	STEM Committee **Michigan Crossroads Council**	**Name:**	
	Supernova Activity Topic: Science **Environmental Science:** **New Things From Old**	**Troop:**	**Date:**

Supernova Activity Topic: Science

If you are fascinated by how things work and you want to help contribute to a better planet Earth, the Supernova activity topic choices for science give you a hands-on chance to:

- Reduce your environmental impact on Earth.
- Explore the wonders of space technology.
- See why carbonation and candy create an explosive experiment.

Choose any *one* of these activities and discover how it drives your imagination, your curiosity, and your fascination with science.

Environmental Science: New Things From Old

This activity can be done individually or in a group. Your task is to investigate the logistics and environmental value of recycling and repurposing used items into new products and to invent a product that is predominantly made from used item(s).

Part 1: Research

1. Find two products made primarily from recycled materials. Describe the recycling process and the production process for each of these products. Discuss with your mentor:

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A. The impact of these recycled products on the environment compared with the impact of the same products made with all-new materials

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B. The environmental impact of the two products regarding pollution control and remediation, such as hazardous byproducts in the air, water, and waste

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C. The environmental impact of the two products regarding resource conservation and management, such as animal life, plant life, water, fuel, and protected lands/sites

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D. The environmental impact of the two products regarding production infrastructure, such as land use, municipal planning, transportation, and energy

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Part 2: Product Invention and Report

1. Develop your own design for a product that can be made by recycling or repurposing other items. The items being recycled or repurposed should form the bulk of the new product. For instance, avoid designs that are 5 percent recycled and 95 percent new materials. Use ONE of the following two approaches.

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A. Find an item that isn't environmentally friendly, doesn't break down easily, and is typically thrown away. Invent a new product that would repurpose that item. The recycling of tires into road surfacing material and into playground mulch is an example of this approach.

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B. Think of an often-used product that is typically made with all-new materials. Develop a way to make that product out of recycled or repurposed materials. (The production of paper grocery bags made from recycled paper instead of "new" paper is an example of this approach.)

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2. Summarize design specifications of the product you invented for requirement 1, and create a drawing, model, or prototype. What resources would be needed to carry out a large-scale production of your invention? Speculate on the environmental impact of using your product over a comparable product made with all-new materials. Create a report that includes your design specifications, photos or illustrations, a summary of how your product can be mass produced, and a case for the environmental soundness of your product.

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Supernova Mentor: _____ Date: _____

Resources

Theodore Gray. *Theo Gray's Mad Science: Experiments You Can Do at Home- But Probably Shouldn't.* Black Dog & Leventhal Publishers, 2011. Susan Casey. Kids Inventing! A Handbook for Young Inventors (for younger youth). Jossey-Bass, 2005.
Russel Gehrke. Recycling Projects for the Evil Genius (lots of how-tos). McGraw-Hill/ TAB Electronics, 2010.
Garth Johnson. 1000 Ideas for Creative Reuse: Remake, Restyle, Recycle, Renew (pretty pictures, good inspiration, no how-tos). Quarry Books, 2009.
Robert Bruce Thompson. *Illustrated Guide to Home Chemistry Experiments: All Lab, No Lecture.* O'Reilly Media, 2008.