**Ely St. John’s Primary**

**Science- Year 3**

**Forces and Magnets**

 Year 3 Key Science Vocabulary

Our Science Journey

Force, push, pull, friction, surface, magnet, magnetic, attract, magnetic field, pole, north, south, compass, direction

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| **EYFS** | **Y1** | **Y2** | **Y3** | **Y4** | **Y5** | **Y6** |
|  Being updated 2020-2021 | Animals - HumansPlants(trees)/Seasonal Changes | Living things and their habitatsAnimals including humans | Rocks and Soils | ElectricitySound | ForcesEarth and Space | Living things and their habitatsLight |
|   | AnimalsMaterials | Uses of everyday materialsPlants | LightPlants | States of matterDigestion and Teeth | Properties of Materials | Evolution and inheritanceElectricity |
|  | PlantsScience skills | The EnvironmentScientists and Inventors | Animals including humansForces and Magnets | Living things and their habitats | Living things and their habitatsAnimals, including humans | Animals including humans  |

 **Science-Year 3**

**Forces and Magnets**

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| **Key Knowledge** | * To know that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (e.g. opening a door, pushing a swing.)
* To explore the behaviour and everyday uses of different magnets (e.g. bar, ring, button and horseshoe).
* Working scientifically:
* To compare how different things move and group them
* To sort materials into those that are magnetic and those that are not
* To look for patterns in the way that magnets behave in relation to each other and what might affect this e.g. the strength of the magnet or which pole faces another
* To identify how these properties make magnets useful in everyday items and suggest creative uses for different magnets
* To describe magnets as having two poles
* To know that some forces need contact between two objects by identifying the different types of forces acting on objects
* To understand that the speed of how things move on different surfaces can be altered
* To understand that a magnetic force acts at a distance, and that this is known as the magnetic field
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| **Key Vocabulary** | Force, push, pull, friction, surface, magnet, magnetic, attract, magnetic field, pole, north, south, compass, direction,  |
| **Key Skills** | **Key Skills: to plan and carry out a fair test and draw conclusions (focus on children doing this more independently)**Ask relevant questions and use different types of scientific enquiries to answer themMake systematic and careful observations Gather, record, classify and present data in a variety of ways to help in answering questionsRecord findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tablesReport on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusionsIdentify differences, similarities or changes related to simple scientific ideas and processesUse straightforward scientific evidence to answer questions or to support their findingsExplore the strengths of different magnets and find a fair way to compare themCompare how things move on different surfacesNotice that some forces need contact between two objects, but magnetic forces can act at a distanceObserve how magnets attract or repel each other and attract some materials and not othersCompare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materialsPredict whether two magnets will attract or repel each other, depending on which poles are facing |
| **Lines of Enquiry** | 1. Observing over time
2. Pattern seeking
3. Identifying and classifying
4. Research (secondary sources)
5. Fair testing
6. Problem solving
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| **Main Unit Line of Enquiry** | 3. Identifying and classifying4. Research (secondary sources) |
| **By the end of this unit…****Include key skills and key knowledge** | ...all children should be able to: Use their results to make a conclusion.Sort the materials.Make a prediction. Form a conclusion from their results.Describe friction as a force that slows objects down.Feel the pulling force of a magnet. Sort materials according to whether they are magnetic or not. Participate in an investigation into magnet strength.Identify the different poles of a bar magnet. | **...most children will be able to:** Use the key words to explain their conclusion.1. Make generalisations about magnetic materials.
2. Make a prediction using scientific language.
3. Explain that magnets produce an invisible pulling force.
4. Identify magnetic materials.
5. Identify different types of magnet.
 | **...some children will be able to:** Explain their prediction and conclusion using scientific language.Explain what a magnet is.Explain their conclusion using scientific language.Identify and describe the invisible magnetic field around a magnet.Make generalisations about the types of materials that are attracted to magnets. |

**Science-Year 3 – Forces and Magnets**

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|  | **Session 1** |  **Session 2** |  **Session 3** |  **Session 4** |  **Session 5** |
| **LO and SC** | LO: To identify the forces acting on objectsI can name different types of force.I can say when there is a push or a pull acting on an object.I understand that magnetic forces can act at a distance. | LO: To investigate the effects of friction on different surfacesI can explain the force of friction.I can make a prediction using scientific forms of language.I can take measurements and present simple scientific data in a table.I can describe what I have found out, linking cause and effect.  | LO: To sort magnetic and non-magnetic materialsI can name some magnetic materials and some non-magnetic materials.I can explain that magnets produce a force that attracts some materials.I can describe what I have found out, linking cause and effect. | LO: To investigate the strength of magnetsI can identify different types of magnet. I can use scientific evidence to answer questions- make a prediction.I can present my data in a table. | LO: To explore magnetic polesI can identify the poles of a magnet. I can use scientific forms of language when communicating simple ideas. I can present simple scientific data in the form of a poster. |
| **Key Knowledge** | To know that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (e.g. opening a door, pushing a swing.)To know that some forces need contact between two objects by identifying the different types of forces acting on objects.

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 | To understand that the speed of how things move on different surfaces can be altered. | To understand that a magnetic force acts at a distance, and that this is known as the magnetic field.To sort materials into those that are magnetic and those that are not. | To explore the behaviour and everyday uses of different magnets (e.g. bar, ring, button and horseshoe)To describe magnets as having two poles | To describe magnets as having two polesTo understand that a magnetic force acts at a distance, and that this is known as the magnetic fieldTo look for patterns in the way that magnets behave in relation to each other and what might affect this e.g. the strength of the magnet or which pole faces another |
| **Key Vocab** | Force, push, pull | Force, push, pull, friction, surface

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 | Force, magnet, magnetic, attract, magnetic field

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 | Magnet, attract, force | Magnet, pole, north, south, attract, repel, compass, direction

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| **Key Skills** | Ask relevant questions and use different types of scientific enquiries to answer themMake systematic and careful observations  | Make systematic and careful observations Compare how things move on different surfacesReport on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions | Make systematic and careful observations Gather, record, classify and present data in a variety of ways to help in answering questionsObserve 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 materialsUse straightforward scientific evidence to answer questions or to support their findings | Make systematic and careful observations Gather, record, classify and present data in a variety of ways to help in answering questionsRecord findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tablesReport on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions | Make systematic and careful observations Use straightforward scientific evidence to answer questions or to support their findings Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tablesPredict whether two magnets will attract or repel each other, depending on which poles are facing |
| **Lines of Enquiry** | 3.Identifying and classifying | 5. Fair Testing | 3. Identifying and classifying | 2. Pattern Seeking | 4. Research (secondary sources |
| **Session Notes****+ Resources** |

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| Introduce the unit using the **Lesson Presentation.** Ask the children to complete the **Forces and Magnets Mind Map.**  |

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| Explain forces using the **Lesson Presentation,** then watch the clip. While watching, ask children to identify examples of pushing or pulling and record.

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| Discuss the examples of pushing and pulling seen in the clip using the information on the **Lesson Presentation.** **Activity**

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| Ask the children to work in pairs to create a freeze frame of an action to show a pushing or pulling force. They should show their freeze frames to the class, who should try to identify whether their action showed a pushing or pulling force.

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| Children to complete their **Pushing and Pulling Activity Sheet** by identifying the forces acting on the objects in the pictures. Look for children who can correctly identify pushing and pulling forces. Some children may need to act out the actions to decide if they are pushes or pulls.  |

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**Resources:****Presentation****Pushing and Pulling Activity Sheet****Forces and Magnets Mind Map**

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| Recap forces using the **Lesson Presentation.** Ask the children to discuss how the cyclist can change the motion of the bicycle.

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| Explain the force of friction and how it is created by different surfaces using the information and diagrams on the **Lesson Presentation.**  |

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| Children watch this **video** to see a friction investigation. **Activity**

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| Explain the investigation described on the **Lesson Presentation.** Children conduct the investigation as a whole class. LA- Children use their results to make a conclusion.MA- Children use the key words to explain their conclusion.HA- Children explain their prediction and conclusion.**Resources:** **Presentation** **Toy car****5 boards covered with different surfaces (e.g. sandpaper, a towel, tinfoil, lino, carpet, corrugated card or bubble wrap)****Rulers****Access to video****Investigating Friction Activity Sheet** |

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| Children discuss the ideas about magnets on the **Lesson Presentation.**

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| Use the **Lesson Presentation** to explain magnetic force. Children attract a paper clip to a magnet to experience magnetic force.  |

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| Following the instructions on the **Lesson Presentation,** children use iron filings to detect a magnet’s magnetic field.  |

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| Show **video** to watch magnets sorting materials in a scrapyard. Explain how the magnets are sorting the different materials using the **Lesson Presentation.**

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| **Activity**Children use magnets to sort piles of mixed materials according to whether they are magnetic or non-magnetic, using the differentiated **Magnetic Materials Activity Sheet** to record their findings. **Resources:****Presentation****Steel paper clips, bar magnets, iron filings, trays****Pile of magnetic/ non-magnetic materials mixed together per group (e.g. coins, iron, steel paper clips, nails, drinks cans, pes, pencils, food tins, wooden spoons, plastic tubs)****Magnetic Materials Activity Sheet**

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| Children carry out the hovering paper clip activity as described in the **Lesson Presentation**. Explain this activity using the **Lesson Presentation.**

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| Explain the different types of magnets using the image on the **Lesson Presentation.** Introduce the investigation.

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| Explain the investigation method as described on the **Lesson Presentation.** **Activity**

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| Children complete their predictions on the differentiated **Magnet Strength Activity Sheet,** then conduct the investigation. Children record their results and come to a conclusion on their activity sheet.**Resources:****Presentation** **Steel paper clips, cotton thread, masking tape, variety of different types of magnets (horseshoe, bar, button, disc, arc, cylinder, square)****Magnet Strength Activity Sheet**

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| Introduce the 2 ends of a magnet and watch this **video** about magnetic poles. Discuss the questions and explanations on the Lesson Presentation.  |

**Activity**

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| Children explore the forces of attraction and repulsion by placing north and south poles together as described on the **Lesson Presentation.** Children then make a poster that explains how the magnetic poles repel and attract.**Resources:** **Presentation** **Bar magnets** |

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**Science- Year 3 – Forces and Magnets**

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|  | **Session 6** |  **Session 7** |  **Session 8** |  **Session 9** |  **Session 10** |
| **LO and SC** | LO: To use and apply prior knowledge to answer questionsI can identify materials that are attracted to magnets.I can use scientific evidence to answer questions.I can use scientific ideas when describing simple processes. |  |  |  |  |
| **Key Knowledge** | To sort materials into those that are magnetic and those that are not |  |  |  |  |
| **Key Vocab** | Force, magnet, attract |  |  |  |  |
| **Key Skills** | Use straightforward scientific evidence to answer questions or to support their findings |  |  |  |  |
| **Lines of Enquiry** | 4. Research (secondary sources) |  |  |  |  |
| **Session Notes****+ Resources** | **Activity**

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| Children play the game described on the **Lesson Presentation** to match the **Forces and Magnets Questions** to the **Forces and Magnets Answer Cards.**  |
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| **Resources:****Presentation****Forces and Magnets questions and answer cards** |

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