Work Program for B2FMaths@Home Week 2 Year 4

Contents – click on the link below

How to use this work program

Accessing the online resources

To access the online resources, please go to: https://www.backtofrontmaths.com.au/b2fmathshome

Running the program each week

Each week is designed with five maths lessons so that you can do it each day. Different days have different types of lessons to make sure that students experience the kind of thinking that they need to continue growing in maths. The types of lessons include:

- **At-home investigation:** This is a hands-on task where students explore a new idea before they are taught that skill. They need to come up with an idea to try to solve the problem, try out their idea, decide if it worked or not, try again if needed, and explain what they did.
  If your child has time with your teacher with a webcam, the teacher will generally be doing this lesson with your child. This is the lesson that will require the heaviest input from you to help your child think through an idea and generally requires the use of some hands-on materials that are listed in the information page.
- **Connecting lesson:** This type of lesson has questions that lead students to develop their ideas and learn a new skill. It should be fairly easy for a student to do, but you will need to be available to read the question to your child as needed, encourage them to think further, and make sure that they complete the work. Most of these lessons will include 10 minutes of practising number operations or concepts through activities or games.
- **Interleaved practise lesson:** This type of lesson provides 8-10 questions from different areas of maths so that students practise remembering what they have previously been taught. Some of the questions may not be easy for your child, so feel free to help whenever you see them struggling.
- **Generalising lesson:** This lesson contains some extension material for use if your child found the week's lessons too easy. *If you would prefer*, you can spend this lesson playing more of the number games that are included in the connecting lesson or giving your child time to complete any of the lessons that they have not yet done.

Getting help

The website above will have answers to frequently asked questions as well as videos to help you successfully teach your child at home. If you have further questions or need support, please contact your child's teacher directly using the contact details that they have provided to you. If they can't answer your questions, they will contact the B2FMaths@Home team directly to get an answer within 3 days.

What you need to know this week

Week overview

This week we are teaching the concept of **2D shape and angles**. In particular, we are focusing on angles in 2D shapes as this is the “C” standard.

Students need to work out:

- 2D shapes are flat. A round ball is not a circle, it would be a sphere. A pyramid is a pyramid, not a triangle, even though its faces are triangular.
- 2D shapes are generally classified by the number of sides and angles that they have, not by “pointiness” or the orientation (if it is straight or on an angle). That means that a triangle that has the point at the bottom is not “upside down”. It is just a triangle. Likewise, a square that is angled is not a “diamond”. It is still a square.
- Triangles can have different length sides. They don’t have to be the same.
- A square is a special type of rectangle (*see the video on the website*). A rectangle has opposite sides that are equal (same length) and parallel (run in the same direction), with right angles (square corners). It actually doesn’t have to have 2 long and 2 short sides – that’s just how we tend to see it.
- Squares and rectangles have right angles (square corners)
- Angles are measures of turn, and can be described as the amount you have turned (e.g. half turn, quarter turn).
- Right angles are “square”. Angles can be classified as smaller than right angles (acute), between right angles and straight angles (obtuse), or larger than straight angles (reflex).

We are also hoping that students will learn over the next few years:

- “Regular” shapes have sides and angles that are equal. For example, a regular 4-sided shape is a square. A regular octagon looks like a stop sign.
- When naming shapes, the prefix tends to refer to the number of sides or angles.
    - Tri = 3: a tricycle has 3 wheels, a triceratops has 3 horns, a triangle has 3 angles or 3 straight sides (tri = 3, angle = angles)
    - Quad = 4: a quad-bike has 4 wheels, a quadrilateral has 4 sides (quad = 4, lateral = refers to lengths or sides). Squares, rectangles, parallelograms and trapeziums are some types of quadrilaterals.
    - Pent = 5: a pentagon has 5 sides, a pentagram is a 5-pointed star. The sides do not have to be the same length.
    - Hex = 6: a hexagon has 6 sides. The sides do not have to be the same length.
    - Oct = 8: an octagon has 8 sides, an octopus has 8 legs. The sides of an octagon do not have to be the same length.
- For all straight-sided 2D shapes, the angles will add up to be the same amount of degrees. The angles of a triangle add to 180° because if you tear the triangle apart and line up the corners, it makes a straight line (see the video).

You will need the following objects:

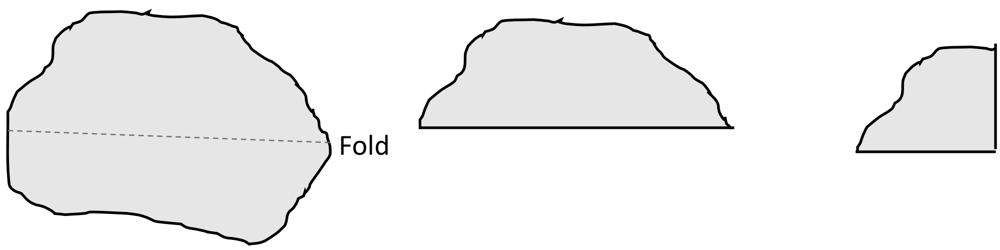
- For Friday: paper of two colours if you can, a bowl to trace around, scissors.

Monday: At-Home Investigation

Is our room square?

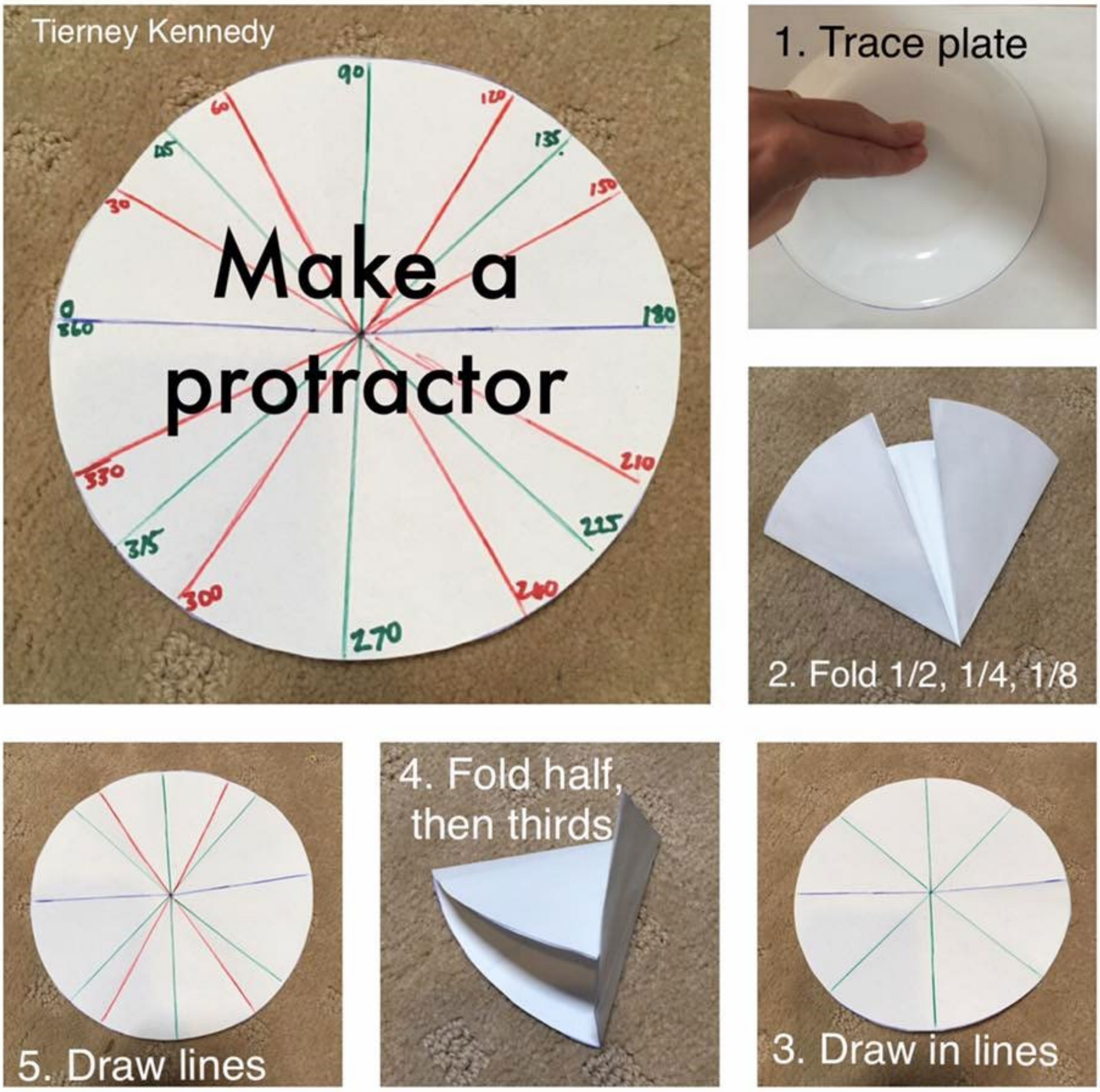
You will need:
- Paper to fold to make a right angle (or “square” angle)
- Protractor if you have one (see video online on how to make a paper version)

Make a right or square angle by folding any piece of paper, then folding again along the line you have made. This makes a right angle, like the corner of a square or rectangle, and like most corners in your house. You can use the paper to test any angles to see if they are bigger, smaller or equal to a right angle/quarter turn.



Steps:
1. Make sure you have read “What you need to know this week” so that you know what to emphasise with your child.
2. Read the sheet to your child. Ask for their ideas on how to solve the problems. If you need to, you can show them the steps above to make a right angle but try to let them use their own ideas first.
3. Make sure that you try out their ideas first before you try to help them come up with a better plan. This is important because then they will know *why* their idea didn’t work.
4. Help your child to describe their thinking about angles. If you have access to a protractor, your child can refold their paper so that the angle matches the wall, then measure the paper with a protractor.
5. Discuss what your child found out with them. Keep in mind the ideas from the “What you need to know this week” section so that you can ask questions that are appropriate to the issues identified.

Here is a photo showing how to make a protractor. If you fold each 30° angle in half again, you will have 15° sections. This is close enough for estimating angles for this task and the next few.

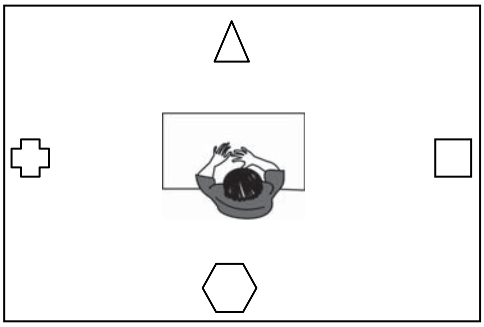


PROBLEM 35: ANGLES AND TURNS

TR p144

Look at the following situations and work out what the descriptions mean. Use this understanding to give your own directions to the places specified below.

Degrees of turn:
Look at the picture below and the instructions given.
See if you can work out what 'quarter turn' and 'half turn' mean.



- Jemma sits in the middle and faces the triangle. She turns a **half-turn**. This means that she is facing the hexagon.
- Jemma faces the triangle. She turns a **quarter-turn clockwise**. This means that she is facing the square.
- Jemma faces the triangle. She turns a **quarter-turn anticlockwise**. This means that she is facing the cross.

1. What does a half-turn mean?

2. What does a quarter-turn mean?

3. Stand up behind your desk. Turn a half-turn. What are you facing?

4. Stand up behind your desk. Turn a quarter-turn clockwise. What are you facing?

5. Stand up behind your desk. Turn a quarter-turn anticlockwise. What are you facing?

6. Stand up behind your desk. Turn a half-turn, then a quarter-turn clockwise. What are you facing?

7. Stand up behind your desk. Turn a half-turn, then another half-turn. What are you facing?

Giving your own directions

Using what you have learned about turns, write some directions for a friend to follow:

____

____

____

____

Work out what they would be facing at the end but don't write it down.

Swap books with a friend and follow each other's directions to find out how well the directions worked. **Write your answer on your friend's book and have them write their answer here:**

Friend's name: ________________ How well did the directions work? Explain your answer:

Understanding and manipulation: Start facing where your directions ended. **Reverse** your directions so that you end up where you started. Write them here:

____

____

____

____

____

____

____

____

____

<u>Teacher initials</u>:

Date:

Problem solving / T&R:
- o Problem solved with minimal or non-mathematical prompting
- o Some leading questions were used to prompt thinking
- o Solved after explanation
- o Did not work out solution
- o N/A- not a novel problem

Reasoning / Comm.:
(verbal, written, working and equations, or visual representations)
- o Clearly and logically reasoned, clear directions
- o Easily understood reasoning and directions
- o Understood with some interpretation needed
- o Some gaps or miscommunications
- o Minimal or off topic

Understanding / Reflect:
- o Connected manipulation problems to previous questions and answered easily
- o Connected manipulation problems to previous questions with some prompting, and answered correctly
- o Answered once the similarities to previous questions had been pointed out
- o Had some problems in answers but was on the right track
- o Did not answer appropriately

o Student not observed

Tuesday: Connecting Lesson

Number task for 10-15 minutes: *Finding a total*

Choose a number between 10 and 50. *Please note, 24 and 36 are the easiest, 41 and 37 are particularly hard.*

Roll a dice 4 times to get 4 numbers, or just pick any 4 numbers between 1 and 8.

Try to use those numbers to get as close as possible to your target number.

Rules:

- Not all 4 numbers have to be used
- A number can only be used once
- Use any operation you like (+ - x ÷) and any others that you know (e.g. powers or square roots, ! etc.)

Try at least 3 numbers.

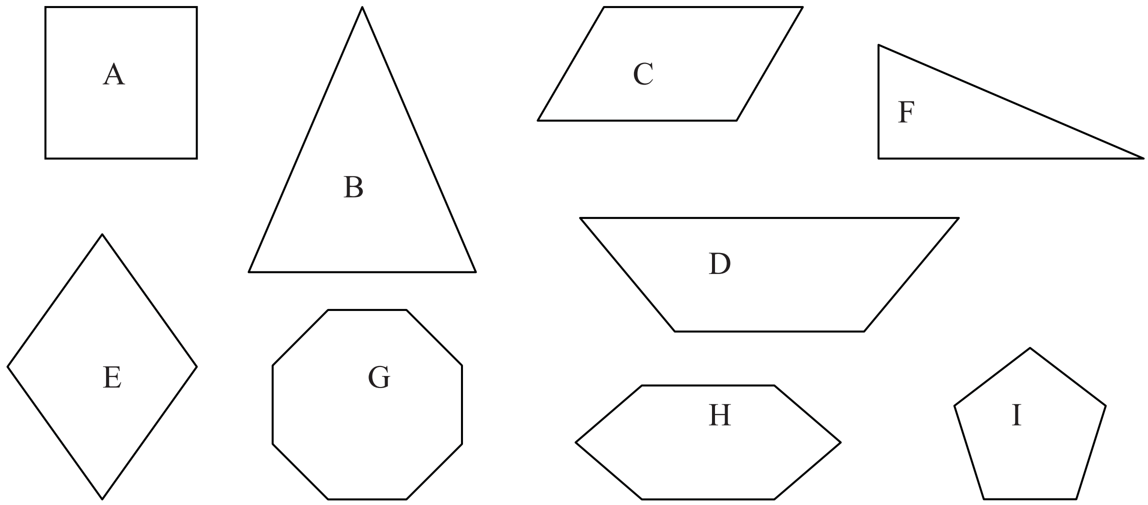
Worksheet task:
This lesson is a review of 2D shapes, in preparation for detailed classification next year. In addition to the questions listed, please ask your child to describe the angles in the shapes as this is important for the "C" standard. Use your angle measuring device or the protractor to estimate the size of each angle if you can.

K1. Properties of lines in 2D shapes

The sides of many 2D shapes are straight lines. They can be described in lots of different ways. In this activity you will learn to ask and answer some questions about lines that border shapes.

Questions you can ask about the sides of 2D shapes:
1. How many are there?
2. How long are they?
3. Are there any the same length? Which ones?
4. What position are they in: horizontal, vertical or oblique (on an angle that is not horizontal or vertical)?

Look at the shapes below, work out the answers and write them in the table.



Shape	How many?	How long?	Same length?	Position?
A	4	2cm each	Yes	2 h 2 v
B				
C				
D				
E				
F				
G				
H				
I				

What is one way that I could group the shapes above? List the categories that you could use to group them, and write the letter of the shape in the group.

What is one other way that I could group the shapes above? List the categories that you could use to group them, and write the letter of the shape in the group.

What is one other way that I could group the shapes above? List the categories that you could use to group them, and write the letter of the shape in the group.

What patterns have I found for grouping the shapes? What properties am I using?

Wednesday: Application Lesson

This lesson allows your child to think further about the characteristics of shapes and how we might group them. Please note, shape L has been included in 2 groups deliberately so that students can find out that it is an error. It should not be in the group of pentagons.

Number task for 10-15 minutes: ***Multiplication grid below***

Worksheet task: 15-20 minutes
This lesson is following on from what your child learned yesterday about **describing shapes**. The purpose of the lesson is to think about how we can use properties to classify shapes into families.

Make sure that your child **explains out loud** their reasons as this means that they will be more likely to remember it later.

If your child can identify characteristics, ask them to try drawing shapes that are combinations of other shapes (e.g. putting a triangle and a rectangle together in different ways), then describe the angles they have made.

Multiplication Practise:

X	3	4	5	6	7	8	9
3							
4							
5							
6							
7							
8							
9							

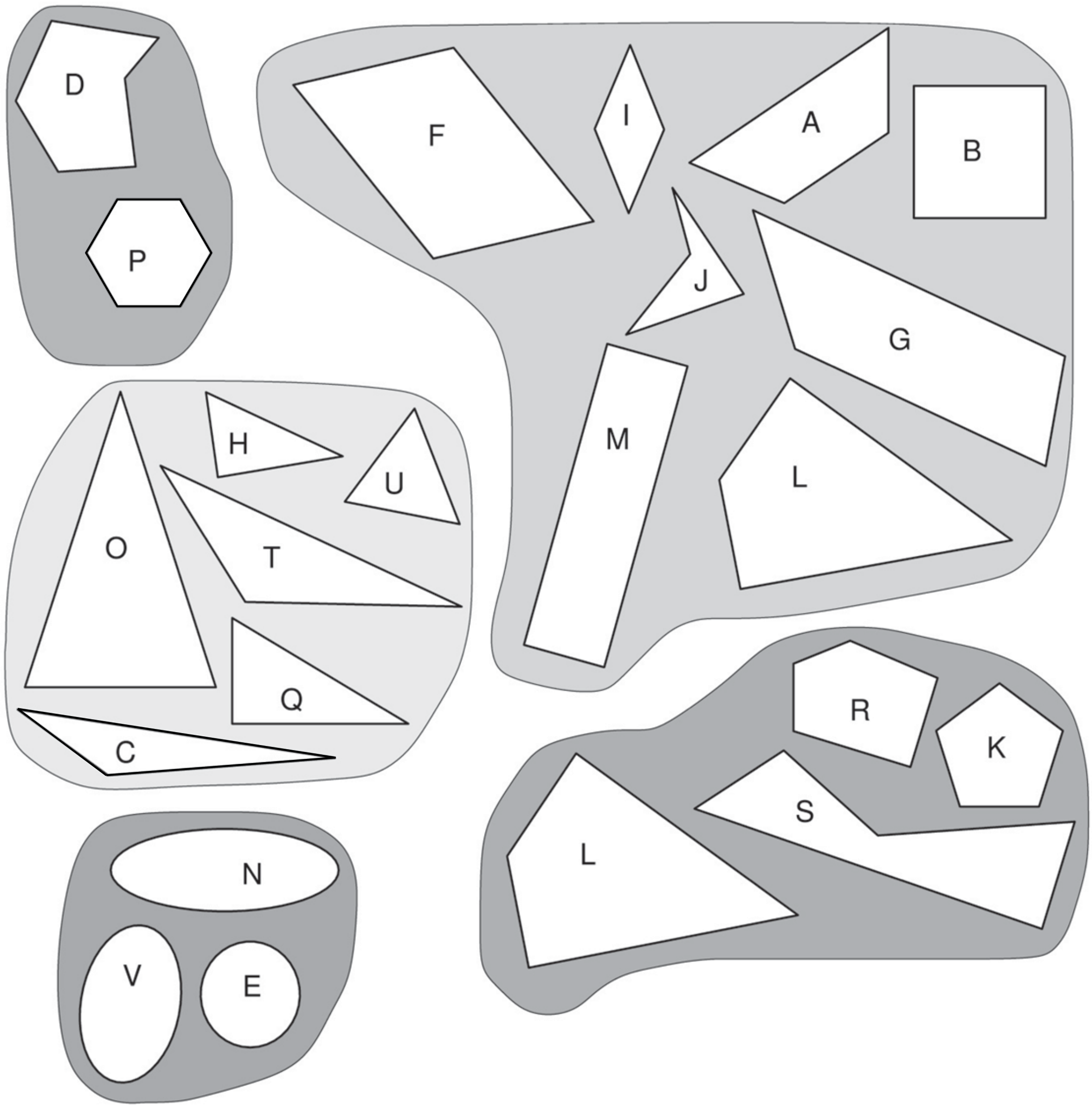
Record your time here for the 49 questions:

Mark your answers using a calculator or with an adult. Circle any that are wrong.

K2. Shape families

TR p136

How have these shapes been grouped into families?



How have the shapes been grouped into families? Did you find the shape in the wrong family?

How are the families similar? How are the families different?

Thursday: Interleaved Practice Questions

Why we are using mixed up questions:
In this lesson your child will be reviewing a range of skills that they have learned previously. Each question is unrelated to the previous question, because we want your child to have to *think hard* about what to do. Mixing up questions like this, rather than just practising related questions, has been shown in research to improve student retention of concepts by 60% over a 4 month period.

What to expect:
Your child will probably have forgotten how to complete quite a few of the questions. If needed, change the numbers in each question to make them easier because this will still require your child to think hard and remember a process. If they still can't work it out, feel free to show them, but try using different numbers rather than the exact same question. There are answers to each question on the website in case you get stuck.

Interleaved practice

Number:

1. Complete the following number sequence: 68 , 63 , ___ , ___ , 48 , ___ , ___ , 33

2. 14 328 + ____ = 21 502

3. What arrays can you make with 36 counters? Draw the arrays that you made.

4. What number comes after 19 909?

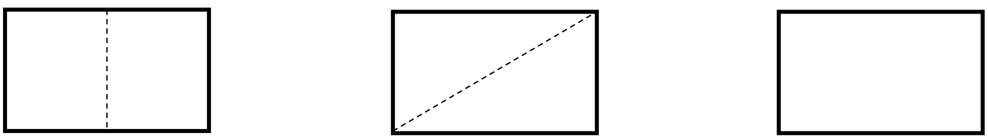
5. Find two different ways to make $71.85 without using any gold coins.

Measurement/Geometry:

6. Use a ruler or tape measure to find the length of 3 objects that are longer than 30cm and shorter than a metre. Write the name of the objects and their length here.

7. What time will it be in 110 minutes?

8. The dotted line in shape 1 shows a line of symmetry. It is not a line of symmetry in shape 2. Why not? Draw a different line of symmetry in shape 3



shape 1 shape 2 shape 3

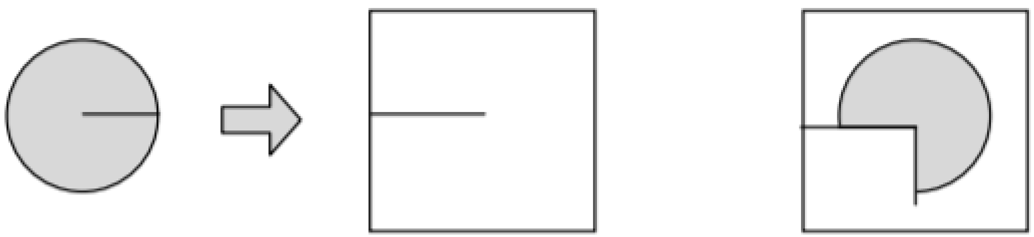
Chance/Data:

9. Choose 5 different types of toys and work out how many you have.
   Design a table to record your findings.

Friday: Generalising and Extending Lesson

You will need to decide between the following options:

- Child found the thinking about angles on Monday, including describing the directions tricky: do the first worksheet so that you can make sure understanding of angles as degrees of turn is solid. To complete this worksheet, you will need a circle cut out of a piece of paper (trace around a bowl), and a square as well. Make the slits as shown on the diagram below and slide the circle onto the square. When you rotate the circle, you will be able to show different degrees of turn.

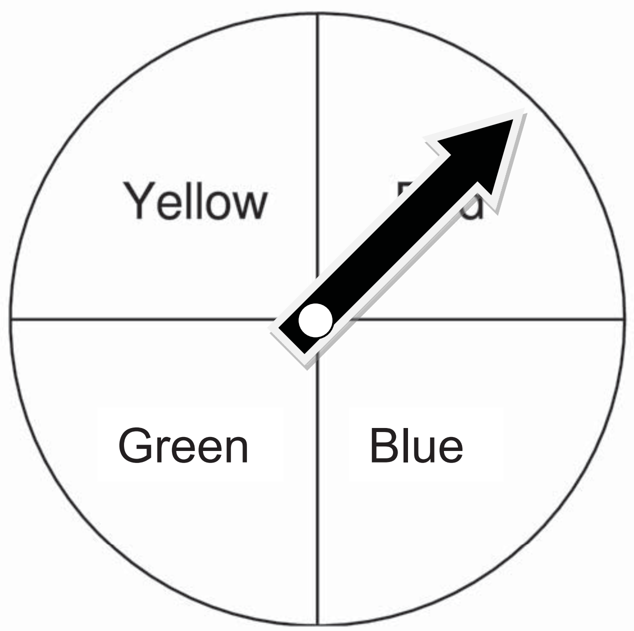


- Child found the thinking about angles on Monday too easy: do the second worksheet about classification of angles, then use this classification system on the worksheet from Wednesday.

Angles and turns

Look at the spinner below. A game is played where each player gets to spin the spinner. A point is scored by the player who's section the spinner lands in. Answer the questions and work out who won the game. Use a pointer for the spinner if needed.

The spinner is currently in the middle of the Red section.



Thinking question:
How could Elijah spin the spinner from its starting position so that he would score a point? List as many ways as you can think of:

Tally chart for recording the points:

Elijah	Yellow + Red	
Jane	Green + Blue	

What really happened:

Elijah went first. He spun the spinner a half-turn. What did it land on? Add the point to the table.

Jane went next. She spun the spinner a quarter-turn clockwise. What did it land on? Add the point to the table.

Elijah spun the spinner another quarter-turn clockwise. What did it land on? Add the point to the table.

Jane spun the spinner a whole turn and another half turn. What did it land on? Add the point to the table.

Elijah spun the spinner three quarter-turns anticlockwise. What did it land on? Add the point to the table.

Jane spun the spinner three quarter-turns clockwise. What did it land on? Add the point to the table.

Who won?

K3. Properties of angles in 2D shapes

TR p125

Angles in 2D shapes can be classified into various types.

Measure the following angles and try to determine how they are classified.

<table>
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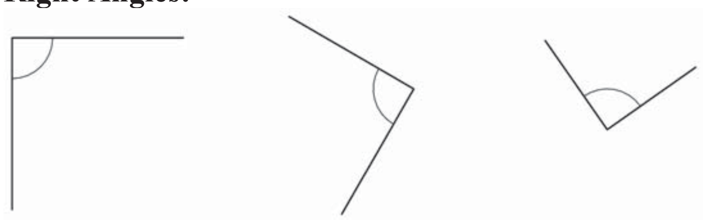
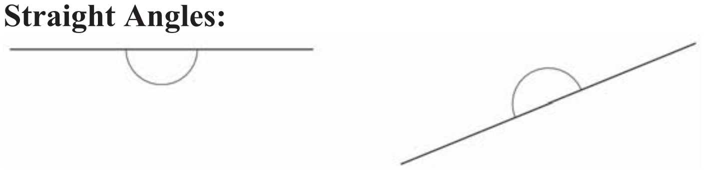
Acute Angles:

Obtuse Angles:

Right Angles:



Straight Angles:



Reflex Angles:

</td>
<td>

How big is this compared to a right angle?

</td>
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</table>

BACKWARDS QUESTION: See if you can draw the following in your maths books.
A shape with 4 sides and a reflex angle
A triangle with one obtuse angle
A triangle with two obtuse angles