SBSP PROGRESSION OF COMPONENT KNOWLEDGE THROUGH SCIENCE UNITS

PHYSICS – FORCES AND MAGNETS

Year 3 NC links:

- compare how things move on different surfaces
- notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
- describe magnets as having 2 poles
- predict whether 2 magnets will attract or repel each other, depending on which poles are facing
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials

Year 3 Component Knowledge

- Identify different types of forces
- Identify different types of forces and describe the effect they have on an object
- Identify different types of forces and explain how they impact the movement of an object
- Compare how things move on different surfaces
- Explain why some surfaces slow objects down
- Explain how friction can be increased or decreased
- Describe magnets as having two poles
- Name some different types of magnet
- Identify some everyday uses for magnet
- Understand how magnetic materials behave
- Identify a range of materials which are magnetic
- Compare and group materials based on their magnetic properties
- Observe how magnetic forces act at a distance
- Understand how magnetic forces can act at a distance
- Explain how magnetic forces act at a distance
- Understand what a compass is and how it works
- Understand what the four main compass points are
- Explain how a compass works

Working Scientifically Component Knowledge

- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units
- Using a range of equipment, including thermometers and data loggers
- Setting up simple practical enquiries and comparative and fair tests
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- Using a range of equipment including thermometers and data loggers

Key Vocabulary

- friction, air resistance, non-contact forces, force, contact force
- motion, texture, resistance, tilt, surface
- repel, magnet, horseshoe magnet, attract, bar magnet
- iron, magnetic field, steel, magnetism, magnetic

- non-magnetic materials, recycle
- magnetic north, magnetic needle, compass, direction, orienteering

Year 5 NC links:

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect between the Earth and the falling object

Year 5 Component Knowledge

- Explore the life and work of Isaac Newton
- Understand the influence gravity has on the universe
- Investigate the relationship between mass and gravity
- Understand how air resistance acts on objects
- Design and test parachutes, using averages to get more accurate results
- Draw an accurate diagram of the forces acting on a parachute and explain their purpose
- Understand how water resistance acts on objects
- Describe the forces acting on an object floating in water
- Identify the similarities and differences between air and water resistance
- Understand how friction acts on objects
- Accurately use a Newton meter to measure a force
- Describe ways of changing the size of a frictional force
- Name the forces acting on a range of objects
- Describe the effect forces can have on an object
- Explain how gears work
- Explain how gears work and their purpose
- Create a set of interacting gears
- Notice patterns in the workings of gears

Working Scientifically Component Knowledge

- Identifying scientific evidence that has been used to support or refute ideas or arguments
- Taking measurements and using a range of scientific equipment with increasing accuracy and precision; taking repeat readings when appropriate
- Reporting and presenting findings from enquiries - including conclusions, causal relationships and explanations of and a degree of trust in results - in oral and written forms such as displays and other presentations
- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Key Vocabulary

- weight, mass, astronomy, Sir Isaac Newton, gravity
- Galileo Galilei, opposing, air resistance, parachute, streamlined
- streamlined, up thrust, buoyant, water resistance, sink
- Newton meter, resistance, lubricant, Newton, friction
- load, pulley, lever, pivot, fulcrum
- gear, mesh, mechanism, rack and pinion, bevel gear

KS3 NC links:

Magnetic fields by plotting with compass, representation by field lines. Earth's magnetism, compass and navigation. Forces as pushes or pulls, arising from the interaction between two objects. Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. Moment as the turning effect of a force. Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. Forces measured in Newtons, measurements of stretch or compression as force is changed.