

# Lesson Plan

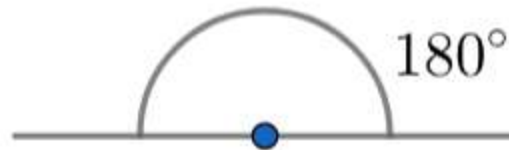
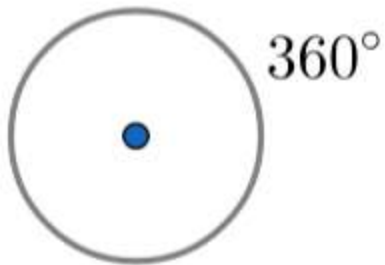


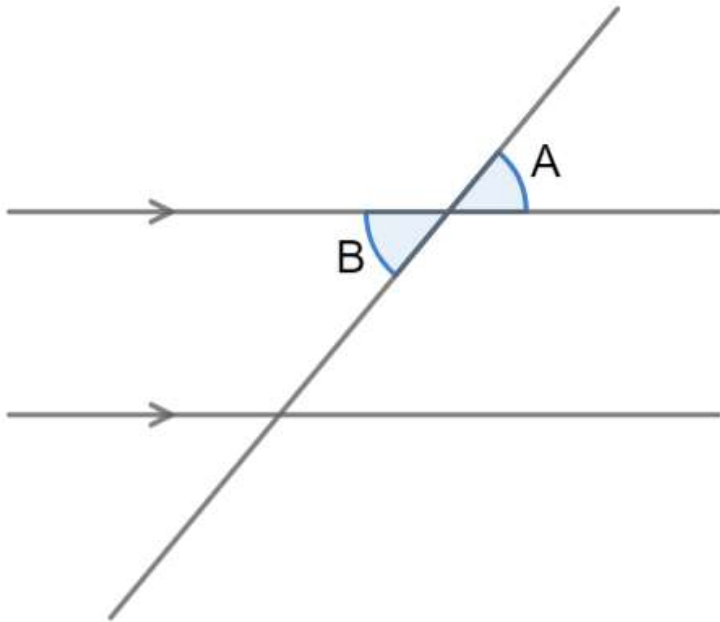
## What you need to know

Two straight lines are **parallel** if they are always the same distance away from each other, no matter how long the lines are extended. In other words, they're going the exact same direction and will never meet. Parallel lines are marked with matching arrows (see below).

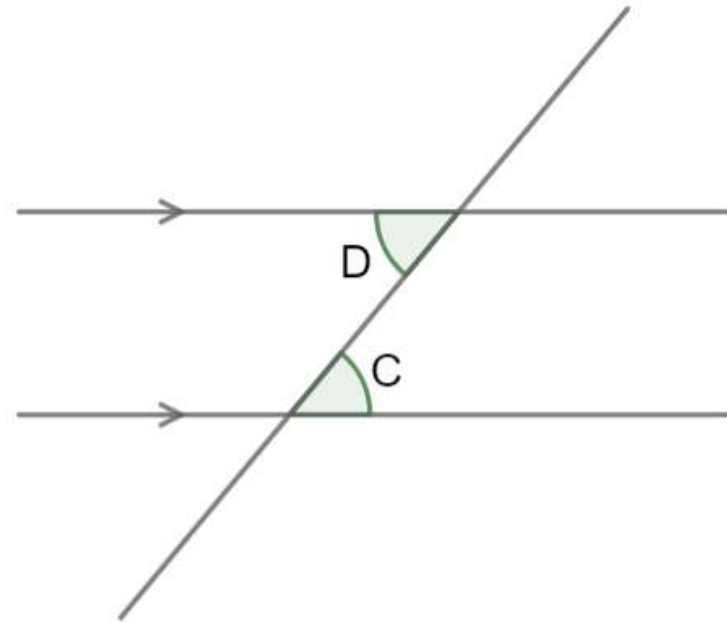
If you draw a straight line that passes right through two parallel lines, a whole bunch of angles are formed. 8, to be specific, but the fact is that all of those angles are related to all the other angles in some way, and that's what this topic is about.

Before that however, we must know two important facts: the angle around a point is always  $360^\circ$ , and the angle on a straight line is always  $180^\circ$ .

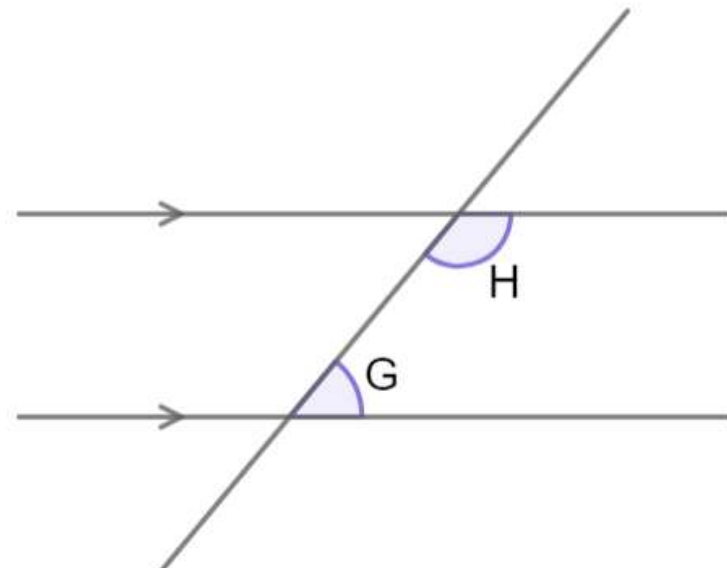
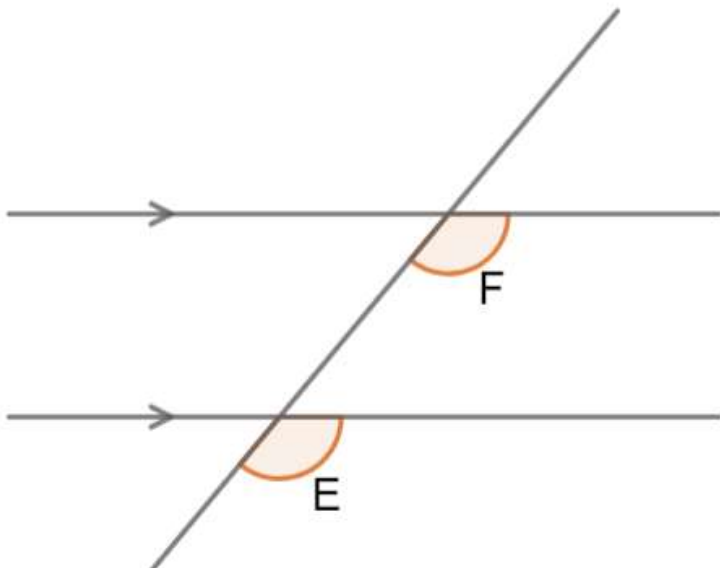




A and B are **vertically opposite** angles.  
They are equal.



C and D are **alternate** angles.  
They are equal.



Furthermore, if there are several angles which together go all the way around a point, they will add up to make  $360^\circ$ , and similarly if there are several angles which together form a straight line, they will add to make  $180^\circ$ .

Here are all of the different pairings of angles, their names, and their relationships.

**Note:** vertically opposite angles don't require the presence of the parallel lines – they occur when any two straight lines cross.

Some of these facts might look obvious, you might think the angles \*look\* the same, but if a question asks you to find a missing angle using these facts, it will almost certainly ask you to quote the fact you used, so make sure you know them all.

It's important to understand that A and B, marked on the first diagram, are not the only pair of vertically opposite angles in picture. The same goes for all the other types of pairs and their diagrams, too.

**Example:** BD and EG are parallel lines. Find the angle marked XXX in the picture below. State which angle fact you used at each step.

These two angles do not go together in any of the pairs seen above, so to find XXX we will need to use more than one of our angle facts (each of which will be bolded, just to be clear).

There are multiple correct ways to do this, we'll go through one.

Firstly, we will use the fact that angles on a straight line add to 180. Specifically, angle EFC and angle GFC add to make 180, so if we subtract EFC from 180, then we get the size of angle CFG.