



**Lesson Plan  
Suggestions –  
Middle School/  
Junior High**

# Helpful Links

50+ activities, divided by subject area (history, math, science), to engage students and teach environmental awareness [found here](#)

EPA's list of lesson plans, activity guides, and other online environmental resources, divided into sections like air, climate change, ecosystems, energy, health, waste, and water [found here](#)

NEEF's list of activities and resources for any lesson or subject area imaginable [found here](#)

This resource from NEEF has lesson plans for activities in gardening, geography, water resources, math, energy efficiency, weather, and climate: [Greening STEM Toolkit](#)

National Geographic's lesson plan database has tons of well-designed activities that fit in an entire class period: [right here](#)

[Environmental Education Games](#)

## **For Science Classes:**

### **Natural Disasters and Climate Change**

Students use maps and graphs to understand how the frequency of billion-dollar natural disaster events has changed over time. They analyze how climate change affected the 2017 California wildfires and the flooding from Hurricane Harvey.

### **The Greenhouse Effect**

Students consider what happens when there is more carbon than usual in the atmosphere. They then model the greenhouse effect of Earth's atmosphere through a hands-on experiment. Finally, students deepen their understanding of the greenhouse effect by watching a short video and undertaking a reading and reflection activity.

### **Our Footprints**

Students conduct a carbon footprint audit by examining their personal carbon consumption. Next, students perform research to explain how such personal habits impact carbon consumption. Finally, students generate a collaborative list of strategies to reduce their carbon footprint on an individual and group level.

# For Engineering Classes:

## Build a Water Filter

Materials needed: 'polluted' water, coffee filters, sand, pebbles, sponges, cloth, paper, used plastic water bottles, and any other methods of filtration you can think of! (optional: charcoal), to make 'polluted' water: take a bucket of water, mix in soil from outside.

Have students watch [Water Pollution](#) and [Why Care About Water?](#), Ask students: Why is water such an important resource? Why is it so scarce in some places? How do you know that the water you drink is clean? What should clean water look like? What should it taste like?

After discussion, point out that different things need to be taken out of the water before it is drinkable. First sediment and other suspended particles, and then microorganisms and bacteria.

Have students work in groups to brainstorm different ways to get suspended particles and bacteria out of the water, have them write down their ideas and present these to the class.

Give each group of students their materials and tell them to brainstorm and draw a diagram of how they could make a filter using just these materials.

Have students make their water filters, and once all groups are finished pour the dirty water into each filter,

compare each group's water clarity. Point out how hard it is to filter just suspended particles, and how important clean water is to humans and how some people do not have access to this clean water.

## Upcycle: Design a bird feeder with household trash

**Materials:** Have teachers and parents donate any kind of durable household trash: Cans, plastic bottles, plastic bags, old toys, unused building materials such as PVC pipes and mesh (Optional: bird seed).

Have students go through engineering design process to build their bird feeders.

**Find the problem:** Discuss with students that household trash builds up in landfills, and in landfills this trash decomposes even slower than usual because of the airtight nature of landfills, plus it takes up a lot of space and energy to maintain a landfill! Tell them that when we reuse items that would usually go in the trash, we are helping the environment by keeping this trash out of the landfills and making sure that new items don't have to be made (making new stuff like a plastic water bottle uses natural resources and energy, often causing pollution as the byproduct of creating this energy in power plants). So, the students will be solving this problem through reusing everyday trash to make a birdfeeder.

**Research:** Have students research what bird feeders generally look like and write down these common characteristics. Have a couple of students read what they wrote aloud, and discuss with the class to see if they agree with these common characteristics.

**Discuss limitations:** What does this bird feeder need to be able to do? What does it need to have so that birds can use it? Have students write these limitations on the bird feeder down. If they are stuck, give some examples: It needs to be able to support the weight of at least 2 birds. It needs to be able to be off the ground (either on a tree or on a pole). It needs to hold bird seed without it falling out.

**Brainstorm Solutions:** Have students look at the materials available, if there are many unique materials, have students pick out a few now (If there are not, they can get their materials later). Then, either in groups or individually, have them draw out 3 different designs that they think would work. Have students write down at least 1 pro and 1 con for each of their designs, and then choose their final design based on these pros and cons.

**Design Prototype:** Have the groups/individual students design their prototype based on the final design they chose in the brainstorming phase.

**Test Prototype:** Have students take their designs home to hang up or hang them up around the school, watch how they hold up over time!