Define Engineering Problems

Grade 3 Science Worksheet - Challenge Me

Name _____ Date _____

Circle the answer.

1. Which is the best order for starting a design project?

   state the problem, list criteria and constraints, then brainstorm

   build a model, state the problem, then test

   brainstorm, state the problem, then list criteria

   list criteria, build, then state the problem

2. A greenhouse must keep plants above 40°F at night. On a 25°F night, the inside reads 45°F. Did it meet the goal?

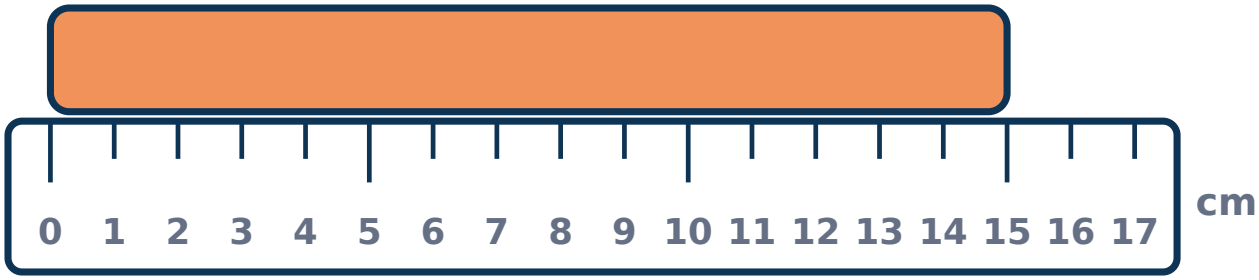
   no, because 45°F is below 40°F

   yes, because it was cold outside

   yes, because 45°F is above 40°F

   no, because it was 25°F outside

3. A card bridge must span a gap of at least 18 cm. This bridge spans 15 cm. Does it meet the requirement?



   yes, because 15 cm is close enough

   no, because it uses too many cards

   no, because 15 cm is shorter than the 18 cm goal

   yes, because it uses only index cards

4. A doghouse must keep rain out and fit a yard 4 feet wide. Doghouse A is 3 feet wide and keeps rain out. Doghouse B keeps rain out but is 6 feet wide. Which solves the problem?

   neither doghouse Doghouse A only both doghouses Doghouse B only

5. A tower must be at least 30 cm tall and use no more than 20 straws. Tower A is 32 cm with 18 straws. Tower B is 35 cm with 20 straws. Which towers meet the rules?

   Tower A only Tower B only neither tower both towers

6. A boat must hold 10 pennies and use one sheet of foil. Boat A holds 12 pennies but uses two sheets. Boat B uses one sheet but holds 7 pennies. Which boats meet the rules?

Boat B only both boats Boat A only neither boat

7. A bike rack must hold 12 bikes and fit a space 3 meters long. A student says it should look cool. Is looking cool a criterion of this problem?

- no, it is not one of the stated needs
- yes, because it is a limit
- yes, every idea is a criterion
- no, because it is a constraint

8. A class must keep an ice cube from melting for 30 minutes using only paper, foil and tape. Which is a constraint?

- fit the cube inside the holder
- keep the ice cube from dripping
- use only paper, foil and tape
- keep the ice cube for 30 minutes

9. A bird feeder must let small birds eat but keep squirrels out. Which question best defines the problem?

- How can small birds reach the seeds while squirrels cannot?
- How can a feeder be built quickly?
- How can a feeder hold the most seeds?
- How can squirrels reach the seeds faster?

10. Why should engineers talk with the people who will use a design before building it?

- to make the design cost more
- to choose the materials for them
- to skip testing later
- to learn what needs the design must meet

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Answer Key - Grade 3 Science Worksheet - Challenge Me

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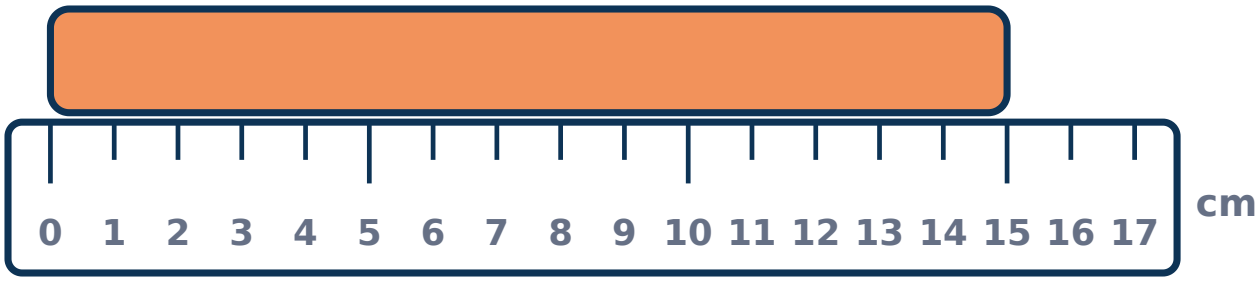
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