Spirit of Innovation STEAM Resources

Maths

Year Five

Number & Measure

Shape and Speed

Links

Number – number and place value

- Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- Solve number problems and practical problems that involve all of the above

Number – addition and subtraction

- Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- Add and subtract numbers mentally with increasingly large numbers
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Measurement

- Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre;)
- Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes
- Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]
- Solve problems involving converting between units of time
- Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

Geometry – properties of shapes

- Identify 3-d shapes, including cubes and other cuboids, from 2-d representations

Resources

- Paper plane instructions (Download)
- A4 thick paper
- Rulers
- Pencils
- Protractors
- Markers
- Sticky tape
- Weighing scales
- Masking tape
- Tape measure/metre sticks
- Clipboard
- Chalk
- Result sheet (Download)
  On paper or electrical device
- Top 6 distance travelled sheet (Download)

https://www.dkfindout.com/us/math/geometry/types-triangle/

https://www.dkfindout.com/us/math/geometry/angles/

- Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- Draw given angles, and measure them in degrees (°)
- Identify:
- Angles at a point and one whole turn (total 360°)
- Angles at a point on a straight line and a turn (total 180°)
- Other multiples of 90°
- Use the properties of rectangles to deduce related facts and find missing lengths and angles
- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

Statistics

- Solve comparison, sum and difference problems using information presented in a line graph
- Complete, read and interpret information in tables, including timetables.

Skills

- Follow instructions
- Accurate measuring: - ruler, protractor
- Reading and recording numbers
- Identifying the furthest/nearest measurement
- Compare angles, length, distances & weight
- Understand the reasons for a fair test
- Create a fair test
- Discuss findings using vocabulary such as; bigger angle, smaller angle, acute, obtuse, right angle, equilateral, isosceles, scalene
- Understanding coordinates/grid references (Along the corridor and up the stairs)

Questions

- How are you going make your plane? (Online/template/instructions/previous knowledge)
- If you want a plane to fly a long way, what do you need to consider?
- How will we make it fair?
- How will we know how far each plane has gone?
- What will we use to measure?
- Which units allow for the greatest accuracy? Why?
- (centimetres, millimetres, metres)
- How will we record the results?
- How will we identify whose plane went the furthest?
- What angle are you going to use for the nose? Wings?

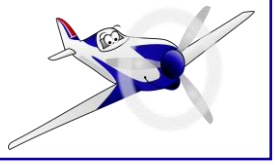
Activity

Activity One
Whole Class/Individual/Pairs
(40 - 60 mins)
Additional space required outside area/hall

Introduce the topic of air speed records to the pupils, inform them that there is a link between shape and speed. In an air speed records attempts; the aim is to make an extremely sleek and aerodynamic aircraft.

The objective of this activity is to design and make a paper plane that will travel the furthest, taking into consideration the angles of the wings and nose.

Explain that there will be a 'test flight' to see which one(s) goes the furthest. Request that they need to design and make their planes using one piece of A4 paper, the type of paper and thickness can vary.



These planes can be made by individuals or as pairs; using online research, a template, instructions or from prior knowledge of paper planes. All pupils will need to remember to add their name to their plane, in order to identify them.

Bring the class together before the 'test flight' to discuss how to make it a fair test. For example: mark out a place where everyone throws from, decide if planes are going to be thrown one at a time, how many throws per plane etc.

Mark out the 'flight path' with a throwing line and then run a tape measure, or some metre sticks, along the edge of the flight path.

Once a plane is thrown, mark the ground with chalk, or masking tape if inside, with the name of the thrower. Record the distance on the result sheet (Download) (Hint: *If recording results on paper, and throwing more than once, add the pupil's names before printing the required number of copies.*)

Once all test flights have been taken and distance travelled recorded. Gather the top 6 planes. As a class, reflect on the most successful planes. Discuss 'why' they think these designs travelled the furthest.

Using the Top 6 distance travelled sheet (Download), protractors and ruler; measure the angle of the wings/nose, plus make a note of whether the angles are obtuse or acute, then record the length of fuselage (cm)

<u>Extension: Design Plane Two and Repeat Activity One</u>
Repeat Activity One using their knowledge gained in flight test one.
Compare the data from plane one and plane two.
Did the improvements to the design reflect in the distance travelled?
If so:
How much further did it travel? How much cargo was it carrying?
Suggest what improvements lead to plane two's success?
If not:
Why not?
What improvements do you think your plane still needs to go further?