# Maths: Angles

Our next unit of maths focuses on angles. Over the next few weeks we will look at how to recognise, measure and calculate angles. In school we would spend some time using protractors to measure and draw angles. We understand that this is not equipment that we all have at home – please do not worry. You will not need any equipment for the work that you have been set. We will have plenty of opportunities to practice using a protractor when we are back in school.

Key Vocabulary:

Familiarise yourself with some of the language that we use to describe angles. You may recognise some of this from Year 4.
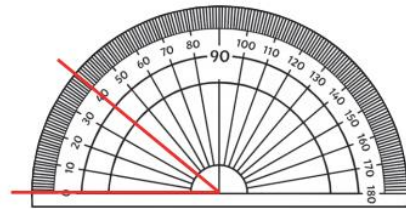
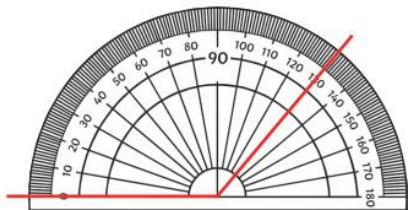**Right Angle**

A right angle is 90°.
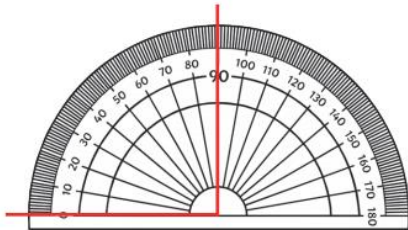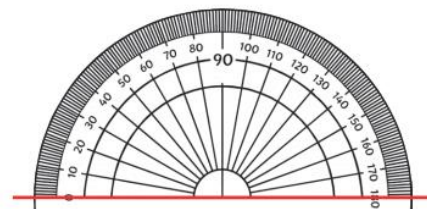
Acute Angle

An acute angle is less than 90°.

Obtuse Angle

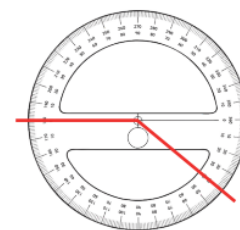An obtuse angle is more than 90° and less than 180°.

Straight Angle

A straight angle is exactly 180°.

Reflex Angle

A reflex angle is greater than 180° and less than 360°.

Once you are confident with this vocabulary you should be able to complete the following tasks on Mathletics:

- What Type of Angle?
- Classifying Angles

You could also watch the videos below and complete the tasks at the end.

https://www.bbc.co.uk/bitesize/topics/zb6tyrd/articles/zg68k7h

https://www.bbc.co.uk/teach/class-clips-video/maths-ks2-understanding-angles/zk7tf4j

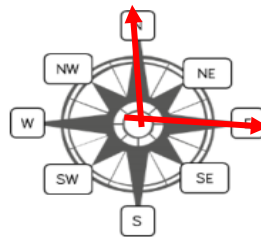How many right angles can you spot around your home?

Measuring angles in degrees

The unit of measure we use for angles are degrees. This tells us how much something has rotated.
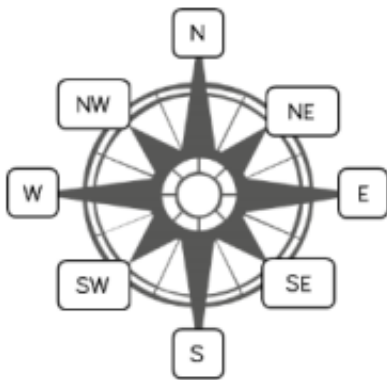
Matt is facing North. He turns to face East. Describe the turn that he has made.

I'm going to draw this turn to help me. I could also act it out myself.

I can see that Matt's move has created a right angle. This means that he has **rotated by 90˚**.

I can see that this turn is **one quarter** of the whole circle.

He has turned in a **clockwise** direction (he has moved in the direction the hands move on an analogue clock).
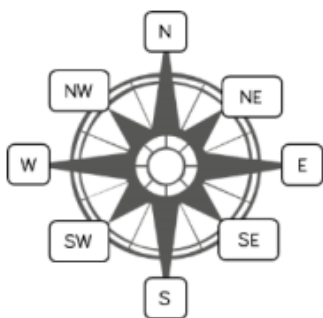
Optional Tasks

If you would like some practice at using degrees, have a go at the tasks below.

Question 1

Use the example above to help you to complete the table below. You may also want to look at the vocabulary cards on the previous page.

Use the compass to complete the table.

| Turn	Degrees	Type of angle	Fraction of a turn
North-East to South-East Clockwise	90°	Right angle	$\frac{1}{4}$ of a turn
North-West to North-West Clockwise			
South-West to South-East Anti-clockwise			
South-West to _____ Clockwise	180°		
North-East to East Clockwise			$\frac{1}{8}$ of a turn

Question 2:

Choose and complete one set of questions.

(Remember that the questions get slightly harder, the deeper the submarine goes)
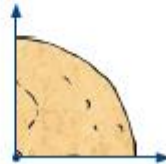
1) Estimate the size of each angle of the biscuits.

   Remember to use what you already know about angles to help you.

   Label each as acute, obtuse or reflex.
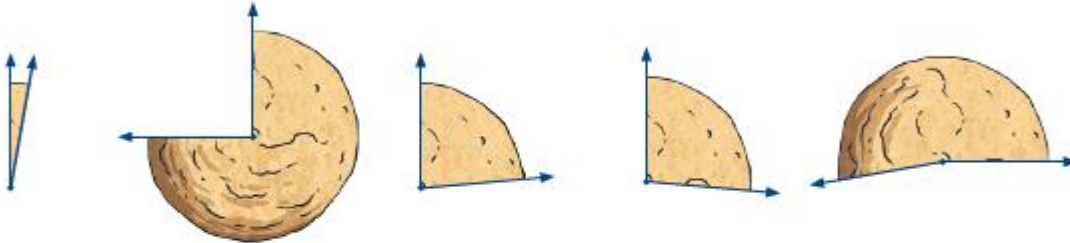
2) Estimate these angles and then order from smallest to largest.

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1) Use the correct symbol (< > =) to complete these statements.

   135° ▢ ½ turn

   ¾ turn ▢ 270°

   ⅜ turn ▢ ▢ 270°

2) Sam says, "My turn will be a reflex angle if I turn from north-east to west clockwise." Is he correct?

   Circle: Yes / No

   Explain your answer.

1) True or false? A $\frac{3}{4}$ turn is greater than $\frac{5}{8}$ of a turn. Prove it!
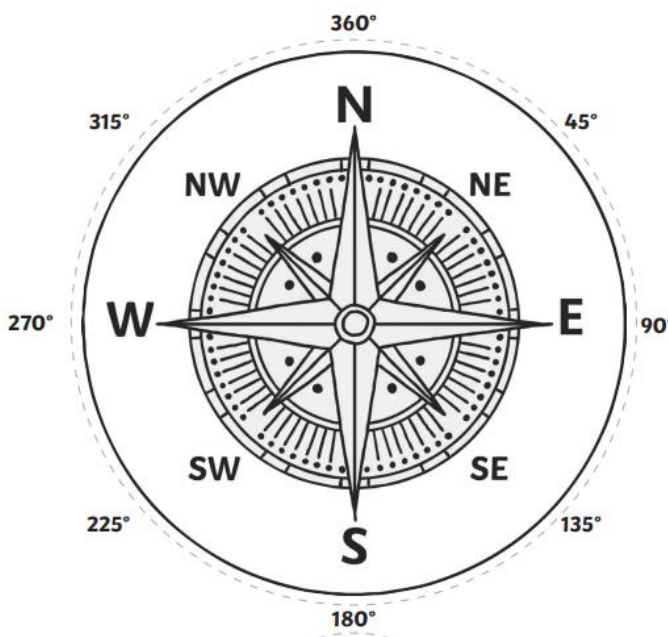
2) Follow the instructions to work out the code to unlock the jar.

- Imagine you are facing 0. Make a $\frac{3}{4}$ turn anticlockwise.
- Then turn $\frac{3}{8}$ clockwise.
- Next, turn 90° anticlockwise.
- Finally, turn $\frac{2}{8}$ clockwise.

☐ ☐ ☐ ☐

How many other ways can you write the instructions to give the same code?

Further Help:

This image may be good to have on hand while you are completing your tasks. After a while you may find that you start to memorise these position.

Can you make your own version using a clock face?

Measuring Angles Using a Protractor

We use a protractor to accurately measure angles. There are two scales on a protractor and it is important that we learn to read the correct one. Accuracy is also incredibly important, so you need to take care over how you line up your protractor.
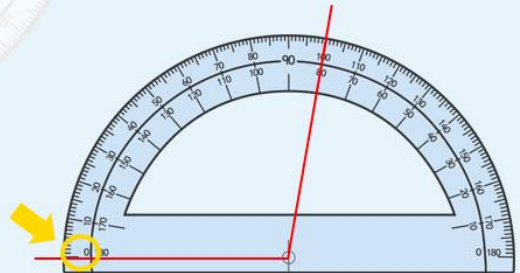
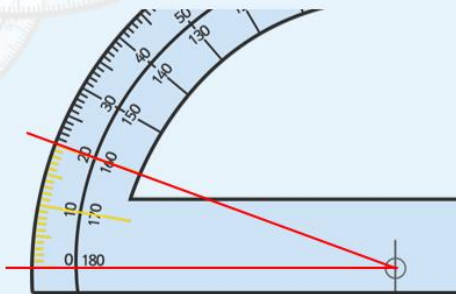**1** Place the cross or circle at the point (vertex) of the angle that you are measuring.
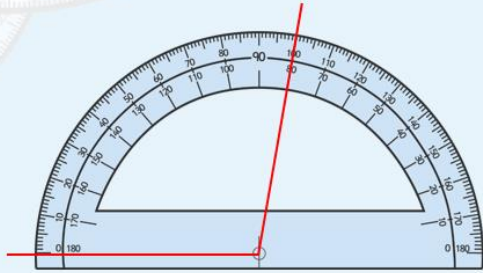
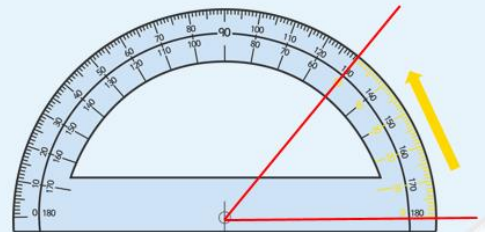**2** Read from the zero on the outer scale of your protractor.

3 Count the degree lines carefully.

4 If the angle that you are measuring turns in an anti-clockwise direction, you will need to use the inner scale of your protractor.

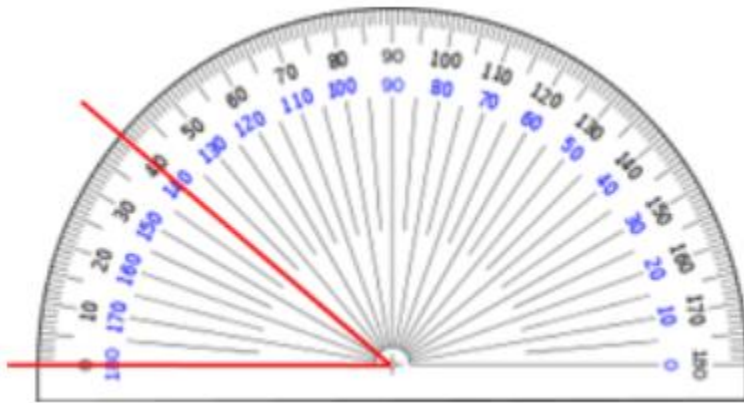**Tip!** It is a good idea to estimate the angle before measuring.

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Using a protractor:

https://www.youtube.com/watch?v=9RTM418qfdl

https://www.youtube.com/watch?v=Gzd_lsNwTOI

https://www.youtube.com/watch?v=nrFOrFPpn2o

If you do have a protractor at home you could now have a go at using it. You could draw yourself some angles and try to measure them accurately. If not, do not worry! The activities on the next page allow us all to practice.

Measuring Angles using a Protractor

If we follow the step-by-step guide on the previous page, we should be able to accurately measure angles. It is important that we take care when reading the measurement on the protractor.

First I am going to estimate the size of the angle. I can see that it is an acute angle, so it will be less than 90°. I estimate that it will be 45°.

Now I need to look for 0 on the base line. I can see that my angle passes through the 0 on the outer scale, so I will be using this.

My angle crosses through the outer scale again at 40°. Looking back at my estimate, this is a sensible answer.

I have used the outer scale to determine that this angle is 40°

Why don't you try?

Read the angles shown on the protractor — remember you want to measure the angle between the two red lines!
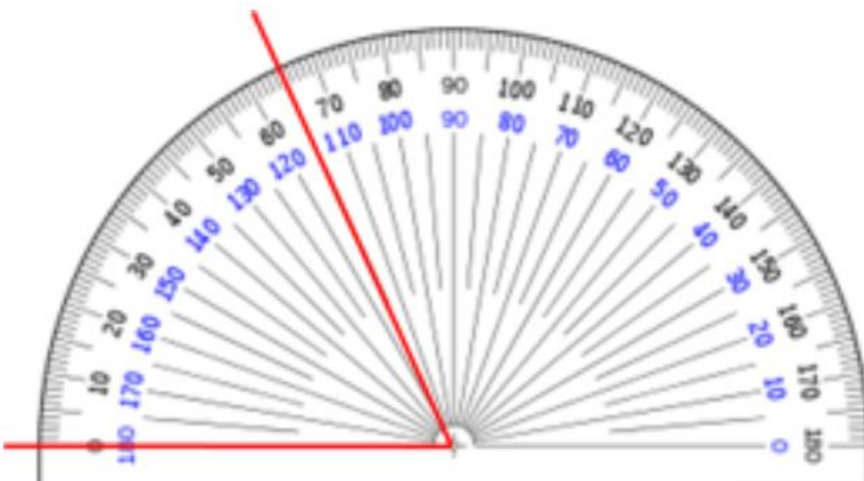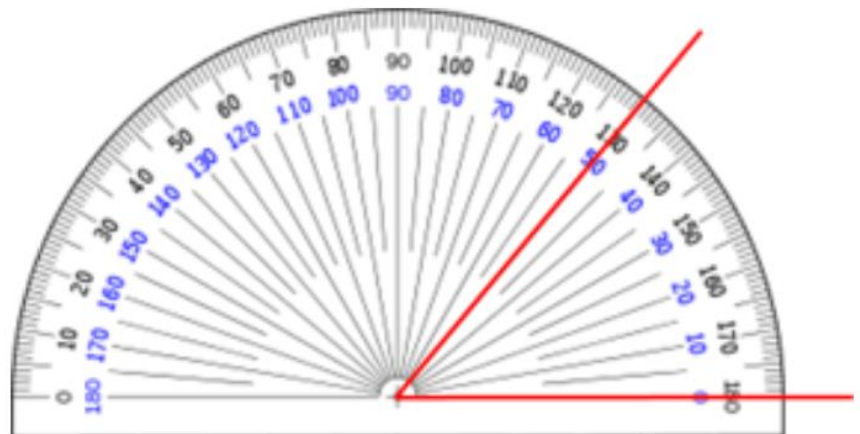
Want some more practice?

Below are some activities that you can complete if you would like to practice measuring with a protractor. These are optional activities.

Activity 1:

Follow the link to the Maths Playground website. Use the on screen protractor to measure each of the angles and put your answer into the calculator on the side of the screen.

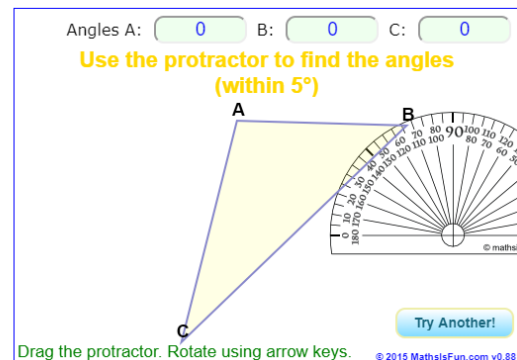https://www.mathplayground.com/measuringangles.html

Activity 2:

This website reminds you of how to measure angles and has a task to complete at the end. You can move the on screen protractor to measure the angles.

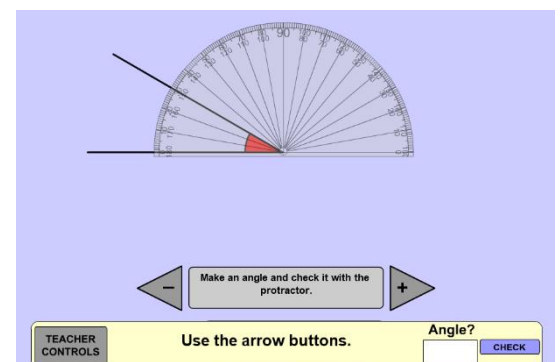https://www.mathsisfun.com/geometry/protractor-using.html

Activity 3:

This activity allow you to make your own angles and then measure them using the on screen protractor. This is a brilliant opportunity to practice measuring a range of angles.

http://flash.topmarks.co.uk/651

Reasoning and Problem Solving Challenges

If you are feeling confident with how to measure angles, why not try the reasoning and problem solving activities below. Remember you may need to explain your answer to be able to fully answer the question.

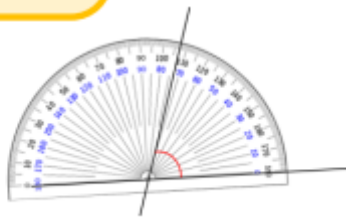Which angle is the odd one out?

| 180° | 45° | 79° | 270° |

Could another angle be the odd one out for a different reason?

Always, sometimes or never true?

- If I turn from North-East to North-West, I have turned 90°
- If I turn from East to North-West, I will have turned through an obtuse angle.
- If I turn from South-West to South, my turn will be larger than 350°

Teddy

I have measured the angle correctly because my protractor is the right way round.
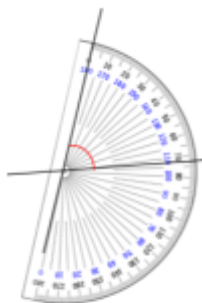
Whitney

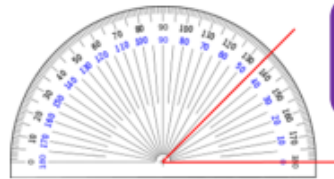I have measured the angle correctly because my protractor is on the line accurately.

Who do you agree with?
Explain why.

Three children are measuring angles. Can you spot and explain their mistake?
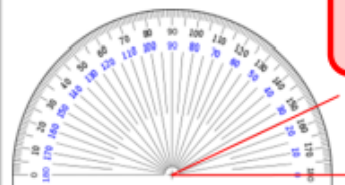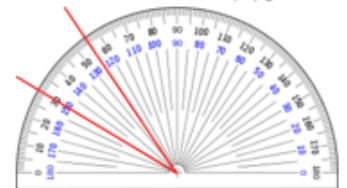
My angle measures 135°

Mo

My angle measures 55°

Dora

My angle measures 35°

Alex