

# Air Mail Challenge

Scientists on a remote island need your help! Design a container that can survive a drop from an airplane to their island below. Use the materials to create a package prototype that can withstand the conditions of being dropped – it must be waterproof, able to float, have the lowest mass possible, and protect the material (potato chip) inside from breaking. Gather your materials and start designing!

## TEKS:

4.2 Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations.

5.5A Classify matter based on physical properties, including mass, magnetism, physical state (solid, liquid, gas), relative density (sinking and floating), solubility in water, and the ability to conduct or insulate thermal energy or electric energy.

## How To:

1. Examine the material (potato chip) you will be packaging. Brainstorm designs that might protect it from breaking after a drop.
2. Design your package. Keep it light, waterproof, and able to float.
3. Test your package! Place your package in the tub of water. Does it float? Is it waterproof? Drop your package from knee-height and shoulder-height into the tub of water. Did your materials survive both drops?
4. Modify, update, and refine your design if needed.
5. Retest and redesign your package until it works.

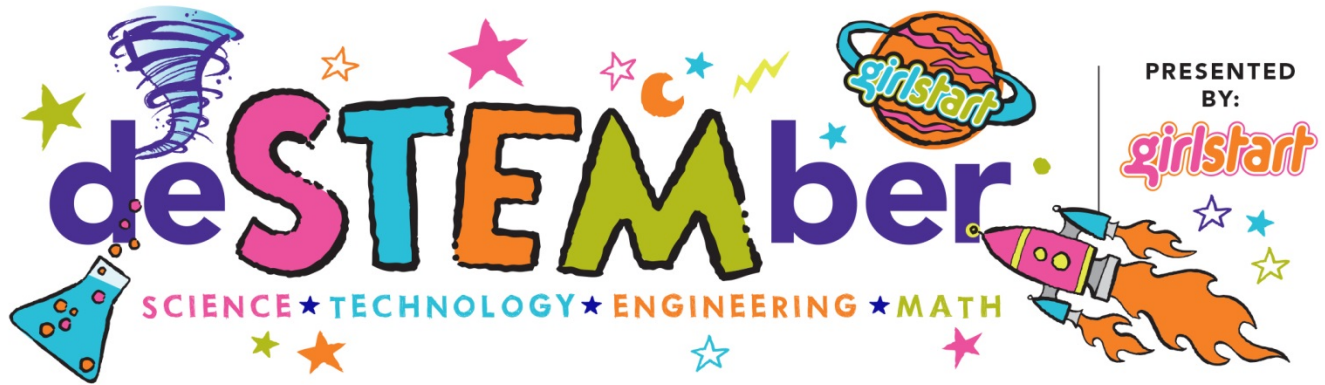
## Materials:

- Duct tape
- Potato chips
- Bubble wrap
- Cotton balls
- Packing peanuts
- Plastic cups
- Foam cups
- Paper cups
- Tub of water

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## How Does It Work?

Each material used to make the container has different masses and is made up of different materials. This affects your package's ability to float. Some of the materials don't absorb the force of hitting the water very well, and the chip may hit the sides of the container hard enough to break. Other materials cushion the chip as it hits the water, reducing the amount of force applied to the chip.

## Career Connection:

***Manufacturing engineers*** make things. They design, direct, and coordinate the processes and systems for making almost any kind of product – from beginning to end. Manufacturing engineers apply scientific principles in designing and producing quality products.

## Resource:

- TryEngineering: Ship the Chip: <http://www.tryengineering.org/lessons/shipthechip.pdf>

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