

Teacher's Guide

Natural Resources

Part 1

Based on the Karnataka State Board Curriculum for
Standard VIII



JANAAGRAHA CENTRE FOR CITIZENSHIP & DEMOCRACY

Janaagraha's initiative to improve citizen engagement in India's democracy through their civic learning program

Developed in collaboration with Young Leaders for Active Citizenship (YLAC)

Natural Resources | Teacher’s Guide (1/2)

Part 1

Class VIII

Board – Karnataka State Board

Subject – Science

Textbook – Science Textbook for Class VIII (Karnataka State Board)

Chapter 1 – Natural Resources

Number of part – 03

Length – 65-80 minutes (estimated, for a class of 40-45 students)

Note: Teachers may divide the lesson plan into as many periods as they see fit

Section I: What are we going to learn and why is it important

Learning objectives

Students will:

- Define and classify natural resources.
- Understand the sources and forms of water.
- Understand the various patterns of water consumption and how human actions impact sources of water.
- Understand the need and importance of conserving water.

Learning outcomes

Students will be able to:

- Understand the features of natural resources and appreciate the need to conserve them.
- Make connections on how human activities have negative consequences on the health of water sources.
- Take initiatives to conserve water at home, school and in their neighbourhood.

Key terms

Natural Resources	Renewable	Non-renewable	Exhaustible
Inexhaustible	Scarcity	Extinct	

Materials Needed:

1. Paper chits (one for each student) with names of resources written for activity Who am I, or print outs from the appendix section.

2. 1 litre bottle full of drinking water, 4 empty smaller bottles/containers, salt, spoon, blue ink (optional) for the activity sources and consumption of water.
3. 2 sets of paper flash cards for each group (depending on the number of groups) for activity uses of water.
4. Blank sheet of paper and colors/ sketch pens for the activity need to conserve water.

Section II: How are we going to learn

1. The Meaning and Classification of Natural Resources

Activity: Think-Pair-Share

Time: 5 minutes

Note to the teacher:

This section will help students understand the meaning of natural resources. Students will look at words displayed on the board and identify 2 key similarities between them:

- (i) They all occur in nature.
- (ii) They are useful to human beings.

Honey bees	Petroleum	Sunlight	Cows	Forests
Coal	Water	Iron	Trees	Soil

This activity can be done in pairs. Students should be given a minute to think about the 2 similarities and then discuss them with their partner, followed by whole class sharing. In case students are unable to reach the desired responses, the teacher can ask the following guiding questions to the students:

- a) Where do these things come from?
- b) Do you make use of any of these? How so?

Facilitation notes:

- To begin this lesson, I want you to look at all the words displayed on the board. These words have 2 things in common.
- Take 1 minute to think about what these words have in common and write them in your notebook.
- (After a minute) Now share your 2 similarities with your partner.
- (Take a few responses) (Expected answer- they occur in nature, they are living/ non-living, they are found in forests, they are used in day to day work etc.)

De-brief:

The teacher should take 3-5 student responses and help students to arrive at the 2 desired responses. He/She should then state that these are all ‘**natural resources**’ which are ‘things that occur in nature and are useful to us.’ Ask the students to write this definition in their notebooks.

Activity: Who am I?

Time: 20-25 mins

Materials needed: Chits of paper with names of resources written on them. (a printable sheet with sample resource names is given in the appendix)

Note to the teacher:

- The objective of this activity is to help students identify various features of natural resources and classify them accordingly.
- In the activity, each student will be given a chit with a natural resource written on it. Students will think about the natural resource assigned to them and answer the following questions to identify its features/properties and fill the below mentioned table. **The third column is to be filled during/ after the debrief.** (The teacher to draw the following table on the board and ask the students to copy it in their notebooks)

Questions about the resource	Answers	Type of resource (renewable, non-renewable, exhaustible, inexhaustible)
Does it have life?		
Will it be available forever? / Can it be used continuously?		
Can it be replenished or refilled once it is over/depleted?		
How is the resource used?		

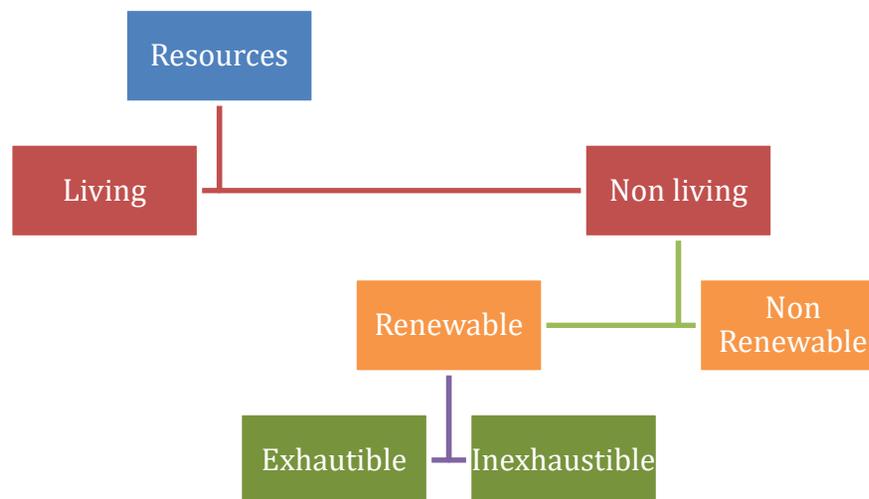
- Once students have filled the table, the teacher should make a statement about the features or properties of natural resources.
- For example, the teacher may say ‘I will probably never get over. I am continuously available for use’. If the resource assigned to the students matches the statement, he/she must stand up.
- In this case, students who have a chit saying ‘water’ or ‘wind’ should stand up.
- The teacher should ask the students who stood up what resource was assigned to them and help correct inaccuracies where required.
- (The teacher should then explain that these are all renewable natural resources.)

- The teacher should make the following statements and give the corresponding explanations for each type of resource.

Teacher Statements	Explanation
I am a non- living resource. I will probably never get over, I am continuously available for use. (Correct responses- water, wind, sunlight)	These are all renewable natural resources because they can be renewed or restocked. They are also inexhaustible/ renewable , meaning that they will never get over or exhausted.
I am a living resource. I can be replenished slowly. But, once completely over or extinct I cannot be replenished. (Correct responses- animals/wildlife, forests)	Plants and animals are renewable as they can be replenished or replaced. However, once a forest is destroyed or an animal is extinct, it cannot be replenished. Therefore, these are exhaustible renewable resources , i.e. they may get depleted by continuous use or interference by humans.
I am a non- living resource. I take millions of years to form. Once I am over or exhausted, I cannot be replenished. (correct responses- minerals and fossil fuels)	Minerals like gold, iron etc. and fossil fuels like coal, petroleum etc. take millions of years to form inside the Earth. Once they are completely exhausted or used up, they cannot be replenished at all as they are consumed much faster than they are formed. This makes them non-renewable resources.

Debrief:

- The teacher should ask 4-5 student volunteers to summarize what they know about renewable, non-renewable, exhaustible and inexhaustible natural resources and ask students to note the same in their notebooks and complete the previous table.
- Students can draw the following diagram for clarity.



- The teacher then mentions that we will now discuss a few resources most important to us in detail and will start with perhaps the most important one- water.

2. Sources and Consumption of water

Activity: Sources of water

Time: 15-20 minutes

Materials needed: 1 litre bottle full of drinking water, 4 empty smaller bottles/containers, salt, spoon, blue ink (optional)

Note to the teacher:

- The objective of this activity is for students to understand the sources of water and how water is divided among these sources.
- Students should be divided into 5 groups
- List the following sources of water on the board- oceans and seas, rivers, lakes, groundwater, water vapour and ice-caps.
- Randomly assign one source of water to each group. Each group should also identify the % of water their source has. (For example, a group may say- we choose ground water. We think ground water has 3% of the total water)
- Using the steps listed in the Facilitation Notes, the teacher should help students identify the % of water in various sources.
- Since the activity involves use of water, the teacher can also take the students outside in the school field/ lawn.

Facilitation Notes:

- We are now going to do an activity about a very important renewable natural resource. We use this resource every day and is continuously available for consumption. 71% of the Earth's surface is covered with it. We find it in many places and many forms. Can you guess what this resource is?
- (After student responses) We use water all the time, but do we know where this water comes from? Let's find out.
- Imagine that this one bottle of water represents all the water in the world.
- Each group has been given a source. Take 30 seconds and decide what % of the world's total water should your source get.
- (After groups make their predictions, distribute the liquid to the groups one by one using the amounts listed below. Be sure to write the quantity and source on the containers)
 - ocean- 4/5th of the water- almost the entire bottle.
 - ice: About 5% of the water- about 2-3 spoons
 - groundwater: 2 spoons
 - lakes: half spoon
 - rivers: (roughly 1 drop)
- Did your group get the amount you predicted? How did it differ? (Take student responses)
- So as we can see, most water (97%) is found in oceans and seas. So, congratulations to the group that got 'oceans'. Can this group drink this water? Why or why not? (Put salt in their cup as you say this)
- (After student responses) This water is not fit for drinking as it is full of salt. The remaining water is what we have available to use. This is called fresh water and is used for all the different activities for which we need water.
- (now put some ink in the water with the group ground water, lakes, and rivers). Can anyone tell me what this ink represents? It represents all the human activities that pollute the sources of fresh water. Will talk about this in a later section.

Debrief

The teacher should ask students the following questions and take 2-3 responses per question:

- a) Is the amount of usable water available enough for us all? Why/why not?
- b) Do you think the water available in all other sources (except oceans) can be consumed directly? Why/why not?

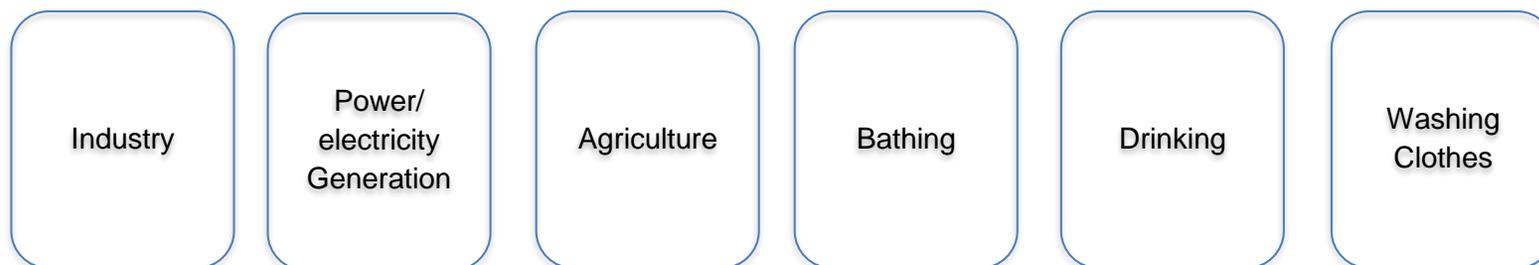
The teacher should guide the discussion towards the understanding that a limited amount of water is available for our consumption. Further, given the amount of water pollution, most of it cannot be consumed directly.

Activity- Water Use

Materials needed: 2 sets of paper flash cards for each group- one set of uses of water and one set of problems.

Note to the teacher:

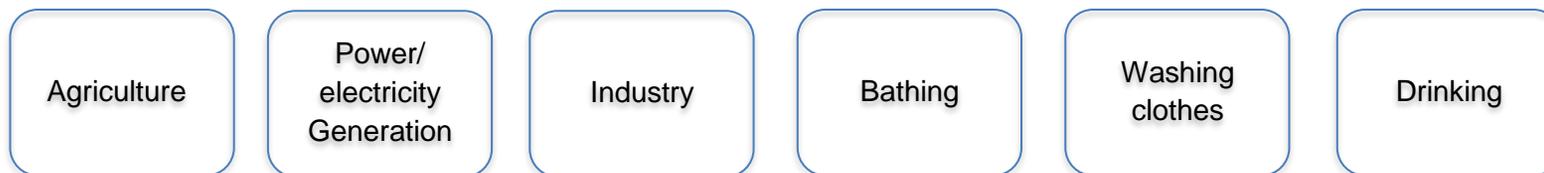
- Through this activity, students will understand patterns of water consumption, pollution and its consequences.
- Each group of students will be given several flash cards with various uses of water. In their groups, students must arrange the flash cards from most water consuming to least water consuming activity.
- After students have arranged the flash cards, the teacher will ask a series of questions (refer to facilitation notes) to help students learn about water pollution and need for conservation.



(This is the correct order of consumption)

Facilitation Notes:

- Now that we have understood where our water comes from, let's understand how it is used. Each group has been given 6 cards that show an activity that requires water. You must arrange the cards beginning with the activity that consumes the most amount of water and ending with the one that consumes the least. You have 3 minutes to do this.
- (After 3 minutes) Can one representative from each group share how and why they arranged cards in their particular way.
- (After student responses) Now let's check how many of us got the pattern right. The most amount of water- about 80% is spent for growing food for our large population followed by power generation, industry, and then domestic activities of bathing, washing clothes and drinking. Here is the correct pattern.



- Where is all the water for these activities coming from? (expected response- rivers, lakes groundwater)
- Now, I'm giving each group another set of flashcards. These flashcards have problems associated with water use written on them. You must match these problems with the correct activity. You have 2 minutes to do this.

Fertilizer seeps into ground water (Agriculture)	Dams block supply of water to some areas (Power generation)	Waste like plastic, glass, chemicals etc. is dumped into water bodies (Industry)	Leaving the water running for too long. (Bathing)	Leaving the water running for too long. (Washing clothes)	Drinking (diseases caused by unsafe water)
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- (After 2 minutes) Can one representative from each group share how you matched the cards?
- (After student responses) These are all problems that lead to pollution and wastage of water. Remember the few sources of fresh water we identified? Those are polluted by human beings through these various activities and cause a scarcity or shortage of clean water.

De brief:

The teacher should ask students:

'What are the other problems caused by pollution and wastage of water?'

After 5-7 responses, students should be asked to write down the answer to the question in their notebooks.

The teacher can sum up this discussion with an optional video:

Video: India's water bodies dying a slow death

This video talks about different rivers of India which are drying up leading to water crisis in the nation.

Link: [YouTube](#)



3. Need for conservation of water

Time: 20-25 minutes

Materials needed:

- Blank sheets of paper. (The number to depend on the strength of the class- one sheet per pair)
- Colors and sketch pens.

Note to the teacher:

In this section, students will understand the need to conserve water and how this can be done.

Students will read an excerpt from an article about water demand and scarcity in India and make a poster on the topic 'My world without water in 2050'. The teacher may write the excerpt on the board.

(The teacher can start this conversation with the following optional video on water conservation:

Video: HUL start a little good

The video shows how the water needs of tens of people can be met only if the water one man wastes in a day is redirected

Link: [YouTube](#))



As population increases, the demand for water will also increase. In India there are 320 million people who do not get enough water for their needs. As our population grows, this number will become 840 million people in 2050. Imagine a world where so many people do not have enough water to survive. What can we do about this? Is there an alternate to water? Can we replace water with something else?

Source: [Article](#) in Livemint

Facilitation Notes:

- Now that we have understood that pollution and wastage of water can lead to so many problems, let's read a few lines from a newspaper article about the demand for water.
- (Ask a student volunteer to read the information aloud for the class) Do you think it's possible to replace water with something else?

- (After 2-3 responses) Imagine that it is the year 2050. As many as 840 million people do not have access to adequate water. What will their life look like? (Take 5-7 responses)
- Now that we know some of the consequences of shortage of water, in pairs, we will make a poster on the topic 'My world without water in 2050'.
- Everyone to now take an empty sheet of paper in pairs and make this poster.

Debrief:

- Once the students have made the poster, ask 3-5 pairs to show their poster to the class and explain what they have showed in their poster.
- Take a few responses from students on what can they do to save water in their homes.

(Expected answers)

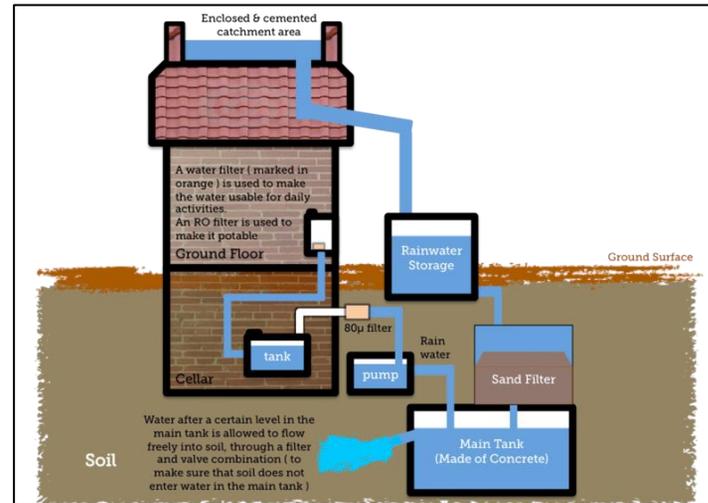
- Turn off the tap while brushing teeth and washing hands.
- Fix leaky taps, faucets and pipes immediately.
- Wash the car with a single bucket of water, not a hose pipe.
- Use just one bucket of water for bath instead of an overhead shower
- Only use a full load washing machine/dishwasher.
- Water plants with a bucket instead of a hose pipe.
- Reuse water used for washing fruits & vegetables for watering plants.
- Let your friends and family know about Rainwater Harvesting.
- Talk to your friends and family about the importance of water and the need to save it.

4. Discussion: Rainwater Harvesting

Time: 5 minutes

(The teacher can introduce rainwater harvesting here briefly to give students an understanding of how water conservation can be done at a community level)

- Rainwater Harvesting is the process of collection of rainwater from surfaces on which rain falls, filtering it and storing it for multiple uses.
- The groundwater will get replenished leading to an increase in the water table. It is the best way to make sure that water table does not get depleted and it is a very cheap process.
- Simply put, all the buildings just need to be made in a way that the rainwater on the rooftops slides into a storage tank.
- Since rainwater harvesting is a cheap and effective way of addressing the water crisis, many state governments and municipal bodies have made policies to make rainwater harvesting compulsory in large buildings.



Source: [Wikimedia](#)

Section III: Assessment

Time: 5 minutes

Choose the odd one out and give a reason for your choice.

- Coal, petroleum, iron, wind
(Wind is the odd one out as it is a renewable resource and the rest are non-renewable resources)
- Leather, timber, minerals, dairy products
(Minerals is the odd one out as it is a non-living resource while the rest are products that we get from living resources)
- Tigers, Water, Lions, Forests
(Water is the odd one out as it is an inexhaustible natural resource while the rest are exhaustible)
- Brushing with the tap left running, showering instead of using a bucket, using a running pipe to clean a car, reusing kitchen water to water plants
(Reusing kitchen water is the odd one out because that is the only one in which water is used carefully)
- Soil, wind, water, sunlight
(Soil is the odd one out as it is an exhaustible resource while the rest are inexhaustible)

Think about the stages through which water passes before it reaches your house. Draw a flow chart from the main source of water to the tap in your house.

How are human actions causing water pollution? How can we reduce this damage? (give 3 points)

Complete the table:

Source	% of water contribution	How does it get polluted?	Consequences
Groundwater			
Lakes			
Rivers			

Homework

1. Community Walk:

Take a walk around your community and note all examples of wastage of water. Write down steps to conserve this water.

2. Group work: Green School Plan

Read the following story about Imrana and her friends and answer the questions that follow:

Imrana and her friends Rahul and Priya study in Grade VIII, in a school near their colony. The school is clean and has a large playground too. But what is amazing about their school is that it is a Green School. This means that their school is waste free!

What does that mean? It means that there is no wastage of water, electricity or resources.

Interestingly, all this began with a leaky roof. Rainwater and water from the tanks on the terrace used to get collected and seep through the roof, leaking into classrooms. Imrana and her friends, with the help of their principal, wrote to the local authorities about the leaking roof in many classrooms. After many letters and visits to the local authorities and many awareness walks around the community, Imrana and her friends convinced the authorities to start a rain water harvesting system in the school. They installed large tanks to collect rainwater and even fixed the old leaking taps. The water collected is used to water the field which is now lush green and full of happy students on sunny afternoons!

How can you make your school a Green School? The first step is to stop wastage of water. Make an action plan to ensure that water is not wasted in your school.

Section IV: Closure

Summary by students

- Ask students to give examples of
 - a) renewable and non-renewable resources
 - b) exhaustible and inexhaustible resources.

(Allow one student to give only one example each so that a larger number of students may participate.)

- Ask students to
 - a) State one reason why we need to conserve water
 - b) State one way in which he/she will conserve water

(Allow one student to give only one point each so that a larger number of students may participate.)

Recap by the teacher

The teacher should recap the properties of renewable and non-renewable resources and the need to conserve water.

- Resources can be classified as renewable and non-renewable.
- Renewable inexhaustible resources are resources that are available in unlimited quantities and we do not need to worry about them getting over. These include wind, sunlight etc.
- Renewable exhaustible resources are resources that can be generated again if they are used carefully, these include forests, wildlife etc.
- Non-renewable resources are the ones that took years to form and once used up, cannot be generated again. These include coal, petroleum etc.
- Water, one of our most precious resource, is a renewable resource.
- Of all the water available on Earth 3% is available to use for use. Human population and increased pollution is creating serious pressure on this and there is an urgent need for us to conserve water.
- We all can take some actions on our own levels to protect this immensely important natural resource. Few examples are:
 - Turn off the tap while brushing teeth and washing hands.
 - Fix leaky taps, faucets and pipes immediately.
 - Wash the car with a single bucket of water, not a hose pipe.
 - Use just one bucket of water for bath instead of an overhead shower
 - Only use a full load washing machine/dishwasher.

Section V: Additional resources**Resources for students:**

1. Video: HUL- Start a little good
This video very beautifully shows how we very carelessly waste water- water that can benefit so many people.
Link: [YouTube](#)
2. Video: Journey 2050 Water
This video explains the sources of water, uses of water and the need to conserve water.
Link: [YouTube](#)

Resources for Teachers:

1. Video: Can 100% renewable energy power Earth?
The video details if it's possible to only depend on renewable energy for our power needs.
Link: [YouTube](#)
2. Video: The future of renewable resources in India
The video talks about how crucial is exploring renewable resources in a country like India and how it can happen.
Link: [YouTube](#)



Appendix
Printable worksheet for the activity who am I?

Lakes	Trees	Herbs	Sunlight	Wind
Diary Animals	Coal	LPG	Honey Bees	Gold
Milk	Chickens	Iron	Petroleum	Oceans
Fresh Water	Copper	Eggs	Stone	Sheep
Salt	Hens	Rabbits	Plastic	Medicinal plants
Goats	Silver	Bulls	Horses	Paper
Silkworms	Fish	Rubber	Crops	Soil

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