

Flood Barrier Design Challenge

Student Pages

NAME: _____

SAVING THE DOGHOUSE

Challenge: Design a barrier to save your doghouse from getting wet during a flood. You will be limited (constrained) by the materials you will be able to use.

A flood is

Absorb is

Name a few of the effects of the flood in the video.

PART 1: ABSORBENCY TEST PROCEDURE

1. Measure 50 mL of water into a graduated cylinder.
2. Cover the hole in the Styrofoam cup with the absorbent material to be tested, and place that cup into the second Styrofoam cup.
3. Using a second hand or timer, pour the 50 mL of water into the top Styrofoam cup, and wait for exactly 15 seconds.
4. Lift the top Styrofoam cup and place into the plastic cup/container to catch any excess water.
5. Pour the water remaining in the bottom Styrofoam cup into the graduated cylinder to measure it. Record this amount and observations on the worksheet.
6. Remove the tested material and repeat for each of the other absorbent materials.

SAVING THE DOGHOUSE

ABSORBENCY TEST RESULTS:

MATERIAL TESTED	WATER (mL) (NOT ABSORBED)	OBSERVATION	RANGE OF CLASS DATA (mL not absorbed)

Based upon your data, which material(s) absorbed the most water? Which materials absorbed the most based upon class data?

Based upon your data, which material(s) absorbed the least water? Which material(s) absorbed the least water based upon the class data?

SAVING THE DOGHOUSE

- Materials List:**
- 1 cup polyester fiber fill
 - 1 sponge
 - 1 sheet of paper towel
 - 1 piece of microfiber towel

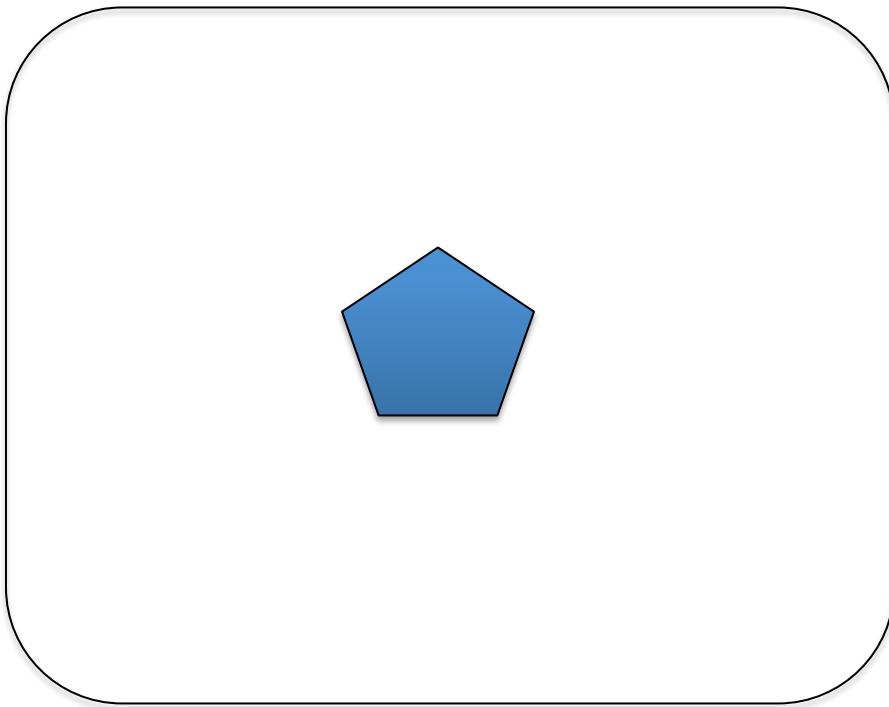
PART 2: ENGINEERING TRIALS

DESIGN YOUR FLOOD BARRIER

Collaborate with your engineering team to design the flood barrier. Make a detailed drawing of your design below and label all materials utilized. Below, record why you have chosen this design.

Requirement: The doghouse must be completely dry 10 seconds after adding 2 cups of water.

TRIAL 1 DESIGN



Design Rules

- The house must be centered on the bottom of the container.
- The house cannot be covered with the materials.
- The materials cannot be more than half the height of the doghouse.
- Choose one of the absorbent materials we tested.

Explain why you think these materials and this design will keep the doghouse dry.

NAME: _____

SAVING THE DOGHOUSE

NOW TEST YOUR FLOOD BARRIER DESIGN!!!

TRIAL 1 RESULTS:

AFTER 10 SECS, OUR DOGHOUSE WAS (CIRCLE ONE)

DRY

DAMP

VERY FLOODED

If your doghouse was dry, record the factors that caused it to be successful. Consider the materials used and the arrangement of the barrier.

If your doghouse was damp or flooded, record what you observed and the possible causes of the damage. Be prepared to share your thoughts with the class.

Factors that caused the barrier to

SAVING THE DOGHOUSE

- Materials List:**
- 1 cup polyester fiber fill
 - 1 sponge
 - 1 sheet of paper towel
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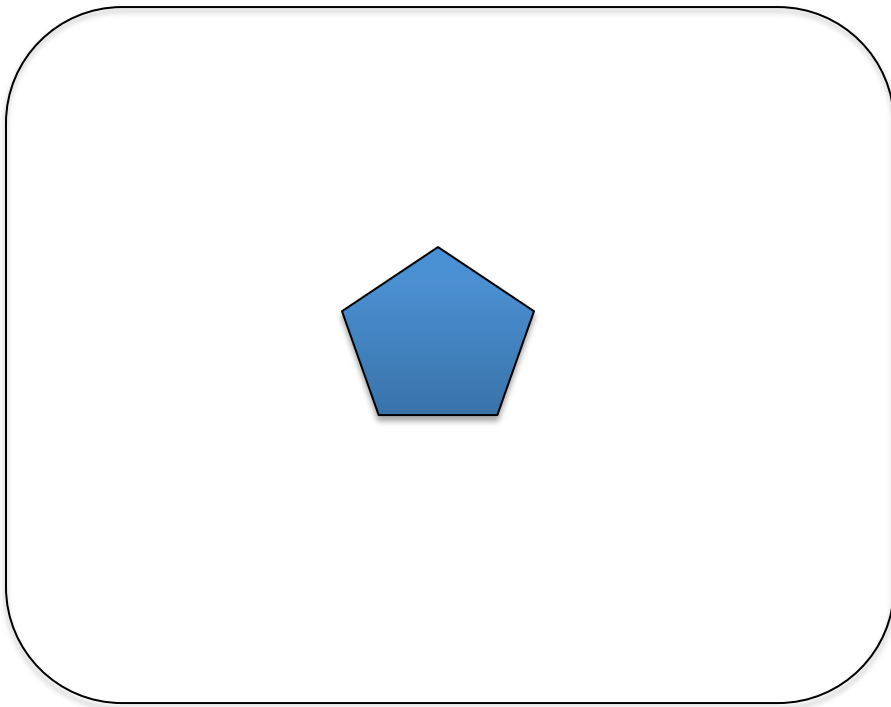
PART 2: ENGINEERING TRIAL 2

REDESIGN YOUR FLOOD BARRIER

Collaborate with your engineering team to redesign the flood barrier. Make a detailed drawing of your design below and label all materials utilized. Below, record why you have chosen this design.

Requirement: The doghouse must be completely dry 10 seconds after adding 2 cups of water.

TRIAL 2 DESIGN

	<p>Design Rules</p> <ul style="list-style-type: none"><input type="checkbox"/> The house must be centered on the bottom of the container.<input type="checkbox"/> The house cannot be covered with the materials.<input type="checkbox"/> The materials cannot be more than half the height of the doghouse.<input type="checkbox"/> Choose one of the absorbent materials we tested
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Explain why you think these materials and this design will keep the doghouse dry.

NOW TEST YOUR FLOOD BARRIER DESIGN!!!

TRIAL 2 RESULTS: AFTER 10 SECS, OUR DOGHOUSE WAS (CIRCLE ONE)

DRY

DAMP

VERY FLOODED

If your doghouse was dry, record the factors that caused it to be successful. Consider the materials used and the arrangement of the barrier.

If your doghouse was damp or very flooded, record what you observed that might have caused the damage. Be prepared to share your thoughts with the class.

The effect to my doghouse was

If the constraints were removed, would you change any materials? Explain

Would you change the design? Explain
