Lesson-7: Changes in Our Environment

9 Periods (40 minutes each)

Learn Better (Main Coursebook), Stay Ahead (Workbook), Book of Holistic Teaching, Book of Project Ideas, Posters, CRM signs.

Animation, Animated Activities, Concept Map, Diagram, Dictionary, eBook, I Explain, Quiz, Slideshow, Test Generator.

Affirming better

Changes bring new opportunities for learning.

Curricular Goals and Objectives (NCF)

To enable the students:

- to explore the composition of air and identify the different gases present in it.
- to understand the Greenhouse Effect, its causes and its role in global warming.
- to learn about factors contributing to global warming and discuss measures to control it.
- to engage in creative expression through skits, journaling and project work on environmental issues.

Methodology

Period 1

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we dive into our lesson, let us take a moment to relax and focus our minds with a short meditation. Ready?

SHOULD DO — 05 MIN.

Teacher: Sit comfortably in your chair, with your back straight and feet flat on the ground. Close your eyes gently and take a deep breath through your nose. Hold it for a moment, then slowly breathe out through your mouth.

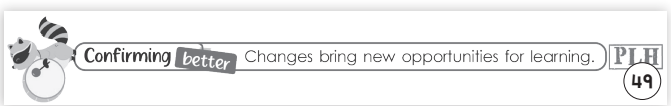
Let us do these three more times. Breathe in... and breathe out. As you breathe, imagine your mind becoming clear and ready to learn.

Open your eyes and smile at your friends. Let us start our lesson with positive energy.

Confirming better

Teacher: Before we start the class, let us all say together something positive 'Changes bring new opportunities for learning.' Repeat after me: 'Changes bring new opportunities for learning.'

MUST DO — 05 MIN.



Teacher: Alright. Today, we are going to begin a new chapter 'Changes in Our Environment.' We use a KWL chart to help us organize our thoughts and learning. I have made a KWL format on the blackboard. Please take out your notebooks and draw the same format.

K	W	L

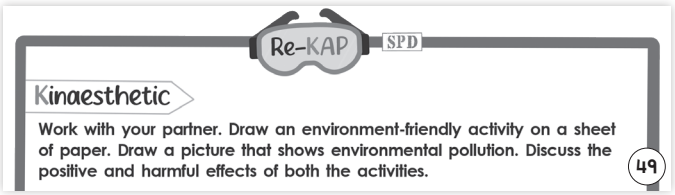
Teacher: Let us start by filling out the 'K' and 'L' columns. Take a few minutes to think and write. If you have any questions, feel free to ask.

Teacher: Before we start the chapter, we will do a quick Re-KAP, which involves revisiting our previous knowledge through creative activities using Kinaesthetic, Auditory and Pictorial methods to make our learning interactive and engaging.

Kinaesthetic

Teacher: Let us begin with the Kinaesthetic activity. Imagine you are an artist. You have to work with a partner to draw two pictures—one of an environment-friendly activity and another showing environmental pollution. Think about what you see around. What are some activities that help our environment? And what are some that harm it?

MUST DO — 10 MIN.



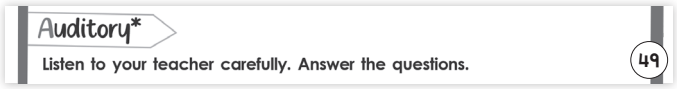
(Wait for the students' responses.)

Teacher: Now, once you have drawn your pictures, discuss with your partner the positive and harmful effects of these activities. How do they impact nature? Take your time and think carefully before sharing.

Auditory

Teacher: Let us move to auditory activity. Listen carefully to me. I will ask you some questions and I want you to pay attention to every detail before answering. Are you ready?

MUST DO
10 MIN.



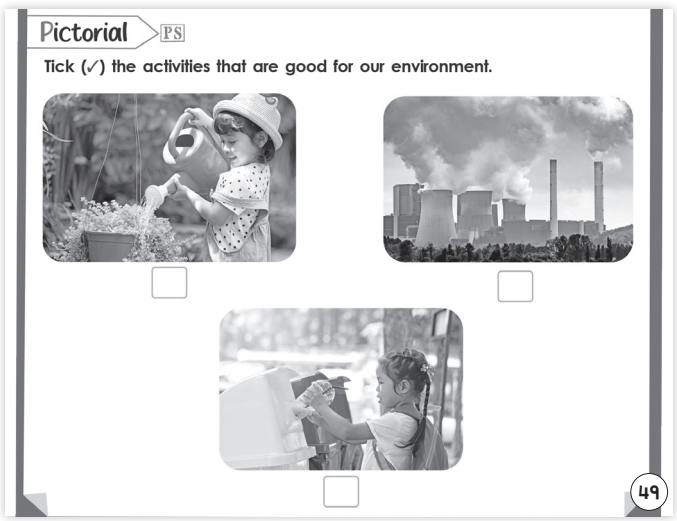
The Earth's temperature gets hotter because of pollution and increased amount of carbon dioxide in the air. This causes global warming which in turn causes melting of ice in the Arctic.

1. What causes the Earth's temperature to get hotter?
2. What happens in the Arctic because of global warming?

(Wait for students to answer)

Teacher: Great listening. Keep it up.

Pictorial



Teacher: Next, let us look at the three pictures on page 49 of the Main Course Book. Your task is to identify which ones show activities that are good for the environment. If you think an activity is helpful, tick (✓) the box under it. Think before you decide.

MUST DO
10 MIN.

(Guide students as they evaluate the pictures.)

Differentiated Activities

110 km/hr

What is one major environmental effect of excessive industrial pollution?

80 km/hr

Name one way we can reduce pollution in our daily lives.

40 km/hr

What should we do with waste plastic bottles—reuse or throw away?

Home Task

Observe an activity at home that helps or harms the environment. Write two sentences about how it affects nature in your notebook.

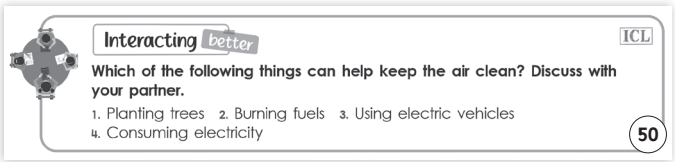
Period 2

Interacting better

Teacher: Good morning, students. How are you all today?

Teacher: Great. Today, we will start with an 'Interacting better' activity.

MUST DO
10 MIN.



Teacher: Let us explore how we can keep the air clean. Discuss with your partner and decide which of these activities can help:

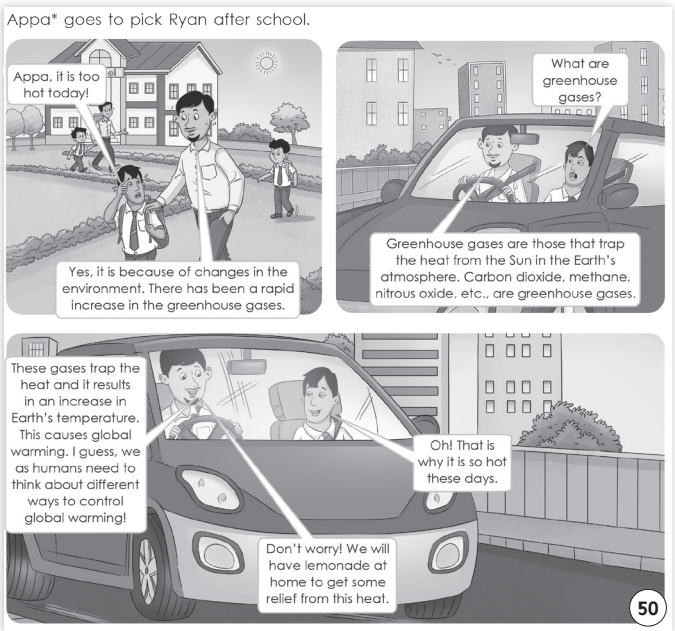
1. Planting trees
2. Burning fuels
3. Using electric vehicles
4. Consuming electricity

Take a moment and think carefully. Why would some of this help while others might harm the air quality? Discuss your reasons with your partner.

(Encourage students to explain their answers and guide the discussion accordingly.)

(Use CRM signs to settle the class.)

Teacher: Great answers everyone.



Teacher: Great. Now, it is story time. Let us start an interesting story from your book.

MUST DO
30 MIN.

Teacher: Turn to page number 50 of your Main Course Book. Take a few minutes to read the story silently on your own and try to understand it.

Teacher: As you read, imagine the characters and events in your mind. Pay close attention to the details—this will help you enjoy the story and answer questions later.

(Give time to the students to read the story)

Teacher: Now that you have read the story, let us talk about it. Tell me, why does Ryan say, 'It is too hot today?'

Teacher: Yes, he feels the heat, but what does his father say about why it is getting hotter?

Teacher: Right. He talks about greenhouse gases. Can you name some of the greenhouse gases mentioned in the story?

Teacher: Well done. Now, how do these gases affect the Earth's temperature?

Teacher: Yes, they trap heat from the Sun, making the Earth warmer. This leads to something called global warming. Can anyone explain what global warming is and why we should be concerned about it?

Teacher: Good thinking. If global warming continues, it can change our weather, melt ice caps and harm plants and animals. But do we have ways to reduce global warming? What actions can we take?

Teacher: Excellent ideas. Now, let us imagine something. If you were Ryan and had to explain global warming to a friend, how would you do it? Think about simple words you would use and share your ideas with your partner.

Teacher: Well done. Now that we understand how greenhouse gases affect our environment, let us think about small changes we can make to protect the Earth. Every action counts.

You may show the **Dictionary** and **eBook** on the digital platform.

Differentiated Activities

110 km/hr

How does deforestation contribute to the increase of greenhouse gases in the atmosphere?

80 km/hr

Which greenhouse gas is released in large amounts when fossil fuels are burned?

40 km/hr

Name one activity that helps keep the air clean.

Home Task

Observe your surroundings and note down one activity that adds pollution to the air and one activity that helps keep the air clean. Write your answers in your notebook.

Period 3

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we begin today's lesson, let us play a quick game to refresh what we have learned so far. I will give you some clues and you have to guess the correct word. Are you ready?

SHOULD DO
05 MIN.

Teacher: I am an invisible gas. Plants take me in and humans breathe me out. What am I? (Carbon dioxide)

Teacher: I am made of glass and trap heat inside me to help plants grow. What am I? (Greenhouse)

Teacher: I am a process where certain gases trap heat in the Earth's atmosphere, making the planet warmer. What am I? (Greenhouse effect)

Teacher: Cutting down too many trees increases me in the air and I contribute to global warming. What am I? (Carbon dioxide)

Teacher: I am a gas released when fossil fuels are burned and I contribute to the greenhouse effect. What am I? (Carbon dioxide)

Teacher: Great work. Let us move on to today's lesson.

Teacher: Today, we will learn how our environment is changing and why it is important to take care of it.

MUST DO
15 MIN.

(The teacher will read the last two paragraphs of page 50 and the first four paragraphs of page 51 aloud and provide explanations to ensure that the students understand the content.)

Our environment supports our life. We should also support our environment. Let us learn how our environment is changing and why.

GREENHOUSE

A greenhouse is a structure which is typically made of glass. It is designed to trap heat from the Sun within its interior. The walls of a greenhouse provide no room for the heat

Teacher's Note: *Tell the students that Ryan calls his father 'Appa'.

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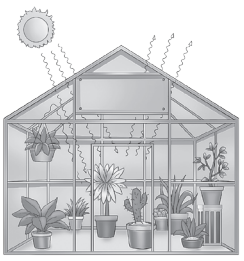
to escape. This trapped heat creates a warm and controlled environment in the greenhouse. This environment is suitable for growing plants in cold climates or in any unfavourable conditions. A variety of crops including vegetables, fruits, flowers and herbs can be cultivated* in greenhouses.

Greenhouse gases

Some gases, such as methane, carbon dioxide, nitrous oxide, chlorofluorocarbons (CFCs)*, ozone, water vapour, etc. are present in our atmosphere. Just like a greenhouse traps heat, these gases trap the Sun's heat in the Earth's atmosphere, making it very warm. Therefore, these gases are called greenhouse gases. Heat escapes from our atmosphere, thereby warming the Earth's surface.

The warming of the Earth caused by the greenhouse gases is called the greenhouse effect. Let us learn about the different greenhouse gases.



greenhouse effect

Carbon dioxide

The burning of fossil fuels* and deforestation* have led to an increase in the amount of carbon dioxide in the atmosphere. If the amount of carbon dioxide keeps on increasing at this rate, the Earth's temperature will soon increase to such levels that our Earth will become uninhabitable.

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Teacher: First, let us begin with a simple question. What do you think a greenhouse is?

Teacher: Great ideas. A greenhouse is a structure made of glass. It traps heat from the Sun, making the environment inside warm and controlled. Can you think of a reason why farmers might use greenhouses?

Teacher: Exactly. Greenhouses help in growing plants in cold climates or places with harsh weather. The heat stays inside, providing a suitable environment for plants to grow. Now, if a greenhouse traps heat, do you think something similar happens in our environment? Let us discuss this further.

Teacher: What are some gases in the atmosphere that trap heat from the Sun?

MUST DO
10 MIN.

Teacher: Yes, gases like carbon dioxide and methane trap heat from the Sun. What are these gases called?

Teacher: Correct. These are called greenhouse gases. Can you name any greenhouse gases mentioned in your book?

Teacher: Well done. Nitrous oxide, ozone and chlorofluorocarbons (CFC), are some of the gases that act like a greenhouse around the Earth, keeping the heat in. But if too many greenhouse gases are present, what do you think happens to the Earth's temperature?

Teacher: Correct. The Earth becomes hotter and this is called the greenhouse effect. Now, let us think. What happens when the temperature keeps rising?

Teacher: Yes. This leads to global warming, which changes the weather, melts glaciers and affects living beings.

Teacher: Do you know the biggest contributor to greenhouse gases?

MUST DO
10 MIN.

Teacher: One of the main causes of rising greenhouse gases is carbon dioxide. It comes from burning fossil fuels and cutting down trees. What happens when we burn too much fuel or cut too many trees?

Teacher: Right. The carbon dioxide in the atmosphere increases and if it continues, Earth's temperature will rise so much that it may become uninhabitable.

Discovering better

(Explain the term uninhabitable and discuss it with the class.)

Teacher: What do you think we can do to reduce carbon dioxide levels?

Teacher: Excellent ideas. Planting trees, using less fuel and choosing clean energy sources can all help.

Teacher: Well done.

You may show the **Animation** and **Diagram** on the digital platform.

Differentiated Activities

110 km/hr

How does the greenhouse effect contribute to climate change?

80 km/hr

Name one human activity that increases carbon dioxide in the atmosphere.

40 km/hr

Which gas do plants absorb from the atmosphere?

Home Task

Observe your surroundings and write down two activities that increase greenhouse gases and two activities that help reduce them. Note your answers in your notebook.

Period 4

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we begin today's lesson, let us have a quick warm-up activity to refresh our learning. Listen carefully and answer the following questions as quickly as possible. Are you ready?

SHOULD DO
05 MIN.

Teacher: I am an energy source that does not pollute the air and is harnessed from the Sun. What am I? (Solar energy)

Teacher: When trees are cut down in large numbers, I increase in the atmosphere and lead to global warming. What am I? (Carbon dioxide)

Teacher: I am the effect caused by greenhouse gases trapping heat in the Earth's atmosphere. What am I? (Greenhouse effect)

Teacher: I am an activity that helps in reducing air pollution by decreasing the number of vehicles on the road. What am I? (Carpooling)

Teacher: I am a gas essential for plant growth and plants absorb me from the air. What am I? (Carbon dioxide)

Teacher: Well done, everyone. Let us begin today's lesson.

Teacher: Today, we will learn about methane, a gas that plays a role in global warming.

(The teacher will read the last three paragraphs of page 51 aloud and provide explanations to ensure that the students understand the content.)

Methane

A major component of the natural gas, methane is produced by the decay of organic material. This production of methane can take place both above or below the surface of the Earth. Methane can be released in the atmosphere by either natural processes or human activities.

Methane is produced above the Earth's surface through natural processes like decay of organic materials in wetlands (like swamps and marshes), through organic waste in the landfills. It is also produced in the digestive systems of ruminant animals (like cows and sheep). In such animals, microbes break down food and produce methane, which is released into the atmosphere when the animal burps.

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Methane is also produced below the Earth's surface like in peat bogs (a deposit of dead plant material) where organic material accumulates and decomposes slowly over time, producing methane. Later, this gas slowly releases into the atmosphere. Methane can also be produced by sediments, soils and coal mines.

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Teacher: Now, tell me what is methane? Where do you think it comes from?

MUST DO
15 MIN.

Teacher: Interesting. Methane is a major component of natural gas and it is produced when organic materials decay. This can happen both above and below the Earth's surface. Can you tell me some places where materials decompose naturally?

Teacher: Yes. Methane is released into the atmosphere through natural processes and human activities. It can come from swamps, landfills and even from animals. Some animals, like cows and sheep, produce methane in their digestive systems. Do you know how it is released?

Teacher: Exactly. When these animals burp, methane is released into the air. This is one of the reasons why scientists study ways to reduce methane emissions from livestock.

Teacher: Now, let us discuss the methane that is produced below the Earth's surface. What happens to dead plants and organic material over time?

MUST DO
10 MIN.

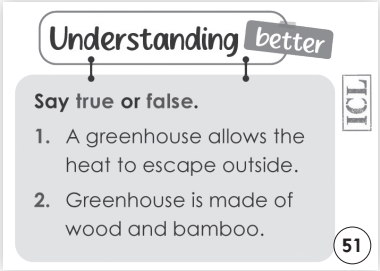
Teacher: Correct. They decompose slowly and in places like peat bogs, methane is produced. Over time, this gas is released into the atmosphere. Methane can also be found in sediments, soils and coal mines. Why do you think too much methane in the atmosphere can be a problem?

Teacher: Yes. Methane traps heat from the Sun, making the Earth warmer. This contributes to global warming, which affects our climate, weather patterns and sea levels.

Understanding better

Teacher: Let us do the understanding better activity given on page 51 of the Main Course Book.

MUST DO
10 MIN.



Teacher: I shall read out the two statements and you will say whether you think it is true or false. Here is the first one: 'A greenhouse allows the heat to escape outside. .'

Teacher: If you said 'false,' you are correct. Well done. Now, here is the second statement: 'A greenhouse is made of wood and bamboo.'

Teacher: If you said 'false,' you are correct. Wonderful. Great discussion, everyone.

Differentiated Activities

110 km/hr

Why is methane considered a greenhouse gas?

80 km/hr

Name one natural source of methane.

40 km/hr

Which gas is released when organic waste decomposes?

Home Task

Observe your surroundings and find one example of an activity that might release methane into the air. Write five sentences explaining how it happens.

Period 5

Teacher: Good morning, students. How are you all today?

Teacher: Great. Today, we will start with a quick game called 'True or False?' I will read out some statements about the environment, pollution and greenhouse gases. If you think the statement is true, raise your right hand. If you think it is false, raise your left hand. Let us begin.

SHOULD DO
05 MIN.

Teacher: Planting more trees increases the amount of carbon dioxide in the air. (False)

Teacher: Methane is a greenhouse gas that traps heat in the Earth's atmosphere. (True)

Teacher: Burning fossil fuels releases oxygen into the air. (False)

Teacher: Global warming can cause ice caps to melt and sea levels to rise. (True)

Teacher: Carpooling and using public transport can help reduce air pollution. (True)

Teacher: Great work, everyone. Let us begin today's lesson.

Teacher: Today, we will explore some important greenhouse gases and their role in the greenhouse effect. (The teacher will read the first five paragraphs of page 52 aloud and provide explanations to ensure that the students understand the content.)

Water vapour

Water vapour acts as the Earth's most abundant greenhouse gas. It contributes about 41–67 per cent to the greenhouse effect. Unlike other greenhouse gases, water vapour remains in the atmosphere for a short period of time.

Ozone

Unlike other gases, ozone does not act as a typical greenhouse gas. In the upper regions of the stratosphere (a layer of the Earth's atmosphere), ozone absorbs the ultraviolet* rays from the Sun. However, in regions near the ground, ozone acts as a greenhouse gas and a pollutant* by absorbing infrared radiation emitted by Earth's surface, which contributes to atmospheric warming.

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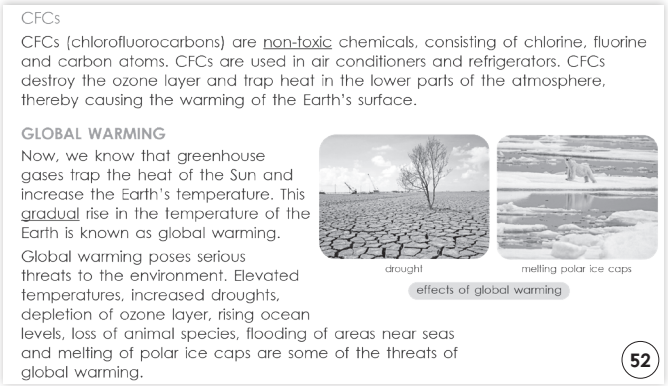

CFCs

CFCs (chlorofluorocarbons) are non-toxic chemicals, consisting of chlorine, fluorine and carbon atoms. CFCs are used in air conditioners and refrigerators. CFCs destroy the ozone layer and trap heat in the lower parts of the atmosphere, thereby causing the warming of the Earth's surface.

GLOBAL WARMING

Now, we know that greenhouse gases trap the heat of the Sun and increase the Earth's temperature. This gradual rise in the temperature of the Earth is known as global warming.

Global warming poses serious threats to the environment. Elevated temperatures, increased droughts, depletion of ozone layer, rising ocean levels, loss of animal species, flooding of areas near seas and melting of polar ice caps are some of the threats of global warming.

drought

melting polar ice caps

effects of global warming

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Teacher: Let us start our discussion with a simple question—what is the most abundant greenhouse gas in the Earth's atmosphere?

MUST DO 15 MIN.

Teacher: Yes. Water vapour is the most abundant greenhouse gas, making up about 41-67 per cent of the greenhouse effect. Unlike other gases, water vapour stays in the atmosphere for only a short time. Why do you think water vapour disappears faster than other greenhouse gases?

Teacher: Exactly. Water vapour condenses into clouds and falls back to the Earth as rain. Now, let us talk about another gas—ozone. What is the ozone layer? What does it do?

Teacher: Correct. The ozone layer absorbs harmful ultraviolet rays from the Sun. But did you know that ozone near the ground can act as a greenhouse gas? It absorbs infrared radiation from the Earth's surface, contributing to atmospheric warming.

Teacher: Now, let us talk about a man-made greenhouse gas called CFCs or chlorofluorocarbons. Where do you think they are used?

MUST DO 05 MIN.

Teacher: That is right. CFCs are used in refrigerators and air conditioners. They are non-toxic, but they have a serious effect on our environment. They destroy the ozone layer and trap heat in the atmosphere, which makes the Earth warmer.

Discovering better

(Explain the terms mentioned in the activity. And discuss with the class.)

Teacher: What are the ways to reduce the use of CFCs?

Teacher: Excellent ideas. Using eco-friendly appliances and reducing air conditioning usage can help lower CFC emissions.

MUST DO 05 MIN.

Teacher: Now that we know how greenhouse gases trap heat, let us discuss global warming. What do you think happens when the Earth's temperature keeps rising?

Teacher: Correct. The gradual rise in the Earth's temperature is called global warming. It affects the environment in many ways. Can you name some problems caused by global warming?

Teacher: Very good. Global warming leads to extreme weather conditions, floods and habitat loss for animals. If we do not take action, these problems will become worse. What do you think we can do to slow down global warming?

Teacher: Great. Planting trees, reducing pollution and using clean energy sources are some of the ways we can help. Now, let us summarise what we have learned.

Understanding better

Teacher: Let us do the understanding better activity given on page number 52.

MUST DO 05 MIN.

Teacher: I shall read out the two statements and you will say whether you think it is true or false. Here is the first one: 'Global warming decreases the temperature of the Earth.'

Teacher: If you said 'false,' you are correct. Well done. Now, here is the second statement: 'We can control global warming by planting trees.'

Teacher: If you said 'true,' you are correct. Wonderful. Great discussion, everyone.

Poster

Teacher: Let us take a moment to look at the poster on the wall.

(Display and discuss the posters prominently in the classroom to reinforce the learning about climate solutions. Encourage students to observe the posters and discuss the different ways to protect, manage and restore the climate.)

MUST DO 05 MIN.

Teacher: Great observation everyone.

You may show the **Concept Map** on the digital platform.

Differentiated Activities

110 km/hr

How do CFCs contribute to the warming of the Earth's surface?

80 km/hr

Name one environmental problem caused by global warming.

40 km/hr

What is the most abundant greenhouse gas in the atmosphere?

Home Task

Write three ways in which global warming affects the Earth and three ways we can reduce its impact.

Period 6

Teacher: Good morning, students. How are you all today?

Teacher: Great. Let us begin today's lesson with a quick guessing game. I will describe a greenhouse gas and you have to guess its name.

SHOULD DO
05 MIN.

Teacher: I am the most abundant greenhouse gas and I form clouds and rain. What am I? (Water vapour)

Teacher: I protect you from harmful ultraviolet rays but also act as a greenhouse gas near the ground. What am I? (Ozone)

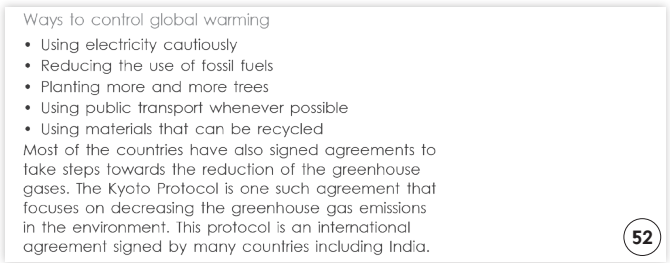
Teacher: I am produced by air conditioners and refrigerators and I damage the ozone layer. What am I? (CFCs)

Teacher: I cause the gradual rise in the Earth's temperature and lead to extreme weather conditions. What am I? (Global warming)

Teacher: Well done everyone. Let us begin today's lesson.

Teacher: Good morning, students. Today, we will discuss some important ways to control global warming.

(The teacher will read the last paragraph of page 52 aloud and provide explanations to ensure that the students understand the content.)



Ways to control global warming

- Using electricity cautiously
- Reducing the use of fossil fuels
- Planting more and more trees
- Using public transport whenever possible
- Using materials that can be recycled

Most of the countries have also signed agreements to take steps towards the reduction of the greenhouse gases. The Kyoto Protocol is one such agreement that focuses on decreasing the greenhouse gas emissions in the environment. This protocol is an international agreement signed by many countries including India.

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Teacher: Let us start our discussion with a question—what are some things we do daily that contribute to global warming?

MUST DO
10 MIN.

Teacher: Great thoughts. Using too much electricity, burning fossil fuels and cutting down trees all contribute to global warming. What are the things we can do to reduce it?

Teacher: Yes. First, let us talk about electricity. Why do you think using electricity cautiously can help reduce global warming?

Teacher: Correct. When we use electricity, we often rely on power plants that burn fossil fuels. If we switch off lights and fans when not needed, we use less electricity and reduce pollution.

Teacher: Now, how do fossil fuels contribute to global warming?

Teacher: Right. Burning fuels like coal and petrol releases carbon dioxide, which traps heat in the atmosphere. So, what can we do instead of using fossil fuels?

Teacher: Excellent. Using solar and wind energy, cycling or walking instead of using cars helps reduce fossil fuel consumption.

Teacher: Another simple way to help the environment is by planting trees. Why do you think trees are important in fighting global warming?

Teacher: Yes. Trees absorb carbon dioxide from the air and release oxygen. The more trees we plant, the cleaner the air becomes.

Teacher: Now, let us think about transportation. How does using public transport help reduce global warming?

Teacher: That is correct. When more people travel together in buses or trains, fewer vehicles are on the road. This reduces fuel consumption and pollution.

Teacher: Finally, recycling is another way to protect our planet. How does using recyclable materials help in reducing global warming?

Teacher: Very good. Recycling reduces the need for producing new materials, which saves energy and reduces emissions from factories.

Teacher: Apart from these steps, did you know that many countries have also agreed to take action against global warming? Can you think of any international agreements that help reduce greenhouse gases?

Teacher: Yes. One important agreement is the Kyoto Protocol. This is an international agreement signed by many countries, including India, to reduce greenhouse gas emissions. Why do you think agreements like this are important?

Teacher: Exactly. When countries work together, they can create stronger policies to protect the environment. Every small step we take, whether as individuals or as a country, makes a difference.

Connecting better

Teacher: Now, let us discuss the 'Connecting better' given on page 53. Did you know that deforestation is one of the major causes of global warming? Imagine two friends, Ryan and Sam, having a conversation at school. Ryan tells Sam, 'Do you know that due to the loss of forests, there is an increase in global warming?' Sam replies, 'Yes, Ryan, I have also read that the world lost 3.7 million hectares of forest annually from 2022 to 2023.'

MUST DO
05 MIN.

Connecting better

Maths

HoLL

Ryan tells Sam, at the school "Do you know that due to loss of forests there is increase in global warming." Sam replies, "Yes Ryan, I have also read somewhere that the world has lost 3.7 million hectares of forest annually from 2022 to 2023."

53

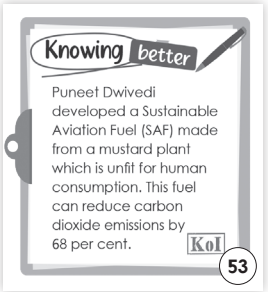
Teacher: What do you think happens when so many trees are lost in just one year?
(Encourage students to discuss the impact of deforestation.)
Teacher: Right. Trees absorb carbon dioxide and when forests are cut down, more carbon dioxide remains in the air, leading to higher temperatures.

Knowing better

Teacher: Now, let us talk about an inspiring scientist named Puneet Dwivedi. Has anyone heard of him?

MUST DO
05 MIN.

Teacher: Puneet Dwivedi developed Sustainable Aviation Fuel (SAF) using mustard plant oil, which is safe for human consumption. What do you think makes this fuel special?

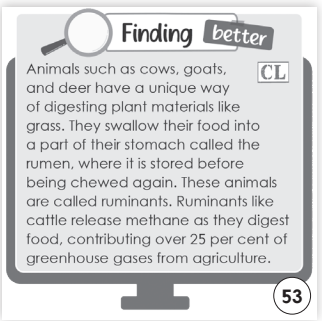


Teacher: Correct. This fuel can help reduce carbon dioxide emissions by up to 68 per cent. Imagine if all planes used this type of fuel—how would it help the environment?

Finding better

Teacher: Let us now look at something interesting—certain animals contribute to greenhouse gas emissions. Animals such as cows, goats and deer are called ruminants because of their unique digestive system. What do you think is special about their digestion?

MUST DO
05 MIN.



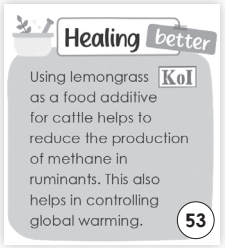
Teacher: Exactly. These animals chew their food, swallow it and then bring it back to chew again. This process helps them digest tough plant materials, but it also causes them to release methane, a powerful greenhouse gas. How do you think this affects global warming?

Teacher: That is right. Methane traps heat in the atmosphere, just like carbon dioxide. In fact, methane emissions from ruminants contribute to more than 25 per cent of the greenhouse gases produced by agriculture.

Healing better

Teacher: But do you think we can do something to reduce methane emissions from cattle? Scientists have found a natural way to help—using lemongrass as a food additive for cattle. How do you think this might help?

MUST DO
05 MIN.

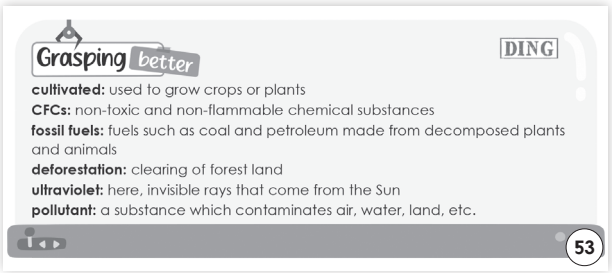


Teacher: Good thinking. Lemongrass reduces the production of methane in ruminants, which helps control global warming. Can you think of other natural ways we can reduce pollution and greenhouse gases?

Grasping better

Teacher: Before we end the lesson, let us go through some important words we have learned so far. I will say a word and I want you to tell me what it means. Ready?

MUST DO
05 MIN.



Teacher: Cultivated – What does it mean? (Used to grow crops or plants.)
Teacher: Fossil fuels – What are they? (Coal, petroleum and other fuels from decomposed plants and animals.)
Teacher: Deforestation – What happens in deforestation? (Clearing of forests.)
Teacher: CFCs – Where are these used? (Refrigerators and air conditioners.)
Teacher: Pollutant – What is it? (A substance that contaminates air, water or land.)
Teacher: Well done. Understanding these terms helps us better understand how we can take care of our environment. Now, let us think—what can we do in our daily lives to help reduce pollution and protect the Earth?
Teacher: Fantastic ideas. Small actions like saving electricity, reducing waste and using eco-friendly products can make a big difference.
(Instruct the students to bring their workbooks in the next class.)
You may show the **Animated Activities** on the digital platform.

Differentiated Activities

110 km/hr
How does using lemongrass in cattle feed help reduce global warming?

80 km/hr
What type of fuel did Puneet Dwivedi develop?

40 km/hr
What is the name of animals that release methane while digesting food?

Home Task

Write three sentences about how humans contribute to global warming and three sentences on ways to reduce it.

Period 7

Teacher: Good morning, students. How are you all today?

Teacher: Great. Let us start with a fun activity. I will read out a question and give you two options. You have to choose the correct answer. Let us begin.

SHOULD DO
05 MIN.

Teacher: Which greenhouse gas is released by ruminant animals like cows?

Teacher: That is correct. The answer is methane. Now, which scientist developed a fuel that reduces carbon dioxide emissions?

Teacher: Well done. Puneet Dwivedi developed a fuel that helps lower carbon dioxide emissions. Next, which plant helps reduce methane production in cattle?

Teacher: Great answer. Lemongrass is known to help reduce methane production. Now, what is the process of cutting down trees called?

Teacher: Yes. It is called deforestation. Lastly, which gas destroys the ozone layer?

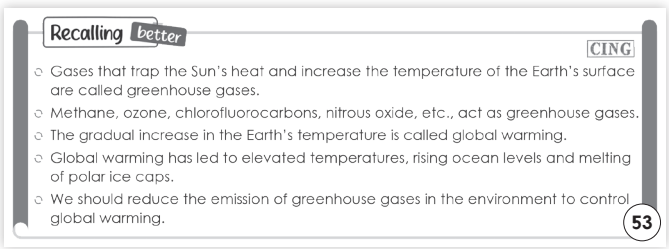
Teacher: Correct. CFCs are responsible for damaging the ozone layer.

Teacher: Well done, everyone. Let us begin today's lesson.

Recalling better

Teacher: Let us take a moment to revise what we have learned so far. Can you tell me what we call the gases that trap the Sun's heat and warm the Earth's surface?

MUST DO
10 MIN.


Recalling better

CING

- Gases that trap the Sun's heat and increase the temperature of the Earth's surface are called greenhouse gases.
- Methane, ozone, chlorofluorocarbons, nitrous oxide, etc., act as greenhouse gases.
- The gradual increase in the Earth's temperature is called global warming.
- Global warming has led to elevated temperatures, rising ocean levels and melting of polar ice caps.
- We should reduce the emission of greenhouse gases in the environment to control global warming.

53

Teacher: Yes, they are called greenhouse gases. Now, can you recall some examples of these gases?

Teacher: Well remembered. Methane, ozone, chlorofluorocarbons and nitrous oxide are some greenhouse gases. What happens when too much of these gases gather in the atmosphere?

Teacher: That is correct. The Earth's temperature rises gradually, a phenomenon known as global warming. Can you think of some effects of global warming that we discussed earlier?

Teacher: Absolutely. It leads to higher temperatures, rising ocean levels and the melting of polar ice caps. Now, what can we do to help control global warming?

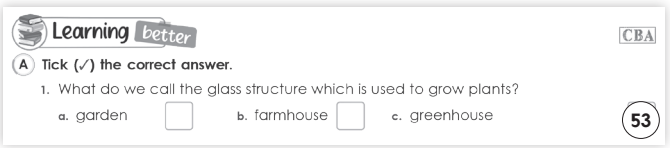
Teacher: Exactly. Reducing the emission of greenhouse gases is one of the best ways to slow it down.

Teacher: You have done a great work recalling these key points. Now, let us continue with our lesson.

Learning better

Teacher: Everyone please open page number 53 of your Main Course Book. In Exercise 'A' of 'Learning better' you have to tick the correct answer. Are you ready to get started?

MUST DO
10 MIN.

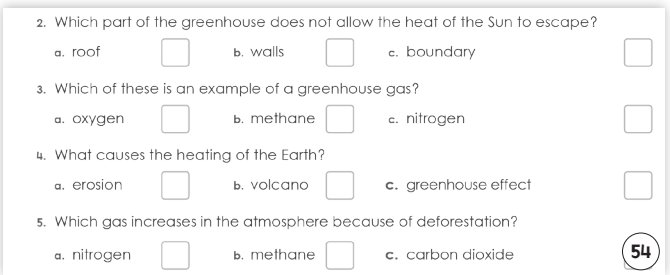

Learning better

CBA

A Tick (✓) the correct answer.

1. What do we call the glass structure which is used to grow plants?
   a. garden ☐ b. farmhouse ☐ c. greenhouse ☐

53

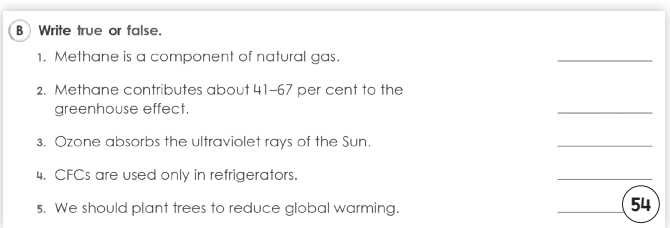

2. Which part of the greenhouse does not allow the heat of the Sun to escape?
   a. roof ☐ b. walls ☐ c. boundary ☐
3. Which of these is an example of a greenhouse gas?
   a. oxygen ☐ b. methane ☐ c. nitrogen ☐
4. What causes the heating of the Earth?
   a. erosion ☐ b. volcano ☐ c. greenhouse effect ☐
5. Which gas increases in the atmosphere because of deforestation?
   a. nitrogen ☐ b. methane ☐ c. carbon dioxide ☐

54

Teacher: Great. Let us begin with the first question. What do we call the glass structure which is used to grow plants?

Teacher: The correct answer is greenhouse. Well done.

(Similarly complete all five questions)


B Write true or false.

1. Methane is a component of natural gas. _____
2. Methane contributes about 41–67 per cent to the greenhouse effect. _____
3. Ozone absorbs the ultraviolet rays of the Sun. _____
4. CFCs are used only in refrigerators. _____
5. We should plant trees to reduce global warming. _____

54

Teacher: Let us do Exercise 'B' of 'Learning better'. You have to write true or false in the given blanks. Are you ready to get started?

MUST DO
05 MIN.

Teacher: Great. Let us begin with the first question. Methane is a component of natural gas. Think carefully and write true or false in the blanks.

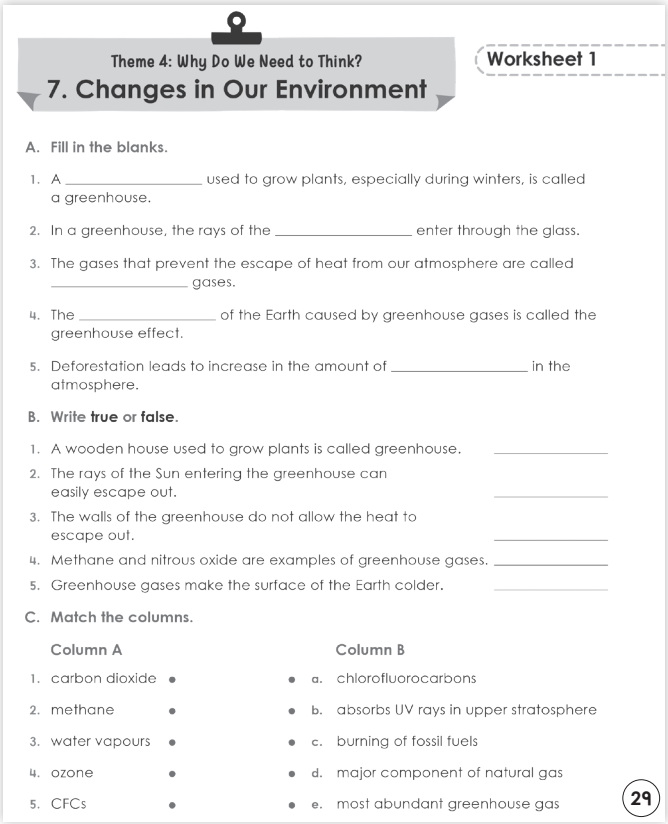
(Similarly complete all five questions)

Worksheet – 1

Teacher: Let us do some activities from the workbook. Everybody, please open page 29 of your workbook and answer the questions given in worksheet - 1.

(Let the students answer the questions on their own. Then discuss the answer by writing the correct answer on the blackboard.)

MUST DO
15 MIN.



Theme 4: Why Do We Need to Think?

7. Changes in Our Environment

Worksheet 1

A. Fill in the blanks.

1. A _____ used to grow plants, especially during winters, is called a greenhouse.
2. In a greenhouse, the rays of the _____ enter through the glass.
3. The gases that prevent the escape of heat from our atmosphere are called _____ gases.
4. The _____ of the Earth caused by greenhouse gases is called the greenhouse effect.
5. Deforestation leads to increase in the amount of _____ in the atmosphere.

B. Write true or false.

1. A wooden house used to grow plants is called greenhouse. _____
2. The rays of the Sun entering the greenhouse can easily escape out. _____
3. The walls of the greenhouse do not allow the heat to escape out. _____
4. Methane and nitrous oxide are examples of greenhouse gases. _____
5. Greenhouse gases make the surface of the Earth colder. _____

C. Match the columns.

Column A		Column B
1. carbon dioxide	•	• a. chlorofluorocarbons
2. methane	•	• b. absorbs UV rays in upper stratosphere
3. water vapours	•	• c. burning of fossil fuels
4. ozone	•	• d. major component of natural gas
5. CFCs	•	• e. most abundant greenhouse gas

29

You may start the Slideshow on the digital platform.

Differentiated Activities

110 km/hr

How does the process of deforestation exacerbate the greenhouse effect?

80 km/hr

What is the primary greenhouse gas released by ruminant animals?

40 km/hr

Name one activity that reduces greenhouse gases.

Home Task

The Project Idea, given in the book of Project Ideas, page number 16 under the title 'Changes in Our Environment' This project should be assigned to the students as a home task to work on. Ensure that the students understand the project requirements and provide any necessary guidance or materials they might need.

Period 8

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we begin today's lesson, let us have a quick warm-up activity to refresh our learning. Listen carefully and answer the following questions as quickly as possible. Are you ready?

SHOULD DO

05 MIN.

Teacher: What is the name of the fuel developed by Puneet Dwivedi that reduces carbon emissions? (Sustainable Aviation Fuel)

Teacher: Which natural process releases methane from swamps and landfills? (Decomposition)

Teacher: What is the term for the layer in the atmosphere that protects us from harmful UV rays? (Ozone layer)

Teacher: Which human activity is a major source of nitrous oxide emissions? (Farming/Agriculture)

Teacher: What is the name of the digestive process in cows that releases methane? (Enteric fermentation)

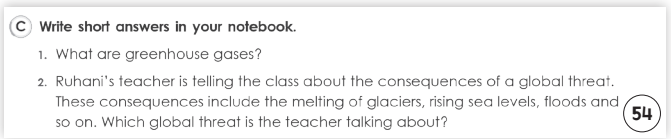
Teacher: Well done everyone. Let us begin today's lesson.

Learning better

Teacher: Now, let us explore some short-answer questions. In Exercise 'C' of the 'Learning better' section, you have to write a short answer. Are you ready to get started?

MUST DO

10 MIN.



C Write short answers in your notebook.

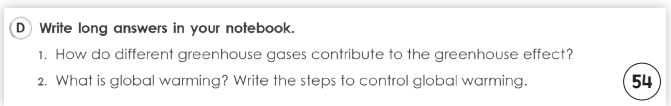
1. What are greenhouse gases?
2. Ruhani's teacher is telling the class about the consequences of a global threat. These consequences include the melting of glaciers, rising sea levels, floods and so on. Which global threat is the teacher talking about?

54

Teacher: Great. Let us begin with the first question. What are greenhouse gases?

(Students have to write the answers for the given questions in about 40 to 50 words in their notebook. Wait for the students to write the answers.)

(Similarly, complete the second question)



D Write long answers in your notebook.

1. How do different greenhouse gases contribute to the greenhouse effect?
2. What is global warming? Write the steps to control global warming.

54

Teacher: Great. Let us explore some long-answer questions. Let us begin with the first question. How do different greenhouse gases contribute to the greenhouse effect?

MUST DO

10 MIN.

(Students have to write the answers for the given questions in about 100 to 150 words in their notebook. Wait for the students to write the answers.)

(Similarly, complete the second question.)

Worksheet – 2

Teacher: Let us do some activities from the workbook. Everybody, please open page 30 of your workbook and answer the questions given in worksheet - 2.

(Let the students answer the questions on their own. Then discuss the answer by writing the correct answer on the blackboard.)

MUST DO

10 MIN.

Worksheet 2

A. Fill in the blanks.

1. The gradual rise in the temperature of the Earth is called _____.
2. Global warming results in the loss of animal species and _____ ocean levels.
3. We should _____ the use of fossil fuels to control global warming.
4. We should encourage the _____ of trees to reduce global warming.
5. We should use _____ transport in place of private vehicles.

B. Unscramble the words to make meaningful words related to global warming.

1. ATURETEMPER _____
2. OUGHTDR _____
3. ODSFLO _____
4. MATECLI _____
5. MENTENVIRON _____

C. Write true or false.

1. The gradual rise in the temperature of the Earth is called greenhouse effect. _____
2. Global warming results in some serious threats to the environment. _____
3. We should use electricity in a careful manner. _____
4. We should use more and more fossil fuels in our daily lives. _____
5. We should cut down more and more trees to control global warming. _____

30

Book of Holistic Teaching

Chapter 7: Changes in Our Environment

Theme 4: Why Do We Need to Think?

A English HoLL MDA

Observe the words ending with ee given below. Write a sentence each using the words.

1. Tree: _____
2. Free: _____

B Maths

There is 78.08% nitrogen, 20.95% oxygen, 0.93% argon and 0.04% carbon dioxide present in the atmosphere. Convert each of the percentages into fraction.

C Social Studies

During the British rule, various industries had been set up in India. Industries release gases like carbon dioxide in the environment. How did these industries helped in the upliftment of India? Write the answer in your notebook.

23

COULD DO

05 MIN.

Refer to the Book of Holistic Teaching, page number 23 under the title 'Changes in Our Environment.' Complete the activities mentioned in this section and ensure that the students complete them. These activities are designed to enhance their holistic understanding and engagement with the topic. Provide any necessary support and materials to help the students successfully finish the activities.

(Instruct the students to bring their Little Book in the next class.)

You may start the **Quiz** on the digital platform.

Differentiated Activities

110 km/hr

How does the process of enteric fermentation in ruminant animals contribute to global warming?

80 km/hr

What is the primary source of nitrous oxide emissions in agriculture?

40 km/hr

Which gas is released during the decomposition of organic waste?

Home Task

The 'Creating better' activity (Create a simple greenhouse using clear cups to observe plant growth) given on page 54 of the Main Course Book.

Period 9

Teacher: Good morning, students. How are you all today?

Teacher: Great. Today, we will start with a quick game called 'True or False?' I will read out some statements about the environment, pollution and greenhouse gases. If you think the statement is true, raise your right hand. If you think it is false, raise your left hand. Let us begin.

SHOULD DO

05 MIN.

Teacher: Water vapour is the most abundant greenhouse gas in the atmosphere. (True)

Teacher: Planting more trees increases the amount of carbon dioxide in the air. (False)

Teacher: CFCs are used in refrigerators and air conditioners. (True)

Teacher: Methane is a gas that helps cool the Earth's atmosphere. (False)

Teacher: Using electric vehicles can help reduce air pollution. (True)

Teacher: Great work, everyone. Let us begin today's lesson.

Book of Project Ideas

Chapter 7: Changes in Our Environment

Theme 4: Why Do We Need to Think?

ICT PRO 21st CS

Make a presentation using the Internet* on how global warming is taking a toll on human life. Show different ways through which we can contribute to decrease or control global warming.

- Brief introduction about global warming.
- Write about the effects of global warming on human life.
- Write the effects (e.g., extreme weather, health issues, sea level rise) of global warming.
- Show pictures or small videos to depict how global warming can be controlled or reduced.

23

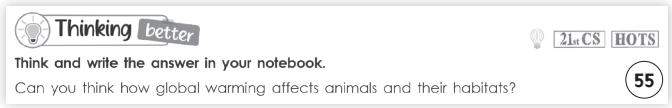
Please discuss the project assigned as the home task in period seven, focusing on helping students understand the objectives and addressing any challenges they face.

MUST DO
05 MIN.

Thinking better

Teacher: Let us begin with a question to make you think. I will ask a question and you have to answer that in your notebook.

MUST DO
05 MIN.



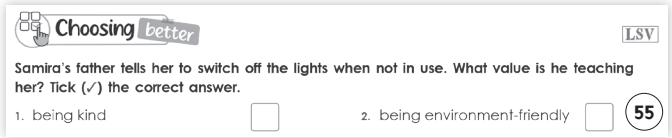
Teacher: Can you think about how global warming affects animals and their habitats? Think properly and write your answer in your notebook.

(Give students to think and write their answers in their notebooks.)

Choosing better

Teacher: Let us think about a situation. Samira's father tells her to switch off the lights when they are not in use. What do you think he is trying to teach her?

MUST DO
05 MIN.



(Pauses to allow students to think.)

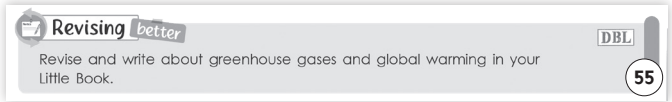
Teacher: Here are two choices. First, he is teaching her to be kind. Second, he is teaching her to be environment-friendly. Which one makes more sense?

Teacher: Yes. He is teaching her to be environment friendly.

Revising better

Teacher: Now, open your Little Book. Write a few sentences explaining greenhouse gases and global warming in your own words. Try to keep it simple and clear.

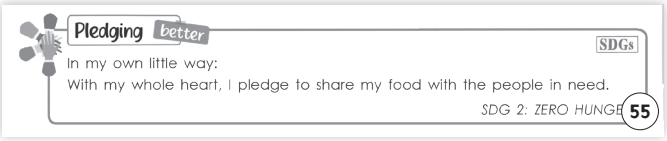
MUST DO
05 MIN.



(Encourage students to share their thoughts once they finish.)

Pledging Better

Teacher: Imagine you have extra food. What would you do with it?

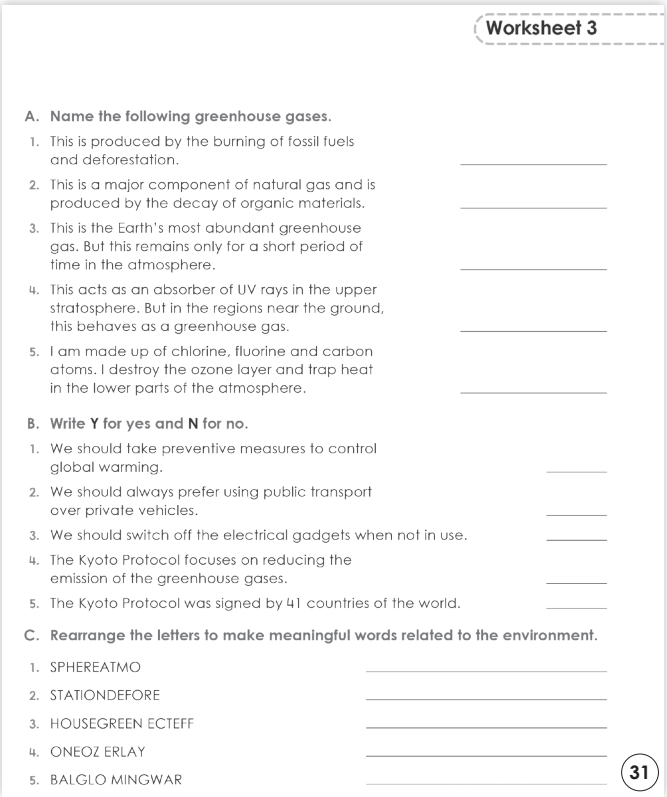


Teacher: Good. Now, let us take this pledge together. Repeat after me: 'With my whole heart, I pledge to share my food with the people in need.' Let us remember to act on this pledge and make a difference every day.

Teacher: How does this connect to SDG 2: Zero Hunger? Think and share your thoughts.

(Listens to students' responses.)

Worksheet – 3



Teacher: Let us do some activities from the workbook. Everybody, please open page 31 of your workbook and answer the questions given in worksheet - 1.

MUST DO
10 MIN.

(Let the students answer the questions on their own. Then discuss the answer by writing the correct answer on the blackboard.)

You may generate additional practice worksheets using the **Test Generator** given on digital platform.

Teacher: Now, let us complete the 'KWL' activity.

SHOULD DO
05 MIN.

Teacher: Take out your notebook and fill in the last column. Write what have you learned in this chapter.

(Wait for students to fill in the chart.)

Teacher: Let us all give a huge round of applause to everyone for their hard work and creativity. Great work,

everyone. See you in the next class. Have a wonderful day ahead.

Differentiated Activities

110 km/hr

How does global warming affect animal habitats?

80 km/hr

What is one human activity that contributes to global warming?

40 km/hr

Name one way we can save energy at home.

Home Task

The 'Activity 3' (Water cycle in a bag) given on page 56 of the Main Course Book.

Learning Outcomes

The students will:

Domain	Learning Outcome
Physical Development	• demonstrate fine motor skills by creating a simple greenhouse using clear cups and observing plant growth.
Socio-Emotional and Ethical Development	• develop empathy and responsibility towards the environment by understanding the impact of human activities on global warming.
Cognitive Development	• evaluate solutions to control global warming, such as planting trees, using renewable energy and reducing waste.
Language and Literacy Development	• use scientific vocabulary (e.g., greenhouse gases, carbon dioxide, methane, deforestation) to explain environmental changes.
Aesthetic and Cultural Development	• appreciate the role of nature and ecosystems in sustaining life through activities.
Positive Learning Habits	• practice responsibility by pledging to take small actions (e.g., sharing food and reducing waste) to contribute to a sustainable environment.

Starry Knights

How was the experience in teaching Global Warming and Greenhouse effect on human life? Are the learners concerned about the suggested activities to reduce the emission of greenhouse gases?

Give yourself a STAR.

Lesson-8: Conservation and Erosion of Soil

9 Periods (40 minutes each)

Learn Better (Main Coursebook), Stay Ahead (Workbook), Book of Holistic Teaching, Book of Project Ideas, CRM signs

Animation, Animated Activities, Concept Map, Diagram, Dictionary, eBook, I Explain, Quiz, Slideshow, Test Generator.

Affirming better: I accept change positively.

Curricular Goals and Objectives (NCF)

To enable the students:

- to explore soil and its conservation by understanding soil erosion, its causes and methods to prevent it.
- to engage in hands-on learning by observing soil samples and performing experiments on soil erosion.
- to enhance creative and critical thinking by finding logical solutions to environmental problems.
- to make connections between science and well-being by exploring mud therapy.

Methodology

Period 1

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we dive into our lesson, let us take a moment to relax and focus our minds with a short meditation. Ready?

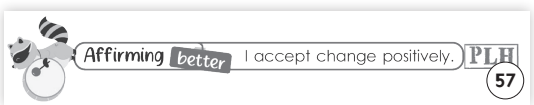
SHOULD DO — 05 MIN.

Teacher: Sit comfortably in your chair, with your back straight and feet flat on the ground. Close your eyes gently and take a deep breath through your nose. Hold it for a moment, then slowly breathe out through your mouth.

Let us do these three more times. Breathe in... and breathe out. As you breathe, imagine your mind becoming clear and ready to learn.

Open your eyes and smile at your friends. Let us start our lesson with positive energy.

Affirming better



Teacher: Before we start the class, let us all say together something positive, 'I accept change positively.' Repeat after me: 'I accept change positively.'

MUST DO — 05 MIN.

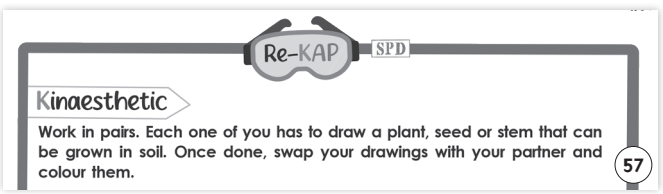
Teacher: Alright. Today, we are going to begin a new chapter 'Conservation and Erosion of Soil.' We use a KWL chart to help us organize our thoughts and learning. I have made a KWL format on the blackboard. Please take out your notebooks and draw the same format.

K	W	L

Teacher: Let us start by filling out the 'K' and 'L' columns. Take a few minutes to think and write. If you have any questions, feel free to ask.

Teacher: Before we start the chapter, we will do a quick Re-KAP, which involves revisiting our previous knowledge through creative activities using Kinaesthetic, Auditory and Pictorial methods to make our learning interactive and engaging.

Kinaesthetic



Teacher: Let us begin with a fun drawing activity. Work in pairs. Each of you will draw a plant, seed or stem that can be grown in soil. Once finished, swap your drawings with your partner and colour them. Why do you think plants are important for the environment? Think and discuss with your partner.

MUST DO — 10 MIN.

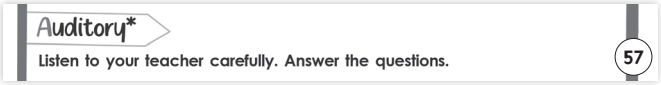
(Give the students time to complete the activity.)

Teacher: Excellent. Plants are renewable resources. They give us oxygen, food and shade. Now, let us do the next activity.

Auditory

Teacher: Let us move to auditory activity. Listen carefully to me. I will ask you some questions and I want you to pay attention to every detail before answering. Are you ready?

MUST DO
10 MIN.



Teacher: Soil conservation is important because it keeps our soil healthy. This helps to grow plants. Soil erosion happens when wind and water carry soil away. Deforestation is the biggest cause of soil erosion.

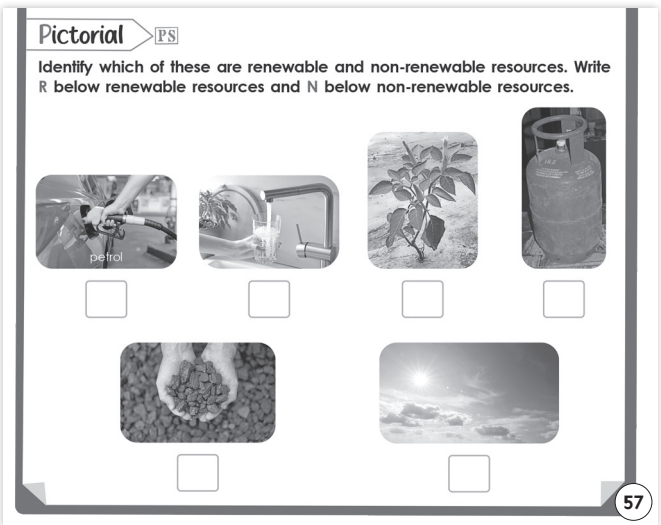
1. Why is soil conservation important?
2. What causes soil erosion?
   (Waits for student responses.)

Teacher: Great listening. Now, let us do our next activity.

Pictorial

Teacher: Look at the pictures on the board. Your task is to identify which ones show renewable and non-renewable resources. Write 'R' below renewable resources and 'N' below non-renewable resources.

MUST DO
10 MIN.



(Let the students complete the activity.)

Teacher: Good thinking. Renewable resources can be used again and again, like sunlight and plants. Non-renewable resources, like petrol and coal, take millions of years to form and will run out if we use them too much.

Differentiated Activities

110 km/hr

How does excessive use of non-renewable resources impact the environment?

80 km/hr

Name one way we can conserve non-renewable resources.

40 km/hr

What type of resource is the Sun—renewable or non-renewable?

Home Task

Observe your surroundings and list two renewable and two non-renewable resources that you use daily. Write two sentences about each of them in your notebook.

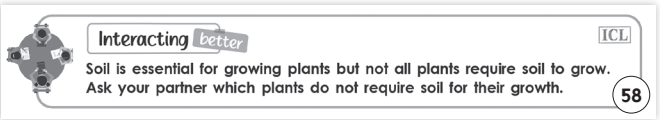
Period 2

Interacting better

Teacher: Good morning, students. How are you all today?

Teacher: Great. Today, we will start with an 'Interacting better' activity.

MUST DO
10 MIN.

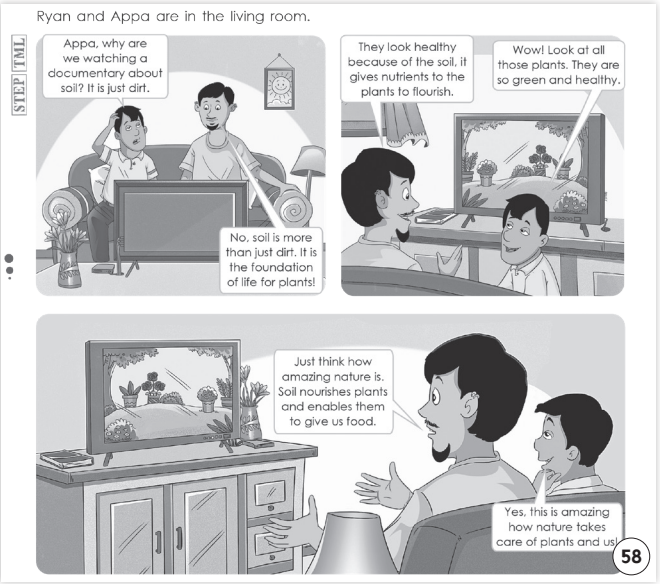


Teacher: Soil is essential for growing plants, but do all plants need soil to grow? Turn to your partner and discuss which plants can grow without soil. Think about plants you have seen in water or other places.

(Let the students discuss with their partners.)

Teacher: Now, share your thoughts—can you name any plants that do not require soil? How do you think they survive?

(Give students time to complete the activity.)



Teacher: Great. Now, it is story time. Let us start an interesting story from your book.

MUST DO
30 MIN.

Teacher: Turn to page number 58 of your Main Course Book. Take a few minutes to read the story silently on your own and try to understand it.

Teacher: As you read, imagine the characters and events in your mind. Pay close attention to the details—this will help you enjoy the story and answer questions later.

(Give time to the students to read the story)

Teacher: Now that you have read the story, let us discuss it together. What was Ryan curious about in the beginning?

Teacher: That is right. Ryan thought the soil was just dirt. What did Appa say in response?

Teacher: Correct. Why do the plants look so green and healthy?

Teacher: Good thinking. Soil provides nutrients to plants. But why is this important for us? What do plants give us in return?

Teacher: Excellent. Plants grow in soil, they give us food and they make the environment beautiful. Now, think about Appa's last statement—how does nature take care of both plants and us?

Teacher: That was a great discussion. Now, can you think of any ways we can take care of soil and keep it healthy?

Teacher: Great thinking everyone.

You may show the **Dictionary** on the digital platform.

Period 3

Teacher: Good morning, students. How are you all today?

Teacher: Great. Let us begin with a quick question-based warm-up. Listen carefully and try to answer as quickly as you can.

SHOULD DO
05 MIN.

Teacher: What do plants provide us that helps us breathe? (Oxygen)

Teacher: What happens when soil is washed away by wind or water? (Soil erosion)

Teacher: Name one cause of soil erosion. (Deforestation)

Teacher: What type of resource is coal—renewable or non-renewable? (Non-renewable)

Teacher: What does soil provide to plants to help them grow? (Nutrients)

Teacher: Excellent. You are remembering so much from our previous lessons. Now, let us move on to today's learning.

Teacher: Today, we will learn about soil and its layers.

(The teacher will read the last two paragraphs of page 58 and the first six paragraphs of page 59 aloud and provide explanations to ensure that the students understand the content.)

Teacher: Soil is one of the foundations of life on Earth. But can you explain how soil is formed?

Teacher: That is right. The formation of soil takes a long time. It happens through the weathering of rocks and the decomposition of organic matter. Can you tell me about the things that affect soil fertility, texture or colour?

We know that soil is one of the foundations of life on Earth. Let us now learn more about soil and its importance.

SOIL AND ITS LAYERS

The uppermost layer of the Earth which contains minerals, organic matter, air, water and living organisms is called soil. The formation of soil takes place through

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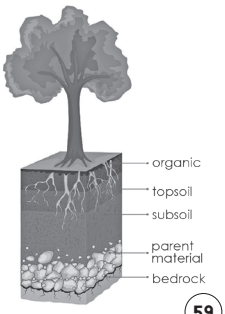
weathering of rocks and minerals over a long period of time, combined with the decomposition of organic matter by microorganisms. Soils differ in fertility, texture, composition and colour. Factors depicting these are climate, topography (study of Earth's surface), parent material (starting point for most soil development like mineral rock or organic matter) and time. Soil plays a vital role in providing food to all living things that exist on this planet. Below the soil, there is a layer of solid rock.

Different layers of soil which you can see in a soil profile are called soil horizons. These are:

1. O-Horizon (Organic) – This layer is rich in organic matter, such as leaves, twigs and dead plants. This layer is called humus. It constantly keeps getting bigger as plants and animals decay and return nutrients to the soil.
2. A-Horizon (Topsoil) – The A-Horizon lies beneath the O-Horizon. This layer is rich in nutrients, such as nitrogen, phosphorus and potassium. These are required by plants to grow.
3. B-Horizon (Subsoil) – This layer has all the minerals and nutrients that are washed down from the A-horizon. The B-horizon is often clay-rich and can be harder than the A-horizon.
4. C-Horizon (Parent material) – This layer is made up of partially disintegrated and weathered rock fragments. The material in this layer can range from loose and flaky to more consolidated rock.
5. R-Horizon (Bedrock) – This layer consists of unweathered cemented layer. The R-horizon is solid and has continuous rocks. For example, rocks like granite, basalt, limestone etc. are found in this layer.



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Teacher: Good. Soil is influenced by climate, topography and the materials from which it is formed. Now, let us discuss the different layers of soil.

MUST DO
15 MIN.

Teacher: Soil is made up of different layers and each layer has a unique function. Look at the diagram in your book. What do you see?

Teacher: Correct. These layers are called soil horizons. The topmost layer is the O-Horizon, also called the humus. What do you think it contains?

Teacher: Yes. It is full of decomposed leaves, twigs and dead plants. It provides nutrients for plant growth. Now, what is below the O-Horizon?

Teacher: That is right. The A-horizon, also called topsoil, is rich in essential nutrients like nitrogen, phosphorus and potassium. Why do you think these nutrients are important for plants?

Teacher: Absolutely. Plants absorb these nutrients to grow strong and healthy. Now, can anyone describe what comes next in the soil layers?

MUST DO
10 MIN.

Teacher: We have learned about the top layers of soil. Now, let us go deeper. Below the A-Horizon is the B-Horizon. Can anyone tell me another name for the B-Horizon?

Teacher: Yes. It is called subsoil. Look at the diagram in your book. How does the B-Horizon look different from the A-Horizon?

Teacher: That is right. The B-Horizon has fewer nutrients than the topsoil, but it holds minerals that wash down from the A-Horizon. Do you think plants grow well in this layer? Why or why not?

Teacher: Good thinking. Plants do not grow as easily here because there are fewer nutrients, but deep-rooted plants can still reach this layer for water. Now, let us go even deeper.

Teacher: Below the B-Horizon, we find the C-Horizon. This layer is also called the parent material. Why do you think it has this name?

Teacher: Excellent. It is called the parent material because it is made of weathered rock fragments, which break down over time to form soil. If you dig deep into the ground, what do you think this layer might feel like?

Teacher: Yes. It can be rough and rocky because it is not fully broken down. The material in this layer can be loose, like small pebbles or hard, like solid rock. Can plant roots grow easily in this layer? Why or why not?

Teacher: That is correct. Most plants cannot grow here because there are no nutrients. Only strong, deep roots can reach this layer for water. Now, let us go even deeper to the final layer of soil.

Teacher: The last layer is called the R-Horizon or bedrock. What do you think this layer is made of?

MUST DO
10 MIN.

Teacher: Well done. It is made of solid rock. This layer is very hard and does not contain any soil. Have you ever seen large rocks or boulders on the ground? Those come from the bedrock layer deep underground.

Teacher: Do plant roots grow in this layer? Why or why not?

Teacher: That is right. Roots cannot grow here because the rock is too solid. This layer is important because it supports all the layers above it. Without the bedrock, the soil would not have a strong foundation.

Teacher: So now, can anyone name all the layers of soil from top to bottom?

Teacher: Great job. Now, let us think—how does each layer help in plant growth? Discuss with your partner and share your thoughts.

Teacher: Now that we understand soil layers, let us think—how does soil help us in our daily lives?

Teacher: Very good. Soil provides food, supports plants and even helps in construction. Have you ever seen soil that looks different in different places? What might cause these differences?

Teacher: Excellent thinking. Soil can differ based on its texture, minerals and how much organic matter it contains. Now, let us summarise what we have learnt.

Differentiated Activities

110 km/hr

Why is the O-Horizon important for plant growth?

80 km/hr

Which layer of soil is also called topsoil?

40 km/hr

What is the lowest layer of soil called?

Home Task

Observe the soil in your garden or nearby area. Write two sentences describing its colour and texture. Compare it with soil from another place, such as a park or playground.

Period 4

Teacher: Good morning, students. How are you all today?

Teacher: Great. Let us start with a quick warm-up. Listen carefully to my questions and answer as quickly as you can.

SHOULD DO
05 MIN.

Teacher: What is the uppermost layer of the Earth called? (Soil)

Teacher: Which layer of soil contains humus? (O-Horizon)

Teacher: Which layer is known as bedrock? (R-Horizon)

Teacher: Which layer is also called subsoil? (B-Horizon)

Teacher: What does the A-Horizon contain that helps plants grow? (Nutrients like nitrogen, phosphorus and potassium)

Teacher: Well done. Now, let us move on to today's lesson.

Teacher: Today, we will learn about soil erosion and the causes of soil erosion.

(The teacher will read the last two paragraphs of page 59 and the first three paragraphs of page 60 aloud and provide explanations to ensure that the students understand the content.)

Natural forces, such as rain, wind and water, help in soil formation. The same natural forces, sometimes, also harm the soil. At places where the land is covered with natural vegetation, there is a balance between soil formation and loss of soil. Often this balance is disturbed by either human activities or natural forces. This results in the soil getting worn off or carried away by wind or water. The removal of the top layer of the soil is called soil erosion. Soil erosion affects the land by decreasing its fertility. This eventually affects the crop yield.

Running water causes soil erosion

Heavy rains often result in flood. Flood washes away the top soil from hill slopes, making the slopes unfit for cultivation. One such example is the Chambal Valley

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Madhya Pradesh, where constant running water has led to soil erosion.

Sometimes, rivers coming down from the hills carry mud with them. As they reach the plains, the flow of the rivers slow down leaving huge portions of the soil on their way. The soil left behind accumulates with time. This changes the course of the river. One such example is River Kosi, in Bihar. This river changed its course in 2008 and caused great havoc that affected lakhs of people.

Wind causes soil erosion

In dry and hot regions, such as deserts, strong winds carry the top soil away with them.

soil erosion caused by wind

Human beings also cause soil erosion

Roots of plants and trees hold the soil. The cutting down of trees causes the soil to become loose, which leads to the soil getting carried away easily. Also, the ploughing of hill slopes and overgrazing causes soil erosion.

soil erosion caused by human activities

60

Discovering better

(Explain the given terms and discuss it with the class.)

Teacher: Soil is formed naturally over a long period, but did you know the same natural forces that help form soil can also harm it? Think about it—what happens when strong winds blow over loose soil?

MUST DO
10 MIN.

Teacher: Yes. The wind carries away the topsoil, which is known as soil erosion. Can you think of any other natural forces that cause soil erosion?

Teacher: Absolutely. Rain and running water can also erode the soil. Now, imagine a place with many trees and plants. How do you think the soil there is different from a place with no trees?

Teacher: That is right. Trees and plants help hold the soil in place. When forests are cut down, the soil becomes loose and gets washed away easily.

MUST DO
10 MIN.

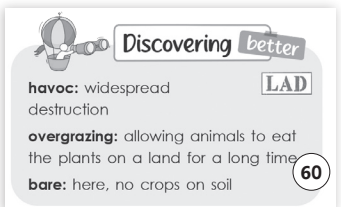
Let us now explore some real-life examples of soil erosion.

Teacher: Heavy rains can cause floods. What do you think happens to soil when there is a flood?

Teacher: Correct. Running water washes away the top layer of soil. This is why places with many hills, like the Chambal Valley in Madhya Pradesh, often experience soil erosion. The soil from these hills gets washed down by rain, making the slopes unfit for farming.

Discovering better

(Explain the given terms and discuss it with the class.)



Teacher: But erosion does not only happen in hilly areas. Rivers also change because of soil erosion. Have you heard of the River Kosi in Bihar? What do you think happened to it in 2008?

Teacher: Well done. The River Kosi changed its course because of soil erosion. When rivers slow down in the plains, they drop the soil they carried from the hills. This changes the shape of the river over time and can cause disasters.

Teacher: We have discussed how water causes soil erosion. Now, let us think—how does wind cause soil erosion?

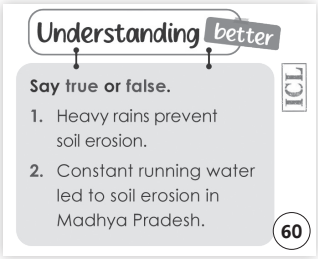
MUST DO
10 MIN.

Teacher: Yes. In dry and hot places, like deserts, strong winds carry away the top layer of soil. This is why deserts are mostly covered in sand. But do you think humans also cause soil erosion?

Teacher: Correct. Cutting down trees makes the soil loose. Overgrazing by animals and ploughing hillsides also lead to erosion. Imagine a hill covered in grass and another hill where all the grass has been removed. Which one will experience more erosion?

Teacher: Absolutely. The hill without plants will erode faster because nothing is holding the soil together. That is why planting trees and using proper farming methods are important to prevent erosion.

Understanding better



Teacher: Let us do the understanding better activity given on page 60 of the Main Course Book.

Teacher: I shall read out the two statements and you will say whether you think it is true or false. Here is the first one: 'Heavy rains prevent soil erosion.'

MUST DO
05 MIN.

Teacher: If you said 'false,' you are correct. Well done. Now, here is the second statement: 'Constant running water led to soil erosion in Madhya Pradesh.'

Teacher: If you said 'true,' you are correct. Wonderful. Great discussion, everyone.

You may show the **Animation** on the digital platform.

Differentiated Activities

110 km/hr

How does soil erosion affect rivers over time?

80 km/hr

Name one reason why soil erosion reduces crop yield.

40 km/hr

What is one human activity that causes soil erosion?

Home Task

Observe an open area near your home, school or park. Write two sentences about whether you think soil erosion is happening there and one way to prevent it.

Period 5

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we begin, let us test our memory with a quick warm-up. Listen carefully and answer as quickly as you can.

SHOULD DO
05 MIN.

Teacher: What is the removal of the top layer of soil called? (Soil erosion)

Teacher: Name one natural force that causes soil erosion. (Wind/Water/Rain)

Teacher: What happens when trees are cut down? (Soil becomes loose and erodes easily)

Teacher: Which river in Bihar changed its course in 2008 due to soil erosion? (River Kosi)

Teacher: Why does soil erosion affect crop yield? (It reduces soil fertility)

Teacher: Great answers. Now, let us move to today's lesson.

Teacher: Today, we will learn about soil conservation.

(The teacher will read the last three paragraphs of page 60 aloud and provide explanations to ensure that the students understand the content.)

SOIL CONSERVATION

Soil conservation is the protection of soil from erosion. Nature took millions of years to form soil. Therefore, it is our responsibility to preserve and protect it. Although, we cannot stop the forces of nature, such as wind and water, we can control their actions on soil. This can be done in a number of ways. For example, afforestation* is an effective method that holds the soil and prevents it from being eroded.

60

Teacher: Soil takes millions of years to form. That means if it erodes, it cannot be replaced quickly. Why do you think it is important to conserve soil?

MUST DO

15 MIN.

Teacher: Correct. If soil is lost, crops will not grow well and land will become barren. We cannot stop natural forces like wind and rain, but do you think we can control their impact on the soil?

Teacher: Yes. There are ways to protect the soil. One method is afforestation. Does anyone know what afforestation means?

Teacher: Exactly. Afforestation means planting more trees. Trees hold the soil in place with their roots and prevent it from being carried away. Let us look at other ways we can conserve soil.

On flat, open grounds

After harvesting and before sowing the next round of crops, there is a period when the land is bare. Winds blow off the soil from the bare lands easily. To protect this, farmers grow some cover crops*, such as creepers* and grasses. These crops hold the soil and prevent them from being blown away.

60

Teacher: Farmers often face soil erosion when land is left bare after harvesting. What happens when strong winds blow over bare soil?

MUST DO

10 MIN.

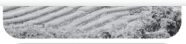
Teacher: That is right. The wind blows away the loose soil. To prevent this, farmers plant cover crops, such as grasses and creepers, before growing their main crops. How do you think these cover crops help?

Teacher: Good thinking. The roots of these plants hold the soil together so it does not get carried away by the wind. Imagine if all farmers used cover crops. What do you think would happen to the soil?

Teacher: Excellent. The land would stay fertile and crops would grow better. Now, let us talk about soil conservation in hilly areas.

On hill slopes

Hill slopes lose soil because the water carries it all down to the plains. Cutting down the hill slopes into steps or terraces prevents soil erosion. The steps slow down the water flow, resulting in the soil getting deposited at the next step.



step farming on hill slopes

60

61

MUST DO

10 MIN.

Teacher: Soil erosion is a big problem on hill slopes because rainwater carries the soil down to the plains. If this keeps happening, what do you think will happen to the hills over time?

Teacher: That is correct. The hills will lose soil and become rocky. Farmers in hilly areas use a method called terrace farming. Have you ever seen farms with step-like structures on hills?

Teacher: Yes. Terrace farming means cutting hill slopes into flat steps. Why do you think this helps stop soil erosion?

Teacher: Great answers. The steps slow down the flow of water, so the soil does not wash away. Instead, it gets collected on each step, making the land more fertile. What do you think will happen if farmers do not use terrace farming on hills?

Teacher: Yes, the soil will wash away and farming will become difficult. That is why soil conservation is important for protecting land and crops.

You may show the **I Explain** and **Diagram** on the digital platform.

Differentiated Activities

110 km/hr

How does afforestation help in soil conservation?

80 km/hr

What is the method of cutting hill slopes into steps called?

40 km/hr

Name one type of plant that helps hold soil in place.

Home Task

Observe an area near your home or school. Identify one method that can help prevent soil erosion there. Write two sentences explaining how it would help.

Period 6

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we begin today's lesson, let us quickly recall what we learned about soil erosion. Listen carefully and answer the questions.

SHOULD DO

05 MIN.

Teacher: What is soil erosion? (The removal of the top layer of soil.)

Teacher: Name one natural cause of soil erosion. (Wind/Rain/Water.)

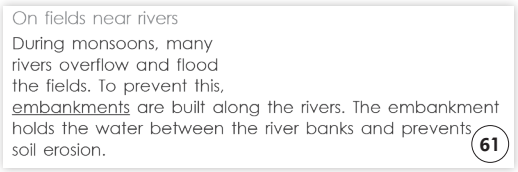
Teacher: How does cutting down trees increase soil erosion? (It makes the soil loose.)

Teacher: What method helps reduce soil erosion on hill slopes? (Terrace farming.)

Teacher: Why is soil important for farmers? (It helps crops grow.)

Teacher: Well done. Now, let us move to today's lesson.

Teacher: Let us continue our learning about soil conservation.


On fields near rivers
During monsoons, many rivers overflow and flood the fields. To prevent this, embankments are built along the rivers. The embankment holds the water between the river banks and prevents soil erosion.
61

(The teacher will read the last first paragraphs of page 61 aloud and provide explanations to ensure that the students understand the content.)

MUST DO
10 MIN.

Teacher: We have learned that soil erosion can be caused by wind and water. Today, we will see how farmers protect their fields, especially near rivers.

Teacher: What happens when heavy rains cause rivers to overflow? Think about what you have seen or read about floods.

Teacher: Yes. Water overflows into the fields and washes away the topsoil. This can make the land infertile. To prevent this, farmers build embankments along riverbanks. Can anyone guess how embankments help?

Teacher: Great thinking. Embankments are raised structures that hold back water and stop soil erosion. Do you think embankments can completely stop floods?

Teacher: Correct. While they cannot stop floods, they reduce the damage and protect farmlands. Have you ever seen an embankment near a river? How do you think they are built?

Discovering better

(Explain the term 'embankments' and discuss it with the class.)

Teacher: Excellent. Now, let us start the 'connecting better' activity.

Connecting better

Teacher: Imagine you are in a market and you see two similar products—one is made in India and the other is imported. Which one would you choose and why?

Teacher: Good. Now, let us talk about something related to this. In the past, people in India had to make an important decision—should they continue using British goods or start using locally made products? Do you know what movement encouraged Indians to boycott British goods?

MUST DO
05 MIN.

Teacher: Yes. It was the Swadeshi Movement. Why do you think it was important for Indians to produce and use their own goods instead of buying British products?

Teacher: Great thinking. Let us now explore this further in our lesson today.

Knowing better

Teacher: Imagine a world where the soil is unhealthy. What would happen to our food, water and environment?

MUST DO
05 MIN.

Teacher: Good thoughts. Soil plays a big role in food production and climate balance. Now, let me introduce you to a scientist who has worked to protect and improve soil health—Prof. Rattan Lal. Have you heard of him?

Teacher: Prof. Rattan Lal is a famous soil scientist. His research focuses on using soil to solve big global problems like climate change, food security and water conservation. Can you think of how soil and climate change might be connected?

Teacher: Excellent. Healthy soil helps absorb carbon dioxide and protects against droughts and floods. Because of his efforts in sustainable soil management, Prof. Rattan Lal received the Japan Prize in 2019.

Healing better

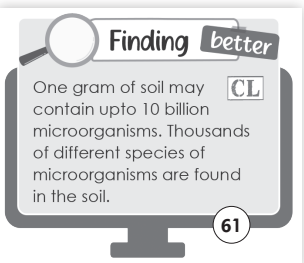
Teacher: Let us begin with an interesting fact—did you know that soil is not just for growing plants but can also be used for healing? Have you ever heard of mud therapy?

Teacher: That is right. Mud therapy is used in naturopathy, a natural way of healing. One special type of soil used for this is ant hill soil. Can you guess how it helps our body?

MUST DO
05 MIN.

Teacher: Good thinking. Ant hill soil is known to remove toxins from the body when applied to the skin. It is often used in mud packs and spa treatments. Many people prefer chemical-free and natural ways to stay healthy.

Finding better



Teacher: Let us start with a fascinating fact—can you guess how many microorganisms are present in just one gram of soil?

Teacher: That is right. One gram of soil can contain up

to 10 billion microorganisms. Imagine how many tiny living things are present in the soil around us. Why do you think microorganisms in the soil are important?

MUST DO 05 MIN.

Teacher: Great thinking. These microorganisms help break down dead plants and animals, making the soil fertile. Some even help plants grow by providing nutrients.

Grasping better

Teacher: Let us start with a few important terms that are related to soil conservation. First, can anyone tell me what afforestation means?

MUST DO 05 MIN.

Teacher: That's right. Afforestation is the process of planting trees on land that did not have trees before. Why do you think planting trees is important for the environment?

Teacher: Excellent. Can anyone explain what they are?

Teacher: Great. Cover crops are plants that are grown to cover bare land. They help prevent soil erosion. Can you think of any cover crops that farmers might grow?

Teacher: Wonderful. What do you think creepers are?

Teacher: Yes. Creepers are plants that grow horizontally along the ground or other surfaces. Why do you think creepers are useful in preventing soil erosion?

Teacher: Fantastic. Creepers help hold the soil together and prevent it from being washed away by water.

You may show the **Slideshow** on the digital platform. (Instruct the students to bring their workbooks in their next period.)

Differentiated Activities

110 km/hr

How do embankments help prevent soil erosion?

80 km/hr

What is the function of cover crops?

40 km/hr

Name one example of a cover crop.

Home Task

Find an example of a soil conservation method used in your area or community. Write five sentences describing how it helps prevent soil erosion.

Period 7

Teacher: Good morning, students. How are you all today?

Teacher: Great. Before we begin today's lesson, let us quickly recall what we learned yesterday. Listen carefully and answer my questions.

SHOULD DO 05 MIN.

Teacher: What is terrace farming? (Cutting hill slopes into steps to prevent soil erosion.)

Teacher: Why do farmers plant cover crops? (To hold the soil in place and prevent it from being blown away.)

Teacher: How does afforestation help in soil conservation? (Tree roots hold the soil together.)

Teacher: What happens when heavy rain carries soil away from hill slopes? (Soil erosion occurs.)

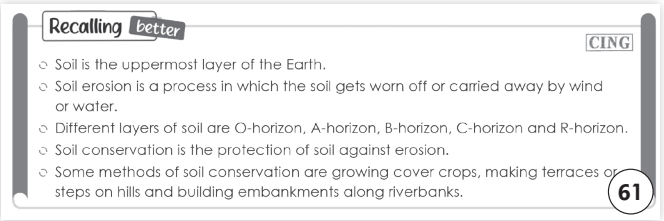
Teacher: Name one natural cause and one human activity that leads to soil erosion. (Wind/Rain and Deforestation.)

Teacher: Well done. Now, let us move to today's lesson.

Recalling better

Teacher: Let us take a few moments to recall what we have learned so far. Can anyone tell me what soil is?

MUST DO 05 MIN.



Teacher: That is correct. Soil is the uppermost layer of the Earth. Now, what happens during soil erosion?

Teacher: Yes, soil erosion is when soil gets worn off or carried away by wind or water. Why is this harmful for the environment?

Teacher: Great. It is harmful because it can reduce soil fertility and make it difficult for plants to grow. Now, let's talk about the different layers of soil. Can anyone name the layers of soil?

Teacher: Well done. The layers are O-horizon, A-horizon, B-horizon, C-horizon and R-horizon. Now, how do we protect the soil from erosion?

Teacher: Exactly. Some methods of soil conservation are growing cover crops, making terraces on hills and building embankments along riverbanks. These methods help protect soil and prevent erosion.

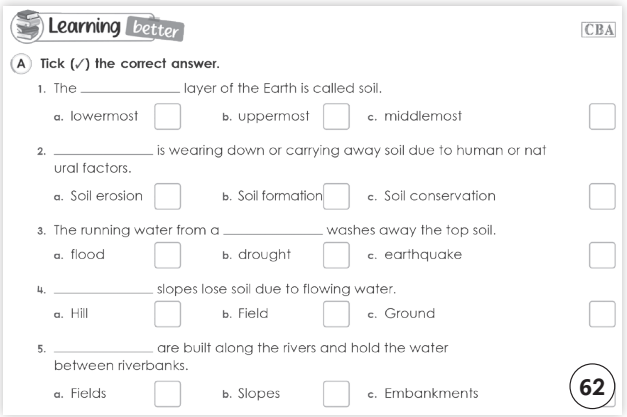
Teacher: Great work everybody.

Learning better

Teacher: Everyone please open page 62 of your Main Course Book. In Exercise 'A' of 'Learning better' you have to tick the correct answer. Are you ready to get started?

Teacher: Great. Let us begin with the first question. The _____ layer of the Earth is called soil.

Teacher: The correct answer is uppermost. Well done. (Similarly complete all five questions)



Learning better — CBA

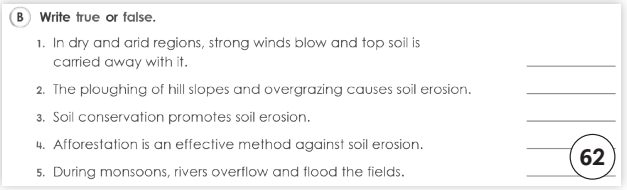
A Tick (✓) the correct answer.

1. The _____ layer of the Earth is called soil.
   a. lowermost ☐ b. uppermost ☐ c. middlemost ☐
2. _____ is wearing down or carrying away soil due to human or natural factors.
   a. Soil erosion ☐ b. Soil formation ☐ c. Soil conservation ☐
3. The running water from a _____ washes away the top soil.
   a. flood ☐ b. drought ☐ c. earthquake ☐
4. _____ slopes lose soil due to flowing water.
   a. Hill ☐ b. Field ☐ c. Ground ☐
5. _____ are built along the rivers and hold the water between riverbanks.
   a. Fields ☐ b. Slopes ☐ c. Embankments ☐

62

Teacher: Let us do Exercise 'B' of 'Learning better'. You have to write true or false in the given blanks. Are you ready to get started?

MUST DO — 05 MIN. ☐



B Write true or false.

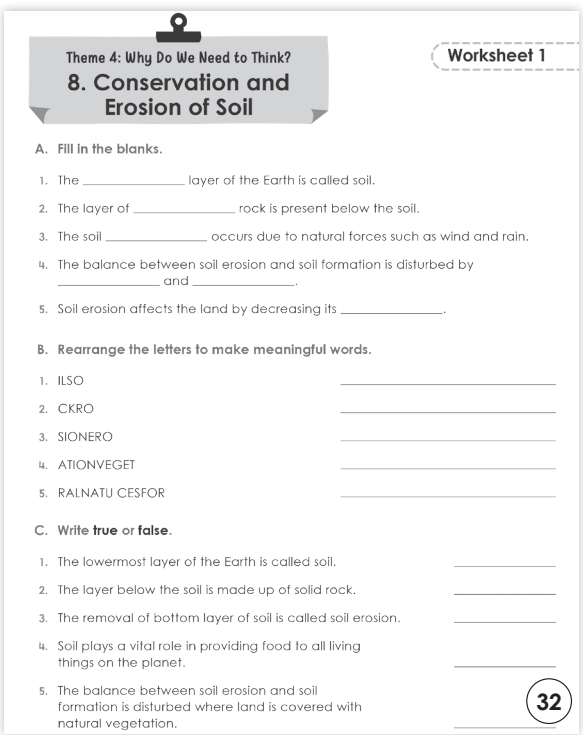
1. In dry and arid regions, strong winds blow and top soil is carried away with it. _____
2. The ploughing of hill slopes and overgrazing causes soil erosion. _____
3. Soil conservation promotes soil erosion. _____
4. Afforestation is an effective method against soil erosion. _____
5. During monsoons, rivers overflow and flood the fields. _____

62

Teacher: Great. Let us begin with the first question. In dry and arid regions, strong winds blow and topsoil is carried away with it. Think carefully and write true or false in the blanks. (Similarly complete all five questions)

MUST DO — 05 MIN. ☐

Worksheet – 1



Theme 4: Why Do We Need to Think?

8. Conservation and Erosion of Soil

Worksheet 1

A. Fill in the blanks.

1. The _____ layer of the Earth is called soil.
2. The layer of _____ rock is present below the soil.
3. The soil _____ occurs due to natural forces such as wind and rain.
4. The balance between soil erosion and soil formation is disturbed by _____ and _____.
5. Soil erosion affects the land by decreasing its _____.

B. Rearrange the letters to make meaningful words.

1. ILSO _____
2. CKRO _____
3. SIONERO _____
4. ATIONVEGET _____
5. RALNATU CESFOR _____

C. Write **true** or **false**.

1. The lowermost layer of the Earth is called soil. _____
2. The layer below the soil is made up of solid rock. _____
3. The removal of bottom layer of soil is called soil erosion. _____
4. Soil plays a vital role in providing food to all living things on the planet. _____
5. The balance between soil erosion and soil formation is disturbed where land is covered with natural vegetation. _____

32

Teacher: Let us do some activities from the workbook. Everybody, please open page 32 of your workbook and answer the questions given in worksheet - 1.

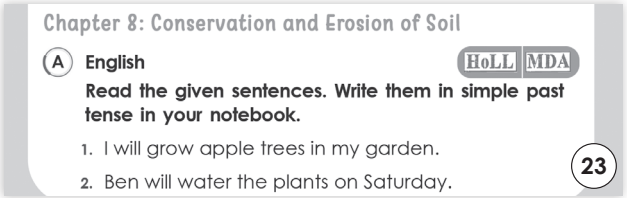
MUST DO — 10 MIN. ☐

(Let the students answer the questions on their own. Then discuss the answer by writing the correct answer on the blackboard.)

Book of Holistic Teaching

Refer to the Book of Holistic Teaching, page 24 under the title 'Conservation and Erosion of Soil.' Complete the activities mentioned in this section and ensure that the students complete them. These activities are designed to enhance their holistic understanding and engagement with the topic. Provide any necessary support and materials to help the students successfully finish the activities.

COULD DO — 10 MIN. ☐



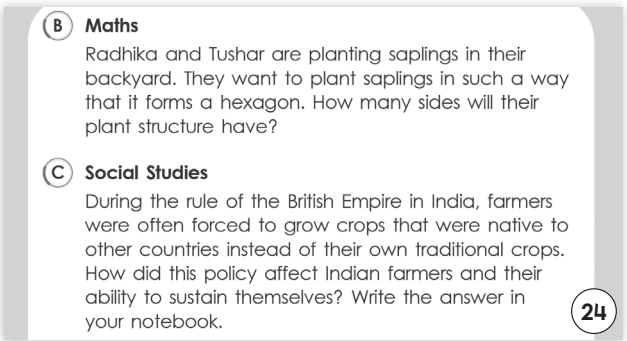
Chapter 8: Conservation and Erosion of Soil

A English — HoLL MDA

Read the given sentences. Write them in simple past tense in your notebook.

1. I will grow apple trees in my garden.
2. Ben will water the plants on Saturday.

23



B Maths

Radhika and Tushar are planting saplings in their backyard. They want to plant saplings in such a way that it forms a hexagon. How many sides will their plant structure have?

C Social Studies

During the rule of the British Empire in India, farmers were often forced to grow crops that were native to other countries instead of their own traditional crops. How did this policy affect Indian farmers and their ability to sustain themselves? Write the answer in your notebook.

24

You may show the **Animated Activities** on the digital platform.

Differentiated Activities

110 km/hr

Describe two methods of soil conservation.

80 km/hr

What is one advantage of using embankments to control soil erosion?

40 km/hr

What is soil conservation?

Home Task

The Project Idea, given in the book of Project Ideas, page number 16 under the title 'Conservation and Erosion of Soil.' This project should be assigned to the students as a home task to work on. Ensure that the students understand

the project requirements and provide any necessary guidance or materials they might need.

Period 8

Teacher: Good morning, students. How are you all today?

Teacher: Great. Let us begin with a quick warm-up. Listen carefully and try to answer as quickly as you can.

SHOULD DO
05 MIN.

Teacher: Which soil layer contains the most nutrients for plants? (A-Horizon or Topsoil)

Teacher: What is the process of planting trees to prevent soil erosion called? (Afforestation)

Teacher: What happens when the topsoil is removed due to erosion? (Soil loses its nutrients and becomes less fertile.)

Teacher: Which farming method is used on hill slopes to reduce soil erosion? (Terrace farming)

Teacher: Name one natural force that causes soil erosion. (Wind/Rain/Water)

Teacher: Excellent. You all are recalling the concepts well. Now, let us move on to today's lesson.

Book of Project Ideas

Chapter 8: Conservation and Erosion of Soil

ICT PRO 21st CS

Use the Internet* to find out the importance of soil conservation and how small actions can make a big difference in protecting our environment. Make a presentation as well.

- Briefly introduce soil conservation.
- Write the importance of soil conservation (e.g., prevents erosion, maintains soil fertility, supports plant growth).
- Write about different ways to conserve soil.
- Show pictures or videos for conserving soil.

16

(Discuss the project assigned as the home task in period seven, focusing on helping students understand the objectives and addressing any challenges they face.)

MUST DO
05 MIN.

C **Write short answers in your notebook.**

1. What is soil erosion?
2. Rohini sees her grandma sowing seeds in the soil. Upon asking, Grandma tells her that she is protecting the soil from erosion. Which term do you think is most appropriate for the activity Grandma is performing?
3. Define embankment.

62

Teacher: Now, let us explore some short-answer questions. In Exercise 'C' of the 'Learning better' section, you have to write a short answer. Are you ready to get started?

MUST DO
10 MIN.

Teacher: Great. Let us begin with the first question. What is soil erosion?

(Students have to write the answers for the given questions in about 40 to 50 words in their notebook. Wait for the students to write the answers.)

MUST DO
10 MIN.

(Similarly, complete all the three questions.)

D **Write long answers in your notebook.**

1. Write the factors causing soil erosion.
2. Enumerate different methods of soil conservation.

62

Teacher: Great. Let us explore some long-answer questions. Let us begin with the first question. Write the factors causing soil erosion.

(Students have to write the answers for the given questions in about 100 to 150 words in their notebook. Wait for the students to write the answers.)

(Similarly, complete the second question.)

Worksheet – 2

Worksheet 2

A. Fill in the blanks.

1. The ploughing of hill slopes causes soil _____.
2. The roots of plants and trees hold the _____ together.
3. Constant running of water leads to soil _____.
4. Strong winds carry the _____ soil away with them.
5. The cutting down of trees causes _____ to become loose and makes it prone to erosion.

B. Rearrange the letters to make meaningful words.

1. ERTDES _____
2. ODFLO _____
3. LLHI OPSSLE _____
4. ATIONCULTIV _____
5. ILSO SIONERO _____

C. Write true or false.

1. Soil erosion does not affect the crop yield. _____
2. Soil erosion affects the land by decreasing its fertility. _____
3. Human activities are one of the causes in soil erosion. _____
4. Heavy rains often result in drought that causes soil erosion. _____
5. The soil erosion is carrying away or wearing off the top layer of soil. _____

33

Teacher: Let us do some activities from the workbook. Everybody, please open page 33 of your workbook and answer the questions given in worksheet - 2.

MUST DO
10 MIN.

(Let the students answer the questions on their own. Then discuss the answer by writing the correct answer on the blackboard.)

You may show the **Quiz** on the digital platform.

(Instruct the students to bring their Little Book in the next class.)

Differentiated Activity

110 km/hr

What is humus important for soil?

80 km/hr

How does afforestation help prevent soil erosion?

40 km/hr

Which farming method helps prevent soil erosion on hill slopes?

Home Task

The 'Creating better' activity (Poster on Environmental Awareness) mentioned on page 63 of the Main Course Book.

Period 9

Teacher: Good morning, students. How are you all today?

Teacher: Let us begin with a quick warm-up. Listen carefully and answer as quickly as you can.

SHOULD DO
05 MIN.

Teacher: Which soil layer is also known as the parent material? (C-Horizon)

Teacher: Why is humus important for soil? (It adds nutrients and improves soil fertility.)

Teacher: What is the lowest layer of soil called? (R-Horizon or Bedrock)

Teacher: Name one method farmers use to prevent soil erosion in their fields. (Cover crops/Terrace farming/ Embankments)

Teacher: How do embankments help prevent soil erosion? (They stop water from washing away soil along riverbanks.)

Teacher: Well done. You all are remembering so much. Now, let us move on to today's lesson.

Thinking better

Teacher: Let us begin with a question to make you think. I will ask a question and you have to answer that in your notebook.

MUST DO
10 MIN.


Thinking better
21st CS HOTS
Think and write the answer in your notebook.
Instead of planting just one type of plant, why is it important to plant a variety of trees and plants in a forest or garden? How does this diversity benefit the environment and the animals that live there?
63

Teacher: Instead of planting just one type of plant, why is it important to plant a variety of trees and plants in a forest or garden? How does this diversity benefit the environment and the animals that live there? Think properly and write your answer in your notebook.

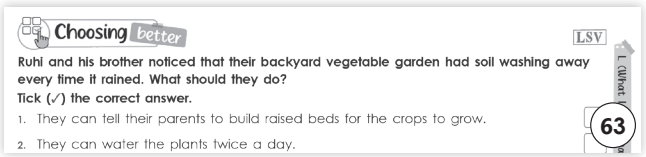
(Give students to think and write their answers in their notebooks.)

Choosing better

Teacher: Let us think about a situation. Ruhi and his brother noticed that their backyard vegetable garden had soil washing away every time it rained. What should they do?

MUST DO
05 MIN.

(Pauses to allow students to think.)


Choosing better
LSV
Ruhi and his brother noticed that their backyard vegetable garden had soil washing away every time it rained. What should they do?
Tick (✓) the correct answer.
1. They can tell their parents to build raised beds for the crops to grow.
2. They can water the plants twice a day.
63

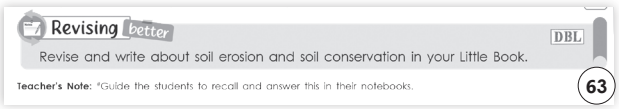
Teacher: Here are two choices. First, they can tell their parents to build raised beds for the crops to grow. Second, they can water the plants twice a day. Which one makes more sense?

Teacher: Yes. The first option makes more sense. Building raised beds will help prevent soil from washing away when it rains.

Revising better

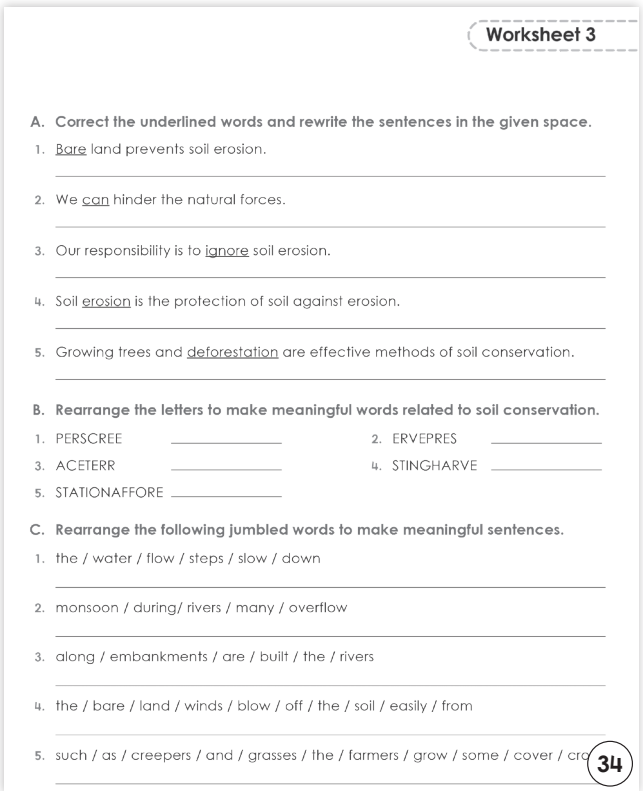
Teacher: Now, open your Little Book. Revise and write about soil erosion and soil conservation in your Little Book. Try to keep it simple and clear.

MUST DO
05 MIN.


Revising better
DBL
Revise and write about soil erosion and soil conservation in your Little Book.
Teacher's Note: *Guide the students to recall and answer this in their notebooks.
63

(Encourage students to share their thoughts once they finish.)

Worksheet – 3


Worksheet 3

A. Correct the underlined words and rewrite the sentences in the given space.
1. Bare land prevents soil erosion.
2. We can hinder the natural forces.
3. Our responsibility is to ignore soil erosion.
4. Soil erosion is the protection of soil against erosion.
5. Growing trees and deforestation are effective methods of soil conservation.

B. Rearrange the letters to make meaningful words related to soil conservation.
1. PERSCREE
2. ERVEPRES
3. ACETERR
4. STINGHARVE
5. STATIONAFFORE

C. Rearrange the following jumbled words to make meaningful sentences.
1. the / water / flow / steps / slow / down
2. monsoon / during/ rivers / many / overflow
3. along / embankments / are / built / the / rivers
4. the / bare / land / winds / blow / off / the / soil / easily / from
5. such / as / creepers / and / grasses / the / farmers / grow / some / cover / cr
34

Teacher: Let us do some activities from the workbook. Everybody, please open page 34 of your workbook and answer the questions given in worksheet - 1.

MUST DO
10 MIN.

(Let the students answer the questions on their own. Then discuss the answer by writing the correct answer on the blackboard.)

You may generate additional practice worksheets using the **Test Generator** given on digital platform.

Teacher: Now, let us complete the 'KWL' activity.

Teacher: Take out your notebook and fill in the last column. Write what have you learned in this chapter.

SHOULD DO

05 MIN.

(Wait for students to fill in the chart.)

Teacher: Let us all give a huge round of applause to everyone for their hard work and creativity. Great work, everyone. See you in the next class. Have a wonderful day ahead.

Differentiated Activity

110 km/hr

Why do deep-rooted plants help in reducing soil erosion?

80 km/hr

How does soil erosion affect farmers?

40 km/hr

Which soil layer is rich in minerals but has fewer nutrients than the topsoil?

Home Task

Find a place near your home where the soil is covered with plants and another where the soil is bare. Write five sentences comparing them.

Learning Outcomes

The students will:

Domain	Learning Outcome
Physical Development	• develop fine motor skills through hands-on activities such as drawing plants, making posters on soil conservation and engaging in craft-based learning.
Socio-Emotional and Ethical Development	• demonstrate awareness of the impact of human activities on soil erosion and conservation; develop a sense of responsibility for environmental protection and sustainability.
Cognitive Development	• understand the process of soil formation, identify different layers of soil and analyse the causes and effects of soil erosion and conservation methods.
Language and Literacy Development	• engage actively in teacher-led discussions, demonstrate comprehension by responding to questions and articulate thoughts on soil conservation using appropriate vocabulary and well-structured sentences.
Aesthetic and Cultural Development	• appreciate nature's role in supporting plant life and explore creative expressions through visual representations of soil conservation methods and environmental awareness.
Positive Learning Habits	• develop curiosity about environmental science, engage in collaborative discussions and demonstrate responsible behaviour towards soil conservation through observations and applied learning.

Starry Knights

What do you think about teaching soil conservation to the learners? Can they really make a difference in climate control and soil conservation?

Give yourself a STAR.