Medium Term Plan: Supporting Implementation of LTP/Progression Grid

Subject: Science Year: Phase 2 year B - Forces

NC/PoS:

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- 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
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Prior Learning (what pupils already know and can do)

The shapes of some solid objects can be changed by squashing, bending, twisting, and stretching.

End Goals (what pupils MUST know and remember)

- Know a force can, make things slow down or speed up.
- Know when an object moves on a surface, the texture of the surface and the object affect how it moves.
- Know moving objects slow down quickly on rough surfaces.
- Know moving objects do not slow down much on smooth surfaces.
- Know that for some forces to act, there must be contact e.g., a hand opening a door, the wind pushing the trees
- Know that magnets do not need to touch objects for a force to occur
- Know most magnets have a North pole (N) and a South pole (S)
- Know a North and South pole attract and like poles repel
- Know monopole magnets only have one pole
- Know only some materials are attracted to magnets – steel and iron
- Know the direction of forces when something floats or sinks.

Key Vocabulary:

magnetic, non-magnetic, iron, steel (an alloy of iron), nickel, bar magnet, North pole, South pole, opposite, like poles, non-contact, magnetic force, bar, horseshoe, repel, attract, push, pull, contact force, average, compare, presenting data

Session 1: review prior learning

Show the children a sponge, blu-tac and pose the question: how might I change the shape of these solid objects?

Introduce career scientists and Galileo Galilei https://www.bbc.co.uk/teach/class-clips-video/science-ks2-the-work-of-galileo-galilei/zh69t39

Explore a range of toys/games that involve forces to move them.

Working Scientifically: Pattern seeking

Session 2: Recap: How do we make solid objects change shape?

Children learn a force can, make things slow down or speed up. For some forces to act, there must be contact e.g., a hand opening a door, the wind pushing the trees

LO: To record observations of pushes and pushes

Think back to the different types of toys. How did we get them to move? Pushes and pulls. Contact forces occur as a result of two objects making contact with each other.

Watch https://www.youtube.com/watch?v=lM9t784dE18 pushes and pulls to introduce forces in everyday life Children record examples of pushes and pulls. (Venn, table etc. own choice) What everyday objects do we use that use push or a pull to move? E.g. doors, brushes **Working Scientifically: Fair and comparative testing.** Vocabulary: push, pull, contact force
Session 3: Recap: What is a force? What does a force do? Give examples of a contact force (pushes and pulls) Children learn when an object moves on a surface, the texture of the surface and the object affect how it moves. Moving objects slow down quickly on rough surfaces and moving objects do not slow down much on smooth surfaces. <u>LO: To record and present results for an object moving across different surfaces</u> Using cars on ramps children measure the distance travelled and record results (table, bar graph) Children pick own 4 materials. Ensure take an average of 3 readings <u>LO: To write a conclusion for a set of results</u> Give reasons for their results e.g. the car travelled furthest on the wooden floor because it was smooth compared to the carpet. Etc Explain that different surfaces create different resistances for the moving object and this can either speed up or slow down the object. **Working Scientifically: Fair and comparative testing** Vocabulary: average, compare, presenting data, friction, resistance.
Session 4: Recap: show a spinning top. How might it move on the carpet, desk etc? Why? Children learn that magnets do not need to touch objects for a force to occur <u>LO: To observe magnets and how they make things move</u> Children have a variety of magnets (magnetic balls and iron filings) and explore making things move. Watch Https://www.youtube.com/watch?v=7HHs98PBgk0 what is a magnet and how it works? Nb Non- contact force as can work from a distance **Working Scientifically: Pattern seeking** Vocabulary: Non-contact, magnetic force, bar, horseshoe, repel, attract
Session 5: Recap: How do magnets make things move? (Repel and attract) What type of force is it? Children learn most magnets have a North pole (N) and a South pole (S). A North and South pole attract and like poles repel. Monopole magnets only have one pole. <u>Lo: to understand that some magnets have two poles</u> Vocabulary: bar magnet, North pole, South pole, opposite, like poles
Session 6: Recap: poles and which ones attract and repel Children learn only some materials are attracted to magnets – steel and iron <u>LO: To compare and group materials that are magnetic</u> Children give a variety of materials to test – include discs of different metals

Vocabulary: magnetic, non-magnetic, iron, steel (an alloy of iron), nickel
Session 7: Recap Magnets, poles and magnetic materials L.O. to understand the direction of forces when something floats. Vocabulary: Float, sink, gravity, forces, pull.
Link to career scientist: https://pstt.org.uk/application/files/2116/2851/6350/Mechanical_Engineer_-_Rafsan_Chowdhury.pdf https://pstt.org.uk/application/files/7516/2851/6241/Civil_engineer_-_Jyoti_Sehdev.pdf
Scientists who have helped develop understanding in this field: Galileo Galilei