

Lesson Plan



- An angle is a way of describing the space between 2 lines that begin at the **same point**. An angle is a measure of how much you have to turn one of the lines so that it **perfectly overlaps** with the other.
- An angle is measured in **degrees** ($^{\circ}$) using a protractor.
- Angles can be measured anywhere from **0° to 360°** . It is possible to estimate angles.

A short video explaining the concept of angles.

Types of angle

An angle is how much one line is turned or rotated from another. The lines do not have to be the same length and it doesn't matter which way they are turned, but they must start at the same point. Angles are given different names according to how big they are:

- **less than $\frac{1}{4}$ turn** is an **acute** angle
- **between $\frac{1}{4}$ and $\frac{1}{2}$ turn** is an **obtuse** angle
- **more than $\frac{1}{2}$ turn** is a **reflex** angle.

Angles are measured in degrees using a **protractor**. There are some special angles that are useful to remember...

- a $\frac{1}{4}$ turn or **right** angle = **90°**
- a $\frac{1}{2}$ turn or **straight** line = **180°**
- 1 turn or **full turn** or **angle around a point** = **360°** . There are 360° in a circle.

Two straight lines that cross at one point, to make an X shape, create two pairs of **opposite** angles that are **equal** to each other.

What are the different types of triangle?

The sum of angles in any triangle is **180°** . On a diagram, equal sides of a triangle have one small line or dash drawn on each side.

Equilateral

An equilateral triangle has **three equal sides and angles**. It will always have angles of **60°** in each corner.

Isosceles

An isosceles triangle can be drawn in many different ways. It can be drawn to have **two equal sides and two equal angles** or with **two acute angles and one obtuse angle**. It is easy to work out the missing angles of an isosceles triangle by looking for the angles that should be equal.

Right-angled triangle

A right-angled triangle has **one 90° angle**. That 90° angle is shown as a small square where two sides of the triangle join. It is possible for a triangle to be a right-angled triangle and an isosceles triangle at the same time. In this case the angles would be 90°, 45° and 45°.

Scalene

A scalene triangle has **three different angles** and **none** of its sides are equal in length.

Obtuse

An obtuse triangle has **three different angles**, with one angle **greater than 90°**. **None** of its sides are equal in length.

- Two identical 2D shapes are said to be **congruent**.
- Two 2D shapes that share the same proportions are **similar**.
- The angles and side lengths can help us decide which type they are.

How do we determine the type of shape?

Congruent

If one shape can be rotated, reflected or translated to fit exactly onto another shape, then the shapes are said to be congruent. Congruent shapes have the same area, size, angles and lengths as each other.

Similar

If we enlarge one shape to make it bigger or smaller, then the shapes are said to be similar. The corresponding sides of similar shapes must be in the same proportion and the corresponding angles are identical. Similar shapes are not the same size as each other.

Some examples of similar shapes are: different size circles, an A4 and an A5 piece of paper.

- Shapes can be transformed in a number of ways. These include **translation, rotation and reflection**.
- Translation and rotation cause a shape to **move**.
- Reflection causes a shape to **replicate itself**.

Translation, rotation and reflection are examples of mathematical operations that you can perform on an object.

Translation

When translating a shape, you can move it up or down or from side to side, but you cannot change its appearance in any other way. When a shape is translated, each of the vertices (corners) must be moved in **exactly the same way**.

Rotation

If you put a sheet of paper on a table and place your pen in the middle of it, you can rotate the paper whilst keeping the pen in a fixed position. The pen is acting as a centre of rotation and you can rotate an object around it, anywhere between **0° and 360°**.

Reflection

If you look in a mirror, you see your own image. You (the object) and your image appear to be the same distance and angle from the mirror. The mirror acts as a line of reflection, through which your image is copied.