

Why don't you ...?

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Thank you to the students at Christleton High School and my previous schools for throwing themselves wholeheartedly into these activities.



Thank you to my line managers for not wondering where the class had disappeared to this time and for occasionally joining in our activities on the yard!

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Starter: Crisp People

prep time

10 mins

activity

20 min

age

KS2/3

things you need

Crisp people

One set per group

Optional

Paper

Any variety for wall display

Colours

Pens or pencils

Glue

here's how

- 1 These are my little crisp people and they've been helping pupils learn for over a decade.

I first thought up this task when an interactive whiteboard and digital projector came in the form of an overhead projector. Using the brand new concept of colour printing onto inkjet OHP transparencies, we could move these little people around the board and investigate different problems.

Each number represents the number of bags of crisps eaten in a week. Each colour represents a flavour (Blue = salt & vinegar, red = ready salted, green = cheese & onion, pink = prawn cocktail).

- 2 You can sort by flavour, you can sort by bags eaten ... in fact you can use this resource with KS2 & KS3 to investigate lots of topics:

- Sorting by category (number/colour)
- Ordering numbers
- Pictograms
- Venn diagrams
- Carroll diagrams
- Bar-charts
- Averages
- Questioning
- Probability

- 3 Download the teacher guide here:



- Download the editable template here:



helpful notes

You can adapt this activity for lower ability KS4 by substituting favourite crisps/ number of bags eaten for favourite social media platform/ hours spent per week. You could illustrate the cars with social media logos.

You can extend this activity to comparing two data sets by printing on different coloured card—say yellow for Y7 and blue for Y9. Does the data follow the same trends?

Toolkit

prep time

0 mins

activity

any

age

KS2/3/4/5

things you need

Chalk

Standard or chalk pen

Tape measure

Long, short or paper
(or talk nicely to Ikea staff)

String

or wool

Metre stick

or lots of rulers!

Duct tape

Any quality, but the cheap stuff can mark carpets

Mini whiteboard

Plus pen

Optional

Water pistol

Loaded, of course!

here's how

- 1 Most of these items are self explanatory. Use chalk on a playground, measure things for measuring stuff, mini whiteboards for outdoor work or for communicating instructions. But duct tape ...?
- 2
 - When it's too wet to go outside, put duct tape axes on the floor and draw on the axes in chalk pen
 - Turn any surface into a micro blackboard with short pieces of tape. It's more effective than masking tape and longer lasting than a post-it note
 - Temporarily attach string to any surface with duct tape - much more reliable than sellotape.
 - Nothing says 'We're doing a murder mystery puzzle' like the outline of a corpse in bright yellow tape on the floor!
- 3 Chalk pen - as temporary as dry wipe marker, but much longer lasting. Label cupboards, write on windows, it will come off again whenever you want with either hot soapy water or an anti-bac wipe

helpful notes

Get chunky playground chalk in bulk from places like the Poundshop.
You can even get chalk holders to avoid covering yourself in chalk dust!

Visualising Volume

prep time

10 mins

activity

15 mins

age

KS2/3

things you need

Metre stick

or lots of rulers!

Duct tape

Any quality, but the cheap stuff can mark carpets

here's how

- 1 You will need a floor and wall.

Mark out a metre square on the floor and on the wall with duct tape. This forms two faces of a 3D cube.

- 2 Simple question: how many students fit in a metre cube?

You will find that it will probably be boys piling on each other. Remind them that they have to fill all the gaps with no limbs sticking out.

My record is eight Y7 boys, with no injuries.

- 3 Now that your students have an idea of how big a cubic metre is, they can better estimate large volumes.

helpful notes

Use other items to fill the metre cube—estimate how many are required and see if they are correct.

Use household objects to estimate volume e.g. how many 2 litre pop bottles could fit in a bath?

Human data

prep time

0 mins

activity

15-20 mins

age

KS2/3/4

things you need

Chalk

Mini whiteboard

Mainly for the teacher

Chalk pen

Mainly for the teacher

Duct tape

And a wall or post

topics

Mean

Median

Mode

Range

Upper/lower quartiles

Interquartile range

Boxplots

Bar charts

Grouped data

Pie charts

here's how

- 1
 - Line up the class in height order. Compare the height of the shortest and tallest students. Mark them on the wall on duct tape and chalk pen.
 - Find the median student height—maybe get pairs of pupils at either end to sit down until the median student(s) remain. Add their height to the duct tape.
 - Now you know where the median is, you can find the upper and lower quartiles. Add them to the duct tape—you now have all the data you need to draw a boxplot of the data on the tape.
- 2
 - Get students to make a human bar chart of their heights (paving slabs outside are great for managing the scale).
 - The biggest 'bar' is the mode.
 - The bar-chart is probably a bit spread out—get the students into groups of similar height. You've just made a grouped frequency bar-chart. The biggest bar is the modal class
- 3
 - Move the bars in order into a line.
Move the bars into a circle
You've just turned a bar-chart into a circle.
 - At this point you may wish to edit the class into a factor of 360 - get excess students to do the chalk and whiteboard or join the circle yourself.
 - Mark the centre of the circle, mark in the lines between each section
Ask how many degrees one person represents—this could be shown on the whiteboard
Ask how many degrees each sector is worth—each sector must agree on an answer.
To consolidate this you can repeat this with a different question, for example 'Number of siblings'
 - To extend this task you can split up the class into two groups and ask a different question. They must create two pie charts and compare the data.

helpful notes

If you have a school camera, you could assign a student to take photos to put up in your classroom and then the students can describe what they did. It will be a really good memory prompt for the topic

Loci

prep time

0 mins

activity

15-20 mins

age

KS 3/4

things you need

Chalk

Water pistol

Seriously, you'll enjoy this

PE markers

optional

topics

Loci around a fixed point

Loci around a line

Loci around a 2D shape

Loci from two lines (bisecting an angle)

here's how

- 1 Mark a point on the ground. Stand on it.
Tell the students to imagine that you have a water pistol with a range of two metres. Students must stand as close to you as possible, but out of range of the 'imaginary' water pistol.
Fire the not so imaginary water pistol. You'll be amazed at how quick they arrange themselves into a circle just out of range.
- 2 Repeat step one, but this time draw a line. You can now move up and down the line. Discuss what shape they've made - two parallel lines with a semi - circle at either end.

Investigate what happens if you draw a shape, like a rectangle or L- shape
- 3 Draw two lines on the ground, forming a big angle. Ask students to stand the same distant (equidistant) from both lines.
After some shuffling, students should bisect the angle

helpful notes

In step 3 you can use your imagination and tell students they are in boats and there are cannons on the cliffs, with the only safe path being equidistant from them.

String shapes

prep time

0 mins

activity

15mins

age

KS 2/3

things you need

String

Tape measure

optional

topics

Properties of 2D shapes

Regular shapes

Estimating angles

Interior angles

Exterior angles

here's how

- 1 Get students into a group of four or five and give them a long piece of string. Any student not directly involved in holding the string will be on quality control duty.
- 2 Instructions (three students holding the string)
 - Make a triangle. Are they identical (get the spare student to check)? Why?
 - Make an isosceles triangle? Are they identical? Why?
 - Make an equilateral triangle? How do you know it is equilateral?
 - What is the name given for shapes that look alike, but aren't identical?
- 3 Instructions (four students holding the string)
 - Make a quadrilateral? Are they the same?
 - Make a shape with equal sides? Are they the same? (square/rhombus)
 - Make a shape with equal angles? Are they the same? (square/rectangle)
 - What instructions would give you similar shapes? (equal sides and angles)
 - What are the equal angles?
 - What is the name for this shape property? (regular shapes)

Extend this to other regular shapes

- 4 Tell a student to walk around a regular shape (n sides)
 - How many degrees to your turn through? (360)
 - How many degrees do you turn through each corner? $(360/n)$
 - What type of angle is this? (Exterior)
 - Estimate the angles inside the shape
 - What are the angles in the shape? $(180 - 360/n)$
 - What type of angle is this? (Interior)

helpful notes

You can substitute the string with the tape measure to make creating regular shapes easier. For example a length of 5m allows you to create a 5 sided shape, with sides 1m

Venn diagrams

prep time

5 mins

activity

15-20 mins

age

KS 2/3/4/5

things you need

Chalk

Mini whiteboard

For notation

Duct tape

For indoors version

topics

Venn diagrams

Union (\cup)

Intersection (\cap)

Universal set (ξ)

Probability

here's how

- 1 Draw a very large rectangle on the floor , with two large overlapping circles. Label them A and B.
Label the rectangle as the universal set ξ
- 2 Tell the students that the whole class must stand inside the rectangle (the universal set).
Select two overlapping topics eg brown hair and blue eyes and write them on your whiteboard:
A = Brown hair
B = Blue eyes
Ask students to stand in the correct part of the rectangle.
You should be able to draw out from the students where they need to stand.
You can then discuss what each part of the rectangle means.
Do the activity again with students selecting the categories
- 3 For older students you can add in \cup and \cap notation.
So that you don't give any clues to the meaning, write $A \cap B$ on the whiteboard.
Students standing in $A \cap B$ should put up their hands.
You can get quite complicated if you move onto groups such as $A' \cup B'$

helpful notes

You can develop this activity to cover probability questions too

The current A-level syllabus includes venn diagrams and probability in the S1 unit and this is a good activity to introduce the topic to students who studied the old GCSE syllabus.

Mechanics

prep time

5 mins

(to scout out safe location)

activity

15 mins

age

KS 4/5

things you need

Chalk pen

Mini whiteboard

For student calculation

Duct tape

Several small pieces

A big drop

A stairwell?

Tape measure

Several small pieces

Stopwatch

Or mobile phone

Object

Which is safe to drop

topics

Practical experiments

Newtonian mechanics

Equations of motion

here's how

- 1 It's easy to miss bits of information from a diagram when you are looking at vertical motion under freefall/gravity. This activity lets you stand in the diagram!

Give the students pieces of duct tape, chalk labelled with a , s , u , v , t .

Go to the staircase and label the wall with the tape – so u (initial velocity) at the top and v (final velocity) on the floor at the bottom of the stairs, etc.

- 2 Students then label what they know: $a=g$, $u=0$, $v=?$, $t=?$, $s=?$
- 3 Students use mobile phones to time the drop of the object from the top to the bottom. They can then use whiteboards and calculate the distance and final velocity.

The physical activity allows them to think about how to draw these kinds of diagram.

helpful notes

You can adapt this for other mechanics questions, just don't break anything or anyone!

Simple mechanics equations may be used in the new GCSE specification, depending on exam board.

Have fun and forget the worksheet!

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For more ideas go to:
www.mathsandpit.co.uk/blog