

58. Pasta Bridge Project

Classroom Activity: To design and build a freestanding bridge that will support a great weight using ordinary uncooked spaghetti and white glue.

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;

58. Pasta Bridge Project

- distinguish between external forces and internal forces 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

Type of Activity: Classroom

Preparation:

Planning Time: 8 hours

Time needed to complete the task: 1 week

Materials/Resources for students:

Uncooked spaghetti pasta

White glue

Thread - ordinary sewing thread

Activity Description:

1. The bridge must be constructed from spaghetti pasta

and ordinary white glue. Thread can be used to construct a suspension bridge or as reinforcement.

2. The bridge must be able to span a canyon of 300 mm and must be 50 mm in width, no height limit.
3. The bridge must not weigh more than 500 gm.
4. The bridge must be able to support a load suspended from the bridge deck at mid span.
5. The bridge must be freestanding (no support from hands, desk or any other objects). A container will be suspended from the bridge at mid-span and scoops of sand will be placed in the container until the bridge breaks.

The load performance will be computed using the following equation: NOTE: there is no equation provided!

Tips:

Handout supplies after explaining the project.