

# Water Without Spills

Define a design problem by naming a need, requirements, and limits.

**4.1.a.iii** "asking questions and defining problems define a simple design problem that can be solved through the development of an object, tool, process, or system"

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## 1 READ AND MARK \_\_\_\_\_ Read it twice

**YOUR JOB** Underline the single sentence in paragraph 2 that begins "Create a tool." Circle the three requirements in the next sentence, so you can see what the tool must do and what limit it must meet.

### A Garden Club Problem

- ① At Oak Street School, the garden club grows lettuce and beans. The water faucet is across a paved path from the garden beds. Club members carry full watering cans, but some water splashes onto the path. Ms. Diaz asks the group to notice the situation before suggesting a solution. They talk with classmates who water the plants and write down what makes the job hard.
- ② After listening, the group writes one design problem: Create a tool that moves water from the faucet to the garden beds without splashing water on the path. The tool must hold at least two liters of water, be easy for a fourth grader to carry, and use materials found at school. These details tell what success should look like and what limits the designers must follow.
- ③ The club sketches several ideas, including a bucket with a lid and a cart with a tray. Before building, they decide how to test each idea. A tool will be filled with two liters of water, carried along the path, and checked for spills. The group can use the test results to improve a design or choose a different idea.

**2 ANSWER WITH EVIDENCE** \_\_\_\_\_ Use the passage

**1** What need does the design problem address?

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**2** What type of solution does the group plan to create?

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**3** Write one requirement for the tool and one limit on its design.

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**4** How will the club test whether a tool spills water?

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**3 YOUR TURN** \_\_\_\_\_ Your own words

Pick a small classroom problem. Write a design problem that names an object, tool, process, or system to create. Then list three requirements for your design, including one limit.

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**PART 1 • READ AND MARK**

Underline the single sentence in paragraph 2 that begins “Create a tool.” Circle the three requirements in the next sentence, so you can see what the tool must do and what limit it must meet. Accept any marking that follows this job and points at the right text.

**PART 2 • ANSWERS**

| # | QUESTION                                                        | ANSWER                                                                                                                                                     |
|---|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | What need does the design problem address?                      | <b>Water needs to move from the faucet to the garden beds without splashing onto the path.</b>                                                             |
| 2 | What type of solution does the group plan to create?            | <b>A tool.</b>                                                                                                                                             |
| 3 | Write one requirement for the tool and one limit on its design. | <b>Requirements include holding at least two liters of water or being easy for a fourth grader to carry. The limit is using materials found at school.</b> |
| 4 | How will the club test whether a tool spills water?             | <b>They will fill it with two liters of water, carry it along the path, and check for spills.</b>                                                          |

**PART 3 • YOUR TURN (SAMPLE ANSWER)**

Design a holder that keeps library books standing upright on a classroom shelf. It must hold at least six books, be easy for a student to move, and use only recycled cardboard and tape.

Accept equivalent answers that identify the water-moving need, the tool, stated requirements, the school-materials limit, and the testing steps. For Your Turn, accept a clear problem statement with a proposed design and three workable requirements, including a limit.