

# SNOW SHOVEL CHALLENGE

**Objective:** Design and build a snow shovel using household materials to move snow-like materials

## LEARNING GOALS:

Understand the Engineering Design Process (Ask, Imagine, Plan, Create, Test, Improve). Problem-solving, Critical Thinking, Creativity, Observation  
Explore the properties of materials and their suitability for specific tasks.  
Learn how simple machines (levers) can help make work easier.  
Build teamwork and collaboration skills if working in pairs or groups.

## INSTRUCTIONS:

**Time Frame: 45–60 minutes**

### STEP 1: Brainstorm & Plan

Ask: What will your shovel need to do?

Imagine: Think about shapes and designs of real snow shovels.

Plan: Sketch your design.

### STEP 2: Build Your Shovel

Use the materials to build your shovel prototype.  
Focus on a sturdy handle and a functional scoop.

### STEP 3: Test Your Design

Use different materials (cotton balls, flour, paper balls) to test the effectiveness of the shovel.

### STEP 4: Improve Your Design

Reflect on what worked and what didn't.  
Make improvements.

## Suggested Materials

### Template (optional)

Straws

Tape

Scissors

Cardstock

Cups

Wooden craft sticks

Paintbrush handles

Plastic spoons or forks

Rubber bands

Small cardboard pieces

Glue

String

Testing materials  
(cotton balls, flour, pebbles)



## Extensions & Variations

Build a device to transport "snow" (cotton balls) across a set distance.

Test how well your shovel holds up after repeated use.

How could your design change if it were for real snow, wet sand, or dry leaves?

# Snow Shovel Challenge Observations

Use this worksheet to process and evaluate your work.



Did your first design work?

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What challenges did you face while building your shovel?

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Which materials worked best for moving the snow-like substances?

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How would you redesign your shovel if given more time or materials?

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Discuss how levers and simple machines are used in snow shovels.

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Explore material science: Why are real shovels made of metal, plastic, or wood?

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# JR-ENGINEERS

# DIY SHOVEL

## CHALLENGE

**CAN YOU DESIGN A SHOVEL USING ITEMS AROUND THE HOUSE?**

**Design and build a device that will move dirt, sand, pebbles, using simple household items.**

**Supply ideas: Straws, tape, scissors, card stock, paintbrush, cups, forks. You may design your own or use or template.**

**Time Constraint: 30 minutes (or more if time allows)**

**Set up: Brainstorm ideas for your shovel prototype. Draw your ideas and pick the best one to build. Design your shovel, test it to see if it works, change your design to make it better, and re-test to get new results.**

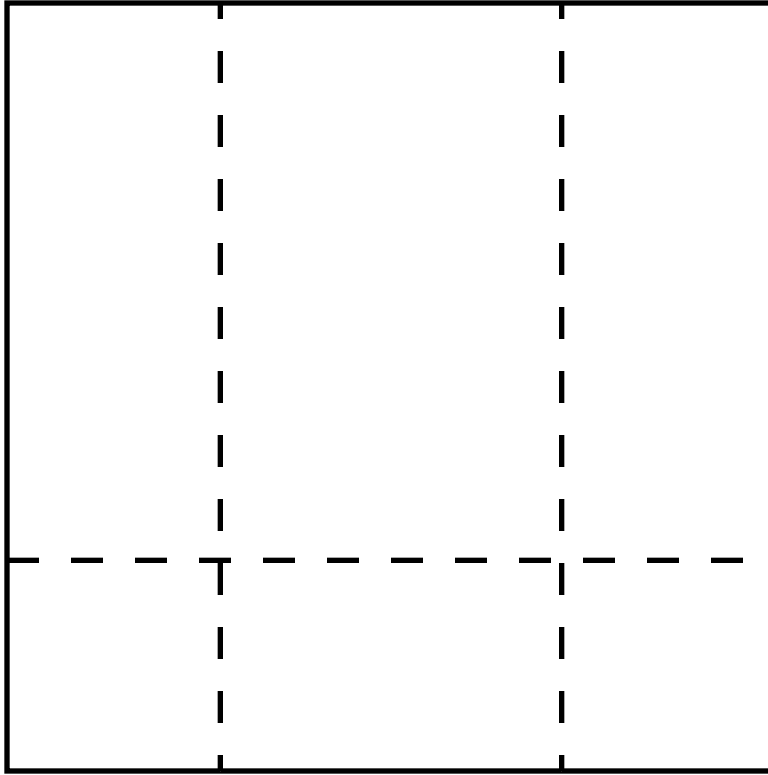
**Options to shovel: balls of paper, cotton balls, flour, pebbles, dirt, sand.**

**Questions for Reflection:**

**Did your first design work?**

**What were some of the challenges you discovered along the way?**

**What worked well and what did not work well?**

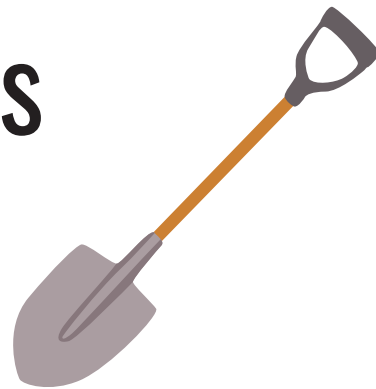




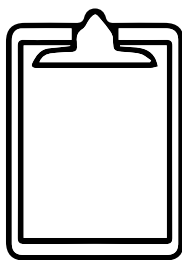


# DIY Shovel Observations

Use this worksheet to process and evaluate your work.



Draw your design ideas for your shovel.



RECORD

Did your designed shovel work well?

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What were some challenges?

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Experiment with different materials to shovel. What worked best?

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