STEM in the lab

Inspiring Idaho's future STEM workforce

PLASTIC SCULPTURES

GRADE LEVELS

This activity is appropriate for grades K-5.

MISSION

Create a flower and vase using nonrecyclable plastics.

VOCABULARY

EARTH DAY: an annual event celebrated around the world on April 22 to demonstrate support for environmental protection.

LANDFILL: place to dispose of refuse and other waste material by burying it and covering it with soil.

RECYCLING: the process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products.

NONRECYCLABLE ITEM: an item that is not able to be processed or treated for reuse in some form.

POLYMER RESIN: a clear liquid plastic product that hardens to create a thick, durable, glossy coating.

MATERIALS

- Any size clear plastic cups, bowls or plates (look for recycling code 6)
- Permanent marker
- Pipe cleaners
- Glue gun
- Scissors
- Empty plastic water bottle to display finished flowers

ABOUT THIS ACTIVITY

In America, 2 ½ million plastic bottles are used each hour. Since plastic bottles are designed to be disposed after one use, these bottles will eventually end up in the local landfill. Some of these plastic bottles also find their way to our oceans. Plastic bottles are among the most common sources of ocean debris. Plastic bottles in the ocean can be easily mistaken as a source of food, which can be dangerous for local marine life.

There are many ways to keep plastic out of our landfills and oceans. Recycling is a process where used materials can be converted into new materials. Rather than throwing items away, many can be reused in the future. Recycling codes can be found on the bottom of plastic containers. Depending on what code they have on their labels, different plastic bottles can be recycled in different ways. Learning how to identify the difference between plastics can help you recycle them properly. Most bottles and jugs are #1 plastic (PET) or #2 plastic (HDPE), which are both accepted by most curbside recycling programs. Another way to recycle plastic water bottles is to turn them into craft projects. In this activity, you will create beautiful flowers out of nonrecyclable plastics and then use a plastic bottle as a vase for your flowers.

INSTRUCTIONS

Before you begin, read ***The Adventures of a Plastic Bottle*** by Alison Inches. This book is a fun way to introduce the process of recycling plastic bottles to children.

1. Preheat the oven to 350 ºF.

2. Look around your house for used polystyrene (Styrofoam) or clear plastic bowls, cups, or plates. Sometimes eggs come in polystyrene containers as well. Most plastic bottles can be recycled, but some plastics cannot. Plastics with code 6, known as polystyrene, are one of these types. This project will reuse polystyrene to create flowers. Make sure that whatever material you use is clean and dry before coloring.

3. Color your plates, cups, and bowls with permanent marker. Color the plastic as completely as possible, especially in the very center because that's where the glue to hold the stem goes. The glue will show if you don't color that part.

4. Carefully, cut slits in the sides of the plastic using scissors. From the top of the plastic, cut 1 to 2 inches down into the plastic. The slits will make the petals of the flowers.

5. Cut off pieces of colored plastic to add to your flower for extra layers.

6. Place plastic pieces on a foil covered baking sheet and bake for 2 to 5 minutes. Be sure to watch your pieces in the oven, both because it's cool to see them melt and curl up, and also to make sure you don't leave them in too long. Additionally, it is also a good idea to put the fan on or open a window for ventilation because melting plastic can get a little smelly.

7. Let the plastic cool, then use a hot glue gun to attach your pipe cleaner to the back center of the newly made plastic flower. This is where you can also glue on an additional pieces of plastic that you want to add to the flower.

8. Add the finished flowers to your water bottle to display them on Earth Day or any day!

THE SCIENCE BEHIND IT

This fun recycling project works because of the characteristics of the plastic in the cups and plates. The heat of the oven changes the alignment of the polymer chains within the plastic. When manufacturers make the plastic cups, plates, and bowls, a polymer resin is heated, extruded, rolled into flat sheets and then molded. This process aligns the polymers into an orderly pattern, but the heat of the oven returns them to their naturally disordered, clumped state.

The placement of the cuts defines how they crumple. Plastic with code 6 works well in this project because its melting point can be reached in the ovens we have in our homes. This plastic also works well because most recycling centers will not accept them for recycling.

EXTENSIONS

- What do you think impacts the final shape of the flower? Form a hypothesis, then try varying the number and size of the cuts as well as the time in the oven. Did the results match your hypothesis? Form your conclusion.
- What other items can you make out of the plastic items? Could you make animals?
- What would happen if you changed the temperature of the oven?
- What would happen if you changed the type of plastic?
- Would this work with other kinds of markers? Why or why not? Test it to be sure.

RESOURCES

- **How to Recycle Plastic Bottles & Jugs:**
  https://earth911.com/recycling-guide/how-to-recycle-plastic-jugs-bottles/
- **Which Plastic is Which Shrinking Cup Experiment:**
  https://leftbraincraftbrain.com/plastics-shrinking-cup-experiment/

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