

LESSON PLAN

Newspaper Tower Challenge

OVERVIEW

- The aim of the challenge is to build the tallest tower possible using newspapers and paper clips. The tower must be free standing (i.e. not attached to the floor, a chair, the wall or a group member!) and must remain standing during judging.
- Split the group into smaller groups of 3-5. Give each group a piece of scrap paper to plan out their design and allow 5-15 minutes planning time.
- Once all groups have completed a plan, distribute a newspapers, scissors, and paper clips. Each group must wait until they are told to begin making their tower to ensure it's a fair competition.
- Allow 30-40 minutes for tower construction (give updates as the time runs out).
- Once time is up, groups must move away from their tower so that it can be judged.
- The winning group is the group with the tallest tower which is free standing (and hopefully still standing at the end of the judging.)

The ideal structure is based on triangles such as the Eiffel tower. The best structures would be made by rolling the sheets of paper into 'sticks' to give strength and then these can be arranged into a tripod shape and built up to make a tall tower – to give added strength, a triangle can be constructed around the bottom of the tripod to ensure that the legs do not slip out from under the structure.

SKILLS AND ENGINEERING CONCEPTS DEVELOPED:

- Integrating the Scientific Method into project based learning
- Involves designing and constructing a free standing tower from newspapers
- Involves creative design, analysis of structural concepts, construction skills (with paper), and concepts of stability.

INTRODUCTION

If you look up the definition of a tower, you will find the following: "An exceptionally tall building or part of a building or an exceptionally tall structure used for some functional purpose." In the past, towers were usually used to house bells (bell towers), for observation (watch towers), or for signaling (light houses). Perhaps the earliest record of a tower comes from the Bible, where the story of the Tower of Babel is told. Other notable towers include the Tower of Pisa and the Eiffel Tower, two completely different types of towers. Today there are many more types of towers that are used for a wide variety of functions. A few examples are transmission line towers, radar towers, radio and TV broadcasting antenna towers, and towers for suspension bridges.

OBJECTIVE

The objective of this project is for students to design and build the tallest free standing tower using only discarded newspapers and paperclips. The tower may **NOT** be attached to the floor.

PROJECT DESCRIPTION

The challenge of this project is to design the tower to make optimum use of newspapers to achieve the greatest tower height. The design of the base will also be challenging, as the tower must be free standing.

CONSTRUCTION

Each team should be given 2-3 newspapers, a pair of scissors, and 5 paperclips. Each team will have 5-15 minutes to plan and design their tower, and 40 minutes to execute their design.

PROJECT CONSTRAINTS

The towers constructed must:

- Be constructed from newspapers
- Be free standing for at least 5 minutes (cannot be attached to the floor).

SUPPLIES REQUIRED

Newspapers

Paperclips

Scissors (one pair for each team)

COMPETITION

- Each tower will be required to free stand for a period of at least 5 minutes.
- The height of each tower that meets the first requirement will be measured, and the tallest tower will win.
- Each team will be given three chances to have their tower free stand for 5 seconds.

SCIENCE CURRICULUM STANDARDS

High School

CLE 3295.T/E.2 Differentiate among elements of the engineering design cycle: design constraints, model building, testing, evaluating, modifying, and retesting.

CLE 3295.T/E.3 Explain the relationship between the properties of a material and the use of the material in the application of a technology

3295.T/E.2 Apply the engineering design process to construct a prototype that meets developmentally appropriate specifications.

3295.T/E.3 Evaluate a protocol to determine the degree to which an engineering design process was successfully applied.

Middle School

SPI 0707.Inq.1 Design a simple experimental procedure with an identified control and appropriate variables.

SPI 0707.Inq.2 Select tools and procedures needed to conduct a moderately complex experiment.

SPI 0707.Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

SPI 0707.T/E.1 Identify the tools and procedures needed to test the design features of a prototype.

SPI 0707.T/E.2 Evaluate a protocol to determine if the engineering design process was successfully applied.