

TECHNOLOGY

Week 6

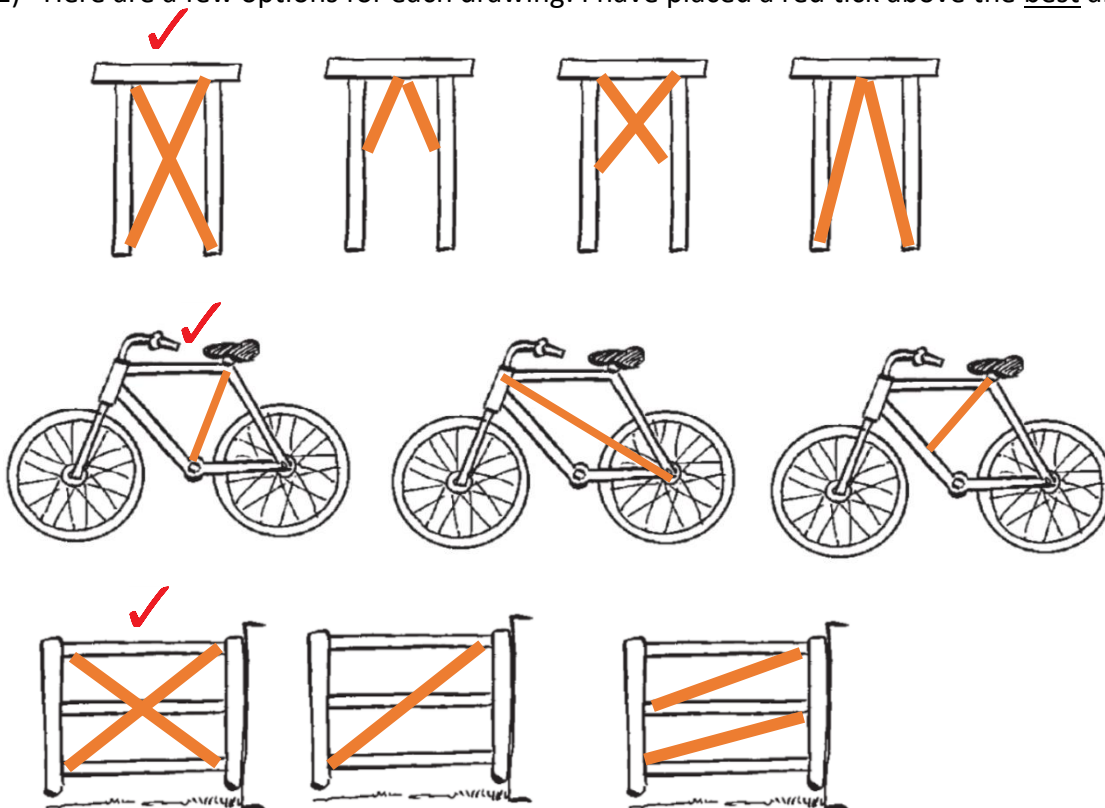
Instruction 1

Use the memo below to mark "Revision of Strengthening Structures" that you did last week.

- 1) When a **force** is applied to a simple four-sided structure, it can be forced out of **shape** quite easily. A structure that behaves in this way is said to be **non-rigid**. When a force is applied to a triangular frame, two of its members stretch the third, making the structure **rigid**. The **triangle** is the most rigid shape. The use of triangles to make any shape rigid is called **triangulation**.

*** The word 'square' was not used in the paragraph. Do not worry about it 😊

- 2) Here are a few options for each drawing. I have placed a red tick above the best answer.



Instruction 2

On the next **two** pages below, you will find two notes. The first one was given to you during Week 4 to study. Read it again to refresh your memory. Read the second note just as carefully in order to understand the content. I will be setting an informal test on this work in two weeks' time. (You will be given more details about the test next week.)

Instruction 3

Watch the 2 clips I have pushed onto your Tech eBook page 69. I have supplied the websites below should the clips not arrive on your iPad.

<https://www.youtube.com/watch?v=iGRLY08Kn2o> (foundations)

<https://www.youtube.com/watch?v=UIMC4Ko31oI> (centre of gravity)

DESIGN ISSUES - CELL PHONE TOWERS

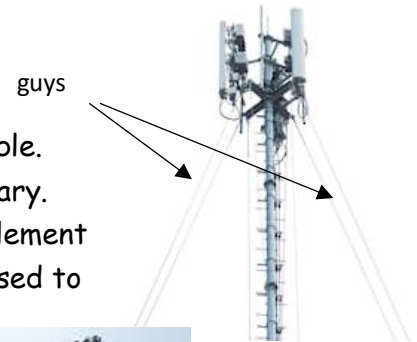
Cell phone structures are tall, large and heavy structures. They must be properly designed to resist **forces** and **loads** caused by the wind, water and earthquakes. A force or load is a push or pull on the tower which can result in it breaking apart, falling over or becoming deformed. A cell phone towers fail or break as a result of poor design, material failure or applying a force or load that is too heavy.

Identifying structural elements

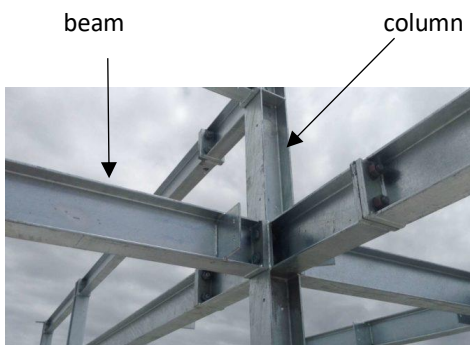
Look at the following cell phone tower. It is tall, thin and not very stable.

To increase stability and wind resistance, additional support is necessary.

Guys are holding this cell phone tower in place. A **guy** is a structural element made from **flexible** material such as ropes, cable or chains, that are used to hold structures in place.



The next cell phone tower is called a **lattice** tower. It is made of criss-crossing parts. The frames consist of a series of stiff metal **columns** and **beams** that are welded or bolted together.



The **columns** are the parts that run **vertically** and the **beams** are the parts of the structure that run **horizontally**. A beam is used to span a gap and is supported by columns on either end.

The beams and columns used in lattice cell phone towers have different shapes, such as the I-shape, H-shape, U-shape, etc. Look at all the different beam and column shapes below. What shape do you think has been used for the beams and columns in the picture above?

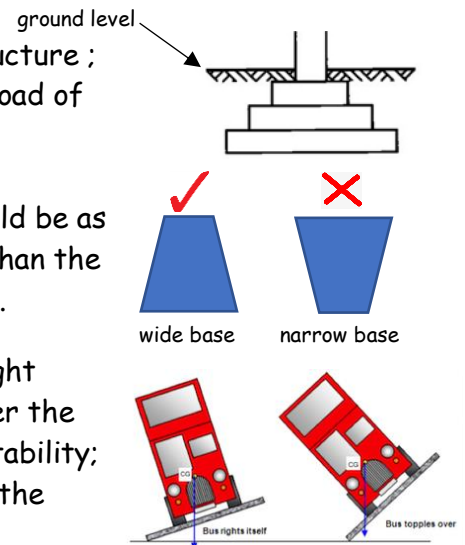


These shaped beams would be even stronger than the circular tubing we looked at earlier!!!

Stability

A structure is **stable** when it will not fall over easily. The following factors are important to ensure stability of a cell phone tower :

- **the foundation** : it is the lowest load-bearing place of a structure ; is usually below ground and transfers the load of the structure onto the ground.
- **base size** : this is the bottom or footing of a tower ; it should be as wide as possible and the top must be narrower than the base ; if the base is narrower, it will topple over.
- **centre of gravity** : this is a specific point where all the weight of an object is evenly balanced ; the lower the centre of gravity in a tower, the more stability; the weight on top should be less than at the bottom of a tower



Visual pollution

Cell phone towers are popping up everywhere. Many people believe cell phone towers are huge, tall and ugly structures. This is known as **visual pollution** and it refers to those elements of a landscape or townscape that a community finds unattractive. For this reason, many companies attempt to disguise their towers as trees.

