

How Do Engineers Work?

- 1 Carlos is using a tool that he built. What problem does it solve?



- (A) Carlos can not reach things on high shelves.
- (B) Carlos does not know how to cook.
- (C) Carlos can not scratch his back.
- 2 Ryan plans to build a toy plane that will fly. Which material should he choose?
- (A) brick
- (B) cotton
- (C) paper

- 3 Jenna designs and tests a pencil holder. Then she thinks of a way to improve it. What step should Jenna do next?

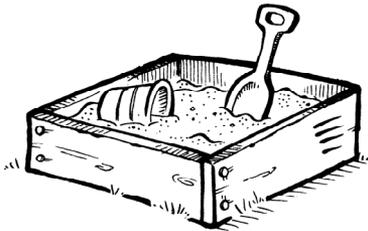
- (A) Find a new problem.
- (B) Communicate results.
- (C) Redesign the holder to make it better.
- 4 Why are math and science important to engineers?
- (A) They help engineers cure illnesses.
- (B) They help engineers solve problems.
- (C) They help engineers use different tools.

How Can We Solve a Problem?

- 1** Pradeep claims that his paper stand held a book for at least 10 seconds. What evidence supports his claim?
- (A) The stand held the book for 20 seconds.
 - (B) The stand is made of good materials.
 - (C) Pradeep tried many different designs.
- 2** Rochelle wants to build a better rake. How can she follow the design process?
- (A) Buy a new rake.
 - (B) Plan a new design.
 - (C) Tell a friend about it.
- 3** You use the design process to plan a tool. What is evidence that the design for the tool is a good one?
- (A) The tool solves a problem.
 - (B) The tool makes a problem.
 - (C) The tool tells about a problem.
- 4** Todd follows the design process to solve a problem. How should Todd keep good records?
- (A) Brainstorm ideas.
 - (B) Choose materials for his plan.
 - (C) Draw and write about what he does.

What Materials Make Up Objects?

1 What kinds of materials do you see in this sandbox?



- (A) only natural
- (B) only human-made
- (C) both natural and human-made

2 Which part is needed to make a bicycle?

- (A) basket
- (B) helmet
- (C) wheels

3 Which two materials are human-made materials?

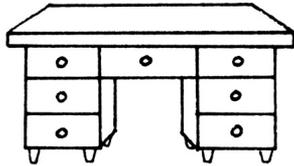
- (A) cotton and wood
- (B) plastic and nylon
- (C) wood and plastic

4 Which object is made from a natural material?

- (A) a wood bat
- (B) a nylon bat
- (C) a plastic bat

How Can Materials Be Sorted?

- 1 Look at this picture.



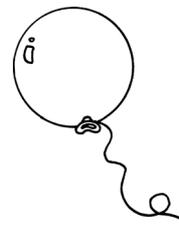
What natural material is the desk made from?

- (A) nylon
 - (B) paper
 - (C) wood
- 2 Jen puts her plastic toys in one group. She puts the wood toys in another group. What claim can she make?
- (A) There is no way to sort objects.
 - (B) You can not sort objects by their materials.
 - (C) One way to sort objects is by the materials they are made of.

- 3 Which object would you sort into a group of human-made materials?

- (A) a metal key
- (B) a plastic toy
- (C) a wooden pencil

- 4 The balloon is plastic. The string is nylon.



What claim does the evidence from this balloon support?

- (A) Objects can be only natural.
- (B) Objects can be only human-made.
- (C) Objects can be both natural and human-made.

Technology All Around Us

1 What do engineers do?

- (A) cure illnesses
- (B) predict weather
- (C) solve problems

 SC.1.N.1.1

2 What makes up objects?

- (A) materials
- (B) science
- (C) words

 SC.1.N.1.1, SC.1.N.1.2

3 Henry plans and builds this paper airplane.



What should he do next?

- (A) test his design
- (B) find a new problem
- (C) choose new materials

 SC.1.N.1.1

4 Mr. Levy builds a fence around his yard. What problem does he solve?

- (A)** His dog will not stay in the yard.
- (B)** His dog will not eat all of its food.
- (C)** His dog will not fetch a stick in the yard.

 SC.1.N.1.1

5 Which of these comes from a natural material?

- (A)** a nylon kite
- (B)** a glass bowl
- (C)** a plastic toothbrush

 SC.1.N.1.1, SC.1.N.1.2

6 Anita used the design process to make a paper airplane. She claimed it did not fly far. What could the evidence be?

- (A)** She predicted how far the plane flew.
- (B)** She thought about the design.
- (C)** She measured how far the plane flew.

 SC.1.N.1.1, SC.1.N.1.2, SC.1.N.1.3, SC.1.N.1.4

7 Which is made of both natural and human-made materials?

- (A) a wooden chair with metal legs
- (B) a plastic chair with wooden legs
- (C) a cotton cloth chair with wooden legs

 SC.1.N.1.1, SC.1.N.1.2

8 Inez has a string of beads. What can she do to **best** tell whether the beads are made from human-made or natural materials?

- (A) Wear the beads around her neck.
- (B) Drop a bead to see if it bounces.
- (C) Use her observations and what she knows about materials.

 SC.1.N.1.1, SC.1.N.1.2

9 Lan and Tom plan and build a solution. What should they do next?

- (A) Find a Problem
- (B) Test and Improve
- (C) Communicate the Results

 SC.1.N.1.1

- 10 Philip uses this table to sort his school supplies. What claim does this table support?

Group 1: Natural Materials	Group 2: Human-Made Materials
wooden pencil metal paper clips	plastic paper clips nylon backpack

- (A) All objects are natural.
- (B) School supplies are plastic.
- (C) Objects can be sorted by what they are made of.

 SC.1.N.1.1, SC.1.N.1.2, SC.1.N.1.3, SC.1.N.1.4

Comparing Bridge Designs

Student Task

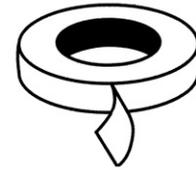
Materials



drinking straws



craft sticks



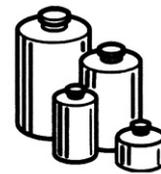
masking tape



glue



yarn



weights

Procedure

- 1 How can you build the strongest bridge? Think about the problem.
- 2 Look at the materials. Decide which materials to use to build a bridge.
- 3 Design a plan to build a model bridge. Draw your design.
- 4 Build your bridge.
- 5 Test the strength of your bridge.
- 6 Record your results. Compare results with your classmates. Draw a picture of the strongest bridge.

Comparing Bridge Designs

Materials Performance Task sheets, drinking straws, craft sticks, masking tape, glue, yarn, a variety of weights

Time 40 minutes

Suggested Grouping small groups

Inquiry Skills make a model, compare, communicate

Preparation Hints Toothpicks, paper clips, and chenille stems can be substituted for craft sticks and drinking straws.

Introduce the Task Show children pictures of different bridge designs. Point out that a bridge is built to support a load. Work together as a class to develop criteria for testing the bridges. Distribute the Performance Task sheets. Ask children to read the directions aloud. Note that the steps closely follow the design process. Make sure children understand each step before proceeding.

Promote Discussion Discuss the importance of having approved criteria for judging the designs. Lead children to understand that results would not be comparable if each group used different criteria to test its bridge. Encourage groups to think of ways to improve upon the best design.

Scoring Rubric

Performance Indicators

_____ Identifies a problem and selects appropriate materials to build a model bridge.

_____ Plans a design and builds a model bridge.

_____ Uses approved criteria to test the strength of the bridge.

_____ Improves and redesigns the bridge to make it stronger.

Observations and Rubric Score

3 2 1 0