

## Choose a Challenge

### Choose a Challenge and Get Building

#### Materials Needed

- Scissors
- Fasteners such as:
  - paper clips
  - binder clips
  - clothespins
  - tape. (For more of a challenge, limit the amount of tape. Suggest no more than 12 inches of tape)
- A collection of construction materials such as:
  - paper
  - cardboard
  - fabric
  - straws
  - craft sticks
  - plastic/paper cups
  - paper plates
  - And other materials found within the household
- A cup or bowl to hold paper strips
- Paper strips about 2 inches square.

#### Grade Range

3-5

6-8

#### Topics/Skills

Engineering

Creativity

Design

#### Learning Standards

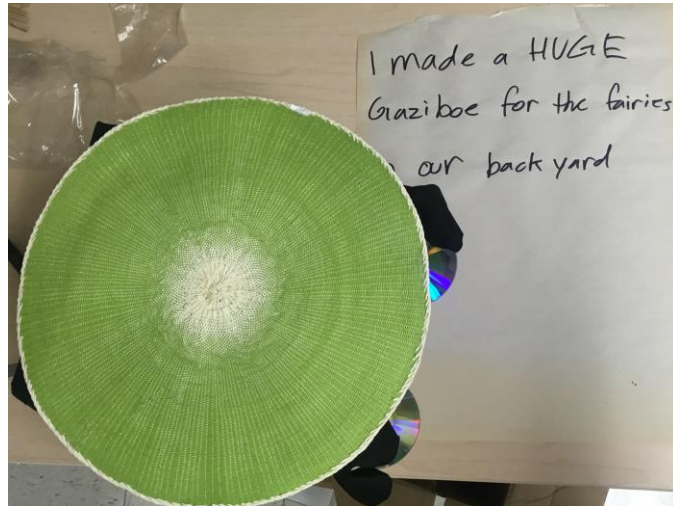
NGSS: [Science & Engineering Practices](#)

#### Duration

30-45 minutes

#### Prep Time

10 minutes



For this activity, students select a build challenge such as “make an umbrella for a small pet” and then they sketch a few designs. After that, they start building using whatever materials they have on hand. It can be a wonderfully creative, and imaginative activity, for a wide range of students.

#### Activity Challenge

Demonstrate creativity, and engineering skills, by building an object using whatever can be found in the household.

#### Preparation

1. To start, review the *Build Challenges* listed on page two. Feel free to add, or shorten, the list.
2. Cut paper into 3-5 strips. On each strip, write a build challenge.
3. Fold each strip in half and place in a cup or bowl.
4. Students will select a paper strip randomly. That will be their build challenge.
5. See the *Materials Needed* list and gather materials, tools and tape for students to build with.
6. Setting a few constraints such as:
  - a. A time limit (35 -45 minutes).
  - b. Must use more than two types of material.
  - c. Can only use 12 inches of tape.

## To Do

1. Choose a piece of paper with a build challenge on it. Follow the next steps (2-5) as guide for completing the build.
2. Design
  - a. Start by sketching a few designs for the challenge selected.
  - b. Write down the materials that could be used to build it.
  - c. Note key features and where materials could be connected. For example, if the object is a flower, note the connection between the flower and the stem.
3. Build
  - a. Gather materials, and using your designs as a plan, start building. Take your time (unless you are setting a time limit).
4. Test and Refine
  - a. Test your build. Make sure it holds together and resembles the challenge. For example, it looks like an umbrella that could be used by a small pet. Make adjustments.
5. Share
  - a. Display the project.
  - b. Demonstrate how the project works or how it meets the challenge.

## Build Challenges

1. Build a boat for a toad with two sails and a cabin to sleep in.
2. Build a car for a bunny rabbit with only three wheels and four windows.
3. Build a gazebo for a family of fairies.
4. Build an umbrella for a small pet.
5. Build a toy for a cat to play with.
6. Build four shoes small enough for a squirrel.
7. Build a pot to plant one pinto bean in.
8. Make a fork for a giant to eat peas with.
9. Build a diving board for a mouse.

## Extension

- o Create a story about your project. Why was the project needed? What problem does it solve and for whom?

## Content behind the Activity

This activity provides a great opportunity to explore creativity and imagination through the design process. Students proceed through four steps in the design cycle: Design, Build, Test and Refine, and Share. These steps in the design cycle are non-linear, meaning that they do not prescribe a strict order. For example, as students come up with a design and begin building, they might think of another approach and go back to designing, then rebuilding. They might also start tinkering with materials, get inspired and then develop an idea for a design. Sometimes designers learn from other designers who share their ideas which then inform changes and modifications to existing designs. This flexibility in the design process is one of its finest attributes and encourages students to persevere!