

## MATERIALS

- blank paper ( for sketching ideas)
- pencils
- scissors
- glue
- masking tape and/or staplers
- assortment of recycled materials

## RESOURCES

Museum of International Folk Art - *Creating in Plastic Land / Rivers of Plastic*

[https://www.youtube.com/playlist?list=PL-Dx1Qh-1temOpmoi1Ju1Mn8dhlLcTx\\_J](https://www.youtube.com/playlist?list=PL-Dx1Qh-1temOpmoi1Ju1Mn8dhlLcTx_J)

## NEXT GENERATION SCIENCE

### STANDARDS (NGSS) LINKS:

- 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

## NATIONAL VISUAL ARTS

### STANDARDS

- **Creating:** Conceiving and developing new artistic ideas and work.
- **Presenting:** Interpreting and sharing artistic work.
- **Responding:** Understanding and evaluating how the arts convey meaning.
- **Connecting:** Relating artistic ideas and work with personal meaning and external context.



Aymar Ccopacatty (Aymara), *Community Through Making: From Peru to New Mexico*, 2018. Photo by Chloe Accardi.

## S.T.E.A.M. Design Challenge: Non-Biodegradable Trash

*"You cannot get through a single day without having an impact on the world around you. What you do makes a difference and you have to decide what kind of difference you want to make."*

*- Jane Goodall*

## INTRODUCTION

Explore how artists and nature recycle. Utilize design thinking and engineering skills to address the abundance of non-biodegradable waste in your home, school and community.

## OBJECTIVES

- Understand the many ways nature recycles and how that natural process has inspired artists, scientists and engineers throughout the ages (historical and cultural understanding).
- Observe designs, structure, form and function in folk art and in botany to make recycling connections between these two worlds (perceiving, analyzing and responding).
- Design and repurpose discarded non-biodegradable materials that don't decompose into a useful object that can bring awareness to the problem of too much trash by creating a solution to address a human need (creating and performing).

## Non-Biodegradable Trash Design Challenge

Create a useful object or gift using discarded non-biodegradable materials.

What is a problem in your classroom or at your home that you could creatively use trash to solve?

You must use objects that would otherwise be thrown away.

### Limitations

- Create a written design plan individually or with classmates.
- Use only collected non-biodegradable plastics, discarded wire, string, zip ties, cloth, or other plastic, like food containers, to solve your home or classroom problem.
- Final product must be something you are proud of and will use, or gift to someone.

### Procedure

1. **Defining the Problem:** At your working table, describe in a sentence or two what your problem, need or want, is on the Design Challenge Worksheet. You may wish to collaborate with classmates.
2. **Develop a Solution:** What type of trash would you use to solve this problem? What can you do with the plastic and how can you: reduce, reuse, recycle, repurpose, or upcycle the plastic? Create a written design plan individually or with classmates. Have plan approved by Educator before proceeding. (Use the worksheet on page 4.)
3. **Prototype Design:** Using discarded non-biodegradable plastic, wire, string, zip ties, or other plastic, students create a useful object or a gift for someone that addresses their identified problem and solution.
4. **Test Design:** Make sure designed object works, or is holding together; consider aesthetics, how it will look.
5. **Revise:** On-going revising and tweaking; make adjustments to design.
6. **Present:** Students share their completed designed object with whole class or small group to create awareness of the possibilities of how to repurpose trash.

### EVALUATION

- Have students share their work, reflecting on how nature recycles and how folk artists from around the world are inspired to reduce, reuse, repurpose/upcycle human made materials to bring awareness to the problem of too much trash.
- They can discuss challenges and lessons learned while designing their non-biodegradable trash project. What additional designs could they create? What additional tools or materials would have been helpful to use in the process? Having had this experience, how would students approach this problem differently?



## EXTENSIONS & CONNECTIONS

- Students can begin to look at connections between nature and folk art and keep a journal for writing and sketching, noticing how recycled and repurposed art can shape healthy, vibrant communities, and change how they can make a difference to change the way they consume in their everyday lives.
- Think about, research and discuss in a group what professions use science, technology, engineering, art, math (S.T.E.A.M.) to combat climate change.

## VOCABULARY

1. **Advocacy:** the act or process of supporting a cause or proposal; the act or process of advocating something.
2. **Aesthetics:** the branch of philosophy dealing with such notions as the beautiful, the ugly, the sublime, the comic, etc., as applicable to the fine arts, with a view to establishing the meaning and validity of critical judgments concerning works of art, and the principles underlying or justifying such judgments.
3. **Climate Resilience:** making choices and adaptations to climate change that have a positive impact on well-being, i.e., hopeful vs. helpless, active vs. passive.
4. **Compost:** decayed organic material used as a plant fertilizer.
5. **Decomposition:** the state or process of rotting; decay.
6. **Design Thinking:** refers to creative strategies designers use during the process of designing.
7. **Climate Change:** a change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels. Climate change occurs when changes in Earth's climate system result in new weather patterns that remain in place for an extended period of time. This length of time can be as short as a few decades to as long as millions of years.
8. **Eco-Friendly:** not harmful to the environment.
9. **Sustainability:** avoidance of the depletion of natural resources in order to maintain an ecological balance
10. **Sustainability:** avoidance of the depletion of natural resources in order to maintain an ecological balance.
11. **Environmental Justice:** is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
12. **Environmental Justice:** is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
13. **Landfill:** a place to dispose of refuse and other wastematerial by burying it and covering it over with soil, especially as a method of filling in or extending usable land.
14. **Non-biodegradable:** (of a substance or object) not capable of being decomposed by bacteria or other living organisms. Human made items that do not decay or break down by living organisms, like plastics, which are made of oil, a non-renewable resource.
15. **Recycle:** convert (waste) into reusable material. Paper and cardboard containers reduces waste by up to 27% and saves trees! Avoid non-recyclables, like Styrofoam and packaging without codes.
16. **Reduce:** make smaller or less in amount, degree, or size. Energy use, like using energy saving light bulbs (LED's), which can cut emissions by up to 10%.
17. **Repurpose:** adapt for use in a different purpose; like clothing and other items into newly imaginative designed wearable or useful products, like the "No-Sew T-Shirt" project.
18. **Reuse:** use again or more than once. Don't throw it; upcycle it! Over 90% of plastics and metals in mobile phones and batteries can be reused in new products. Refill your own drink bottle using a stainless steel or BPA-free bottle.

## Design Challenge - What Will We Do With All This Trash?

**Trash Problem:** We are throwing away too much trash.

**Human Problem:** What is a problem in your classroom or at your home that you could creatively use trash to solve? You must use objects that would otherwise be thrown away.

Ideas to consider. I need \_\_\_\_\_

- Storage
- Toys for home or the playground
- Comfortable cushion for a chair
- Backpacks
- Games to play with friends
- Art to make it more beautiful
- A cover to protect you from sun or rain
- Anything else you can imagine!

Define this problem in a sentence or two:

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What type of trash would you use to solve this problem? What other materials would you need?

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Use the space below to make a plan describing what materials you need and how you will build the solution using trash.

## Community through Making: From Peru to New Mexico

During the spring and summer of 2018, the Museum of International Folk Art hosted three groups of artists and activists from Peru in conjunction with the exhibition *Crafting Memory: The Art of Community in Peru*. During these 10-day residencies, they worked with groups of local artists to explore how art shapes healthy and vibrant communities.

*Rivers of Plastic* brings together sculptors Aymar Ccopacatty and Nora Naranjo Morse, who both see their home landscapes being transformed by plastic waste and use sculpture to open conversations about this intrusive and persistent material.

### About the Collaboration

The collaboration paired sculptors Aymar Ccopacatty (Aymara) and Nora Naranjo Morse (Santa Clara Pueblo) with the theme *Rivers of Plastic*. Both artists utilize non-biodegradable trash with art traditions learned through their families; textiles for Ccopacatty and clay for Naranjo Morse. Both see their home landscapes being transformed by plastic waste and use sculpture to open conversations about this intrusive and persistent material.



Nora Naranjo Morse and Aymar Ccopacatty, 2018 Photographer: Chloe Accardi

### Rivers of Plastic: Trash Loom

Santa Fe has banned plastic bags, but there is plenty of plastic still to be found. Aymar Ccopacatty created this loom and trash weaving with discarded materials collected around town. Wooden pallets form the heddles, which move on a pulley to lift half of the warp strings at a time. The warp strings are made of shrink-wrap that he collected from Albertson's grocery store - this plastic was wrapped around one morning's deliveries. The colorful weft is plastic decoration from 2018's International Folk Art Market. You can also see clear produce bags, blue New York Times bags, and various packaging that came from the homes of museum staff and volunteers.



Aymar Ccopacatty's trash loom at MOIFA during the Arts Alive program, August 2nd 2018 Photographer: Chloe Accardi

### Creating in Plastic Land

Artists and community working with plastic and discarded material, including material from the International Folk Art Market. Programs in conjunction with the 'Community Through Making: From Peru to New Mexico' exhibition.

Creating in Plastic Land Program - Fall 2019. Collaboration with Kha'p'o Community School, Santa Clara Pueblo, New Mexico.

Find the videos' link on page 6 to view students' work and learn more about the collaboration.

## BIBLIOGRAPHY

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## CHILDREN'S BOOKS

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## VIDEOS

Museum of International Folk Art - *Creating in Plastic Land / Rivers of Plastic*  
[https://www.youtube.com/playlist?list=PL-Dx1Qh-1temOpmoi1Ju1Mn8dhlLCtX\\_J](https://www.youtube.com/playlist?list=PL-Dx1Qh-1temOpmoi1Ju1Mn8dhlLCtX_J)

## WEBSITES

*Community Through Making*, 3D Exhibition  
<https://fivedmedia.com/3dmodel/gallery-of-conscience-community-through-making/skinned/>

City of Santa Fe trash & recycling  
[www.santafecountynm.gov/public](http://www.santafecountynm.gov/public)

Climate Strike New Mexico [www.climatestrikenm.org](http://www.climatestrikenm.org)

Earthcare Youth Allies - [www.earthcarenm.org](http://www.earthcarenm.org)

4ocean we're - [www.4ocean.com](http://www.4ocean.com)

Ecowatch - [www.ecowatch.com](http://www.ecowatch.com)

Fair World Project - [www.fairworldproject.org](http://www.fairworldproject.org)

Greenpeace - [www.greenpeace.org/usa](http://www.greenpeace.org/usa)

NRDC (National Resources Defense Council)  
[www.nrdc.org](http://www.nrdc.org)

Sierra Club - [www.sierraclub.org](http://www.sierraclub.org)