Design Challenge: Making a Parachute

In this design thinking activity, your child will create a parachute for a small toy using typical household items. Your child can experiment with different materials until they find ones that work best. The goal is to design a parachute that will keep their toy airborne for as long as possible. Therefore, we suggest having your child create a few different types of parachutes and comparing them to see which works best.

We have given step-by-step instructions which are useful as a guideline for the design thinking framework. Please feel free to go beyond what we've written out: the point is to be creative! We recommend guiding your child through the process but leaving the creative components up to them.

What You Need:

- Small toy (e.g., action figure, miniature doll)
- Stopwatch
- A designated location for testing (e.g., a balcony, standing on a chair)
- Typical household items for constructing the parachute
- Pen and paper for taking notes

Potential materials for the parachute:

- Plastic bag
- Paper
- String
- Dental floss
- Tissues
- Fabric
- Any other household items!

What You Do:

1. First, make sure that your child understands the prompt. Reiterate that they're supposed to build a parachute for an action figure or small toy. (Ask your child to choose the toy they want to build the parachute for.)
2. Tell your child that their goal should be to design a parachute that will allow their toy to remain in the air for as long as possible, so they should test out a variety of materials and see which works best. Tell your child that you will be using a stopwatch to test and compare different designs.
3. Before your child starts brainstorming, ask them to **define** a parachute and its purpose. If they're unsure, feel free to look up images of parachutes online.
   a. Ask your child, "What is a parachute's function? What are parachutes used for?"
   b. You can explain to your child that a parachute is a device that is used to slow the speed at which someone moves through the air and down to the ground. For example, when people go skydiving (jumping out of an airplane), they use a parachute so that they descend slowly. In other words, the parachute acts like a brake.
   c. If you and your child look at some pictures of parachutes online, ask them to take note of the fact that most parachutes are made with light, strong fabrics. (This may help when your child is building their own.)
4. After your child has solidified their understanding of this challenge and defined a parachute, show them the materials you're providing them. (Don't let them start building yet.) Tell your child that they don't necessarily need to use all of the materials you're giving them, and they can use any other materials they'd like.
5. Then, ask your child to begin **brainstorming** by drawing or writing down as many parachute design ideas as possible.
6. After your child has finished brainstorming, ask them to choose the design they think will be most effective. (They may want to make other designs after they test out the first one so that they can compare different models.)
7. Now, allow your child to build a **prototype** (model) of their design!
   - Feel free to assist them as needed but allow your child to do most of the creative thinking.
8. After your child builds their prototype, choose a location from which you can **test** it out. It's best to choose a single location to test all the models so that the parachutes are launched from the same height each time.
   - For example, you could ask your child to stand on a chair, or drop the parachute from over a balcony.
9. Ask your child to attach their parachute to the toy.
10. Then, take the prototype and stopwatch to your designated testing location. Explain to your child that their job is to drop the toy while you use the stopwatch to record how long the toy stays in the air.
11. Test out your child's parachute, and have them record on a piece of paper the time it takes for the toy to fall.
12. After testing their parachute, ask the following question: "How do you think you could improve your design so that the toy stays in the air even longer?"
13. Since your child's goal is to create a design that allows their toy to remain airborne for the longest time possible, we suggest that they create several prototypes and compare the results.
    - If any of your child's prototypes don't function, it's important that they don't get discouraged. Help your child identify what

went wrong. Then encourage them to go back and repeat each step of this process to improve future designs.

14. Continue guiding your child as they brainstorm, build, and test different parachutes. (Be sure to test from the same location each time and write down the times on a piece of paper to refer back to.)
15. After testing each design, ask your child the following questions to help them reflect on the process:
    a. What worked well?
    b. What didn't work well?
    c. How can you improve this design?
16. Continue repeating this process until your child has created a parachute to their satisfaction! We suggest going through the process at least two or three times, but feel free to adjust depending on your child's engagement.

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