Alexander Hosea Curriculum Map – Year 5 **Subject: Science Forces**

Programme of Study Statements

- 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.

Key Vocabulary

Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears

Investigations and Skills for thinking like a Scientist





Comparative Tests	**Identify & Classify**	**Observation over time**	**Pattern seeking**	**Research**
How does the angle of launch affect how far a paper rocket will go? How does the surface area of an object affect the time it takes to sink?	Can you label and name all the forces acting on the objects in each of these situations?	How long does a pendulum swing for before it stops?	Do all objects fall through water in the same way? How does surface area of parachute affect the time it takes to fall?	How do submarines sink if they are full of air?

Sticky Knowledge:

Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way.

- Friction is a force against motion caused by two surfaces rubbing against each other.
- Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move

Prior Learning:

- Compare how things move on different surfaces. (Y3 - Forces and magnets)
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)
- Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets)
- 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. (Y3 - Forces and magnets)
- Describe magnets as having two poles. (Y3 - Forces and magnets)
- Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)

Potential Evidence to support our Scientists (I can..):

- Can demonstrate the effect of gravity acting on an unsupported object
- Can give examples of friction, water resistance and air resistance
- Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance
- Can demonstrate how pulleys, levers and gears work

Future Knowledge:

- Forces as pushes or pulls, arising from the interaction between two objects. (KS3)
- Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3)
- Moment as the turning effect of a force. (KS3)
- Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction

<table>
<tr><td colspan="2">Big Question:</td><td>between surfaces, with pushing things out of the way; resistance to motion of air and water. (KS3)
• Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3)</td></tr>
<tr><td colspan="3">Cultural Capital</td></tr>
<tr><td>Visits and visitors
We the Curious (Bristol)</td><td>Experiences and events</td><td>Key texts

The Enormous Turnip
(Katie Daynes)
Leonardo's Dream
(Hans de Beer)
The Aerodynamics of Biscuits
(Clare Helen Welsh)</td></tr>
<tr><td>Community events and links</td><td>Global issues</td><td>Famous people/ Key Scientists

Galileo Galilei
(Gravity and Acceleration)
Isaac Newton
(Gravitation)
Archimedes of Syracuse
(Levers)
John Walker
(The Match)</td></tr>
<tr><td>Life Skills
Curiosity
Team work
Making Links</td><td>Key places
School playground, school field</td><td></td></tr>
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