



Nature-Watch Activity Kit

Eco-Solutions

(Nature Watch Kit #109)

Kit Contents

<u>Item:</u>	<u>Qty</u>
Paper Screens	5
Sponges	4
Aluminum Trays	2
Book about Ecology	1
Sample Project	1
Instructor Manual	1

Additional Items Needed:

- Various pieces of trash paper, such as junk mail, newspapers, or magazines
- Buckets
- Paper Cups

Next Generation Science Standards Alignment

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem solutions.

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

STEM Extensions

Science

- Do a simple experiment with an air pollution detector to find out what's in the air around you. Spread a thin layer of petroleum jelly on a piece of wax paper and hang the paper somewhere outside. Try hanging multiple detectors in different places where the impacts on the air may be different (and label the papers so you know which is which later). The next day, collect the detectors and take a close look at them with a magnifying glass. Compare what you see on the different detectors and discuss where it might come from. Put the detectors back out for a week to see what collects on them.
- Simulate how water pollution in one place can affect multiple water bodies. Use an egg carton to represent interconnected waterways, with each egg hollow as a water body like rivers, lakes, seas, etc. Pour water in to fill all the egg hollows. Add a "pollutant" to one spot – try a spice that is easily seen like cumin or paprika, adding a heaping spoonful. Add another pollutant elsewhere – red food coloring is Conduct a demonstration comparing an insulated house to an uninsulated one. Fill two jars with the same amount of hot tap water. Place a thermometer in each jar and

This Nature Watch Activity Kit contains an Instructor Manual and materials to implement the curriculum. The kit was designed to be used with adult supervision only. Unsupervised use is not recommended.

- record the starting temperature. Place one of the jars inside a box, surround it with shredded newspaper, and close the lid. This jar represents the insulated house. The other jar, the uninsulated house, should be left as-is. Check the temperatures of each jar every 10 minutes for 60 minutes and record them. Compare the insulated house with the uninsulated house.

Technology

- Create an infographic about one of the environmental issues presented in the activity kit. Take a look at some infographics online to get an idea for the style and purpose of an infographic. Then, use the information from the activity kit and beyond to create one that will help others learn about the issue.
- Aerial images of deforested areas can be a striking symbol of the urgency of the issue of deforestation. Find several photos that show deforestation's impact and share them with the community. Choose a PowerPoint presentation, a Prezi, or another digital method to present them.
- Get in touch with students in another country across the globe. Using video conferencing or other technology, talk to them to learn about the ecosystems where they live and the threats to those ecosystems. Tell them about the environmental issues in your region.

Engineering

- (Younger) Find pictures or diagrams of alternative energy devices (for solar, biomass, wind, or geothermal). What parts do they consist of? How do you think they work?
- (Older) Hold an alternative energy debate. Students should get into small groups and each group will choose an alternative energy strategy (solar, biomass, wind, or geothermal). Each group will present how their alternative energy strategy works and will explain the devices needed to convert the energy source into usable energy. Then they will have a chance to debate each other about which is the best option for their location.
- Go online to read about the Great Pacific Garbage Patch. There are multiple ideas about how to clean it up. What kinds of devices do people think could be helpful there?

Math

- When measuring biodiversity, scientists take into account *species richness* (the number of species present in an area) and *species evenness* (how equal the number of individuals is across species, with the most evenness happening when all species have the same number of individuals in the population). Using your choice of subjects – actual animals and/plants in the wild, plastic toy animals, printed pictures of animals, etc. – determine the species richness and species evenness. Count the number of kinds of species and record the species and the number. Then, count and record the number of individuals present for each species. Do the same for another area (or set of plastic toy animals or set of printed pictures of animals, etc.) and compare the two. Which set has more species richness? Which set has more species evenness?
- A dripping faucet can lead to lots of wasted water. Find out how much by setting a bucket in the sink and allowing the faucet to drip slowly into it. After one hour, use a measuring cup to check how much water dripped. Record your data. Repeat the test, checking the water after 24 hours. Do the 24-hour test five times and get an average amount of water dripping. Then, use that average to calculate how much water would drip in one week, one month, and one year. Are you convinced that fixing leaking faucets is worth it? (Don't just dump out the water from your bucket – use it to water your plants or some other purpose!)