Parachutes

Parachute designers are responsible for designing parachutes, or large pieces of material that slow a person down when they skydive. These are a few important things that parachute designers have to keep in mind to design a safe parachute:

- When the person jumps out of the plane, gravity immediately pulls the person falling and their parachute down towards the Earth.
- When the person jumps, their parachute is packed tightly inside a device that looks like a back pack. Typically, the parachuter pulls a cord that makes the parachute eject and spread out.
- When the parachute opens, the material is stretched tight because it fills full of air molecules. These air molecules push up on the person and the parachute.
- If there are more air molecules inside the material of the parachute, this creates more upward force, which slows down the parachuter.
- Sometimes, there is bad weather while people are using a parachutes. Parachutes need to be able to resist rain!

Testing Parachute Materials

Follow the steps below to perform an experiment to determine which materials are best to use for a parachute.

To do this, you will perform tests to answer the following questions:

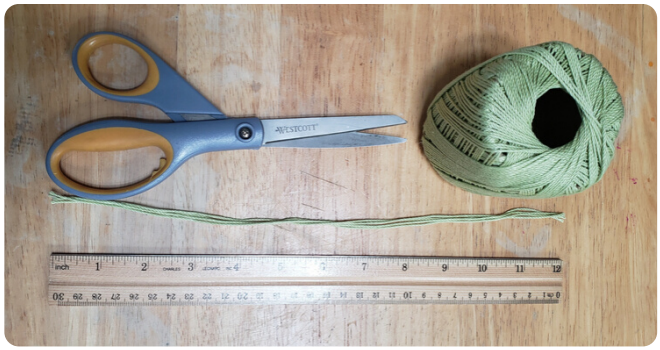
- How well does the material work to slow down a parachuter?
- How well the materials open up after they are crumpled up?
- How strong is the material when it gets wet?

Step One: Experiment Setup

In this step, you will prepare your parachutes for testing. To do this, you will be creating a harness for the parachute. This will make it easier to attach to your action figure.

- Collect 4 different materials that will all be used as test parachutes.

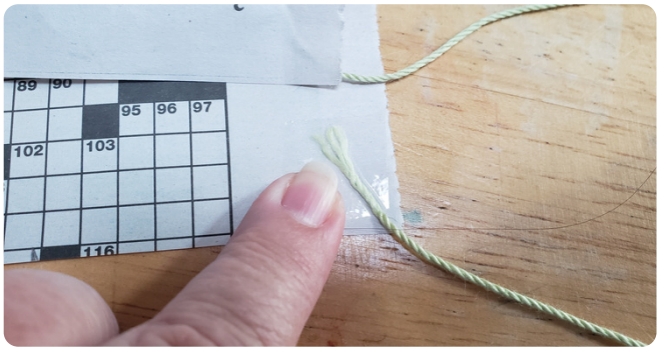
- Cut 4 pieces of string that are each 12“ long.



- Tie a loop in one end of each string. These loops will go on the arms of the action figure during testing.

Testing Parachute Materials

- Tape the end of the string without the loop to the corners on each piece of material.
- Note: You may also hole punch the material and tie the string through the holes.
- You now have a parachute with a harness attached.



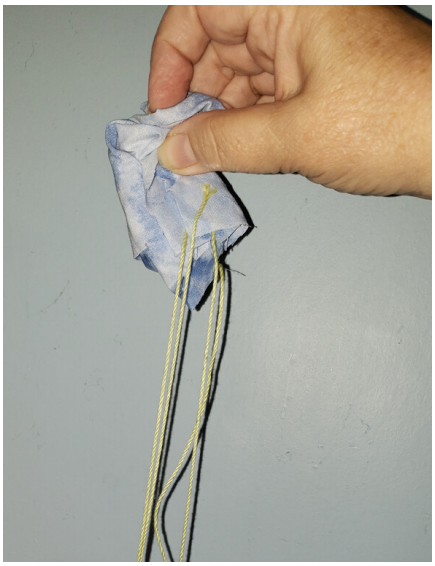
Step Two: Perform Testing

- Use the loops that you tied on the ends of the harness strings to attach the grocery bag parachute to the action figure. Put two of the loops around one of the action figures arms and put the other two loops around the action figures other arm.

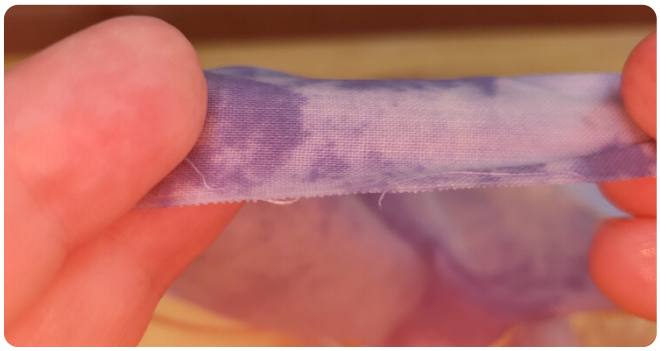
- Test the parachutes drop time. To do this, hold the parachute from the top at the drop height. Let go of the parachute and start the timer. Stop the timer as soon as the action figure hits the ground. Record the time for this material in the data table.

Testing Parachute Materials

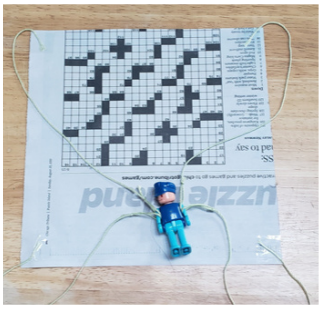
- Test the parachute after it is crumpled. To do this, crumple the parachute into a ball then hold it at the drop height. Let go of the parachute and watch to see if the parachute opens back up before the action figure hits the ground. Record your observations for this material in the data table.

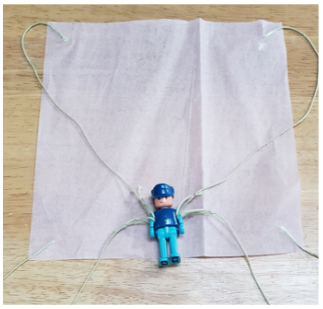


- Test the parachutes strength when it is wet. Grab opposite sides of the parachute and pull hard enough so that the material is stretched tight but does not tear. This is how strong the material is when it is dry. Now, spray water on the parachute until it is wet. Grab opposite sides of the parachute and pull them apart as hard as you did when the parachute was dry. Decide if the parachute material stays strong when it is wet. Record your observations for this material in the data table.



- Remove the action figure from the plastic bag parachute.
- Repeat steps 1-5 for the craft tissue, newspaper, and cotton cloth parachutes. Record all observations for each material in the data table.





STEM CAREER ADVENTURES

Data Table

Parachute Material	Drop Time (in seconds)	Crumple Test	Rain Test
Plastic Grocery Bag			
Craft Tissue			
Newspaper			
Cotton Cloth			

Step Three: Determine the Best Parachute

Determine the best parachute material by looking at the results your recorded in the table.

1. Look at the drop test column on your table. Highlight the longest drop time. If any materials tied for the longest drop time, highlight them both.
2. Look at the crumple test column on your table. Highlight the material that opened the best when dropped. If any materials tied for opening the best, highlight them both.
3. Look at the rain test column on your table. Highlight the material that stayed strong when wet. If any materials tied for the rain test, highlight them both.
4. Look at the results that you highlighted and decide which material is the best material for making a parachute.

The material I choose as the best parachute material is: _____

I chose it because:

_____

_____

_____

_____

Step Four: Create a Backpack

Backpacks are used to store parachutes. Usually, the backpack has a cord that the wearer pulls. When the cord is pulled, the backpack opens up and the parachute shoots out!

Use art supplies and building materials to create a backpack for your parachute. Your backpack must meet the following criteria:

- Must be big enough to fit a crumpled parachute inside.
- Must have a cord for the wearer to pull to deploy the parachute.
- Must have straps to place over the wearer's shoulders.

STEM CAREER ADVENTURES

Data Table Key

Parachute Material	Drop Time (in seconds)	Crumple Test	Rain Test
Plastic Grocery Bag	4 sec	opens back up	stays strong when wet
Craft Tissue	3 sec	opens back up a little	rips easily when wet
Newspaper	4 sec	doesn't open back up	rips when wet
Cotton Cloth	3 sec	opens back up	stays strong when wet