

Teacher's Guide

Water

Part 1

Based on the Karnataka State Board Curriculum for
Standard VI



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)

Water | Teacher's Guide (1/3) Part 1

Class VI

Board – Karnataka State Board

Subject – Science

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

Chapter 14 – Water

Number of parts – 03

Length – 75-90 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

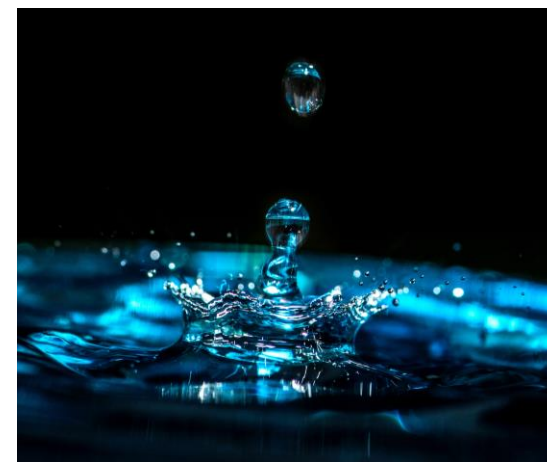
Students will:

- Understand that all natural resources are scarce and therefore need to be conserved.
- Learn that there is shortage of water fit for human consumption on earth.
- Understand why there is a gap between supply and demand of water.

Learning outcomes

Students will:

- Become aware and conscious about their individual water consumption.



Source: [Unsplash](https://unsplash.com/)

Key Terms

Scarcity	Resources	Saline	Artificial Sources	Natural Sources
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Materials needed

1. Globe for discussion on how much water is available,
2. Small crumpled pieces of paper or a packet of thermacol balls for activity- impact of population on resources.

Section II – How are we going to learn?

Note to the teacher: (In case printing of any activity sheets is not feasible, the teacher can write the questions on the board)

1. Discussion on scarcity of resources

Time: 20-25 minutes

Facilitation notes:

Have the following discussion with the students to introduce them to **scarcity of resources**:

- So let's start with a very interesting discussion.
- Do you know what our space explorers look for when they are looking for aliens and life on other planets? (some students will say air)
- It is not air. It is another very important resource that makes life possible. It's water. (In case students do not understand this- give them the easier hint of what they used while brushing, mentioned below)
- How many of you woke up this morning and brushed your teeth? (a few students raise their hands)
- How many of you took a shower? How many of you washed your hands after eating breakfast?
- What is the one common thing you used in all these activities? (Expected answer- water)
- So all those who mentioned 'water' are absolutely correct. As you would have realised, we use water for a variety of things.
- Can you all take the next 2 minutes and make a list of at least 10 things for which we need water every day. (Expected answers- brushing, cooking, bathing, cleaning the house, cleaning clothes, drinking, washing our hands etc.)
- I want you to do a simple calculation. Let's start with an individual- you. Make a list of activities you have done since morning in which you used water and estimate the number of mugs of water you used in them:

Activity	Amount of water used (in mugs)
Brushing	Half mug
Drinking	Two mugs
Bathing	
Total	

- Let's assume that you each used 30 mugs in total.
- If a house has 4 members, then how many mugs of water are needed in this house every day? ($30 \times 4 = 120$ mugs).
- If a colony has 100 houses, then how many mugs are needed every day? ($120 \times 100 = 12,000$ mugs everyday)

- Every city has thousands of such colonies and every state has hundreds of such cities. So can you imagine just how much water is needed every single day to make sure we all are able to do all our daily activities. The following chart will help you imagine better.



- In addition to countless day-to-day uses, there is also a continuous need of water in various other places like factories, farms, water parks, schools, etc.
- There is so much need for water and the need keeps increasing. Since water is so valuable, it is important for all of us to keep a strict check on the amount of water we use and how much of it we waste.
- So do you think it is correct for me to say that the amount of water needed is sometimes even more than the amount of water that is available around us?
- This is known as **scarcity of water**. Scarcity of anything is a situation when we need more of something than is available. Can someone use this general definition and once again tell the class what does scarcity of water mean? (Expected answer- scarcity of water means when the amount of water needed is more than the amount of water available).
- Much like water, there is also scarcity of many other things in this world- like land, metals, food etc. People and countries often end up fighting with each other to get more of these things.
- Most of the wars in history, therefore, are fought by mankind on division of these things- you must have heard in the news that states within India fight over water, countries fight over control of oil, etc. When things get out of control, it leads to large scale wars.
- Some of you may be aware of the Kaveri River water dispute. Can someone talk about it?
- The states of Karnataka and Tamil Nadu both have the river Kaveri flowing through it. Kaveri is an important source of water. Historically, the state of Tamil Nadu would take a lot of water flowing through Kaveri for its own use. This left lesser water for the people of Karnataka. So, the government of Karnataka filed a case in court demanding more water. A long legal battle followed after which the water share was re-divided between Karnataka and Tamil Nadu. As of 2018, Karnataka gets about 37.1% of the water share and Tamil Nadu gets about 57.7%. The remaining is shared by Kerala and Puducherry. (Source of the share: [The Wire](#))
- Write the following quote on the black board:

“Nature has given enough for our need, but not enough for our greed”

- As responsible citizens we need to do our best to conserve the important **resources** on earth, use them carefully and avoid wastage wherever possible.
- Today we will learn about the scarcity of water. Let's start by understanding where all is water present and how do we get this water.

2. How much water is available? And where does it come from?

Time: 20-25 minutes

Facilitation Notes

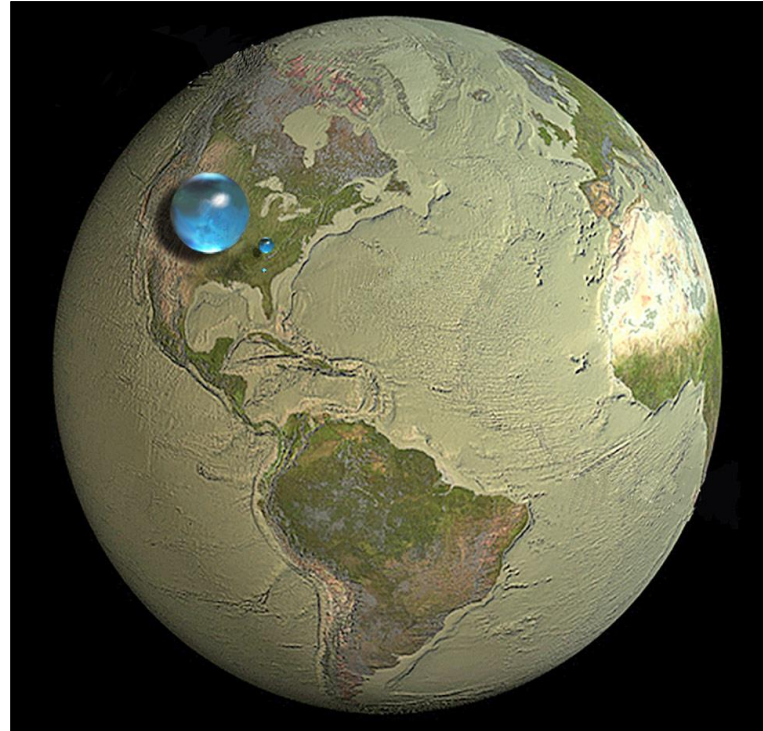
- As a child, I used to often plan vacations with my parents. I remember dreaming of going to a beach and dipping my feet in the cold water as it rushed to the shore. But my parents would eventually take me to the mountains. I used to be so disappointed!
- Just like me, how many of you would love to go to a beach and dip your feet in the cold waves as they rush to the shore?!
- Has anyone been to a beach and actually tasted ocean water? (a few students raise their hands)
- What does it taste like? (expected answer- very salty)
- If I were to give a very thirsty person a glass of ocean water, will he be able to drink it? No. This is because ocean water is extremely salty. It is called **saline water** and is not fit for human use. For this reason, water from oceans cannot be easily used to do many activities.
- Ask students to look at the following picture.

Note to the teacher: Each picture has a source mentioned below it. Please visit the source to download the higher resolution picture for projection. In case there is no projector available, read through this section and explain to students orally and with the help of the blackboard. To make this activity more engaging, the teacher can also use a globe from the school laboratory/library.



Source: [NASA](#)

- Ask a question to seek responses on why does it appear blue? What does that tell about the Earth?
- Now show the following image and explain it:



Source: [NASA](#)

- As you can see, all the blue parts of planet Earth represent the water present on Earth. Earth is mostly made of water.
- The big sphere represents all of Earth's water, including water in the oceans, ice caps, lakes, rivers, groundwater, atmospheric water, water present inside a human body and all forms of animals, the vegetables and the plants.
- While oceans are present on about 3/4th (71%) of Earth, all this water cannot be consumed by humans. Why?
- The medium sphere represents the world's liquid fresh water which includes ground water and water in lakes, swamps and rivers, and water present in the form of ice in cold regions.
- The small sphere represents all the freshwater in lakes and rivers. It is about 0.006% of all the water in the world. The water in that tiny bubble has the huge responsibility of meeting most of the needs of humans and animals.
- Imagine how much strain are we putting on these sources of water and how quickly they can run out.
- (Take a one minute pause for students to ask questions).

- Now think about all the places you get your water from in your homes? Does anyone go to a river and fetch water in buckets in this class? No.
- This is because we can simply switch on a tap and clear, clean water is available to us.
- We can divide all sources of water into 2 parts: **Artificial Sources and Natural Sources**. Instead of me telling you the meaning, let me ask you to classify these sources and see if you can identify the sources of water. (the teacher writes the following on the board and students classify them by raising their hands)
 - Taps, pipes, rains, irrigation systems, rivers, man-made lakes, natural lakes, ponds, oceans, motor pumps, ground water
 - Draw the following table at the end of the exercise:

Artificial Sources	Natural Sources
Taps	Rains
Pipes	Rivers
Irrigation systems	Natural lakes
Man-made lakes	Ponds
Motor pumps	Ground water

- While artificial sources of water have become more common in cities and towns, please remember that they are also ultimately getting their water from lakes, rivers or other natural sources. And if lakes and rivers dry up, there will be no water available in these artificial sources as well.
Ex. Ulsoor lake, Varthur Lake, Bellandur lake-they are unfit for drawing water for consumption.

3. The impact of human activities on water sources.

Time: 5 minutes

- Before we start this activity, I want to quickly recap what we did last. We talked about water and how it is used in our day to day activities. We then talked about how maximum water on the planet is in oceans and is saline (salty) and a very small amount of fresh water can be used for human consumption.
- In this lesson today, we will talk extensively about how there are limited sources of useable water and why they need to be protected. In future lessons we will talk about what can be done on a government level, societal level and individual level to save water. Let's start!

Activity: Impact of population on resources

Time: 15-20 minutes

Note to the teacher: If possible, this activity can also be done as an outdoor activity since the class can get dirty with all the paper or thermacol balls. The teacher can take students into the school field/ any open area and conduct this activity in groups.

Materials Needed: Very small crumpled pieces of paper (for this activity to be done smoothly, get a few students before the lesson to tear very small pieces of paper and crumple them into tiny balls. Every group of 4 should have about 40- 50 tiny balls) or thermacol balls, small paper bowls.

Facilitation Notes:

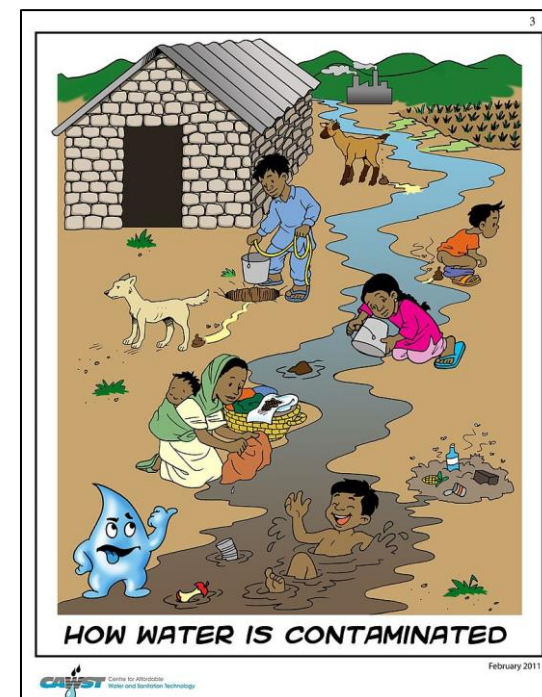
(Ask students to get into groups of 4 and distribute about 50 tiny paper/ thermacol balls in one paper bowl each to every group.)

- For the purpose of this activity, let's assume that every bowl of thermacol balls is a well in a village. The thermacol balls represent the water in this well.
- You're all in groups of 4, but for now I want every group to select one member from their group to hold this bowl. Now when I say start, I want that member to start taking out thermacol balls from the bowl one ball at a time and keep them on the side. Do this till the entire bowl is empty. Everyone else in the group just watch. Everyone pay attention to the time it takes to empty the bowl. (give students some time to empty the bowls)
- Now put all the thermacol balls back in the bowl. Repeat this same activity, but now with two members of the group taking out the balls instead of one.
- Now put the balls back and all four members take out balls from the bowl, one ball at a time.
- (the student will take some time to take out all the balls from the bowl when he does it alone, lesser time when they do it in 2s, and much lesser time when all four do it together)

Debrief:

- So will anyone tell me any general observations they had from this activity? (expected answer- when one person was emptying the bowl, it took more time and when more people emptied the bowl it took less time)
- Imagine that every group is the number of people on Earth and the thermacol in the bowls represents the amount of fresh water.
- As people increase, more people use this fresh water and it gets over very quickly. To add to that, not just people, factories, farms, animals and plants also use water.
- Factories and humans often dirty the water by leaving their waste in it. This is known as water pollution which you will learn about later.

- In conclusion, human beings are using up water quickly on one hand and polluting it on the other. It is extremely important that we conserve this precious resource. Before we conclude this activity, I want everyone to take a minute and think about why it is so important to save water.
- Imagine your life where you have to wait in long queues for hours just to get one bucket of water, which is not even enough for everyone. What would happen if there is no clean water for anyone?
- In the next lesson we will study how nature ensures that there is a supply of fresh clean water all over the planet.



Source: [Wikipedia](#)

Section III –Assessment

Quiz

Time: 10 minutes

Materials needed: Blackboard and chalk

Facilitation notes:

- Split class in two groups. The idea of these statements is to spark a conversation around some of the beliefs that people have with respect to water as a resource.
- Mark each group one for the correct answer and zero for the incorrect, no question will get passed onto the other group
 - Mark 'T' if the statement is True and 'F' if the statement is false
 - Useable water is limited on Earth.

- Countries and states often have disputes over using the water of rivers that flow through them.
- Population increase has no impact on water consumption.
- We only need to be concerned about human beings and their requirement of water.
- Even if natural sources of water disappear, we have artificial sources.
- Saline water cannot be used for consumption.

Homework

- Interview your parents on the following questions and transcribe the interview in a question and answer format:
 - How much is the average water bill of our house every month?
 - During which months do we have the highest water consumption in our house? Why?
 - If everyone knows that water is a scarce commodity, why do adults also waste water?

Section IV – Closure

Time: 5 minutes

Note to the teacher: Select a student at random to summarize the key points and learnings of the session.

Recap by a student

Time: 2 minutes

Recap by the teacher

Time: 3 minutes

- All resources when compared to the human desire are limited in quantity. Scarcity of resources impacts people negatively and often leads to conflict. Therefore, we need to be careful about how we use our resources.
- One of the scarcest resources on this face of earth is water, which we take for granted. Water is important for existence of all life on Earth.
- 71% of Earth's surface is covered with water. However out of all the water available on Earth, only 0.006% is safe for consumption.
- Because of scarcity of water, people suffer around the world- they have to walk miles and miles every day to fetch drinking water. We should therefore check our water consumption habits to conserve it.
- As population grows, the rate at which fresh water is being used up is also growing at an alarming rate.

Section V: Additional Resources

Resources for students:

1. Video: Where do we get our fresh water from?

The video explains about the how much water on earth is fit for consumption.

Link: [YouTube](#)

2. Video: Are we running out of clean water?

The video very interestingly explains the situation of the water resources around the world and if there is a chance for us to imbalance them to an extent that we run out of it.

Link: [YouTube](#)

3. Reading: India has world's highest number of people without clean water

The article details the nationwide lack of access to clean water in India.

Link: [NDTV.com](#)

Resources for teachers:

1. Reading: Water Crisis in India

The article gives a very detailed and objective assessment of the water problem in India

Link: [Waterproject.org](#)

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