

Class: 8	Subject: SST	Topic: Land, Soil, Water, Natural Vegetation and Wildlife Resources
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SUMMARY SHEET		
Pedagogical Approach: Student – led		
Learner Previous Knowledge	N.A.	
Target Knowledge for this Topic	Land Resources Meaning of Land Resource; Significance in human life; What is land use; Factors affecting land use- physical, human and economic factors; Land use in India; Conservation of Land; Study about various types of waste (biodegradable and non-biodegradable); Steps to manage non-biodegradable waste (reduce, reuse, recycle, doing away with plastic bags, recycling of paper); Steps to manage biodegradable waste (composting, landfilling) (Taken from Grade 6, Science); Soil Resources Meaning of Soil Resources; Layers of soil- topsoil subsoil, substratum, bedrock; What is Soil profile; Soil formation- factors affecting it; Types of Soil in the world and in India- characteristics, place of availability and crops grown; Understand that soil acts a home for various organisms and that these organisms in turn help in improving the fertility of soil; (Taken from Grade 7, Sciences); Soil Erosion and Conservation Soil Erosion- common ways, factors affecting erosion; Soil conservation- need and measures; Case Study: Analyze soil type in north India and investigate how it was formed, land use as it stands today, factors affecting it currently, erosion - what is happening and what could be done to prevent it	
Learning Goals		
More Complex Learning Goal- Students will be able to deduce the importance of management of wastes and soil conservation		
Target Learning Goal- Students will be able to explain how land use has changed over the years, explain how to manage wastes and conserve soil		
Simpler Learning Goal- Students will be able to describe land resources and its conservation, soil resources, soil erosion and its conservation		
Period No.	Lesson Objectives	Teaching Learning Materials Required

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1	• Explain ways in which land is used • Arrive at the factors that affect land use	• Case Study (for each student): (Annexure 1A) • Picture Worksheet (for each student): (Annexure 1B) • Data Analysis Sheet (for each student): (Annexure 1C)
2	• List the different types of wastes • Explain the different ways of managing wastes	• Pre-class Preparation: Please arrange for bio-degradable wastes (such as Fruits, vegetables, paper, paper plates, leaves, pencil, pencil shavings) and non bio-degradable wastes (such as plastic bags, packaging materials batteries, glass, bottles, bulb, cans, pin, needle); Carton (for each group) • Worksheet (for each student): (Annexure 2A) • Handout (for each student): (Annexure 2B)
3	• Explain the formation of soil • Elucidate soil profile	• Record Sheet (for each student): (Annexure 3A) • Handout (Reference: Annexure 3B)
4	• Identify and describe types of soil in different parts of the world	• Case Study (for each student): (Annexure 4A) • Investigation Sheet (for each student): (Annexure 4B)
5	• Explain the process of soil erosion • Identify and describe ways to prevent soil erosion	• Handout (Reference: Annexure 5A) • A4 sheets (for each student)

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Lesson Plan 1

Lesson Objectives

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

- Explain ways in which land is used
- Arrive at the factors that affect land use

Teaching Learning Materials required

- Case Study (for each student): (Annexure 1A)
- Picture Worksheet (for each student): (Annexure 1B)
- Data Analysis Sheet (for each student): (Annexure 1C)

Details of Teaching Learning Experience

Seating Arrangement: In groups of 4

Lesson Beginning Time: 10 minutes Purpose: Introduce the topic	<u>Introduction</u> • Distribute case study to all students. (Reference: Annexure 1A) • Ask students to share their understanding of the case study. • Based on their response, arrive at the fact that difference in the quality of land and soil is one of the main reasons why places differ from each other
Lesson Middle Time: 15 minutes Purpose: Develop conceptual understanding	<u>Picture Analysis</u> • Distribute worksheets to all students. (Reference: Annexure 1B) • Ask students to discuss their understanding of the pictures in groups and answer the questions • Let student groups share their answers with the class and arrive at how land use has changed over time and factors that affect land use.
Lesson End Time: 15 minutes Purpose: Recap Students learning	<u>Data Analysis</u> • Distribute Annexure 1C to all students and ask them to do it in their groups • Initiate a discussion in class by asking students the following questions ○ Which country has agriculture as the main contributor to economy? ○ In what way is land use related to economic status of the

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	country? Let each student group share their understanding with the class and arrive at a consensus on how land use is related to economy.
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Annexure 1A- Case Study

Skill – Analytical thinking

Name: _____

Read the case studies given below:

Case Study 1

Zimba lives in a small village in Africa. Every morning Zimba walks a long way to fetch water. She helps her mother in the house and later joins her father in growing maize. Her family owns a piece of dry rocky land around their hut. They can barely grow some maize after toiling very hard. This is not enough to feed their family for the whole year.

Case Study 2

Jack and his family stay in New Zealand. Their family has a wool processing factory located on a grassy plain. Jack visits their factory very often with his father as he loves taking care of their sheep. Jack's family also grows many vegetables and fruits through organic farming. They use latest technology in growing them.

Think Think!

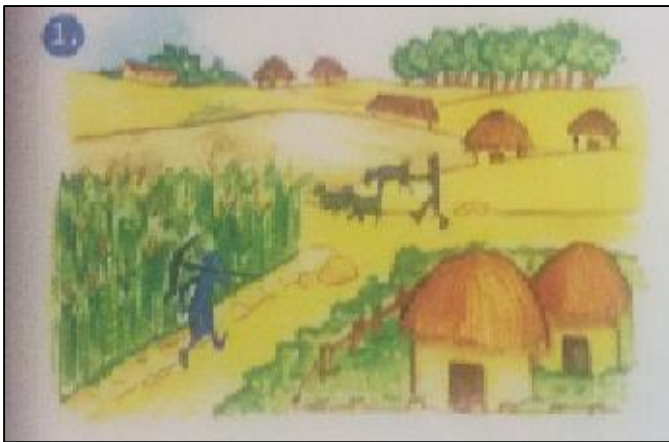
Zimba and Jack live in two different parts of the world and lead very different lives. What do you think is the cause of such difference?

Annexure 1B- Picture WorksheetSkill – Analytical thinking

Name: _____

Observe the pictures given below

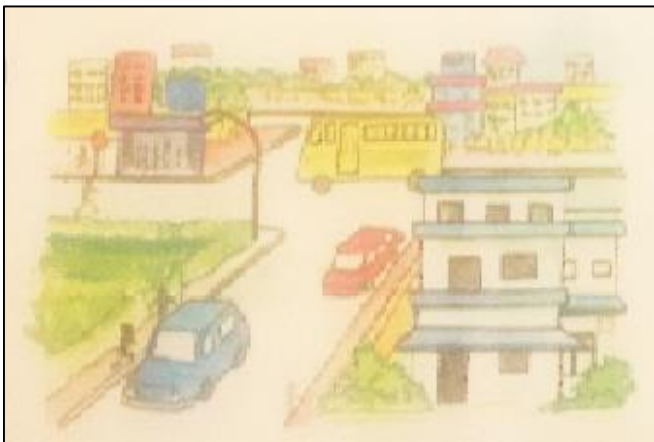
Picture 1



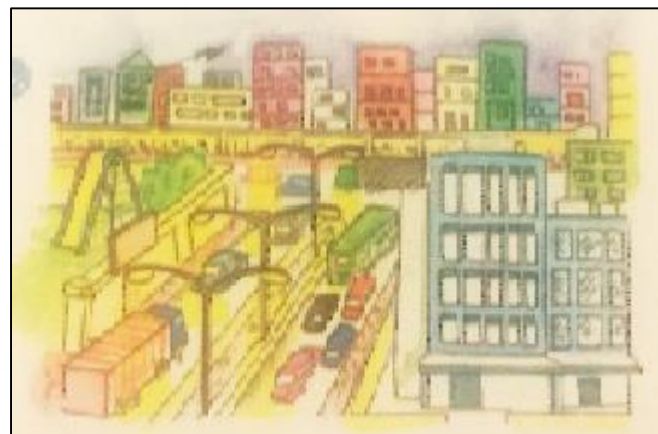
Picture 2



Picture 3



Picture 4



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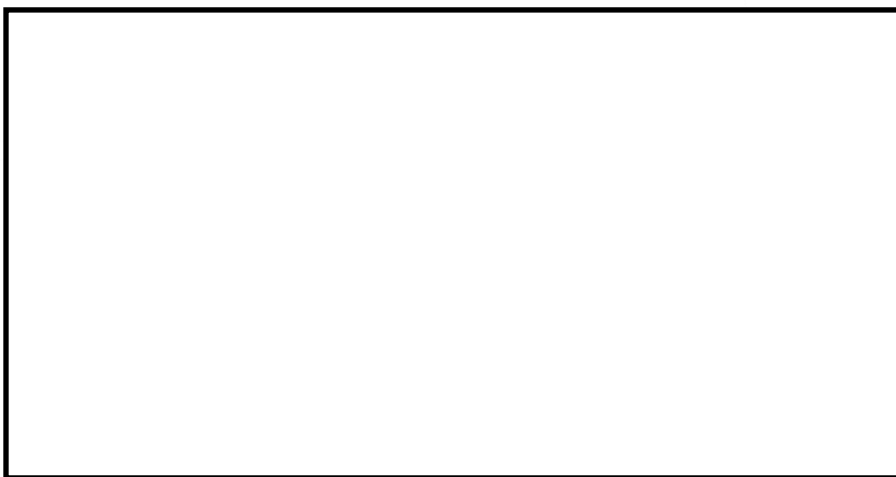
On the basis of your observation of the pictures, answer the following questions:

1. What are the changes that you can observe in the following pictures?

2. What do you think are the reasons for such changes?

3. What kind of picture can you imagine for a future?

Picture 5



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Annexure 1C- Data Analysis Sheet

Skill – Research and evidence

Name: _____

Study the table given below and answer the questions

Countries	Percentage of area in			
	Cropland	Pasture	Forest	Other Use
Australia	6	56	14	24
Brazil	9	20	66	5
Canada	5	4	39	52
China	10	34	14	42
France	35	21	27	17
India	57	4	22	17
Japan	12	2	67	19
Russia	8	5	44	44
UK	29	46	10	16
USA	21	26	32	21
World	11	26	31	32

1. Name the countries which have the highest percentage of land under cropland, pasture, forest and land use.

2. How would you relate the land use patterns of these countries with the probable economic activities?

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Lesson Plan 2

Lesson Objectives

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

- List the different types of wastes
- Explain the different ways of managing wastes

Teaching Learning Materials required

- **Pre-class Preparation:** Please arrange for bio-degradable wastes (such as Fruits, vegetables, paper, paper plates, leaves, pencil, pencil shavings) and non bio-degradable wastes (such as plastic bags, packaging materials batteries, glass, bottles, bulb, cans, pin, needle); Carton (for each group)
- Worksheet (for each student): (Annexure 2A)
- Handout (for each student): (Annexure 2B)

Note: You can also arrange for the creation of compost pit in school if possible.

Details of Teaching Learning Experience

Seating Arrangement: In groups of 4

Lesson Beginning Time: 15 minutes Purpose: Introduce the topic	<u>Sorting/Worksheet</u> • Distribute material in a carton to all groups • Distribute worksheet to individual students. (Reference: Annexure 2A) • Let groups select a group representative who will present the points to the class
Lesson Middle Time: 15 minutes Purpose: Develop conceptual understanding	<u>Discussion</u> • Let the group representatives present group's points to the class • Initiate a discussion by asking students the following questions: ○ On what basis are materials classified as biodegradable and non-biodegradable? ○ Have you seen a place where waste materials are collected in separate bins depending on their nature? (<i>public places like airports</i>) ○ What methods of waste management do you follow in your homes?

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	○ Why is it important to important to manage waste correctly? • Arrive at a comprehensive list for managing biodegradable and non-biodegradable wastes
Lesson End Time: 10 minutes Purpose: Recap students learning	<u>Recapitulation</u> • Distribute handouts (Reference: Annexure 2B) among students which will give them a comprehensive knowledge of all the methods used to manage wastes. • Ask one student to summarize the topic for the class

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Annexure 2A

Skill – Research and evidence

Name: _____

Observe the waste material provided to you and complete the table given below

1. List of waste material provided

Bio-degradable materials (SET 1)	Non bio-degradable materials (SET 2)

Explain a few ways to manage waste in SET 1

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Explain a few ways to manage waste in SET 2

Annexure 2B- Handout

Methods to treat wastes:

The two kinds of wastes (biodegradable and non-bio-degradable wastes) need different methods of disposal. Therefore the first step is to segregate the waste into biodegradable and non-bio-degradable wastes. Every household should have two garbage bins—one for biodegradable and another for non-bio-degradable wastes.

Managing Bio-degradable Wastes

Bio-degradable wastes include vegetables, food morsels, paper, pencil shavings etc. The primary method is to throw the kitchen wastes into garbage bin. Green waste refers to waste such as grass and flower cuttings, branches and hedge trimmings or waste from processing fruit and vegetable crops.

- Bio-degradable wastes can be recycled by the method of **Composting**. This is one of the oldest forms of disposal. It is a natural process that recycles the nutrients in the waste to yield manure or **compost**. The manure obtained is very rich and is very effective for growing plants. It prevents the decay of wastes. Apart from being clean, composting also reduces the amount of disposable garbage.
- **Vermicomposting**. This is another method of composting where compost is made from biodegradable waste with the help of a type of earthworms called redworms.
- We can recycle paper by covering our books and selling the rest to the *kabadiwala* for recycling.



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Reusing and recycling non -Bio-degradable Wastes

Things like packaging cans, aluminium foils, plastics and such other items are all non bio-degradable wastes. We can re-use items such as cans, bottles, glasses etc. We can use plastic bags for keeping things that we buy, instead of taking new bags from the shopkeeper. We can also carry paper bags for shopping instead of plastic bags. Rest can all be sold to the *kabadiwala* who takes these items to the factories where items like cans, broken bottles and glasses are melted to make new products.

Disposal of plastics

When plastics were introduced, they were considered to be wonder material! However, today plastics have become serious environmental and health concern. Careless disposal of plastic bags chokes drains, blocks the soils and prevents absorption of water. If eaten by animals such as cows, it can choke and even kill them.

Thankfully, over the last decade or so, a country-wide network for collection of plastic wastes through rag pickers, waste collectors and waste dealers and recycling enterprises have started to work.

Remember the four 'Rs' of managing wastes:

- ❖ Refuse things that increase garbage
- ❖ Reduce garbage by consuming less and throwing less.
- ❖ Reuse wherever possible.
- ❖ Recycle.

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Lesson Plan 3

Lesson Objectives

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

- Explain the formation of soil and soil profile

Teaching Learning Materials required

- Record Sheet (for each student): (Annexure 3A)
- Handout (Reference: Annexure 3B)

Details of Teaching Learning Experience

Seating Arrangement: In groups of 4

Lesson Beginning Time: 10 minutes Purpose: Introduce the topic	<u>Worksheet</u> • Distribute worksheet to all students (Annexure 3A) and ask students to answer part 1 of the worksheet • Randomly ask a few pairs share with the class the answers written by them
Lesson Middle Time: 15 minutes Purpose: Develop conceptual understanding	<u>Flow Chart</u> • Distribute to the class (Annexure 3B) • Initiate a discussion based on the flow chart. Let students share their understanding of how soil formation takes place and what is present below the surface of the soil • The following questions can be asked during the discussion ○ What factors do you think play an important role in formation of soil? ○ Which layer of soil has highest concentration of humus? ○ Are there places where you can see bedrock exposed? ○ What are the reasons for this? • Arrive at an understanding of soil formation, factors that influence it and different layers of soil and their identification

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Lesson End Time: 10 minutes Purpose: Recap students learning	<u>Worksheet</u> Ask students to complete PART 2 of the worksheet individually
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Annexure 3A

Skill – Critical thinking

Name: _____

PART 1 - Discuss with your partner and answer the following questions

A. Write how do you think soil is formed

B. What will you see if you dig deep into soil?

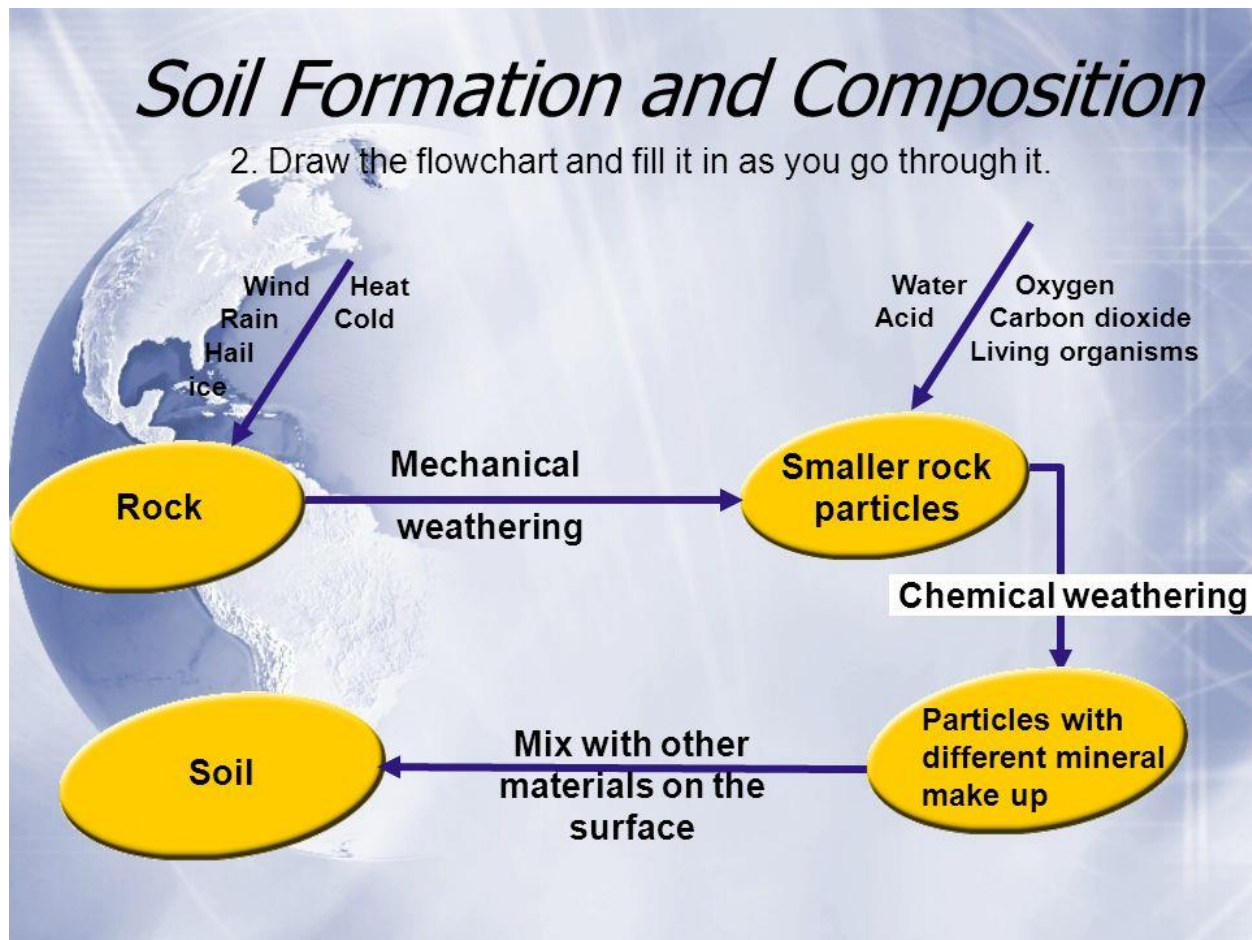
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PART 2 – Based on your observation of the video and points written in part 1, explain the following

a. Process of soil formation

b. Soil Profile

Annexure 3B



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Lesson Plan 4

Lesson Objectives

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

- Identify and describe types of soil in different parts of the world

Teaching Learning Materials required

- Handout (for each student): (Annexure 4A)
- Investigation Sheet (for each student): (Annexure 4B)

Note: This lesson may take longer than 40 minutes

Details of Teaching Learning Experience

Seating Arrangement: In groups of 4, in computer lab

Lesson Beginning Time: 15 minutes Purpose: Introduce the topic	<u>Handout</u> • Distribute case studies among the students. (Reference: Annexure 4A) • Ask students to discuss and answer the questions based on their understanding of the soil types • Initiate a discussion by asking student groups to state reason for choosing soil types for the states given and by asking the question – Why do you think so many different types of soils are found in India? • Arrive at a consensus on the soil type found in various states and their inference about soil found in India.
Lesson Middle Time: 15 minutes Purpose: Develop conceptual understanding	<u>Investigation</u> • Distribute investigation sheets to individual students in each group (Reference: Annexure 4B) • Students will discuss among themselves and complete their investigation sheet.
Lesson End Time: 10 minutes Purpose: Finish Up	<u>Finish up</u> • Ask each group to choose a representative who will present their views. • Let each group present their sheets in front of the class. • The whole point of this activity is to develop a comprehensive understanding of different types of soil in north Indian states.

Annexure 4A**Skill – Critical thinking****Name:** _____

Read the soil descriptions given below

1. Alluvial soil

This soil is derived from the debris brought down from the Himalayas or from the silt left out by the retreating sea. Their colour varies from light grey to ash grey and the texture is sandy to silty loam. It consists of silt, sand, clay, and gravel and often contains a good deal of organic matter. Therefore this soil is very fertile and helps in raising a number of crops like rice, jute, sugarcane, wheat, cotton, maize, oil seeds, fruits and vegetables. This soil is found in deltas of the Mississippi, the Nile, the Ganges and Brahmaputra, and the Huang rivers.

**2. Brown Soil**

In the drier areas of deciduous forest belt, brown soils (mountain soils) are found. They are rich in humus and deep. They are very good for orchard crops. In coniferous forest belts, brown forest soils called Podzol are found. These soils grow maize, barley, wheat and fruits. The soil profiles of these soils are in general immature. Such kind of soil is found in the Rockies in North America, Colorado plateau etc.



3. Desert Soil

Desert soils form in areas where the demand for water is much greater than precipitation. Desert soils are found in arid and semi-arid regions such as Africa, Middle East, North and South America and India. There is great possibility of using these soils if proper irrigation facilities are available. However, in large areas of desert soils, only the drought resistant and salt tolerant crops such as barley, cotton, wheat, millets, maize and pulses are grown. Consequently, these soils support a low density of population.



4. Black soil

Black soils found in the lava-covered areas are significant. These soils are often referred to as *regur* but are popularly known as “black cotton soils,” since cotton has been the most common traditional crop in areas where they are found. Black soils are derived from trap lava and spread to areas where there is both moderate rainfall and underlying basaltic rock. Because of their high clay content, black soils develop wide cracks during the dry season. They are poor in humus yet can retain moisture, thus responding well to irrigation.

Due to their high fertility and capacity to retain moisture, the black soils are widely used for producing several important crops. Black soils are found in Eastern Europe, Russia, Canada, India and so on.



5. Red Soil

Red soils are formed by weathering of ancient crystalline, metamorphic and sedimentary rocks. Their colour is red due to their very high iron content. They are found in areas of low rainfall. They are sandier and less clayey soils. They are usually poor growing soils, low in nutrients and humus and difficult to cultivate. The red soils respond well to the proper use of fertilizers and irrigation and give excellent yields of cotton, wheat, rice, pulses, millets, tobacco, oil seeds, potatoes and fruits. This kind of soil is found in South America, Central Africa, South and Southeast Asia, China, Japan and Australia.



Answer the following questions

1. Choose from soil type for the states from the options given below and state the reason for your choice

Alluvial Soil, Brown Soil, Black Soil, Red Soil, Desert Soil

a. Andhra Pradesh: _____

b. West Bengal: _____

c. Maharashtra: _____

d. Sikkim: _____

e. Rajasthan: _____

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Annexure 4B- Investigation Sheet

Skill – Opinion building

Name: _____

Select one North Indian state and investigate the soil type of the state and fill the details given below

STATE: _____

1. How was soil formed in this state?

2. What are the types of soil found in this state? (Write the dominant soil type and others which are found in the state)

3. What dominant crops are grown in this state and why?

4. What is the present status of soil in this state?

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Lesson Plan 5

Lesson Objectives

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

- Explain the process of soil erosion
- Identify and describe ways to prevent soil erosion

Teaching Learning Materials required

- Handout (Reference: Annexure 5A)
- A4 sheets (for each student)

Details of Teaching Learning Experience

Seating Arrangement: In groups of 4

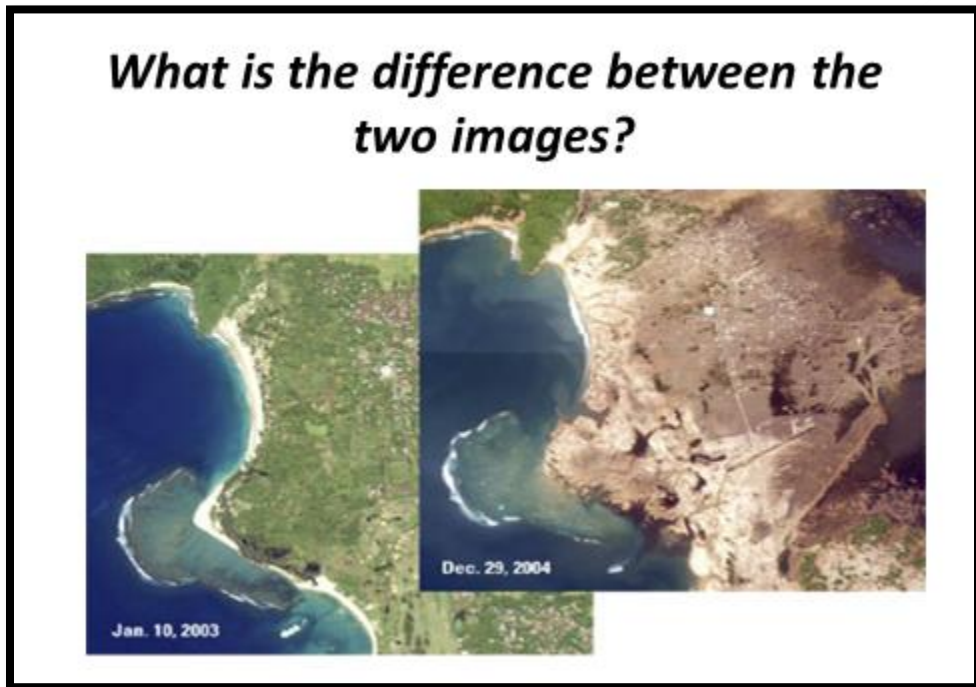
Lesson Beginning Time: 15 minutes Purpose: Introduce the topic	<u>Picture Study</u> • Distribute Handout to students (Reference: Annexure 5A) • Let students study and share their understanding from the 2 set of pictures given. • Using student responses arrive at soil erosion.
Lesson Middle Time: 15 minutes Purpose: Develop conceptual understanding	<u>Group Discussion</u> • Distribute A4 sheets to all groups. • Let students discuss in groups and think about what are the reasons for soil erosion and what would happen if soil erosion continues at a fast rate? • Once group discussion is over, ask each group to select a group representative who will present group's points to the class • Arrive at a list of causes and effects of soil erosion
Lesson End Time: 10 minutes Purpose: Finish Up	<u>Finish up</u> • Ask the groups to think about 2 ways in which soil erosion can be prevented • Let each group present the solutions that they have thought of • Encourage students to think of different solutions Homework: Ask students to write a note about how soil erosion is affecting

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	life and how soil erosion can be prevented
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Annexure 5A

Picture 1



Picture 2

***What is the difference between the
two images?***

