

Important Concepts . . .

Preview Review



Science

Grade 7

W3 - Lesson 2: Structural Forms

Important Concepts of Grade 7 Science

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Materials Required.

Textbook:
Science in Action 7

Science Grade 7
Version 5
Preview/Review W3 - Lesson 2

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Preview/Review Concepts for Grade Seven Science



*W3 - Lesson 2:
Structural Forms*

OBJECTIVES

By the end of this lesson, you should be able to

- name and describe the basic building shapes
- describe how materials can be strengthened
- explain different ways of joining parts

GLOSSARY

beam - flat, narrow structure supported at its ends

bonding - hooking two surfaces together with a different material between them

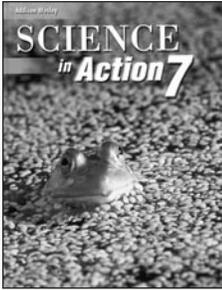
column - a vertical support structure

corrugation - material with wave-like ridges or folds, e.g. corrugated cardboard

W3 - Lesson 2: Structural Forms

Typically, we see structures in many different shapes. Even among those built for the same purpose, a great variety of shapes is possible.

Shapes and Forms for Building



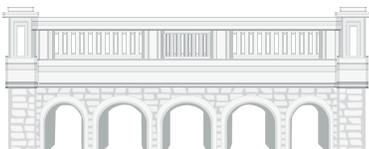
Read pages 290 to 291 and 301 to 303 of *Science in Action 7*. Although numerous shapes can be used in structures, some are stronger than others. As a result, those shapes are commonly used when making objects. Some shapes that are seen frequently in structures are triangles, arches, domes, beams, and columns.

1. If you had only single beams to support a load, which way would you position them for greatest strength – flat, or on edge?



2. Why are arches stronger than columns and beams?

3. What is a simple way of strengthening a rectangular-shaped gate?



4. How could you use triangles to make a strong roof?

5. Why might you use an I-beam rather than a solid beam to fit in the same space?

6. If you could make two equally strong bridges, one a truss bridge, and the other an arch bridge, which would you choose and why?

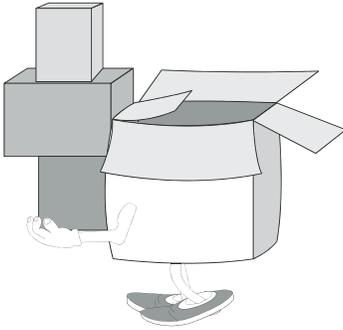
7. Describe a caudileur.

Strengthening Materials

Sometimes materials are formed in ways that will strengthen them. For example, a reasonably firm material such as cardboard or plastic can be strengthened by **corrugating** it. That means one layer of it is folded into a number of triangles. The folded layer is then often attached between two flat layers of the same material. Another method of strengthening a material is **lamination**, or bonding multiple layers of it together. Read pages 329, 330, and 332 of the textbook.



8. Name a piece of sports equipment that is made stronger through lamination.



9. Where might you find corrugated material in buildings?

10. What type of force does a strut on a sign resist? (Hint: See picture on page 330 of your textbook.)

Joining Parts

Structures are rarely made of just one part. This leads to the need to join the parts in ways that allow them to work properly for as long as needed. The type of join must suit the use of the object. Some joints rely on friction and others on bonding, to hold parts together. Some joints are rigid or fixed; they do not move. Others are flexible and can move. Read pages 313 to 315 and 318 of *Science in Action 7*.

11. How does the force of friction create strong joints?



12. How does a bond work to hold parts together?

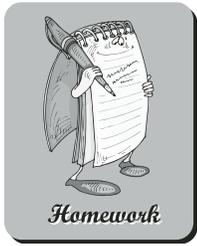
13. What are two different ways you could join the parts of a cupboard?

14. Give an example of a fixed joint.

15. Give an example of a moveable joint.

16. If you had your choice of a nail or a screw to join two parts securely together, which would you use and why?





Homework

17. Experiment with some materials you have around home, such as paper, straws or toothpicks. Make a simple structures such as a bridge using the shapes you learned about. Sketch it and describe how it performed when a load was put on it.



