

## Home Learning: Sorting Shapes

### How can I use this with my children?

This game is a fun way for your child to practise sorting shapes based on their properties. By using the different category labels, your child can sort the shapes in a variety of ways.

### How does this help my children's learning?

By creating different Venn and Carroll diagrams, your child will need to consider many different properties of 2D shapes at once, using problem-solving skills to complete each type of diagram.

### Ideas for further learning:

Once your child has used the labels provided in the game, why not challenge them to create a Venn or Carroll diagram of their own, using unique labels in order to sort the 2D shapes in a different way?

# Sorting Regular and Irregular Shapes

## Instructions

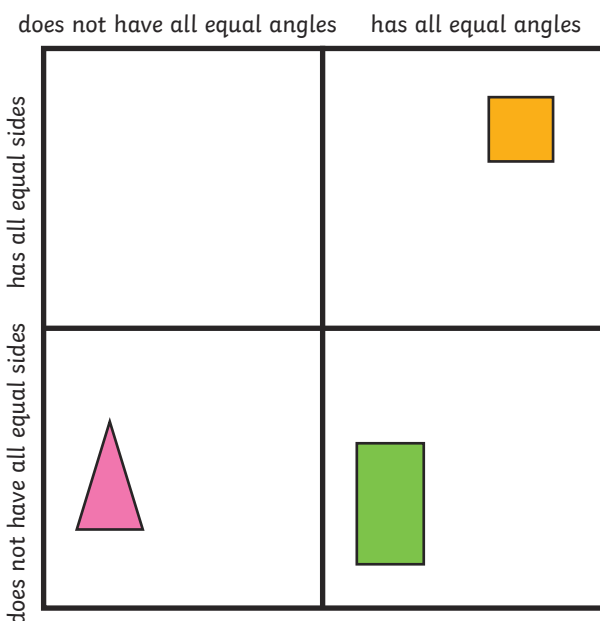
1. Cut out the shape cards (or the shapes themselves) and the word card labels.
2. Use the word card labels to build a Carroll or Venn diagram (see below for examples):
  - With a Carroll diagram, the shapes are sorted into one of the four different categories. These categories should be the opposites of one another, so the shapes cannot be placed into more than one box.
  - With a Venn diagram, the shapes are sorted based on whether they match one of the categories (the shape goes in that circle), both of the categories (the shape goes in the section where both circles cross) or neither of the categories (the shape goes on the outside of the circles)
3. Sort the shapes using a large Carroll or Venn diagram.

## Take It Outside

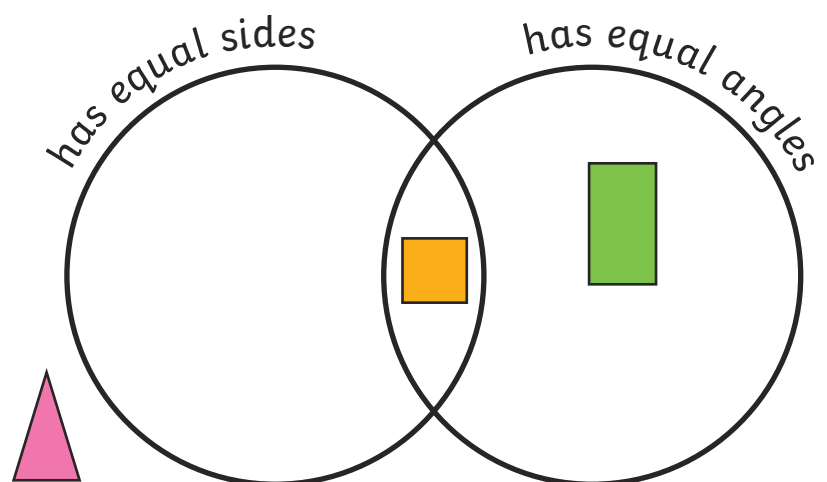
- You could stick the different 2D shape cards onto pebbles for your child to place in the correct sections of Carroll or Venn diagrams drawn with pavement chalk.
- You could use sticks to create Carroll diagrams in the garden or hoops to make Venn diagrams.

## Examples:

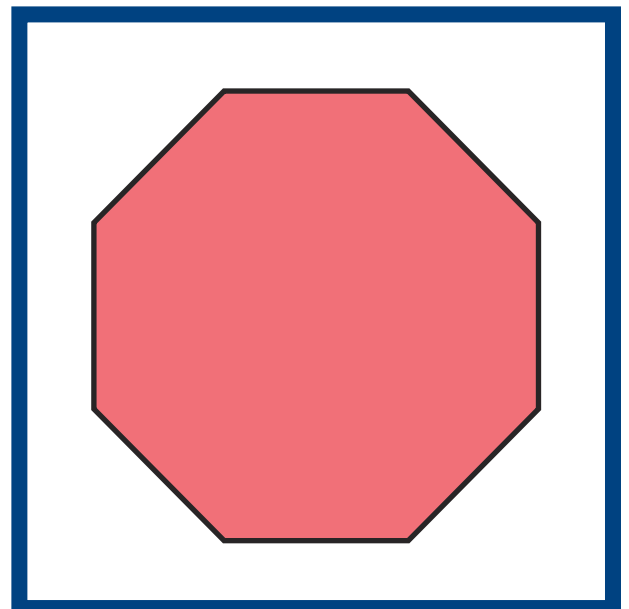
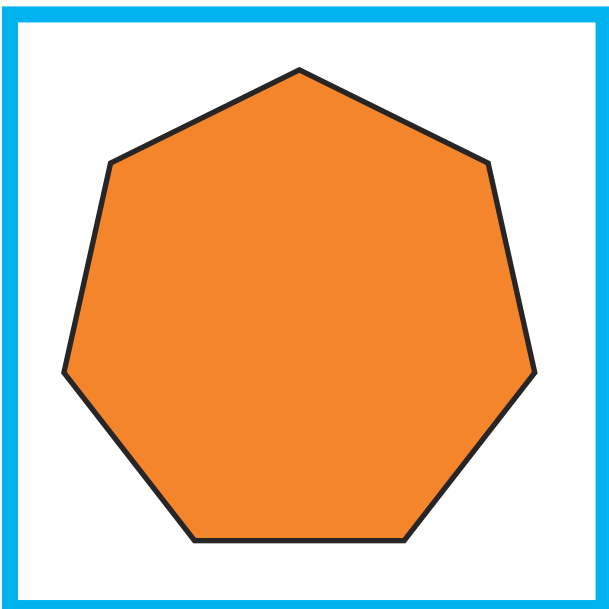
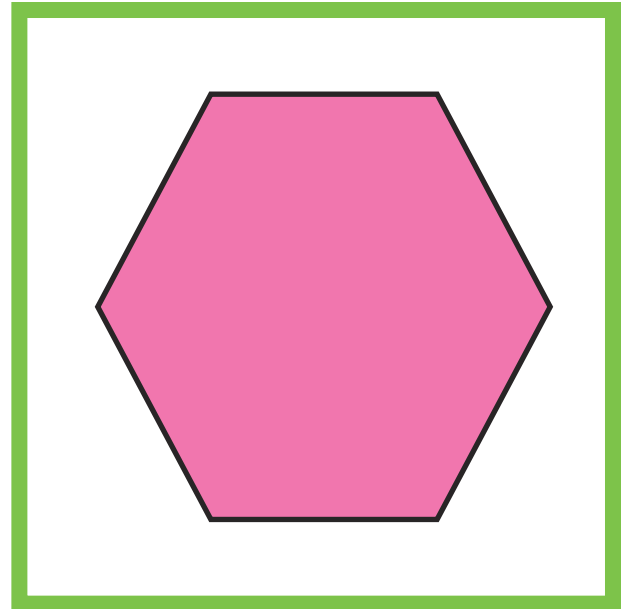
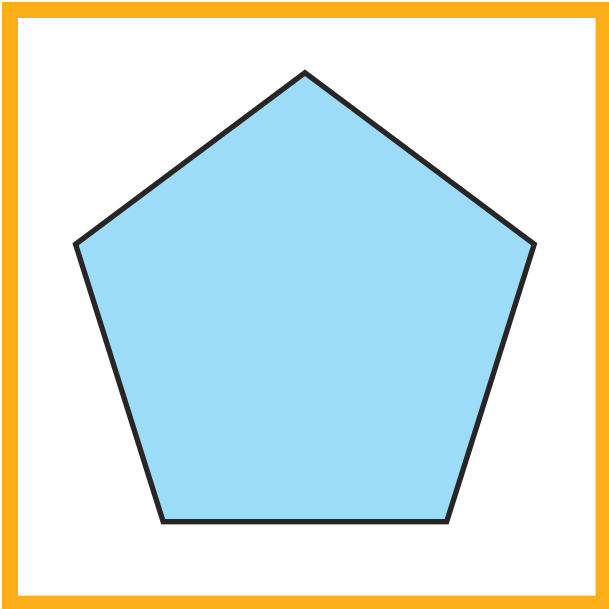
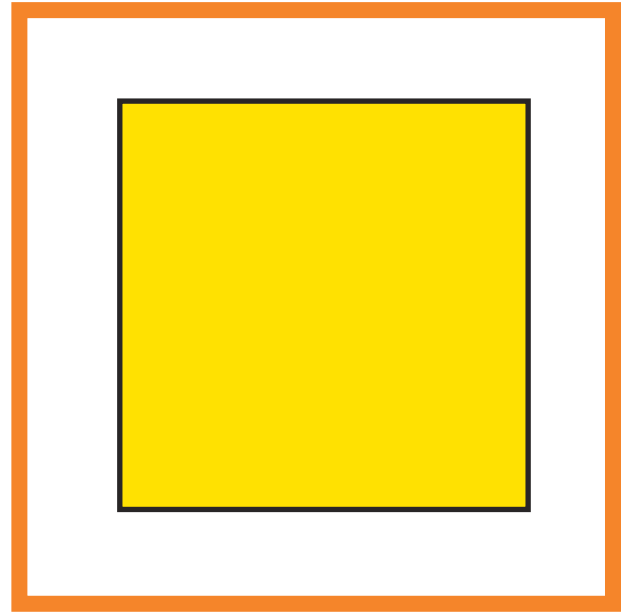
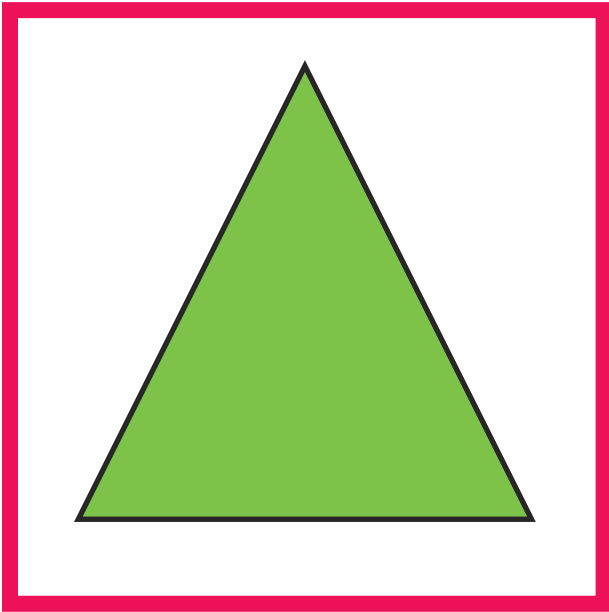
Carroll Diagram



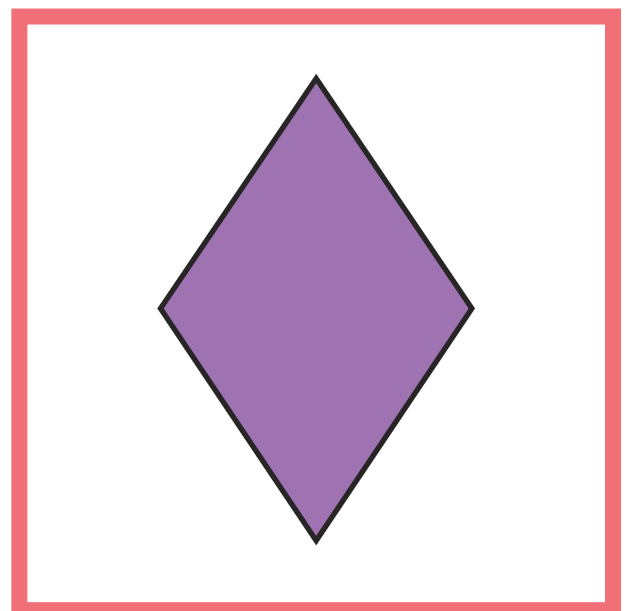
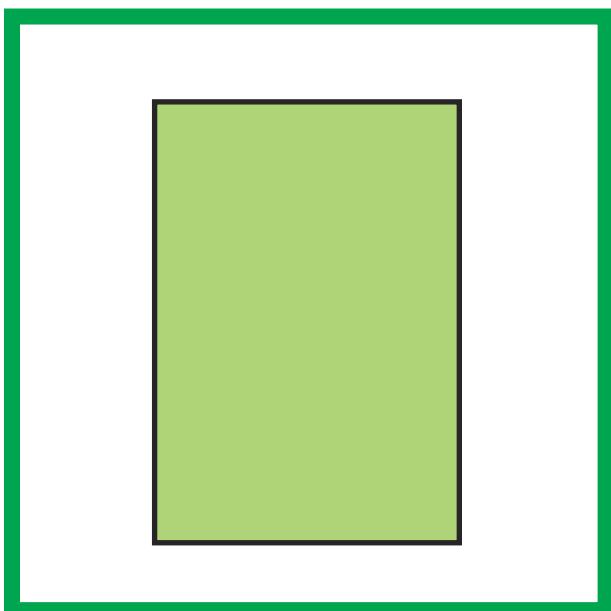
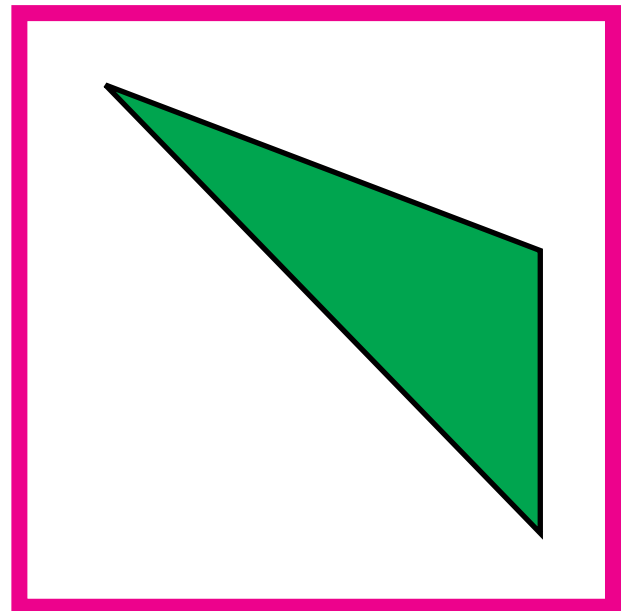
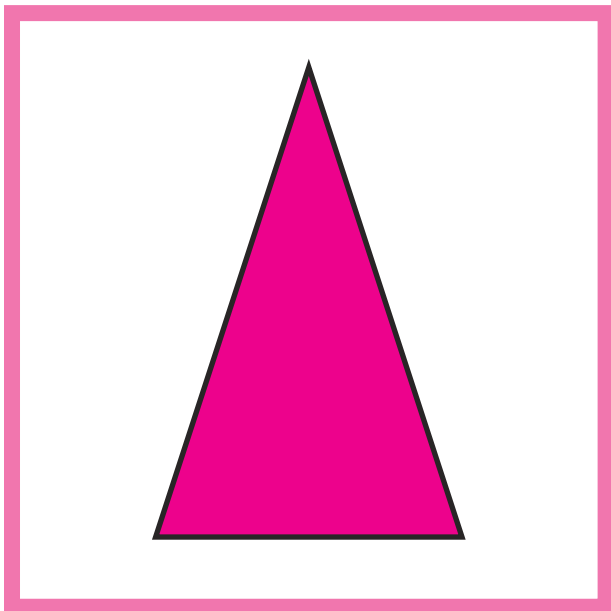
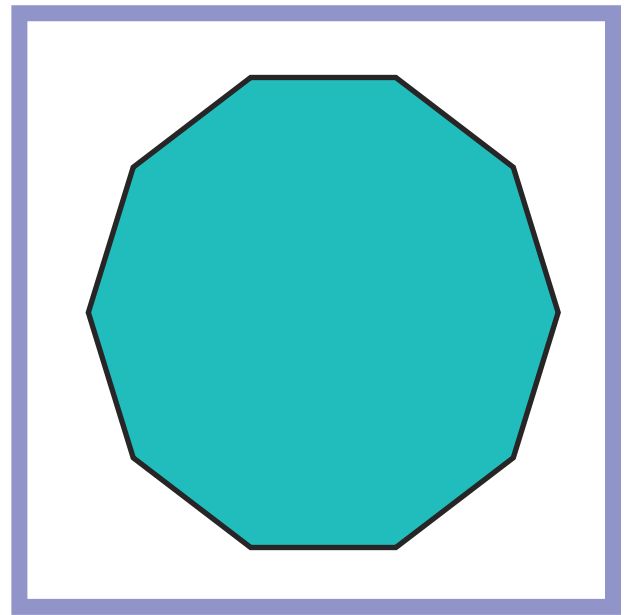
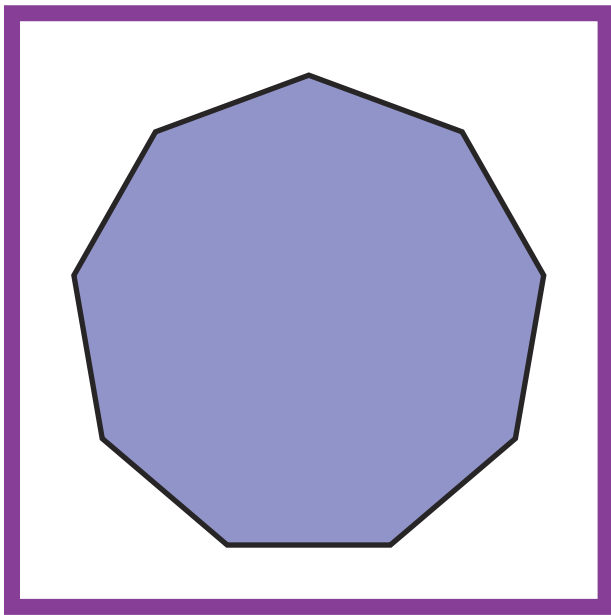
Venn Diagram



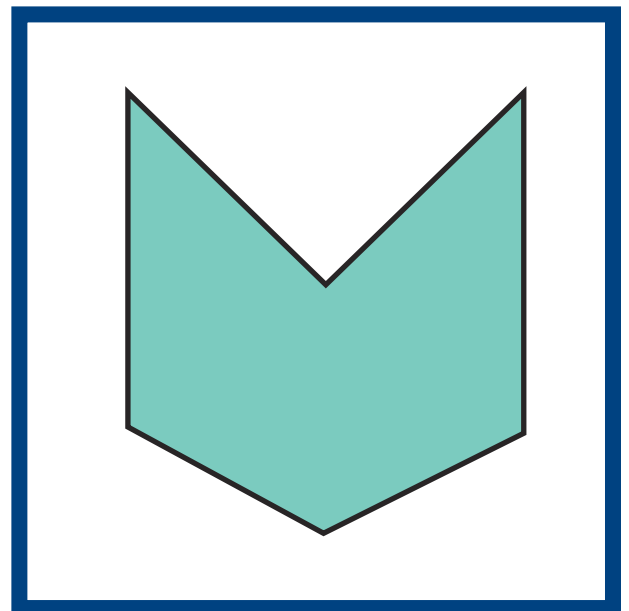
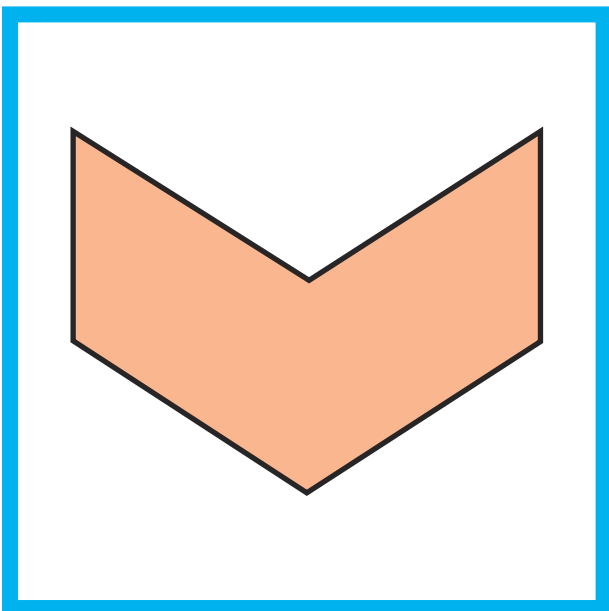
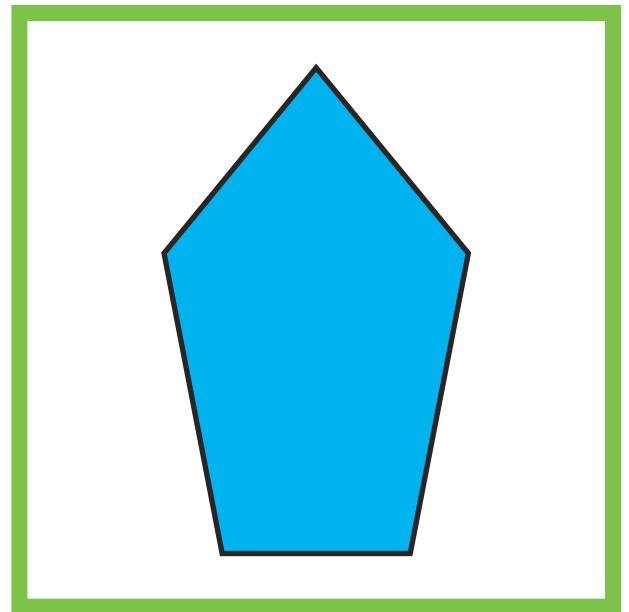
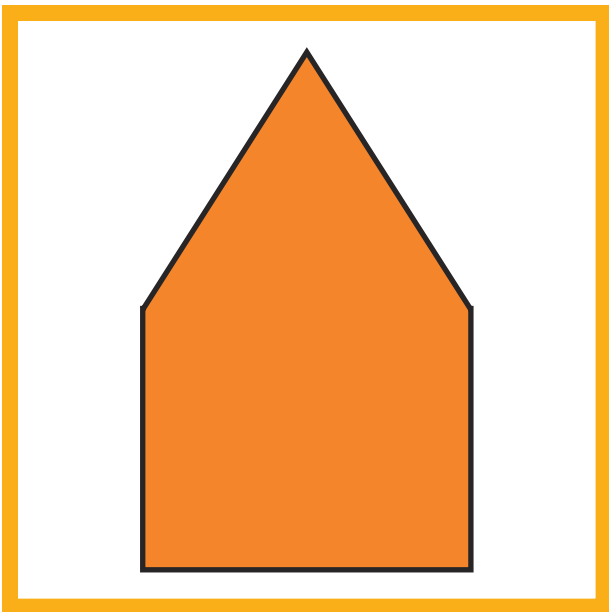
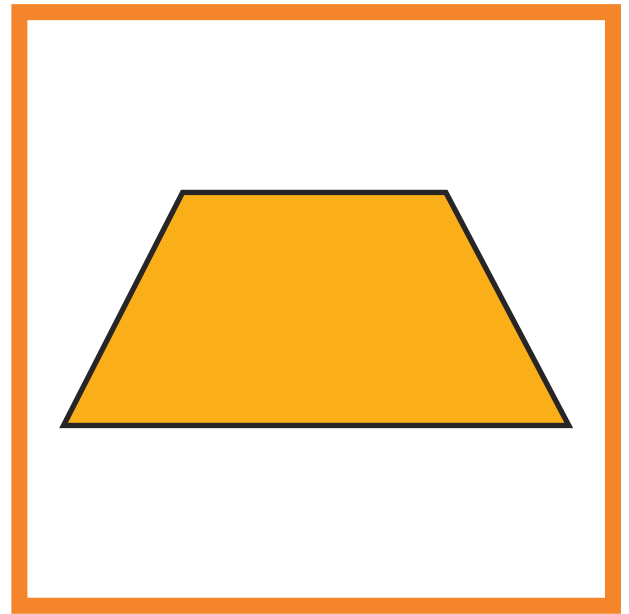
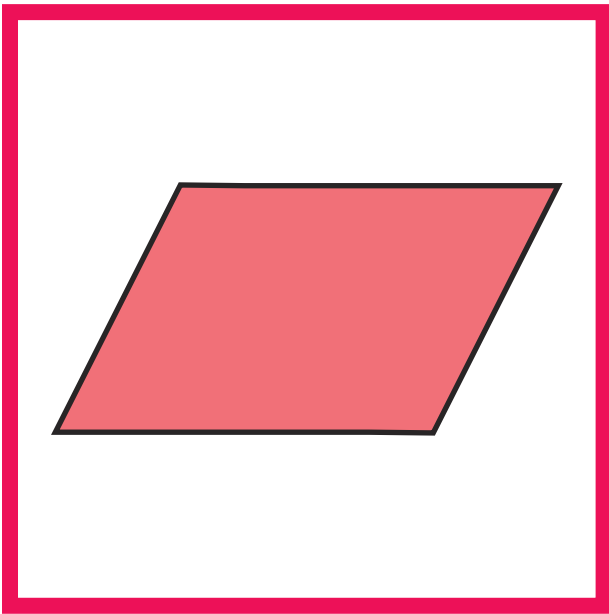
# Sorting Regular and Irregular Shapes



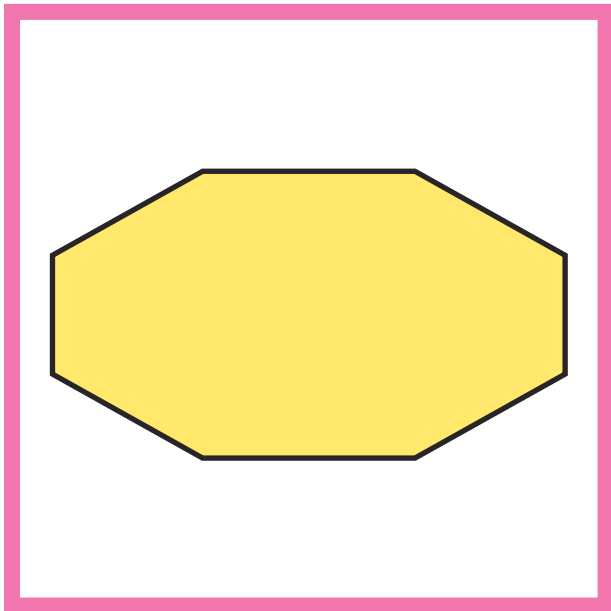
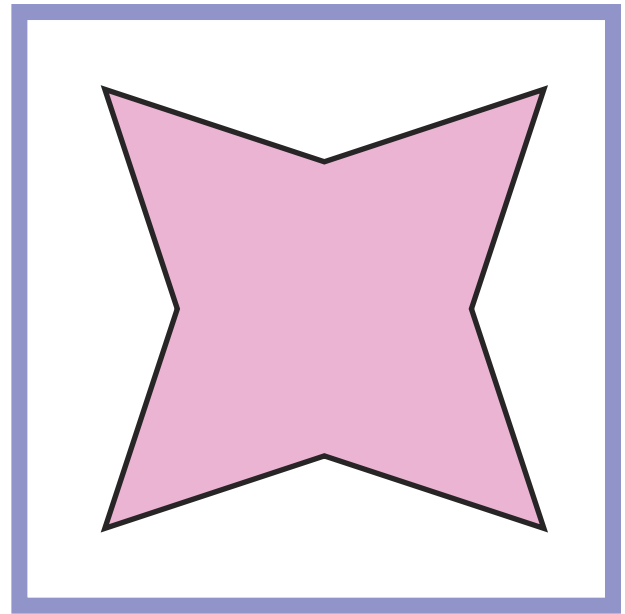
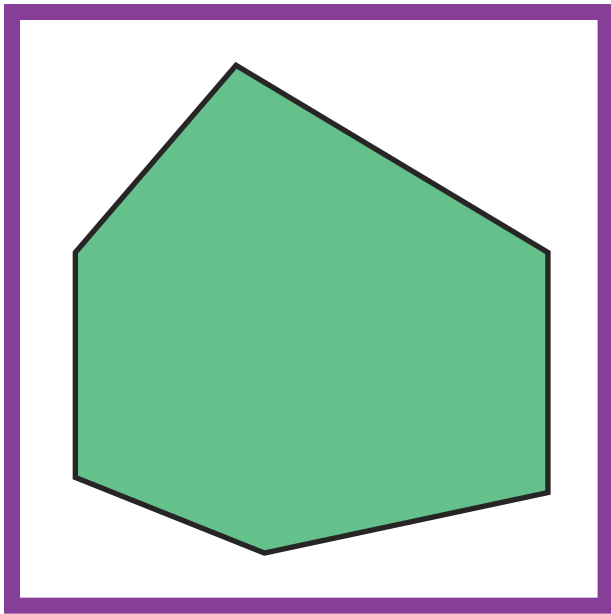
# Sorting Regular and Irregular Shapes



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## Sorting Regular and Irregular Shapes



## Sorting Regular and Irregular Shapes

has all equal angles

does not have all equal angles

has unequal angles

has all equal sides

has unequal sides

does not have all equal sides

# Sorting Regular and Irregular Shapes

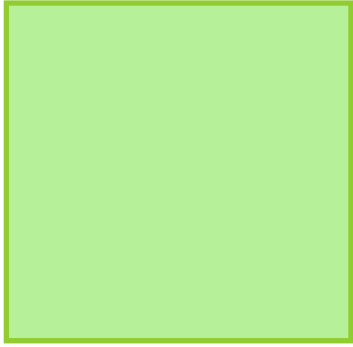
regular

irregular



# Shape Cards

Shape 1:



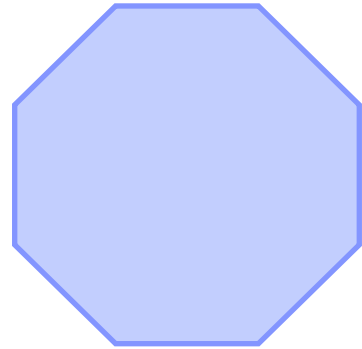
Shape 2:



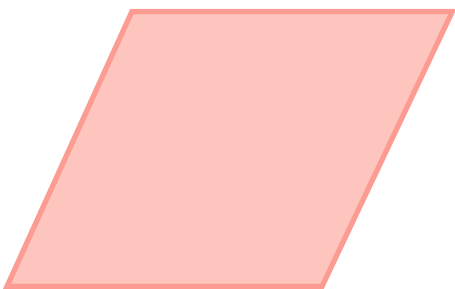
Shape 3:



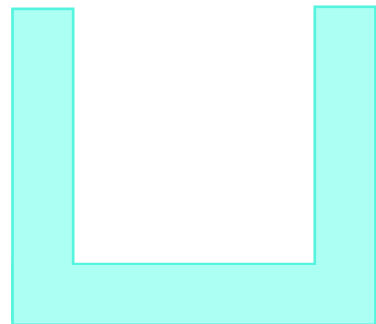
Shape 4:



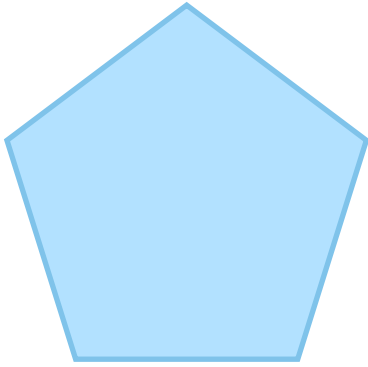
Shape 5:



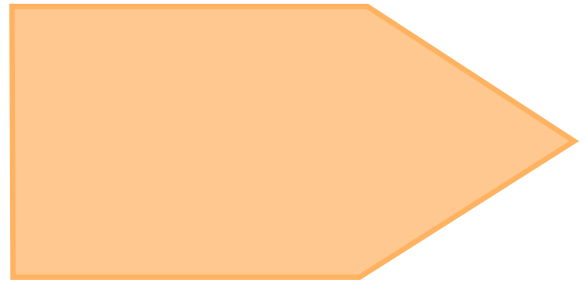
Shape 6:



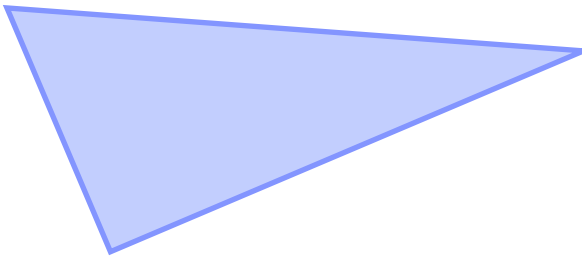
Shape 7:



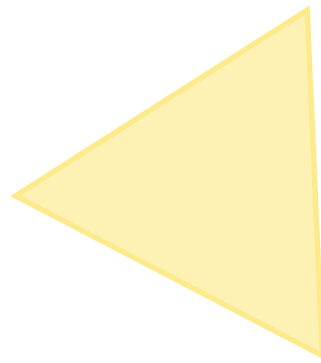
Shape 8:



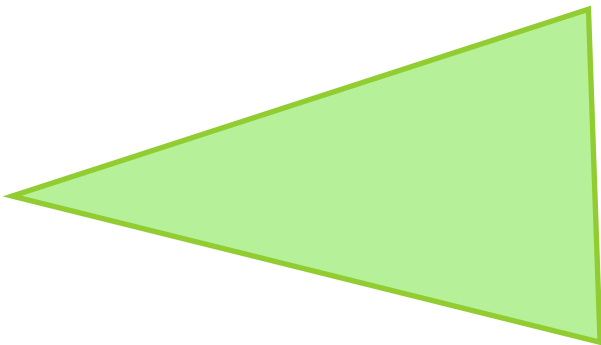
Shape 9:



Shape 10:



Shape 11:



		Name:			Date:	
<b>Same-Day Intervention Assessment</b>		<b>Child A</b>	<b>Child B</b>	<b>Child C</b>	<b>Child D</b>	<b>Child E</b>
Compare polygons with equal sized angles but sides of different lengths.						
Compare polygons with sides of equal length but different sized angles.						
Investigate irregular polygons created from perpendicular lines.						
Compare polygons with sides of different lengths and different sized angles.						
<b>Additional Notes</b>						

# ■ Same-Day Intervention: Identifying Regular and Irregular Polygons

Children will learn to compare lengths and angles to identify regular and irregular polygons.

## Pre-Intervention Check

To access this intervention, can the children...

\*Tick as appropriate.

...measure sides of polygons and identify equal lengths?\*

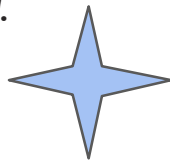
...identify angles that are equal and those that are different sizes?\*

## Explaining the Misconception in Mathematical Understanding

### Common Misconception:

Only identifying shapes with equal sides and not looking at the interior angles.

**For example, a child may identify the following shape as regular as the sides are all an equal length, without identifying that the interior angles are not equal.**



This intervention will help prepare children to explore regular and irregular polygons in more depth in upper KS2.

## Summary of Intervention

Compare polygons with equal sized angles but sides of different lengths.

Compare polygons with sides of equal length but different sized angles.

Investigate irregular polygons created from perpendicular lines.

Compare polygons with sides of different lengths and different sized angles.

Preparation	Key Vocabulary
<ul style="list-style-type: none"><li>• <b>Shape Cards</b></li><li>• Ruler and pencil (1 per child)</li><li>• Straws cut to 8cm and 5cm (6 of each per pair – optional)</li><li>• <b>Home Learning: Sorting Shapes</b> (1 per child)</li></ul>	<ul style="list-style-type: none"><li>• Equal length</li><li>• Sides</li><li>• Interior angles</li><li>• Acute angles, obtuse angles, right angles</li><li>• Degrees</li><li>• Regular, irregular</li></ul>

Key Questions for Deepening Understanding

**Compare polygons with equal sized angles but sides of different lengths.**

- **What does the word polygon mean?**  
(A polygon is a flat 2D shape with straight sides.)
- **What is a regular polygon? What two properties does a regular polygon need?** (all sides of equal length and all interior angles an equal size)

Write these properties on the whiteboard.

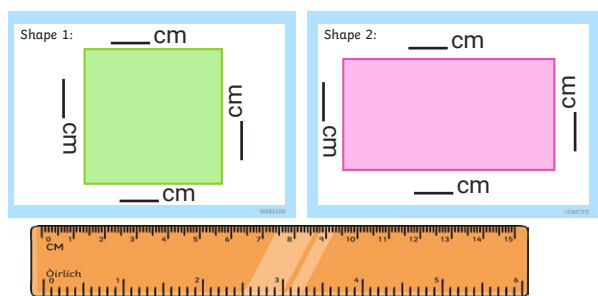
- **What is an irregular polygon?**

Explain that children are going to explore the differences between regular and irregular polygons.

Children look at shapes 1 and 2 on the **Shape Cards**.

- **What are the names of these shapes?**
- **What do they have in common?**
- **What can we call both of these four-sided shapes?** (quadrilaterals)
- **What does the term 'interior angles' mean?** (angles inside the shape)
- **How many interior angles do both of these quadrilaterals have?**
- **What is the size of all of the interior angles in both of these shapes?** (right angles,  $90^\circ$ )
- **Does this mean both of these shapes are regular quadrilaterals?**
- **How are they different from each other?**

Children measure the lengths of each of the sides on both shapes and label them (as shown).



- **Which quadrilateral has all equal length sides?**

- **Which quadrilateral is a regular shape?** (shape 1)  
**Explain how you know.**
- **Which properties of a regular polygon does shape 2 not have?**

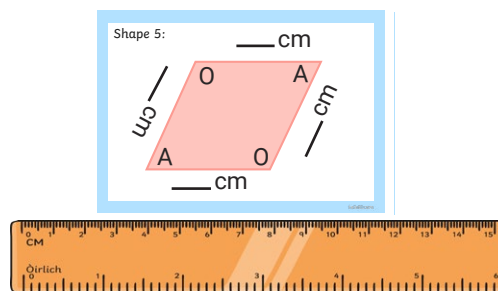
Repeat activity and questions with shapes 3 and 4. Shape 4 is a regular octagon.

**Compare polygons with sides of equal length but different sized angles.**

Children look at shapes 1, 2 and 5.

- **How is shape 5 similar to shapes 1 and 2? How is it different?**
- **Are all the sides in shape 5 an equal length?**

Children measure the lengths of each of the sides and label them (as shown).



- **Unlike shape 2, shape 5's sides are all the same length. Does this make it regular? Why not?**
- **How many interior angles does shape 5 have?**
- **Are all interior angles the same size?**
- **Which angles are acute angles (less than  $90^\circ$ )?**
- **Which are obtuse angles (greater than  $90^\circ$  and less than  $180^\circ$ )?**

Children mark all the interior angles with the letter A or O to show this (as shown above).

- **Are all the interior angles the same size?**
- **Is it a regular shape or an irregular shape?**
- **Which properties of a regular polygon does shape 5 not have?**
- **What is the only regular quadrilateral?** (square)

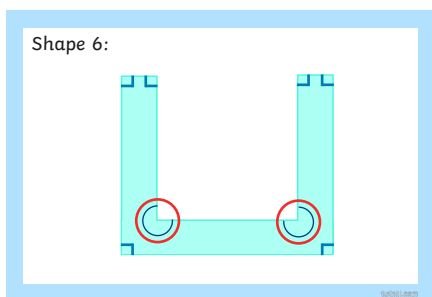
Key Questions for Deepening Understanding (Continued)

**Investigate irregular polygons created from perpendicular lines.**

Children look at shape 6 which is an irregular octagon created from perpendicular lines.

- How many interior angles are there? All of the lines are perpendicular. Are all of the interior angles  $90^\circ$  (right angles)?
- Is this a regular shape?

Children mark all of the interior angles to identify the two that are different (as shown).



- Is this a regular polygon?
- Which properties of a regular polygon does shape 6 not have?

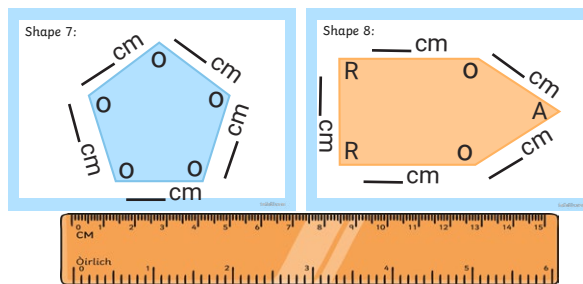
**Compare polygons with sides of different lengths and different sized angles.**

Children look at shapes 7 and 8.

- What can we call both of these five-sided shapes? (pentagons)
- What do they have in common? How are they different from each other?
- Can you spot which is the regular pentagon just by looking at them?
- Which pentagon has sides which are all an equal length?
- Which pentagon has interior angles which are all the same size?

If needed, children measure the lengths of each side in both shapes, label them and mark all the interior

angles with an A, R or O to indicate whether they are acute, obtuse or right angles (as shown).

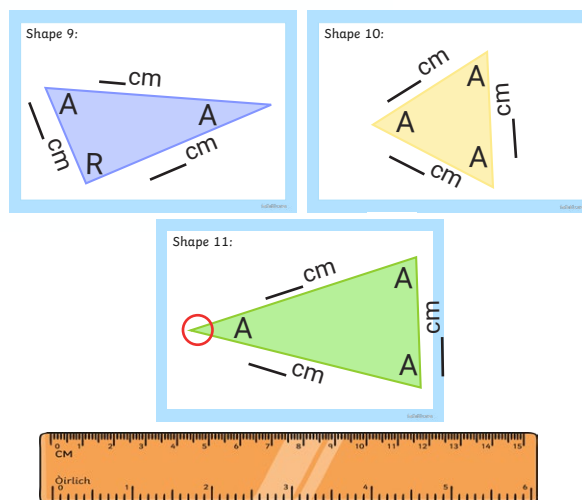


- Which shape is a regular shape? (shape 7) Explain.
- Which properties of a regular polygon does shape 8 not have?

Children look at cards 9, 10 and 11.

- What can we call both of these three-sided shapes? (triangles)
- What do they have in common? How are they different from each other?
- Can you spot which is the regular triangle just by looking at them?
- Which triangle has all equal length sides?
- Which triangle has all equal interior angles?

If needed, children measure the lengths of each side in all three triangles and label them and mark all the interior angles with an A, R or O to indicate whether they are acute, obtuse or right angles (as shown).



- From looking at the angle labels, which triangle is definitely irregular? (shape 9)

**Key Questions for Deepening Understanding (Continued)**

Show children that there are two triangles with all acute angles.

- We know that all the interior angles in shapes 10 and 11 are acute angles but are the angles in shape 10 and 11 exactly the same?
- Which angle in shape 11 is smaller than the other two?

Point out the circled angle on the left.

- Which shape is a regular shape? (shape 10) Explain.
- Which properties of a regular polygon do shapes 9 and 11 not have?

**Additional Opportunities to Reinforce Learning**

Using straws, cut six lengths of 8cm and six lengths of 5cm per pair. In pairs, children create different regular and irregular shapes in the order shown in the opposite column.

Children choose the number of straws required and the correct length of straws for the given shape and place them on the floor to create an accurate shape, being careful with the angles.

When children are constructing the shapes, you could ask the following questions.

- How many sides does this shape need?
- Are all the sides the same length? How do you know?
- Are all the interior angles the same size? How do you know?

When children have completed their shapes, you could ask the following questions.

- Which shapes are irregular but have sides which are all an equal length? (rhombus)

You may want to explain to children that a rhombus is a particular type of parallelogram where the sides are equal and that in some parallelograms only the opposite sides are of an equal length.

- Which shapes are irregular but with all interior angles the same size? (rectangle)

**regular quadrilateral (square):**

four 5cm or 8cm straws



**irregular quadrilateral**

**(rectangle and rhombus):**

two 5cm and two 8cm straws

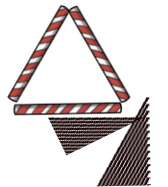
four 5cm or 8cm straws with no perpendicular lines



**regular triangle**

**(equilateral triangle):**

three 5cm or 8cm straws



**irregular triangle**

**(isosceles triangle):**

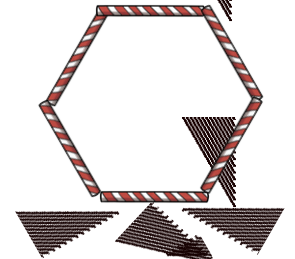
two 5cm and one 8cm straws or

two 8cm and one 5cm straws



**regular hexagon:**

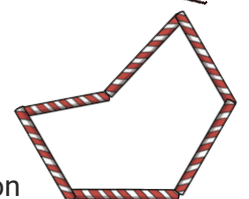
six 5cm or 8cm straws



**irregular hexagon:**

a combination of 5cm and 8cm

straws to make a six-sided polygon



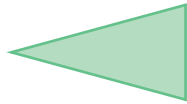
## Home Learning Slip

Today, at school, your child has been learning to identify regular and irregular polygons.

Regular polygons are shapes where all sides are equal length and all interior angles are equal size, e.g. a square or an equilateral triangle.



Irregular polygons are shapes where not all sides are equal length or not all interior angles are equal size, or both, e.g. a rectangle or an isosceles triangle.



- To support their learning further, you could play this game with them. Using the [Home Learning: Sorting Shapes](#), create a Carroll diagram on the floor using string and label each section using the labels (see sheet for explanation and examples). Cut out each shape and sort them into the correct section in the diagram according to the properties of each shape.

Repeat with a Venn diagram (see sheet for explanation and examples).

**Thank you for your support with this. Your help will really make a difference to your child.**

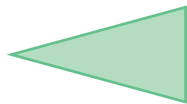
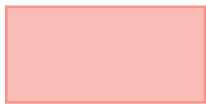
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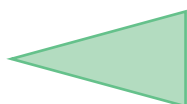
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