



New Physical Science Curriculum for youth in grades K-2

Be a 4-H Scientist! Materials in a Green, Clean World

Developed by: A partnership between the University of Minnesota Center for Sustainable Polymers, University of Minnesota Extension Center for Youth Development, University of California Agriculture and Natural Resources, Cornell (NY) University Cooperative Extension, and *SciGirls*. This work is supported by the National Science Foundation (NSF) under the Center for Sustainable Polymers CHE-1901635.

Target Audience: Youth in grades K-2 (5 to 8 year olds) **Free download at:** www.4hpolymers.org

Be a 4-H Scientist! Materials in a Green, Clean World

is an inquiry-based science curriculum focusing on the following concepts: materials; plastics; the three R's: Reduce, Reuse, Recycle; the work of scientists and engineers. The curriculum is designed to build foundational skills of science and engineering: observation, asking questions, sorting and classifying, and communicating. The curriculum contains six learning modules offering eight hours of hands-on learning (plus ideas to extend the learning if desired). It is intended for delivery in out-of-school time, facilitated by an educator (trained volunteers or program staff). Modules also include a "Science At Home" activity page, for the child and parents/other adults to work on together.

Modules:

1. Engaging Youth as Scientists and Engineers (3 activities, Total lesson time: 60-80 minutes)

Children are encouraged to use their senses and wonder about the world around them using mystery boxes and hydrogel crystals. They learn that they are using the same skills scientists and engineers use every day!

2. The Many Properties of Materials (2 activities, Total lesson time: 95-145 minutes)

Every item and object we encounter is made of a material, and each material has a different set of properties. Using commonly found items, children categorize materials based on properties and then complete a series of challenges to select the appropriate materials to solve a problem.

3. Plastics in Your World (2 activities, Total lesson time: 55-85 minutes)

Plastic and plastic products are abundant in our world. In this module, children learn about the different types of plastic and their uses. After familiarizing themselves with the many types of plastic items, children explore different methods of plastic disposal.

4. Reuse, Recycle, Reduce (2 activities, Total lesson time: 45-80 minutes)

Using the techniques of real-life recycling facilities, children sort and separate different materials. They will review the different properties learned in Module 2 to sort these materials.

5. Renewable vs. Nonrenewable (2 activities, Total lesson time: 40-60 minutes)

After learning about the difference between "renewable" and "nonrenewable," children play a game in which they mine for resources. They will discover the difference when some materials replenish while others do not.

6. Scientists and Engineers (3 activities, Total lesson time: 65-80 minutes)



Children learn about scientists and engineers through reading selected books aloud and further exploring how

they have acted as scientists and engineers. Then they make their own stories featuring a scientist or engineer — and in one option, the children are the scientists in their story!

Supplies:

Activities use inexpensive and easy-to-obtain supplies. A materials list is provided. A kit including some of the materials, including children’s literature used in the modules, may be provided.

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