

Angles

→ Focus

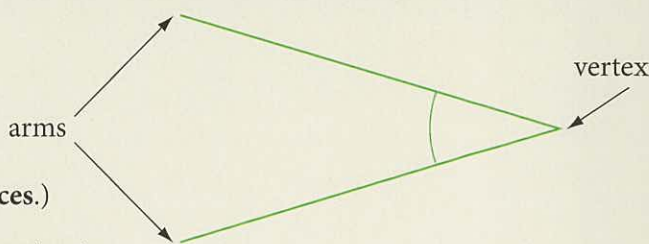
Discovering how to estimate, measure, compare and construct various angles.

Let's think about angles

An **angle** is the amount of turn between two arms. The point where the two arms meet is called the **vertex**. (The plural is **vertices**.)

Angles can be drawn and measured using a protractor.

Angles can be classified under these headings:



Right angle 90°



Straight angle 180°



Acute angle (less than 90°)



Obtuse angle (more than 90°)

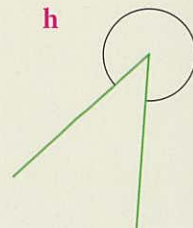
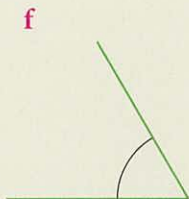
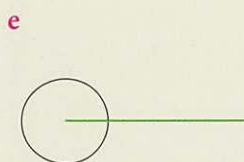
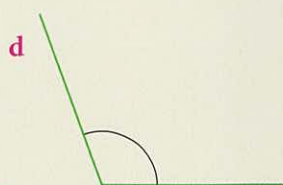
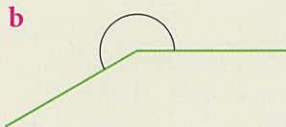


Reflex angle (more than 180°)

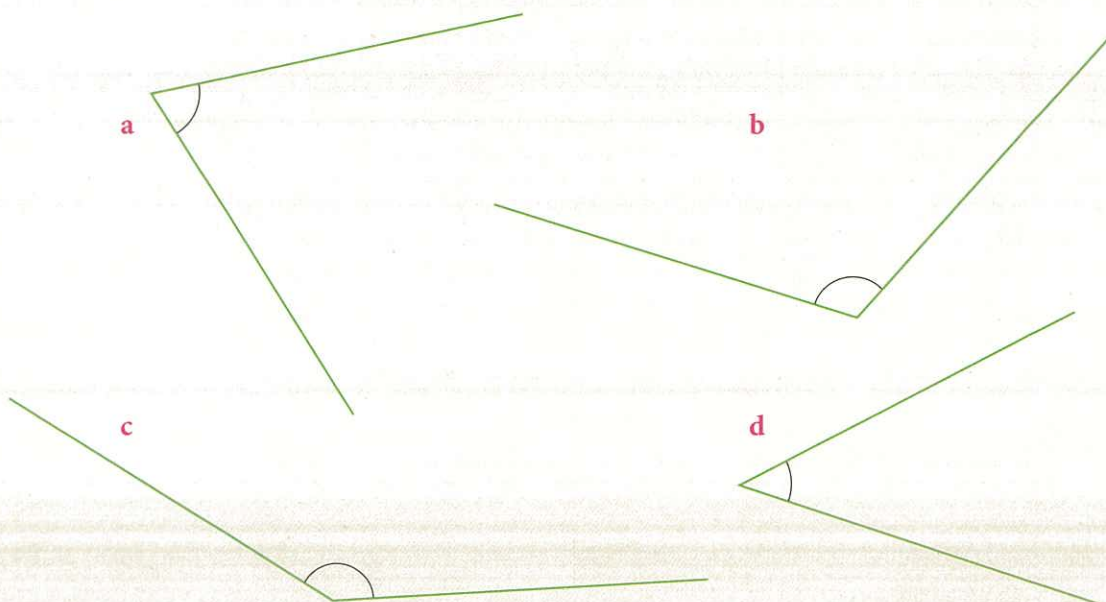


360° angle

- 1 Use the diagrams above to help name each of these angles. Write the angle names in your book.



- 2 Use a protractor to find the size of each angle.



- 3 Draw analogue clock faces on which the hands make various types of angles. Mark each angle with an arc and write the type of angle.



Now try these

- 4 Use a protractor to draw these angles. Draw an arc on each angle and mark the size of the angle inside the arc.

a 120°

b 90°

c 25°

d 240°

e 185°

f 75°

g 300°

h 165°

- 5 Draw these shapes and label the angles.

a A shape with right angles.

b A shape with acute angles.

c A shape with obtuse angles.

d A shape with more than one type of angle.

- 6 Design and draw a yacht that has at least three different types of angles. Use a ruler to help. Label each angle.

- 7 Find some times on an analogue clock when the hands would make a right angle. (Hint: Think why you could draw 3 o'clock, but not half-past 6.)

Thinking about your thinking

In which sports do people need to have a knowledge of angles?

Angles in sport

→ Focus

Exploring the need for knowledge of angles in various sports.

You will need

- pencil and paper (or an exercise book)

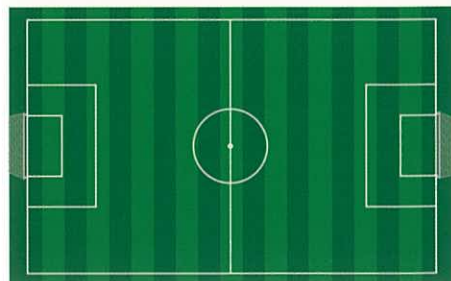
Kicking a goal

When people think of an angle, they usually think of two lines, but we use angles without thinking about lines when we take part in many everyday activities, such as sport. It doesn't matter how old you are, or at what level you play, you need a knowledge of angles when you take part in sport.

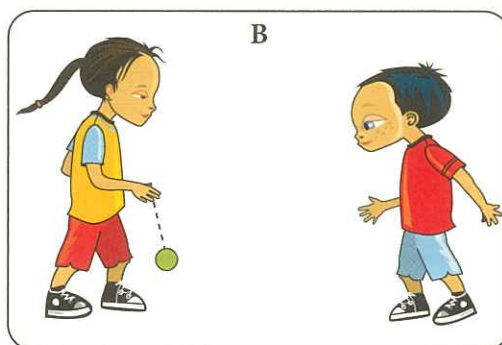
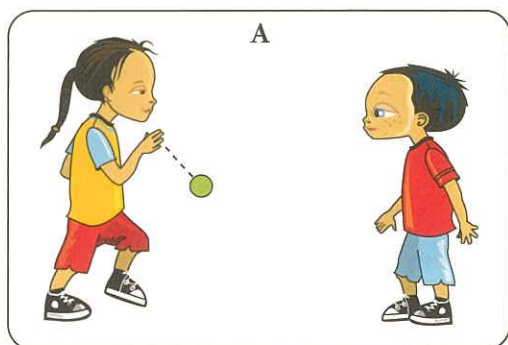
- 1 People who play ball sports, such as NRL or AFL, have to get their angles right if they are going to be successful.



- a Explain why the player in front of the goal (Kick A) has a better chance of kicking a goal than the player trying from the side (Kick B).
- b Copy this diagram of a soccer field. Then draw and label dotted lines to show kicks from an acute angle and from a right angle.



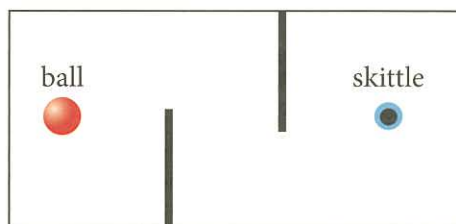
- 2 Perhaps you play handball at school. You need a good knowledge of angles to play handball. You need to be able to send the ball in the right direction. The dotted line shows how the ball will leave the player's hand. In which picture will the ball **not** reach the other side of the court in one bounce?



- 3 A Year 5 class had to invent a game where you roll a ball in a box and try to knock a skittle over. Peter made up these rules for his game:

- The ball must roll; it cannot bounce in the air.
- The ball cannot touch the obstacles.
- You can only touch the ball once.
- The ball can rebound off the edges of the box.

How could the ball get round the obstacles and hit the skittle? Draw the diagram and add a line showing the direction the ball could roll to get to the skittle.



- 4 Make a list of five ball sports and explain how a knowledge of angles is important in each of them.

Going further

Design a game similar to the game in Question 3, where a ball has to rebound at various angles. You can make the game as simple or detailed as you wish, but make sure to write out the rules so that others will know how to play it. Draw a labelled diagram of your design. Your game could be a large-size game that is played in a hall (or played outside using fences or walls). Or it could be a small-scale design using something like a marble and a shoebox. Be creative and have fun!

Thinking about your thinking

Are there any sports in which a knowledge of angles is **not** important?