

STEAM Activity: Will Your Country Stand?

Type of Teacher Tool: Small Group

Targeted Grade Level(s): 5-8

Targeted Curriculum Areas: Earth Science

Learning Objectives:

The learner will:

1. create a structure to withstand an “earthquake” using basic engineering and design principles.
2. test the structure and redesign to improve the structure.
3. research a country and paint the structure in colors of the selected country.

Featured National Standards:

1. CCSS.ELA-LITERACY.RST.6-8.3
Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
2. ISTE National Technology Standards 3d—Students build knowledge by actively exploring real world issues and problems, developing ideas and theories and pursuing answers and solutions
3. ISTE 4a—Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems
4. ETS1.C: Optimizing the Design Solution

Missouri Social Studies Standards

GLE/COMPONENT 5EGT.Aa

Use geographic sources to acquire information, answer questions and solve problems.

National Core Arts Standard Visual Art

VA:Cr2.3.7a

1. Apply visual organizational strategies to design and produce a work of art, design, or media that clearly communicates information.

Additional State and National Standards related to the content of our videos listed below for this lesson are also provided on the Educate.Today page where you find the video.

Resources/Materials Needed:

1. Geology 3: The Science Behind Earthquakes 1
2. Geology 2: The Science Behind Earthquakes 2
3. Building Materials: cardboard base, straws, paper clips, string, pins per group

4. Sand bag (200 grams) per group
5. Various types and colors of paint and brushes.
6. The following Educate. Today videos:
 - Sample Video-116: Flag and Location of Argentina
 - Geography-10: Flag and Location of Mongolia
 - Geography-12: Flag and Location of France
 - Geography-13: Flag and Location of Denmark
 - Geography-14: Flag and Location of Germany
 - Geography-15: Flag and Location of Italy
 - Geography-16: Flag and Location of Argentina
 - Geography-17: Flag and Location of Russia
 - Geography-18: Flag and Location of Brazil
 - Geography-19: Flag and Location of Mali

Teacher Instructions:

1. Watch one of the Geology videos and discuss what happens to buildings when an earthquake occurs.
2. Divide the class into small groups. Some groups should research techniques engineers use to make buildings stronger in earthquakes and others should scan the Geography videos and pick a country they will represent with their building.
3. Set out the design problem: Small groups must build a structure on the base. It must be at least 36 cm. tall and have at least 2 stories that are at least 18 cm. tall. The structure must support the weight of the sand bag, and survive the shaking for 10 seconds.
4. Give the groups access to paints and instruct them to design and paint the building to represent their chosen country.
5. Have the same person in the classroom do all the “shakes” to be a fair test. Test the structures and rebuild if a part needs repairing. Then test again.

Extension Activity Options:

1. Test with different sizes, like 18 cm. tall and 9 cm. tall stories.
2. Have the students dress in colors to represent the country.
3. Have the students conduct the earthquake in an art and a physics class.

Assessment/Evaluation Options:

1. Check that the students have built the structure per the requirements in #3 above.
2. Check that the structure supports the weight of the sandbag
3. Check that if part of the structure needs repairs after the first shake, that the group makes changes.
4. Check if the structure survived the “earthquake.”
5. On a scale of 1-10 rate the buildings visual impact in the use of color, line, and balance in representing the chosen country.