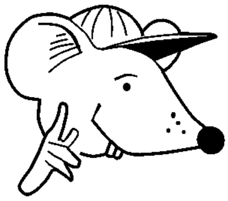
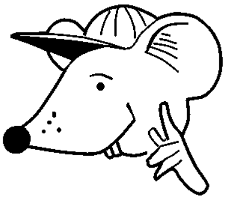


MATHEMATICS



Y6 Measurement

6650

Measure and calculate the circumference of circles.

Equipment

Paper, pencil, ruler.
Tape measure.
Pair of compasses.
String.

MathSphere

Concepts

An enjoyable extension activity involving measuring and calculating perimeter and area is to work with circles.

There are many examples of circles in the real world that can be used for practical work eg measure round the outside of a baked bean tin etc.

With a little help and a lot of practical work, children should be able to see that there is a relationship between the circumference of a circle and the diameter - the circumference being about 3 times the diameter.

From this pi can be introduced, usually as 3.14 and the sign can also be introduced: π

There is some difficult language involved with this, in particular

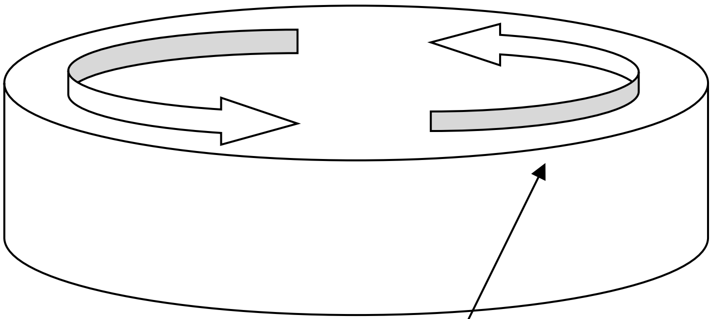
radius, diameter and circumference

Investigate lids!!

Make a collection of various sized circular lids before starting this investigation.

1. Use a tape measure to find the distance round the outside of a lid. Make sure that you measure in centimetres.

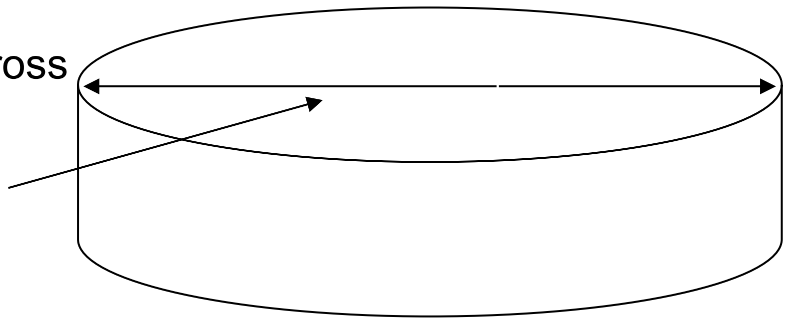
This is called the CIRCUMFERENCE of the lid.



Distance round the lid is the **circumference.**

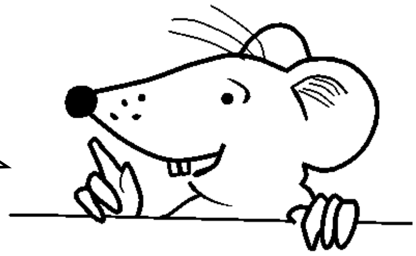
2. Use a tape measure, or ruler, to find the maximum distance across the lid. This must pass through the middle of the lid.
This distance is known as the DIAMETER.

Distance across the lid is the diameter.

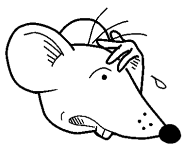


On the next page complete a chart of your results.

Fill in the chart with your results from measuring the circumference and diameters of lids etc.
Do you notice anything about how much bigger the circumference is compared to the diameter?
(Leave c/d for now!)



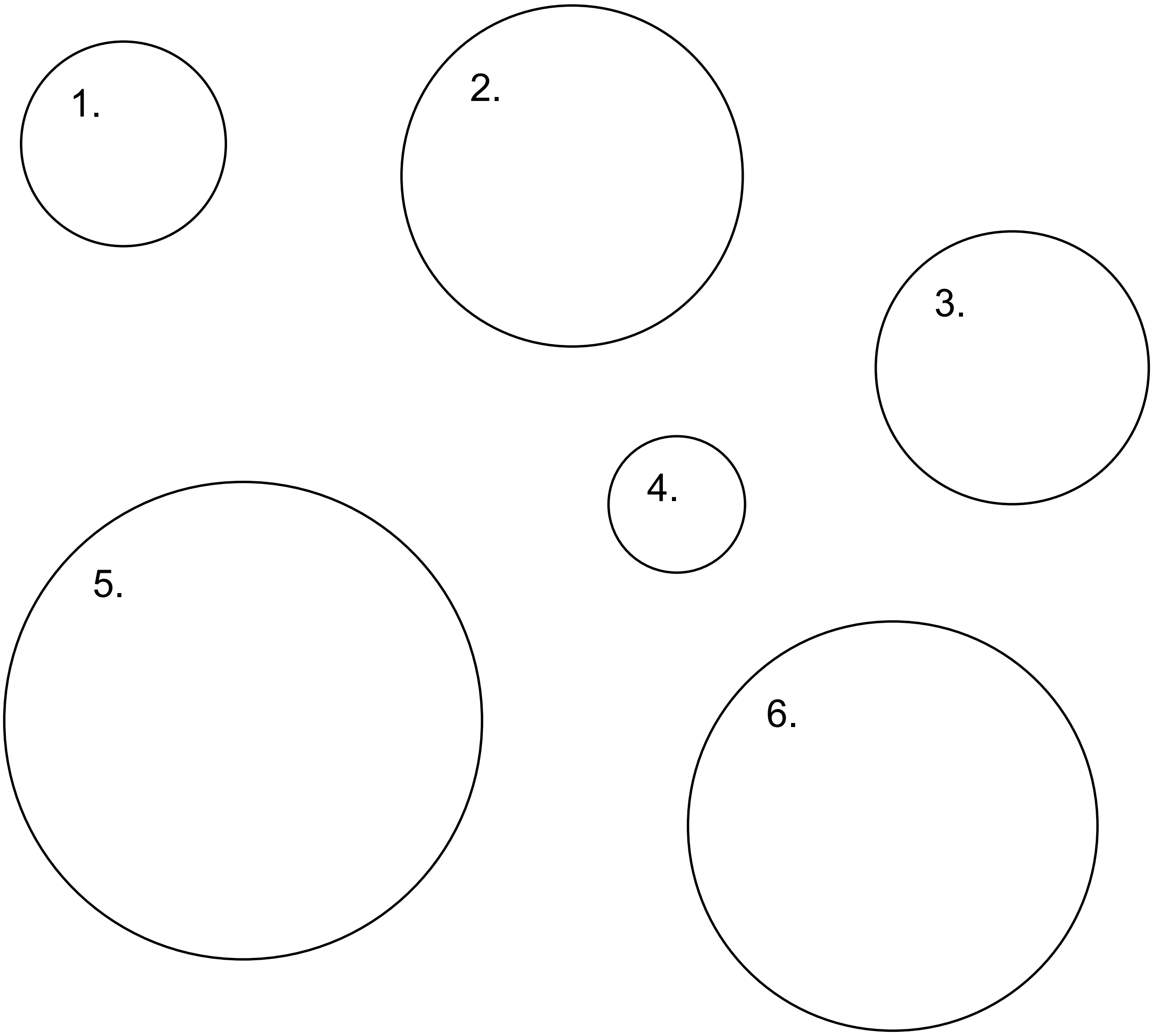
Lid	Circumference (c)	Diameter (d)	c/d
1			
2			
3			
4			
5			
6			
7			
8			



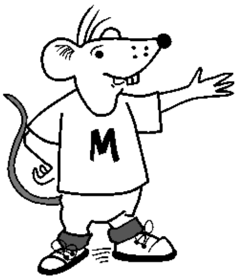
Don't panic!
On your calculator put in the circumference, then press the divide sign and then put in the diameter.
Finally press equals.
Put your answers in the last column of the chart.
This tells you how many times bigger the circumference is than the diameter. Notice anything?

Circumference of circles

You will need string for this activity - and someone to help might be a good idea, too!
Use string to measure how far it is round these circles - you can only be accurate to the nearest centimetre or so.
Then use a ruler to find the diameter of each circle.
Record your results on the chart on the next page.



Circumference of circles



Record your results below.
Then use a calculator and type in the circumference, then the division sign, then the diameter and finally equals.
Record in the last column.
Do you notice anything - you will if you have measured really accurately!!!

Circle	Circumference (c)	Diameter (d)	c/d
1			
2			
3			
4			
5			
6			

You should have noticed that the circumference is about three times as long as the diameter.
Check to see if this is correct.
If not, perhaps you would like to check your measurements.

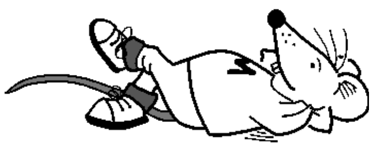
Circumference and diameter of circles

1. Use a pair of compasses and carefully draw circles with radius of 3 cm, 4cm, 5 cm
and 6 cm. You can do them like a bulls eye if you like - it saves paper!
Find the diameter (twice the radius).
Find the circumference - use string or thread.
Record your results in a chart.

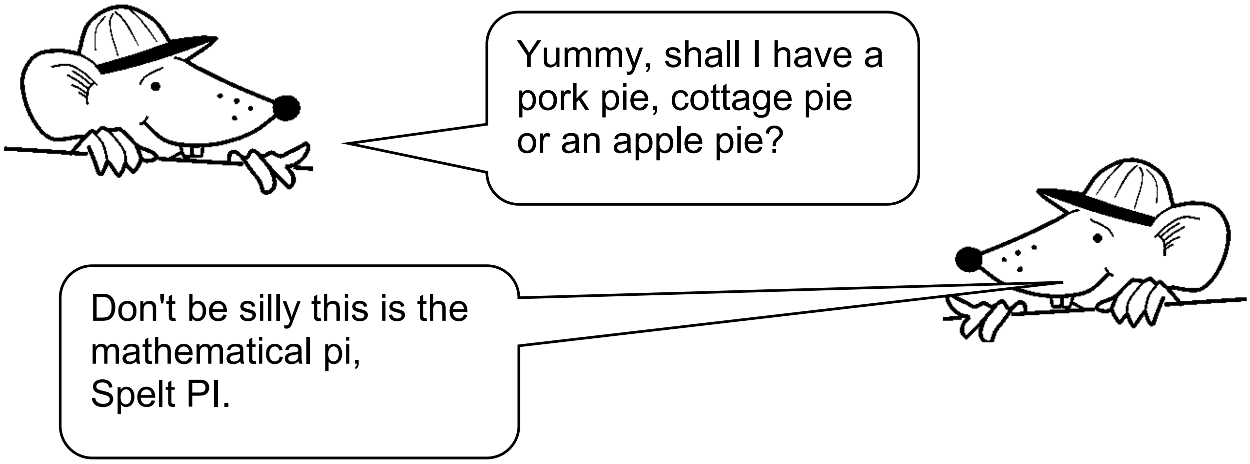
Radius	Diameter	Circumference	What do you notice?
3 cm			
4 cm			
5 cm			
6 cm			

2. You will need a friend for this one!
Find a stick, and tie a long piece of string or a long measuring tape to it.
Tie the other end to a piece of chalk.
On a playground keep the stick in the middle and the string tight, mark a circle.
(It is important that the stick is held in one place - the centre of the circle you are drawing - and that the string does not go slack or you will end up with a very wobbly circle!)
Use a trundle wheel to measure the circumference.
Compare it to the diameter (twice the length of the string when taut.)

3. Find a football pitch.
Measure round the centre circle using a trundle wheel.
Measure the diameter along the centre line.
Compare your measurements.



Pi



You will have worked out by now that when you divide the circumference of a circle by the diameter you will get an answer that is about **3**.
It all depends how accurately you measure!

Our old friend **Archimedes** was one of the earliest mathematicians to use pi. He measured ever so accurately and came up with **3.14** as the value of pi.

Later other mathematicians used the fraction **22/7** or **22 divided by 7**.
Try this sum on your calculator and see what answer you get.

Today pi has been worked out much more accurately - this is pi to 40 decimal places:

3.1415926535897932384626433832795028842

Try to find out more about pi - you will often see it written like this:

$$\pi$$

(Just type in pi on an Internet search engine!)

Using pi.

Knowing that pi is equal to 3.14 can be very useful.
If you know the diameter of a circle you can use it to work out the circumference.

Example: if the diameter of a circle is 5 cm what is the circumference?

Answer is found by multiplying 3.14 by 5 = 15.7 cm

Find the circumference of these circles:

1. diameter of 4 cm

2. diameter of 6 cm

3. diameter of 9 cm

4. diameter of 20 cm

5. diameter of 100 cm

What happened to the cat that swallowed a ball of wool?

She had mittens!

(Remember that the diameter is twice the radius.)
Can you work out the circumference of these circles:

6. radius 2 cm

7. radius 5 cm

8. radius 7 cm

9. radius 8 cm

10. radius 6 cm

Using pi.

Knowing that pi is equal to 3.14 can be very useful.
If you know the diameter of a circle you can use it to work out the circumference.

Example: if the diameter of a circle is 4 cm what is the circumference?

Answer by multiplying 3.14 by 4 = 12.56 cm

Find the circumference of these circles:

1. diameter of 5 cm

2. diameter of 3 cm

3. diameter of 10 cm

4. diameter of 8 cm

5. diameter of 50 cm

(Remember that the diameter is twice the radius.)
Can you work out the circumference of these circles:

6. radius 3 cm

7. radius 6 cm

8. radius 10 cm

9. radius 9 cm

10. radius 4 cm

Knock, knock!

Who's there?
Tracy.

Tracy who?

Tracy the shape in pencil, please.

Answers

Page 5/6

1. c = 9 - 10 cm, d = 3 cm c/d = 3+
2. c = 15 - 16 cm, d = 5 cm c/d = 3+
3. c = 12 - 13 cm, d = 4 cm c/d = 3+
4. c = 6 - 7 cm, d = 2 cm c/d = 3+
5. c = 21 - 22 cm, d = 7 cm c/d = 3+
6. c = 18 - 19 cm, d = 6 cm c/d = 3+

Page 7

1. r = 3 cm d = 6 cm c = approx 18 - 19 cm
r = 4 cm d = 8 cm c = approx 25 - 26 cm
r = 5 cm d = 10 cm c = approx 31 - 32 cm
r = 6 cm d = 12 cm c = approx 37 - 38 cm

Page 9

1. 12.56 cm	**2.** 18.84 cm	**3.** 28.26 cm	**4.** 62.8 cm	**5.** 314 cm
6. 12.56 cm	**7.** 31.4 cm	**8.** 43.96 cm	**9.** 50.24 cm	**10.** 37.68

Page 10

1. 15.7 cm	**2.** 9.42 cm	**3.** 31.4 cm	**4.** 25.12 cm	**5.** 157 cm
6. 18 .84 cm	**7.** 37.68 cm	**8.** 62.8 cm	**9.** 56.52 cm	**10.** 25.12 cm