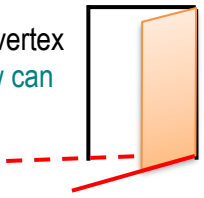
ANGLES WITH A PROTRACTOR.

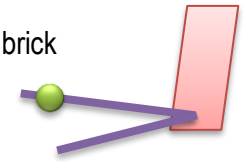
INVESTIGATIONS OVERVIEW PAGE
THIS PAGE IS A SUMMARY OF THE INVESTIGATIONS THAT STUDENTS MAY ENGAGE IN TO DEEPEN THEIR RELATIONAL UNDERSTANDING.
INVESTIGATIONS WITH INSTRUCTIONS TO STUDENTS FOLLOW ON SUBSEQUENT PAGES.

- In pairs children measure angles in their environment that are acute obtuse, straight, reflex angles or revolutions. Children move onto measuring different types of angles when they are ready. Reflection: How can we measure angles?
- In pairs children construct angles of a size that are acute obtuse, straight, reflex angles or revolutions. Children move onto measuring different types of angles when they are ready. Reflection: How can we construct angles?
- In pairs, children measure 2 line angles as the relative slant of 2 lines that meet at a vertex, created by the position of hands on an analog clock. They investigate the times when the hands make right angles, 30 degrees, 120 degrees…, taking into account that as the minute hand moves around the clock, so too the hour hand moves between the numbers. They find times when angles formed are acute, right, obtuse, straight, reflex and revolution. Could be extended to include the second hand. Reflection: How can we measure angles?
- In pairs, children have a set of pattern blocks. Children measure the angles in each block using their protractor. They find relationships between the sizes of the angles in each block, for example the small angles in the rhombus and the angles in the triangle are all 60^{O}. They superimpose the blocks to check. They classify the angles acute, right or obtuse. Reflection: How can we measure angles?

- In small groups, each children constructs an angle. The children place the angles in order of size. They classify each angle acute, right, obtuse, straight, reflex or revolution. Reflection: How can we construct angles?
- In pairs, children draw 5 angles for their friend to measure and classify. Reflection: How can we measure and construct angles?
- In pairs, one child constructs an angle. Their friend classifies the angle, estimates its size, then measures to check. Reflection: How can we measure and construct angles?
- In pairs, children measure angles in capital letters. Construct capital letters with given angles. Reflection: How can we measure and construct angles?
- In pairs, children draw one arm of an angle on paper. They select an angle classification and size. Each child places a dot where they think the other arm should pass through to construct the angle specified. They use a protractor to check. Reflection: How can we measure and construct angles?
- In pairs, children measure 1 line angles created as an amount of turn around a vertex of doors. They open the door, then measure the angle created. Reflection: How can we measure angles?



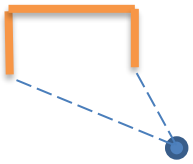
- In pairs, children measure 1 line angles created as an amount of turn around a vertex of one hand on an analog clock. They measure the size of the angle when the minute hand moves all the way around the clock (360^{O} - revolution), half way around the clock (180^{O} - straight), a quarter of the way around the clock (90^{O} - right), between 2 numbers (60^{O}) from 1 number to the next (30^{O}) and from 1 minute to the next (1^{O}). They find angles that are acute, right, obtuse, straight, reflex and revolution. They explain the relationship between an analog clock and a protractor. Reflection: How can we measure angles?
- In small groups, children wet a tennis ball and roll it at different angles towards a brick wall. The ball will leave a wet track of its path.
  Children use a protractor to measure the angle created. Reflection: How can we measure angles?



- Children place a ball on a football field. They use string to make the angle between the ball and the goal, using the ball as the vertex and the goal posts as the end of the arms.

  They measure the angle, then attempt to score a goal form that angle, for example,

  They work out whether it is easier to score goals with a wide angle or a narrow angle. Reflection: How can we measure angles?



Angles with a Protractor.

Measure angles in your environment of a size that you are ready to investigate.

You may be measuring acute angles, right angles or obtuse angles.

Move onto different types of angles when you are ready.

Reflection: How can we measure angles?

Angles with a Protractor.

Construct angles of a size that you are ready to investigate.

You may construct acute angles, right angles, obtuse angles, straight angles, reflex angles or revolutions.

Move onto different types of angles when you are ready.

Reflection: How can we construct angles?

Angles with a Protractor.

Measure 2 line angles as the relative slant of 2 lines that meet at a vertex, created by the position of 2 hands on an analog clock.

Investigate the times when the hands make right angles, 30 degrees, 120 degrees…, taking into account that as the minute hand moves around the clock, so too the hour hand moves between the numbers.

Find times when angles formed are acute, right, obtuse, straight, reflex and revolution.

Could be extended to include the second hand.

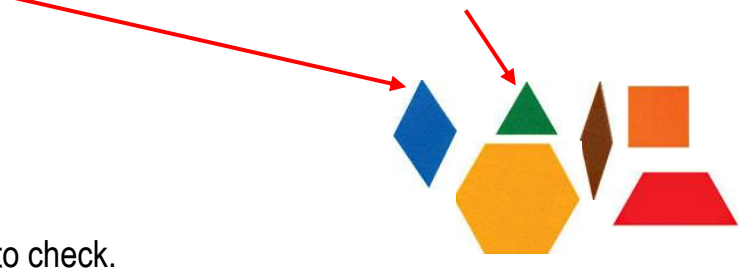
Reflection: How can we measure angles?

Angles with a Protractor.

Have a set of pattern blocks.

Measure the angles in each block using your protractor.

Find relationships between the sizes of the angles in each block, for example the small angles in the rhombus and the angles in the triangle are all 60^{O}.



They superimpose the blocks to check.

They classify the angles acute, right or obtuse.

Reflection: How can we measure angles?

Angles with a Protractor.

Sit in a small group.

Each of you construct an angle.

Place the angles in order of size.

Classify each angle acute, right, obtuse, straight, reflex or revolution.

Reflection: How can we construct angles?

Angles with a Protractor.

Sit with a friend.

Each of you draw 5 angles for your friend to measure and classify.

Reflection: How can we measure and construct angles?

Angles with a Protractor.

Sit with a friend.

One of you construct an angle.

Your friend classifies the angle, estimates its size, then measures to check.

Reflection: How can we measure and construct angles?

Angles with a Protractor.

a) Measure angles in capital letters.

b) Construct capital letters with acute angles / right angles / obtuse angles / straight angles / reflex angles.

Reflection: How can we measure and construct angles?

Angles with a Protractor.

Sit with a friend.

Each of you draw one arm of an angle on paper.

Each of you selects an angle classification and size.

Each of you place a dot where you think the other arm should pass through to construct the angle specified.

Use a protractor to check.

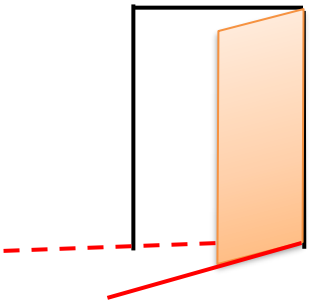
Reflection: How can we measure and construct angles?

Angles with a Protractor.

a) Measure 1 line angles created as an amount of turn around a vertex of doors.

b) Open the door, then measure the angle created.

Reflection: How can we measure angles?



Angles with a Protractor.

Measure 1 line angles created as an amount of turn around a vertex of **one** hand on an analog clock.

Measure the size of the angle when the minute hand moves:

- all the way around the clock,
- half way around the clock,
- a quarter of the way around the clock,
- between 2 numbers
- from 1 number to the next and
- from 1 minute to the next.

Find angles that are acute, right, obtuse, straight, reflex and revolution created as an amount of turn around a vertex of **one** hand on an analog clock.

Explain the relationship between an analog clock and a protractor.

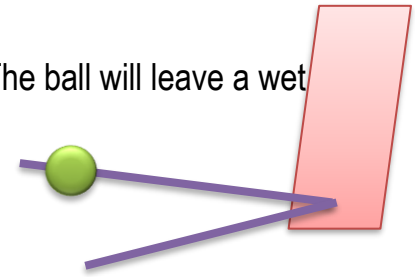
Reflection: How can we measure angles?

Angles with a Protractor.

Investigate in small groups.

Wet a tennis ball and roll it at different angles towards a brick wall. The ball will leave a wet track of its path.

Use a protractor to measure the angle created, for example,



Reflection: How can we measure angles?

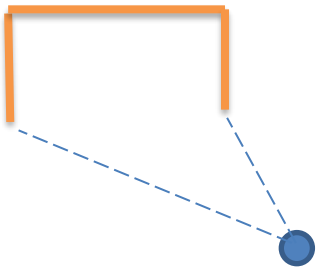
Angles with a Protractor.

Place a ball on a football field.

Use string to make the angle between the ball and the goal, using the ball as the vertex and the goal posts as the end of the arms.

Measure the angle created.

Attempt to score a goal form that angle, for example,



Work out whether it is easier to score goals with a wide angle or a narrow angle.

Reflection: How can we measure angles?