



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at www.projectexploration.org/stemathome.

In this activity, you will:

Learn about ancient structures built by engineers, and then build your own!



Supplies Required:

- Aluminum foil
- Large and small paper or plastic cups
- Craft sticks
- Scotch tape
- Marbles
- 1 liter of water

Video

Watch the demonstration of the activity: <https://tinyurl.com/yafffr53>

2,000 year old structures can still be admired today. Civil Engineers design, construct and maintain for natural built environments including public works such as roads, bridges, canals, sewerage systems, pipelines and systems for water supply. In the read aloud Inca Engineering, you learn about the Inca an ancient/old powerful civilization, with lots of land and impressive engineering features- a part or quality of something, the face of something. For example, they built roads to connect their large empire. The Inca also built irrigation systems, which create an artificial supply of water to land. Since the Inca built their fields into the sides of mountains, they had to get very creative! They used gravity to help get the water where they wanted it! Today you will build a model of a terraced (raised piece of land) irrigation system (powered entirely by gravity) that uses flowing water to transport plastic beads or marbles. Beads or marbles must start at the top layer and must flow through each lower layer until they are trapped in the bottom layer.



Instructions

1. Choose an area where it's okay if you spill water
2. You must use all materials to build your machine
3. There are no restrictions on the exact shape of each layer, but EACH LAYER must be at least 1 cm deep
4. VERY IMPORTANT: the bottom of each layer must be above top of the next layer, as shown in the video
5. Follow the guidelines given in the video and begin to build
6. Many designs will work, so be creative
7. Test your design: start by pouring water only from the top-most layer, and add your beads or marbles
8. If your design doesn't work, make improvements and try again
9. All beads/marbles must start at the top and rest at the bottom, but should not fall out of the machine

Why do you think the Inca chose this design? What was successful about your design and what needed to be changed? What are other things that have been built where an engineering needed to be creative?

Additional Resources

1. Banaue Rice Terrace, learn more: <https://tinyurl.com/ybd5yee6>
2. Learn more about irrigation systems: <https://tinyurl.com/y82xqs3t>

Share It Out

Share on social media: Record a video or take a picture of your activity and post the results online using the hashtags:

#Irrigation
#ProjectExploration
#StemAtHome

Tag a friend and challenge them to do it, too!

For more activities like this one, go to www.projectexploration.org/stemhome. If you're interested in learning more about Project Exploration and our free events, programs, and activities, please find us on social media and be sure to follow!



Call or text us for help: 312-772-6634

www.projectexploration.org