

Engineer a Floating House

Ages 8 – 14 Design a floating base that will keep a model house safe in a flood.

Prep Time: 10 minutes ▪ **Activity Time:** 30 – 60 minutes

Materials:

Provide at least three building materials from the list below and/or recycle supplies from around your home. Water-resistant materials are easiest to redesign and use in multiple tests.

Suggested for building:

- Aluminum foil
- Balloons
- Clothespins
- Foam egg cartons
- Hot glue/duct tape (waterproof adhesive)
- Pipe cleaners
- Plastic bottle caps
- Plastic sandwich bags
- Plastic wrap
- Popsicle sticks
- Rubber bands
- Straws
- String
- Toothpicks

For testing:

- Container filled with 1-2" of water (plastic tub, large bowl, sink, bathtub, etc.)
- Hand towel



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Scenario

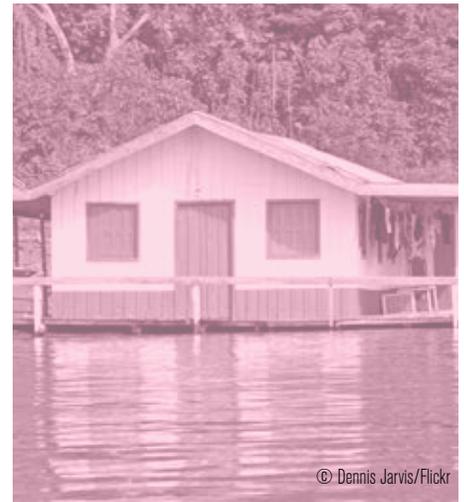
Too much rain can cause a flood. Creative problem solvers, known as engineers, are working to design a new kind of foundation (the base of a house) that floats when water levels rise too high.

In this experiment—you're the engineer! Design a foundation that keeps your house above the water during a flood.

Instructions

- 1 Think about some of the features a house needs to protect the people living inside (walls, a roof, etc.). Then, build a house using some of the materials you've gathered.
- 2 Design your foundation. Before building, see which materials sink and which materials float in the testing station. Test one material at a time.
- 3 Put the house and foundation together. Test to see if your construction sinks or floats.

If your design doesn't float during the test—that's okay. You're experimenting! Dry off the house and foundation with a towel, and think about what you might change or add to your foundation to keep your house afloat. Try something new! Then, test your design again.



Tips for Grown-ups

Show your child the size of the testing station before they start building.

Discuss what size would comfortably fit inside. It's easier to tell if the house is floating if it fits inside the testing station without touching the walls.

If your child gets stuck, try the following prompts:

- Are there building materials filled with air that will float in water (like an inflated ball) that could be added to the base of the design?
- Will making the foundation wider than the house help? What about making the foundation narrower?



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BACKGROUND FOR GROWN-UPS

Questions to Ask Throughout the Activity

An important part of the engineering design process is testing and making changes to a design. Ask your child to reflect on the following questions after each test:

- 1 What is one thing that worked really well about your design?
- 2 Was there anything that didn't work?
- 3 What is one thing that you might change about your design (even if the test went well)?
- 4 What surprised you about your design during your test?

Additional Challenges and Adaptations

- 1 Build a taller/bigger house to float on the same foundation.
- 2 Add additional weight (another house, a "person," etc.) to the same foundation.
- 3 Limit the available materials that easily float, such as foam egg cartons and balloons.
- 4 Simplify this activity by selecting 3 – 4 different materials as options for building that are lightweight and sturdy—such as straws, foam egg cartons, and popsicle sticks.



Continued Learning

As our climate changes and sea levels rise, engineers are working to find ways for homes to stay safe during floods by designing “amphibious” floating houses.

- Ask your child what building materials they think engineers might use to address this problem.
- After discussing, explore some real-life examples together at buoyantfoundation.org.

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