Green Plastic

Grade: 3-4

Time: 30min

Activity Overview :

Have you ever thought about what plastic really is and where it comes from? Today you are going to be biologists and you are going to be making your very own plastic. However, this plastic is not going to be the same as a typical plastic bag, you are going to make plastic that is biodegradable. This means that it will eventually be consumed by bacteria and return to natural compounds in the dirt. It is a more earth friendly way of making plastic, since non biodegradable plastics such as water bottles can take up to 100 years to decompose! You are going to mold your plastic into a plant pot and plant a seed in it. Once the plant is grown, you can place it in the ground outside and let the plastic decompose.

Before we begin think about the following questions:

- How can plastic be turned into other things such as bags?
- Where does plastic go when it is thrown away?
- How can you make something biodegradable?
- What are everyday items that can be switched for bioplastic?

Materials:

- Cornstarch
- Water
- Cooking Oil
- Microwave Safe Container
- Microwave
- Food Colouring (optional)
- Soil
- Plant Seeds

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

Activity:

1. Using a microwave safe container, mix together 1 tablespoon of cornstarch, 1.5 tablespoons of water, and 3-5 drops of cooking oil. Stir the ingredients together until it looks like a milky liquid. * If you want, you can also add 2 drops of food colouring into the container to make your pot coloured.

2. Microwave the contents in the container on high for about 30 seconds. Make sure to watch the container to make sure nothing goes wrong. While microwaving, the mixture should bubble and become transparent.

3. If the mixture looks fairly transparent, take the container out of the microwave. Be careful! The container might be hot.

4. Wait for the mixture to cool down. Knead the plastic mixture until it is soft. Now, you can mold it into a flower pot shape.

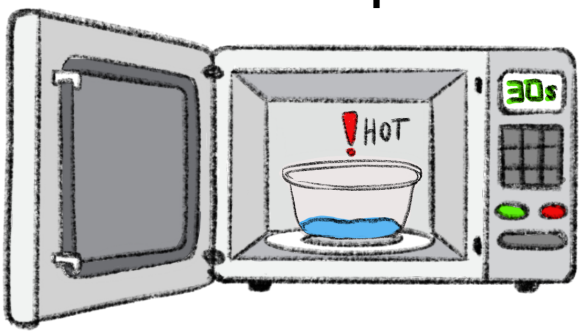
5. Wait 24 hours so that the plastic can harden into the desired shape

6. Add some soil into the flowerpot and plant your seed inside of it. Make sure to give your plant what it requires (water, sun).

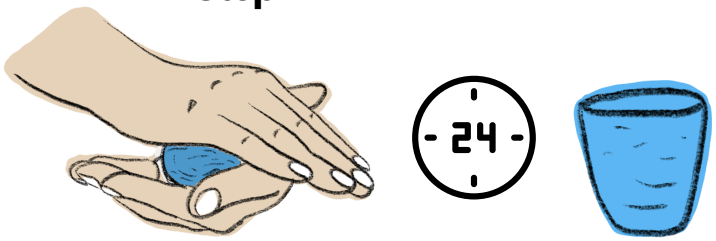
7. Once your plant starts to grow, you can place it outside in the ground to allow your plastic to decompose.

Step 1

Step 2



Step 4



Step 5-6

Engineering and Science Connections

Plastic Pollution

Pollution is the result of when harmful or poisonous substances are added to the environment that we live in. This negatively affects all living things in different areas of their health. There are many different types of pollution, such as air, water, soil, land, plastic, and thermal pollution. Air pollution can make the environment smoky and dusty which can result from factories and vehicles that burn fossil fuels to power themselves. This hurts our lungs when we breathe and can cause other living organisms to die. Plastic pollution is when too much plastic collects in one area, such as in the oceans. This is caused by humans relying on this material too much and because it takes a very long time to decompose. Plastic pollution really harms marine wildlife and we need to reduce our usage of it. Today, you were able to make an alternative to plastic and reduced our pollution.

Biodegradable

Biodegradation is the chemical process of when a substance is broken down by bacteria and other microorganisms into natural compounds. When a substance is biodegradable, it is considered more earth friendly since it decomposes in a short period of time and their elements are deposited back into nature. Things that are biodegradable include foods that are compostable, such as apple cores. Normal plastic bags are not biodegradable and take a really long time to break down. In this activity, you made a biodegradable flower pot that will eventually break down into its elements in the ground.

Bioplastics

When plastic is made by using renewable sources such as vegetable oils, cornstarch, straw, and recycled food, it is considered bioplastic. Bioplastics are considered to be much more environmentally friendly than ordinary plastic since they are made from renewable sources instead of fossil fuels. They are much more likely to biodegrade into the ground and they decompose much faster. Meanwhile, a plastic bottle cap can take up to 400 years to decompose and just sit in the landfill. Bioplastics are the future of all things that use plastic, such as bottles and containers. Biologists and environmental engineers study this area to solve the plastic pollution problem. This activity allowed you to act as a biologist or environmental engineer while experimenting with materials to make your very own bioplastic flowerpot.

Extensions:

Bioplastic Cup

Try making your own bioplastic cup! In a pot, mix 4 tablespoons of cornstarch, 1 teaspoon of vinegar and 1 teaspoon of glycerin. Ask a parent to put the pot onto the stove using medium heat. Make sure they stir continuously until it begins to bubble. They should then turn off the stove and remove the pot from the heat. Ask your parent to pour the substance out onto a level sheet of parchment or aluminum foil. Let the mixture cool for an hour and then shape it into a cup using your hands. Once you are satisfied with your shape, let the cup cool for 24 hours to allow it to harden. After the wait, you have your very own bioplastic cup! You are continuously helping the earth reduce plastic pollution.

- Try using different types of cooking oil (vegetable oil, canola oil, sunflower oil) and observe their different physical characteristics and decomposition progress.
- Be creative and make any kind of shape or toy you would like. Repeat the process above to create bioplastic.
- Notice if the different types of cooking oils affected the plastic. Did one type of oil bioplastic degrade quicker?

Share your creations!

Don't for get 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?