

Chapter 20 Lesson Plan

Large-Scale Construction

| Chapter Resources | | |
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| Textbook Activity | Teacher CD | Online Learning Center |
| Create a Model Space Structure Design and build a 3D scale model of a space station. | Lesson Plan Flash® Presentation ExamView® Chapter Test | Chapter Activities Chapter Quizzes |

FOCUS

This chapter explains the stress forces that act upon structures. Also included are explanations of how major construction projects (especially bridges) are built and an introduction to construction in space.

Objectives

- Identify the stress forces that are exerted on structures.
- Explain how roads, dams, canals, tunnels, pipelines, and bridges are built.
- Describe the seven types of bridges.
- Explain the challenges of construction in space.

Tying to Previous Knowledge

Ask the class if anyone knows how a particular large construction project was built. Is it a step-by-step process? Did it take a long time? Will it last a long time? Does anyone know how long it took to build giant structures many years ago—such as the pyramids in Egypt?

TEACH

1. **Drawing structures.** Divide the class into teams and assign one type of structure (e.g., bridge, tunnel, canal, pipeline, highway interchange, or dam) to each team. The team goal is to draw a picture of a structure that is representative of the type that was assigned. The team may either copy an actual structure or design one. Give the teams a maximum and minimum size for their drawings so that all drawings will be able to fit on the bulletin board or other designated wall space.
2. **History of technology.** The National Highway System is just over 50 years old. Discuss with the class how leaders determined exactly where and how many highways would be built.
3. **Analysis.** Display a highway map of the region. Note if any major highways do not go in a fairly straight line (a more efficient route) and analyze why.
4. **Role of technology.** Display a map of North and South America. Point out the Panama Canal. Ask the class why many people thought the building of the canal (completed in 1914) was crucial.

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Large-Scale Construction (continued)

ASSESS

Have students complete Chapter Test 20. Chapter tests are found in the *ExamView*® Assessment Suite on this Teacher Resource CD-ROM.

Reteach

1. Software programs such as Bridge Builder™ allow students to experiment with a computer simulation of bridge construction. This closely resembles the actual methods frequently used today in construction planning and designing. Computer modeling is becoming more and more prevalent as computer software becomes more powerful and accurate at predicting the behavior of real structures. Discussions about bridge or other structural failures can be tied into discussions about the importance of computer modeling to prevent such disasters.
2. Bridges are very practical structures. Their design is almost entirely based upon the intended function. Why is it that some bridge underwriters (those that sponsor the bridge construction financially) are so concerned with aesthetics (appearances)? Is it not enough that the bridge functions well?

Enrich

1. Tunnels are sometimes built more quickly by having teams tunnel in toward each other so that twice as much progress can be made each day. Assign students to research the topic: How can each team know the direction in which they are going is accurate enough to meet the other team head-on?
2. Some people say the effort and expense of building and maintaining the ISS is not worth it. They feel that resources will be better invested in earthbound projects. Hold a class discussion on the pros and cons of a space station.

REFLECT

Large-scale construction seems to be a basic human drive. For thousands of years, people have built larger-than-life structures. Although the reasons may have varied, such monuments to the human desire to “rule the universe” and conquer the elements seems to be a drive that will continue.