

Backpack for a Stuffed Animal

Lesson Overview: Students will build a backpack for a client (stuffed animal) to help them carry items.

Suggested Time: 60-90 minutes

Learning Objectives:

- To gain practice identifying constraints and criteria
- To design for a client based on the constraints and criteria

Materials:

- Scissors
- Tape (masking seems to work the best)
- Variety of stuffed animals that are at least 8" high - Every group does not have to have a separate stuffed animal, but there should be enough that students have enough time to measure and test their designs several times while holding the stuffed animal.
- Three items per group that will be carried in the backpacks. These can be a pen, a pencil, an eraser, or items picked by students.
- Thin cardboard (like cereal box thickness)
- Felt and/or fabric
- popsicle sticks
- rubber bands
- String
- pipe cleaners
- Plastic or paper cups
- Paper clips

Directions:

1. Explain to students that they will build something to help their client carry items.
2. Discuss possible constraints and criteria for the device. For example, the device should be:
 - a. removable.
 - b. comfortable.
 - c. able to hold the specified items.
3. Show the students the materials to choose from.
4. Introduce students to the "clients."
5. Students can sketch their initial designs. Once they have a sketch, they can begin building. As you circulate, ask students questions about certain design decisions.
6. About 15 minutes into building, bring the students together and have each group share their ideas. Ask the group for ideas for any part that is difficult to build. This step takes more time, but it helps to build the community of collaboration.
7. Have them test the first or second version of their design and lead a discussion of the designs to help them analyze and interpret their designs.
8. Have students keep iterating, encouraging them to analyze and interpret after testing.
9. Be sure to leave time to have a final discussion with the class to talk about their design process.

Possible Discussions Topics:

- Does your design meet the constraints and criteria?
- Why did you decide to make “this” like you did?
- How would your client take the backpack off?