

47. Pasta Bridge

Classroom Activity: Students design and build a pasta structure that can support a load.

Grade(s): 5 and 7

Strand(s): Understanding Structures and Mechanisms (Grades 5 and 7)

This task addresses the following grade 5 overall expectations:

- investigate forces that act on structures and mechanisms;
- identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms.

and the following grade 5 specific expectations:

- follow established safety procedures for working with tools and materials;
- use scientific inquiry/research skills to investigate how structures are built to withstand forces;
- use technological problem-solving skills to design, build, and test a frame structure that will withstand the application of an external force or a mechanical system that performs a specific function;
- use appropriate science and technology vocabulary, including tension, compression, torque, system, and load, in oral and written communication;
- use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes;
- identify internal forces acting on a structure, and describe their effects on the structure;
- identify external forces acting on a structure, and describe their effects on the structure, using diagrams.

This task addresses the following grade 7 overall expectations:

- design and construct a variety of structures, and investigate the relationship between the design



and function of these structures and the forces that act on them;

- demonstrate an understanding of the relationship between structural forms and the forces that act on and within them.and the following grade 7 specific expectations:
- follow established safety procedures for using tools and handling materials;
- design, construct, and use physical models to investigate the effects of various forces on structures;
- investigate the factors that determine the ability of a structure to support a load;
- use technological problem-solving skills to determine the most efficient way for a structure to support a given load;
- use appropriate science and technology vocabulary, including truss, beam, ergonomics, shear, and torsion, in oral and written communication;
- use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes;
- describe ways in which the centre of gravity of a structure affects the structure's stability;
- identify the magnitude, direction, point of application, and plane of application of the forces applied to a structure;

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- distinguish between external forces and internal forces (tension, compression, shear, and torsion) acting on a structure;
- identify and describe factors that can cause a structure to fail.

Assessment Categories:

- Knowledge and Understanding
- Thinking and Investigation
- Communication
- Application
- Teambuilding skills

Type of Activity: Classroom

Preparation: Research and collect images of different types of bridges and important bridge structures in Canada. Prepare building materials.

Materials and Resources for Teachers: no additional resources

Time needed to complete this activity: approx. 80 minutes

Materials/Resources for students:

All About Bridges, Nelson Language Arts Program (film)
pasta (lasagne, spaghetti, cannelloni, fettuccine)

glue gun and glue

string

graph paper

cardboard

Activity Description:

Discuss the different types of bridges (arch, suspension, etc.). Show All About Bridges or another appropriate film about the building of a bridge.

Explain the task to the students. Divide them into teams for planning and construction. Have each team of students submit a bridge design with the elements and materials they will use indicated on the plan. The bridge must be stable enough to allow vehicles to pass on top, but structured as to allow "boats" to pass underneath as well. It must also be able to carry a

predetermined load. The teams are judged on the quality and clarity of their plan, the overall design of the bridge and its ability to support a load.

Tips: The finished bridges can be displayed in the library