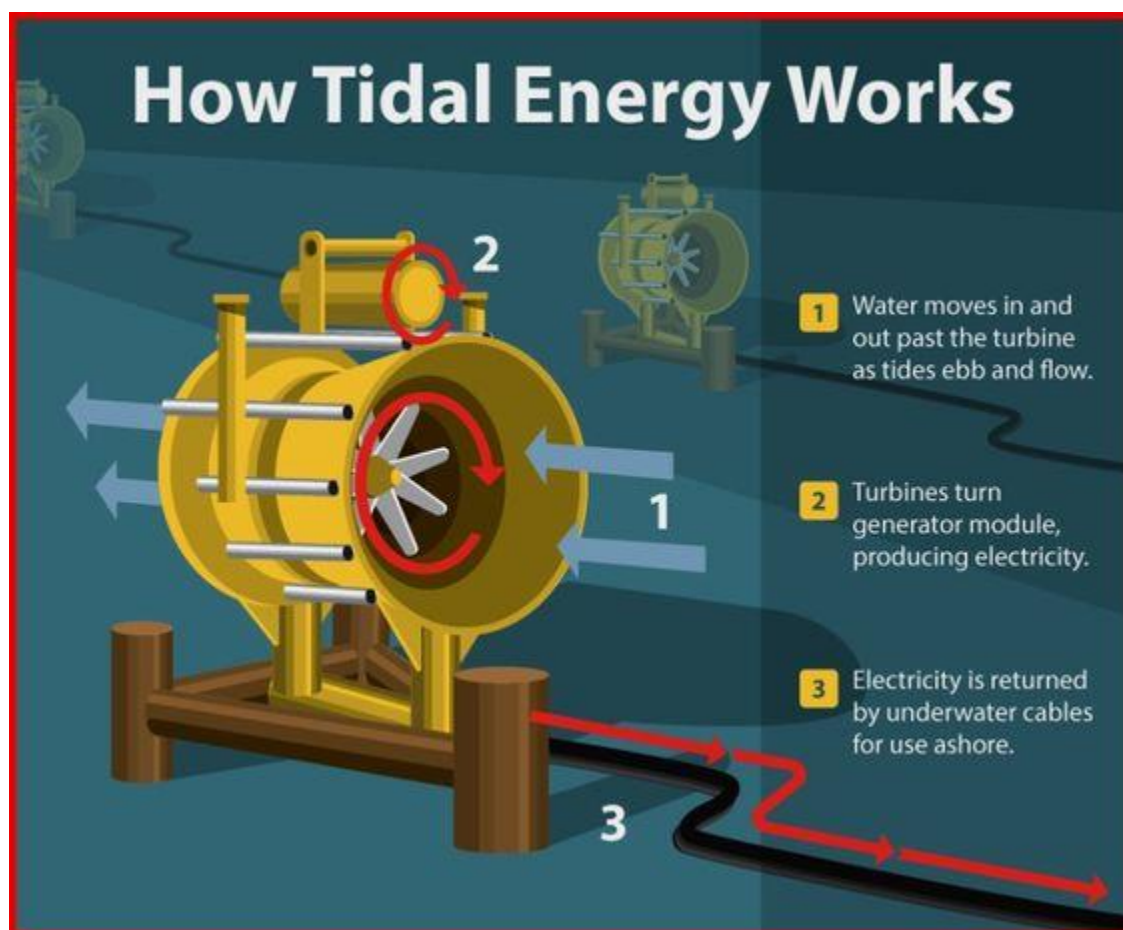
Seating Arrangement: Normal

Lesson Beginning <u>Time:</u> 10 minutes <u>Purpose:</u> Introduce the topic	Image Activity • Distribute Annexure 9A to all the students • Ask them to look at the picture and answer the following questions: ○ Have they ever seen a tidal plant in real? ○ Are they aware of the process or phenomenon under which this plant works? ○ Is it beneficial to us? • Explain them what is tidal power, how it works, and its importance to the country. • Tell them to discuss with their peer group • Ask students to go home and find out some of important tidal power plants in India and write them in their notebooks.
Lesson Middle <u>Time:</u> 15 minutes <u>Purpose:</u> Develop conceptual understanding	Handout • Distribute Annexure 9B to the students • Ask them to read the handout. • Bring the class together to discuss what biogas is? • Let the students talk about biogas plant in and around their houses • How effective it is? • Ask them to share some of their experience, if anyone is having biogas pipe line at their home.
Lesson End <u>Time:</u> 15 minutes <u>Purpose:</u> Finish up	Finish Up • Worksheet (Reference: Annexure 9C) • Let the students complete the worksheet • Give it as home assignment if not completed.

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Annexure 9A

Let the students study the image carefully.



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Annexure 9B



Biogas

Biogas, as a source of renewable energy, has aroused great interest in recent years, perhaps one of the most easily implemented technologies, especially in rural areas. Its potential development, not only considering the production of biogas, but also as an aid to obtaining biofertilizer and treatment of sanitary problems in some cases, makes replication and dissemination in sectors with abundant waste organic matter attractive.

Agricultural activity and the proper management of rural waste can contribute significantly to the production and conversion of animal and vegetable waste (biomass) into different forms of energy. During the anaerobic digestion of the biomass, by means of a series of biochemical reactions, the biogas is generated, which is constituted mainly by methane (CH_4) and carbon dioxide (CO_2). This biogas can be captured and used as fuel and / or electricity. In this way, anaerobic digestion, as a waste treatment method, allows to reduce the amount of contaminating organic matter, stabilizing it (bioabon) and, at the same time, producing gaseous energy (biogas).

From the perspective of developed and developing countries, anaerobic biotechnology contributes to three basic needs: a) Improve health conditions through pollution control; b) generation of renewable energies for domestic activities; and c) supply stabilized materials (biofertilizer) as a [biofertilizer](#) for crops. Therefore, anaerobic biotechnology plays an important role in controlling pollution and obtaining valuable resources: energy and value-added products.

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Annexure 9 C

1. Give an account of mineral distribution in India?

2. How are the minerals utilized?

3. What are conventional resources? Why are they called fossil fuels?

4. Give an account on the distribution and use of coal, petroleum and hydel power?

5. Why are non-conventional sources of energy important and give their uses?
