

PUFF CAR

TECHNOLOGY EDUCATION CHALLENGE

CHALLENGE:

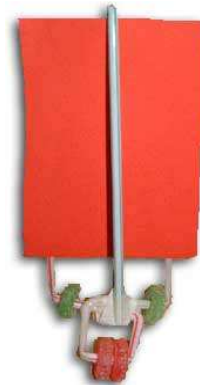
Design and build a device that can go the furthest distance with only one puff of air.

RESTRICTIONS:

- You may not push or throw your device. Only one puff of air can propel your device down the track.
- You may only use the materials and tools provided.
- You must use ALL of the materials.
- You will have three trials for the final testing.

MATERIALS & TOOLS:

- Scissors
- 2 feet of masking tape
- 3 straws
- 1 piece of cardstock
- 4 lifesavers
- 2 paperclips



Example puff car

PART I: BRAINSTORM IDEAS

A. Using a pencil, draw thumbnail sketches that communicate your ideas in the space below.

IDEA 1	IDEA 2	IDEA 3

B. Pick your favorite design from the sketches above, and draw what your device will look like from the front, top, and side view. Label all materials and dimensions (length, width, and height)

		Label all materials & show dimensions!
Top View		
Side View	Front View	

PART 3: TESTING TRIALS

A. Using complete sentences, explain the results of your design. How far did your puff car travel?

PART 4: CONCLUSIONS

A. Did your puff car work like you planned? Explain using complete sentences.

B. Using complete sentences, explain how you would change your device to make it better.

Lesson Plan: Puff Mobile

I. **Course Title:** Technology Education

II. **Teacher's Names:** Stephanie Crawford

III. **Grade Level:** 6-8

IV. **Number of Students:** 20

V. **Lesson Title:** Puff Mobiles: The Design Process

VI. **Lesson Length:** 45 minutes

VII. **Behavioral Objectives:**

At the conclusion of a demonstration, the student will be able to:

- List in order the seven steps involved in the design process with 90% accuracy.
- Explain each of the seven steps in the design process.
- Improve hands on experience and teamwork skills.
- Appreciate the importance of planning and brainstorming when designing.
- Recognize the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- Understand the attributes of design.
- Apply the design process to a given project.

VII. **Procedures:**

Time	Description
2 MIN.	1. Grasp student's prior knowledge and experiences with the design process by asking: Have you ever designed and built something? What steps did you go through before you had a final product?
2 MIN	2. GRAB ATTENTION: Show students a puff mobile and pose the question: What went into making this? (Prompt the students the think of more than just constructing the mobile) Entertain students' responses and then lead into how we will do it in this lab. Explain today's lesson objectives.
5 MIN.	3. Briefly explain the major steps in the design process. Along the way, as students to come up with examples of each step. Review terminology needed to complete upcoming handout. Vocabulary: thumbnail sketches, pros and cons, refinement, implementation
1 MIN.	4. Explain the rules, requirements, and behavior expected during the lesson and activity.
12 MIN.	5. Pass around The Design Process Handout to each student. Allow time to complete.
5 MIN.	6. Have students talk about which design they chose, and then ask why they chose it.
15 MIN.	6. Test the puff mobiles, allow for revisions.
5 MIN.	7. CONCLUSION: Summarize the key steps to in the design process by choosing different students to list the steps in order. Have different students come up to the dry erase board to write in order the steps. Then ask students to list the same steps in their lab notebooks. 1. Problem Identification 2. Research

	3. Brainstorm 4. Analysis 5. Build 6. Test 7. Redesign
Total Time: 45min	

VIII. Assessment: Students will be tested on their achievement of these objectives on a unit examination and through lab performance, cooperation, and participation.

Sample test questions:

1. Of the design process steps listed below, which one should be done first?
 - a. Analysis
 - b. Problem Identification
 - c. Brainstorm

Answer: B

2. What is the name of a quick, small preliminary drawing before a design is started?

Answer: Thumbnail sketches

3. Explain why it is a good idea to brainstorm and explore BEFORE actually construction of a design?

Answer: 1) Your final idea is more refined 2) If your initial idea doesn't work, you have other ideas to fall back on.

VIII. Instructional Aids or Resources:

- Scissors: 1 pair per team
- Masking tape: 3 feet per team
- Puff Kits (3 straws, 1 piece of cardstock, 4 lifesavers, 2 paperclips)
- Wipe-off marker
- Track for testing
- Example of Puff Mobile