

Spirit of Innovation STEAM Resources



Maths

Year Four

Number & Measure

Propeller Investigation

Links

Number – number and place value

- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- Order and compare numbers beyond 1000

Number – addition and subtraction

- Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

Measurement

- Estimate, compare and calculate different measures, including money in pounds and pence

Geometry – properties of shapes

- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- Identify acute and obtuse angles and compare and order angles up to two right angles by size
- Identify lines of symmetry in 2-D shapes presented in different orientations

Geometry – position and direction

- Describe positions on a 2-D grid as coordinates in the first quadrant
- Describe movements between positions as translations of a given unit to the left/right and up/down

Statistics

- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Resources

- How to make a windmill instructions ([Download](#))
- Various sizes and thicknesses of paper
- Pencil
- Rulers
- Glue
- Sticky tape
- Scissors
- Dowel
- Large headed pins
- Stop watch
- Clipboard
- Windmill result sheet ([Download](#)) On paper or electrical device
- Top 10 Windmills ([Download](#))
- Spirit of Innovation - Classic Game of Strategy ([Download](#))

Skills

- Follow instructions
- Accurate measuring
- Reading and recording numbers
- Compare number of spins
- Understand the reasons for a fair test
- Create a fair test

Questions

- What type of windmill are you going to make?
- If you want the windmill to spin quicker, what do you need to consider?
- How will you calculate how many spins it has made?
- How will we make it fair?
- What will we use to measure the spins?



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- Discuss findings using vocabulary such as; heavy, light, bigger, smaller, more, less,
- Understanding coordinates/grid references (Along the corridor and up the stairs)

- How will we record the results?
- How will we identify whose windmill turned the most?
- Can you remember which coordinate comes first? The x or y axis?

Activity

Activity One

Whole Class/Individual/Pairs
(40 - 60 mins)

Introduce the topic of air speed records to the pupils, inform them that the Spirit of Innovation plane is a propeller driven plane. Providing the plane's thrust. The three propeller blades spin at 2,400 RPM (40 times per second!)

Explain that there will be a 'test flight' to see whose propeller (windmill) spins the quickest. Request that they need to design and make their propellers using one piece of paper. These propellers can be made by individuals or as pairs; using online research, a template, instructions or from prior knowledge of windmills. It is up to the designers to decide the size and weight of the paper and how many blades (points) they have. All pupils will need to remember to add their name to their windmill, in order to identify them. A spot/marker will need to be put on one of the blades to identify a full rotation of the blades.

Bring the class together before the 'test flight' to discuss how to make it a fair test. For example: All count the spins together, make sure the stopwatch is started the same time for each test.

Record the number of spins per minute 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 number of spins recorded, use the chart to find the top 10 propellers.

As a class, reflect on the most successful propellers. Discuss 'why' they think these propellers spun the quickest. Maybe compare it to others that were not so successful.

Extension:

Repeat Activity One; using their knowledge gained in round one.

Compare the data from propeller one and propeller two.

Did the improvements to the design reflect in the trust (number of spins)?

If so:

How much faster did it spin?

Suggest what improvements lead to plane two's success?

If not:

Why not?

What improvements do you think your plane still needs to go faster?

Activity Two

Whole Pairs
(30 mins)



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In pairs all pupils should be given two copies of Spirit of Innovation - The Classic Game of Strategy ([Download](#)) Pupils need to cut along the dotted line on both sheets. Next, they will need to cut out one set of Spirit of Innovation icons. These icons need to be glued or placed onto one of the grids. The other grid will be required for marking the whereabouts of their opponent's icons or 'missed coordinates' that they have guessed. The winner is the pupils who guesses the whereabouts of all of the Spirit of Innovation icons. * *Hint: Get pupils to shield their grids behind a large book.*

Coordinates are ordered pairs; the first indicates the point on the x axis and the second the point on the y axis. When reading or plotting coordinates you always go across first and then up (a good way to remember this is: Along the corridor and up the stairs)



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