



Solar Still

Grade: 3-4

Time: 10min prep with ongoing observation

Activity Overview :

Welcome wilderness adventurers! Today you are out with your family in the forest, exploring nature and its beauty. You are all setting up your campsite when you realize you forgot to bring the jug of water from home! How are you going to have fresh water now? Do not worry since today, you will learn how to make a solar still. A solar still is a device that purifies water that has dissolved substances in it (impure) by using the sun's rays to evaporate the water. This allows the water to cool and then it collects in the still, becoming purified. This process is known as distillation, which just means making the water clean and fresh to drink. This is a great survival skill to learn!

Materials:

- Clean Glass Jar
- Wide Plastic Bucket or Bowl (It must be taller than the jar)
- Plastic Wrap
- Small Rock
- Large Elastic band or Tape
- Water
- Salt



Don't worry if you don't have all these supplies. Experiment with other everyday items and see what you can make!

Activity:

- 1 Find a sunny spot where your still can receive sunlight almost all day.
- 2 Fill your plastic bowl with $\frac{2}{3}$ water and add a couple of tablespoons of salt until it dissolves in the water.
- 3 Place your clean glass jar in the center of the bowl and push it down. Make sure that none of the saltwater gets into the jar.
- 4 Cover the set up with plastic wrap and make sure to seal it tightly. Then, place a small rock on top of the plastic wrap to weigh it down. Wait several hours, but do not disturb the still.
- 5 Within the waiting period, you should be able to see water droplets on the plastic wrap and them dropping inside the jar.
- 6 Once you notice that there is enough water in the jar, you can remove the wrap.
- 7 Taste the water inside the jar. It should be fresh and not salty!



Engineering and Science Connections

Solar Stills

Today you learned how valuable solar stills can really be. You saw firsthand how the salty water was able to evaporate and become purified. When you drank the water from the jar, you noticed that the water was fresh and not salty. Solar stills are very useful in areas that do not have access to well water, such as in remote areas. They are also very helpful in areas that are prone to hurricanes, where power outages can last a long time. They are vital in helping make sure that everyone has access to clean water.

Engineering and Science Connections

Environmental Engineers

Environmental engineers use scientific subjects such as chemistry and biology to create solutions to help the health of all living things and the environment. They design plans to improve problems such as waste management, water treatment, and air pollution. When you created your solar still, you acted as an environmental engineer. This is because you were able to design and make a system that purified the water.

Distillation and The Water Cycle

Distillation is a chemical process where 2 or more different liquids are separated. Distillation was used today when the sun's energy heated up the water inside the bowl until it evaporated. When the water evaporated, it became vapour and rose to the plastic wrap where it condensed and became water again. It stuck to the top of the plastic and travelled to the center of the wrap, since the rock was weighing it down. There, the water droplets fell inside the glass jar. The process used today resembled the water cycle. This is because when water evaporates, the salt, microorganisms, and other impurities are left behind. This water then rises, condenses, and falls again as fresh rain!

Extensions:

[Add a bit of dirt with the water or use pond water inside the plastic bowl.](#)

Just make sure that you do not get any dirty water inside your glass jar.

[Leave your solar still out for several days.](#)

You can observe more of the evaporation process and end up with a larger amount of water inside your glass jar.

Share your creations!

Don't forget to share your experiments and creations with us! We would love to see what you've made. You can Email us at: esqinfo@uwaterloo.ca or send us a message/tag us on our social media!

Facebook: @uwengoutreach

Twitter: @UWEngOutreach

Instagram: @uwengoutreach

Thanks for exploring, discovering, and learning with us!

3, 2, 1 Done!

3 - Write or draw 3 things you learned from this activity

2 - Write or draw 2 things you found super interesting or cool and want to learn more about

1 - Do you have any questions about the activity? Did something make you wonder...what if? how? or why?