

How Can I Access Clean Water?

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Purpose Of The Activity:

Yakın çevresindeki veya ülkemizdeki bir çevre problemine ilişkin çözüm üretmek. Kirli suların temizlenmesine yönelik deney yapmak ve gözlemlerini raporlamak.

Theme/Unit:

Reversible and Irreversible Changes

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**CURIOUS
BOX** 





What Do You Know?

- What is clean water? Can you explain the importance of clean water?
- Is groundwater clean?
- Why are clean water sources limited?

**Explain
what you
know!**



**CURIOUS
BOX**

Let's Spark Curiosity!



Let's start exploring!

When we look at photos of Earth taken from space, we see that most of the planet is covered with water. However, the amount of freshwater that living beings need is very limited. Clean water is an essential resource for the sustainability of life. So, where can we access clean water?

For example, let's imagine a 100-square-meter pool and assume its average depth is 2 meters. This pool can hold a total of 200,000 liters of water. If we continuously empty this pool, it can cause serious environmental and economic problems, especially in times when water resources are limited.

So, how can we clean the polluted water around us, just like in the pool example? Shall we explore it together?

Students are asked to take out and examine the activity materials.



The activity video is watched, pausing to check the set content. All steps of opening covers and packages are performed simultaneously with the students. Set Contents Watch the Video by Pausing!



Content Of The Set

- | | |
|---|--|
| <input type="checkbox"/> Experiment tray | <input type="checkbox"/> Clip piece |
| <input type="checkbox"/> Experiment gloves | <input type="checkbox"/> Syringe |
| <input type="checkbox"/> Experiment mat | <input type="checkbox"/> Test tube |
| <input type="checkbox"/> Pot template | <input type="checkbox"/> Transfer spoon |
| <input type="checkbox"/> Beaker | <input type="checkbox"/> Water (not included in the set) |
| <input type="checkbox"/> Precipitating chemical | <input type="checkbox"/> "How Can I Get Clean Water?" |
| <input type="checkbox"/> Clay | experiment report |
| <input type="checkbox"/> Pasteur pipette | |
| <input type="checkbox"/> EVA support | |

How Do We Do It?



Wooden Template Preparation:

First, carefully remove all pieces from the wooden template. Attach the portube's leg pieces in the indicated order.

Portube and Experiment Tray Setup:

Place the experiment tray in front of you. Place the assembled portube onto the experiment tray.

Test Tube Preparation:

Open the test tube cap and attach it to the portube.

Dirty Water Preparation:

Fill the test tube slightly more than halfway with water. Using the transfer spoon, add some clay and soil to the test tube. Close the test tube cap and shake the tube to mix the contents thoroughly.

Chemical Precipitation:

Use the Pasteur pipette to add the precipitating chemical to the dirty water. Wait for a while to allow precipitation. The clay particles will settle at the bottom.

City Template Setup:

While waiting, attach the IV tube to the city template. Thread the clip piece through the designated holes in the city template. Secure the IV tube to the city template using the clip piece.

Filtration Process:

Place the beaker in front of you and insert the filter paper. Slowly pour the precipitated dirty water onto the filter paper. The soil will remain on the filter paper, and the clean water will flow into the beaker.

Clean Water Distribution:

Connect one end of the IV tube to the beaker and the other end to the syringe. Pull the syringe plunger to deliver the filtered clean water to the city template.

What Should Future Scientists Explore?

The following questions are posed to the students:

- How can we prevent the pollution of water sources?
- Why are clean water sources limited?
- What can you do to save water at home?

We are all born in a sea of our own in the womb. Throughout our lives, we need clean water. Water is essential not only for humans but also for all living beings, agriculture, industry, and the healthy functioning of ecosystems. However, the pollution of water sources and the challenges related to access to clean water emphasize the importance of water purification processes. For the water we use in our daily lives to be clean and safe, it must undergo a series of physical, chemical, and biological purification processes, starting from being collected from natural sources. Through these processes, the water is purified from harmful substances, making it drinkable and safely delivered to our homes.

The scarcity of water and drought on Earth are emerging as significant environmental and social issues in many regions. In drought conditions, the shortage of irrigation water can negatively affect agricultural productivity and crop diversity. It can also adversely affect the living standards and economic development of communities.

To solve these problems, water resources need to be managed effectively and sustainably, water efficiency should be increased, climate change must be addressed, and public awareness must be raised.



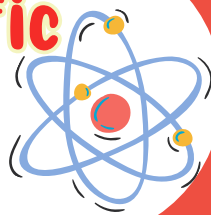
CLEAN WATER

- We should not use fewer chemicals in cleaning.
- We should not throw non-biodegradable waste down the drain.
- We should not throw medical waste into the water.

Did You Know?

Every minute spent in the shower consumes 20 liters of water. The water left running while brushing your teeth amounts to an average of 12 tons per year.

Curious Scientific Explanation



The following questions are posed to the students:

- What stages are involved in water treatment plants?
- From which sources is drinking water obtained?

The cleaning of water and making it suitable for drinking requires a series of special processes. Water treatment processes vary depending on the water source and the intended use. Generally used water treatment methods are as follows:

Physical treatment: In this stage, special grids and screens are used to remove large solid particles present in the water. Additionally, heavy substances like sand and gravel mixed in the water are settled through sand traps.

Chemical treatment: In this stage, chemicals called coagulants are added to the water. These chemicals help the small dissolved or suspended particles in the water to come together and form larger particles.

Filtration: The water is passed through sand and activated carbon filters. The sand filters help to trap small particles in the water, while the activated carbon filters absorb organic matter and some chemicals in the water.

Biological treatment: In this stage, biological filters and the activated sludge process are used, where microorganisms help break down and remove organic pollutants present in the water.

Disinfection: In this step, methods such as chlorination, UV disinfection, or ozonation are applied to kill the microorganisms present in the water.

The relationship between water purity and sustainability is vital for the long-term well-being of both natural systems and human societies. The protection and efficient use of clean water sources are essential requirements for a sustainable future.



What Else Can We Do?



Come on, you
try too!

Dear Teacher,

You observed an experiment related to the sedimentation of soil and clay with future scientists. You could ask your students to prepare scientific evidence and example cases on an environmental issue. This could be a great way to engage them in real-world science and promote critical thinking.

Example Case:

In a lake or river ecosystem, excessive nutrient input into the water may occur due to industrial waste or agricultural fertilizers. In this case, the nutrient balance of the water changes, leading to excessive algal growth. This situation can reduce oxygen levels in the water, creating unsuitable conditions for fish and other aquatic life. As a result, fish populations may decrease, or the risk of extinction for some species may increase.

Empirical Evidence

Numerous studies have shown how physical and chemical factors, such as water pollution and water temperature, affect fish populations in aquatic ecosystems. For example, a study conducted in 2018 revealed that increases in water temperature significantly impacted the distribution and reproductive success of fish species in lakes and rivers (Smith et al., 2018).

Conclusion

With this example, we can see that changes in the physical or biological components of ecosystems have direct impacts on population dynamics and lead to significant consequences for species diversity. Therefore, to maintain the health and balance of ecosystems, these types of changes must be carefully monitored and managed.

What Did We Discover?



"We learned the importance of clean water and what needs to be done for water conservation. We discovered a series of special processes required to clean water and make it suitable for drinking. We observed the biological treatment phase through the experiment we conducted. How did you feel during this activity?"

How can we collect and reuse rainwater in cities?

Question of the Day?

CURIOUS BOX



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