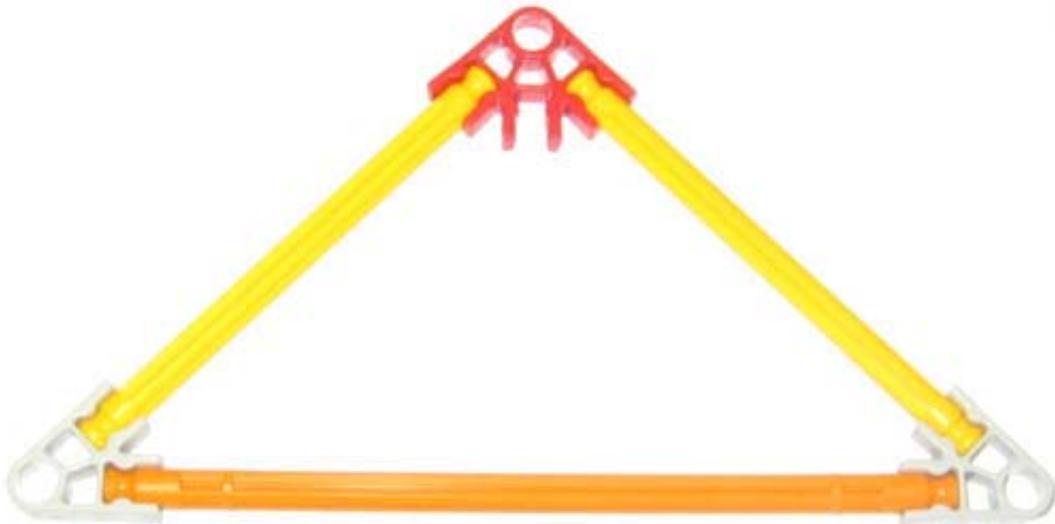


TEACHERS SHEETS

ACTIVITY 1

The TRIANGLE -a fundamental basic of K'Nex designs

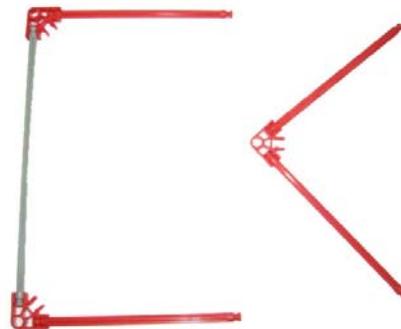
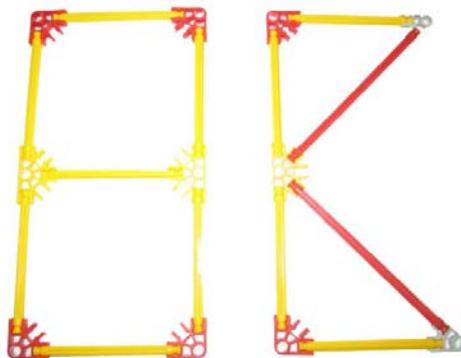
- Introduce the idea of a 2-D shape – flat shapes, shapes that only have height and width.
- Introduce the idea of a right-angled triangle
- This triangle is a specific shape known as an isosceles right angle. The basic shape requires 2 sides of equal length connected by 1 right angle. Different rods and connectors can be used to complete this shape.
- Highlight the importance of triangles due to their strong structural shape. The downward force on the top point of the triangle is spread down the two sides and ends up as a lengthwise force on the bottom rod. There are many examples of triangles used in structural design e.g. electricity pylons and bridges.
- Each pupil should make at least 1 triangle.



TEACHERS SHEETS

ACTIVITY 2 Create your own initials

- Using a variety of rods and connectors, make the initials of your name.
- Think of different combinations of k'nex you can use for each letter to create some interesting designs.
- Each pupil to design his or her own initials.



TEACHERS SHEET

ACTIVITY 3 Construct a cube

- Introduce to 3-D objects, ones that can be measured in three directions, height, width and depth. Compare a 3-D shape such as a cube to the 2-D shapes previously made (triangles and letters).
- Learn how to make a 3-D connector. This is an extremely useful tool in any form of K'nex building. There are 3 possible ways: blue to blue, blue to purple, purple to purple.
- Encourage the cubes to be built in teams of at least 2.
- Each team should discuss how many corners, sides and faces a cube should have **before** it is built.
- Different teams should make cubes of different sizes.



TEACHERS SHEET

ACTIVITY 4 Build a Bridge

- In teams of 2 or more, build the bridge pictured below.
- Test the strength of the bridge by balancing a load on it, such as a book.



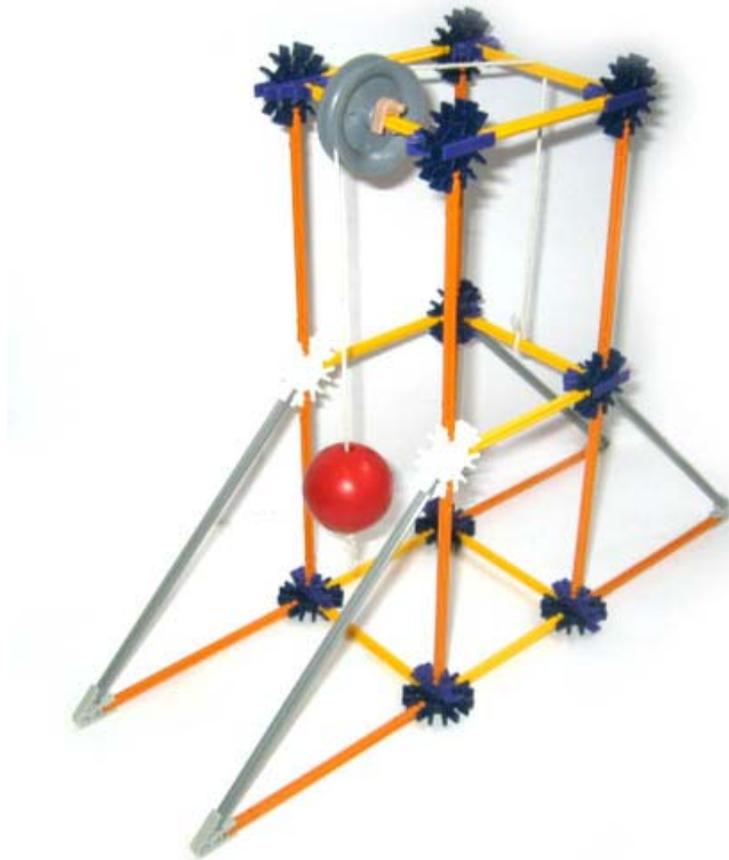
- This bridge is not particularly well designed, as the structure is very unstable. Create ways to improve the design by adding to the original bridge. This can be done a number of ways – adding feet, reinforcing across the middle, using upright supports etc.
- Discuss the different solutions with the class.

TEACHERS SHEET

ACTIVITY 5 a Pulleys – Simple Machines

A pulley can be described as a machine with a rope, belt or chain wrapped around a grooved wheel. By changing the direction of the applied force to downwards, moving heavy objects appears easier as the action works with, not against, gravity. Pulleys are used in cranes, lifts and sail boat rigging.

- In teams of 2 or more, build a structure with one pulley.
- Make sure the pulley can lift a small load e.g. the ball in your K'nex kit.



TEACHERS NOTES

ACTIVITY 5b Pulleys – Block and Tackle

More than one pulley used together is known as a 'Block and Tackle'. This decreases the amount of effort needed to lift a heavy load but increases the amount of rope needed to move the load the same distance. E.g. when 2 pulleys are used, it requires half the effort to move the same weighted object, but twice the length of rope.

- In teams of 2 or more, build a structure using 2 or more pulleys.
- Design a handle that will be used to operate the pulley systems

