Grade Level Expectations (Grades 3 & 4)
Magnetism and Electricity

DRAFT

FOSS Investigations	Essential Learning Indicators Targeted
Investigation 1: **The Force** Part 1 – Investigating Magnets and Materials Part 2 – Investigating More Magnetic Properties Part 3 – Breaking the Force Part 4 – Detecting the Force of Magnetism **Investigation 2:** **Making Connections** Part 1 – Lighting a Bulb Part 2 – Making a Motor Run Part 3 – Finding Conductors and Insulators Part 4 – Investigating Mystery Circuits **Investigation 3:** **Advanced Connections** Part 1 – Building Series Circuits Part 2 – Building Parallel Circuits Part 3 – Solving the String-of-Lights Problem **Investigation 4:** **Current Attractions** Part 1 – Building an Electromagnet Part 2 – Changing Number of Winds Part 3 – Investigating More Electromagnets **Investigation 5:** **Click It** Part 1 – Reinventing the Telegraph Part 2 – Sending Messages Long-Distance Part 3 – Choosing Your Own Investigation	*1.1.1 Understand how to use properties to sort natural and manufactured materials and objects. W (Investigations 1 & 2) • Identify, describe and sort objects and materials using observed physical properties such as magnetic properties. • Sort and classify natural and manufactured materials and objects according to various physical properties. *1.1.4 Understand that energy comes in many forms. W (Investigations 2 & 3) • Describe the forms of energy present in a system (i.e. energy of motion [kinetic], heat energy, sound energy, light energy, electrical energy, chemical energy, and food energy) *1.2.1 Analyze how the parts of a system go together and how these parts depend on each other. W (Investigations 2-5) • Identify the parts of a system and how the parts go together. • Describe the function of a part of a system. • Explain how one part of a system depends on other parts of the same system. • Describe what goes into (input) and out of (output) a system (e.g. what keeps a system running). • Predict and explain how a system would work if one of its parts was missing or broken. • Describe what goes into (input) and out of (output) a system (e.g. what keeps a system running). • Describe the effect on a system when an input in the system is changed. *1.2.2 Understand that energy can be transferred from one object to another and can be transformed (Investigations 2 & 3) from one form of energy to another. W • Identify where or when a part of a simple system has the greatest or least energy. • Describe transfers of energy. • Identify sources of energy. • Describe transformations of energy. *1.3.1 Understand forces in terms of strength and direction. W (Investigations 1,4 & 5) • Describe a force that is acting on an object in terms of strength and direction (e.g. magnetic force, a push, or a pull) • Compare the strength of one force to the strength of another force. 1.3.2 Understand that forces can change the motion of common objects. W (Investigations 1, 4 & 5) • Investigate and report how the position and motion of objects can be changed by a force. *2.1.1 Understand how to ask a question about objects, organisms, and events in the environment. W • Identify the question being answered in an investigation. • Ask questions about objects, organisms, and events based on observations of the natural world. *2.1.2 Understand how to plan and conduct simple investigations following all safety rules. W • Make predictions of t he results of an investigation. • Generate a logical plan for, and conduct, a simple investigation with the following attributes: prediction; appropriate materials and tools; variables kept the same; one changed variable; measured (responding) variable; gather, record, and organize data using appropriate units, charts, and/or graphs; multiple trials. • Identify and use simple equipment and tools to gather data and extend the senses. • Follow all safety rules during investigations. *2.1.3 Understand how to construct a reasonable explanation using evidence. W • Generate a scientific conclusion including supporting data from an investigation. • Describe a reason for a given conclusion using evidence from an investigation. • Generate a scientific explanation of observed phenomena using given data. 2.1.4 Understand how to use simple models to represent objects, events, systems, and processes. W • Investigate phenomena using a simple physical or computer model or simulation. • Describe reasons for using a model to investigate phenomena *2.1.5 Understand how to report investigations and explanations of objects, events, systems, and processes. • Report observations or data of simple investigations without making inferences. • Summarize an investigation by describing: reasons for selecting the investigative plan, materials used in the investigation, observations, data, results; explanations and conclusions in written, mathematical, oral, and information technology presentation formats; safety procedures used. 2.2.1 Understand that all scientific observations should be reported accurately even when the observations contradict expectations. W • Explain why scientific observations are recorded accurately and honestly. • Explain why scientific records of observations are not changed even when the records do not match initial expectations.

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	2.2.3 Understand why similar investigations may not produce similar results. W (Investigations 1 & 4) • Describe reasons why two similar investigations can produce different results 2.2.4 Understand how to make the results of scientific investigations reliable. W (Investigations 1 & 4) • Describe how the method of investigation insures reliable results. • Identify and describe ways to increase the reliability of the results. 2.2.5 Understand that scientific comprehension of systems increases through inquiry. W • Describe how scientific inquiry results in facts, unexpected findings, ideas, evidence, and explanations. • Describe how results of scientific inquiry may change our understanding of the systems of the natural and constructed world. • Explain how ideas about the natural and/or constructed world have changed because of scientific inquiry. *3.1.1 Understand problems found in ordinary situations in which scientific design can be or has been used to design solutions. W (Investigations 3 & 5) • Describe an appropriate question that could lead to a possible solution to a problem. • Describe how science and technology could be used to solve a human problem. • Describe the scientific concept, principle, or process used in a solution to a human problem. • Describe how to scientifically gather information to develop a solution. *3.1.2 Understand how the scientific design process is used to develop and implement solutions to human problems. W (Investigations 3 & 5) • Propose, implement, and document a scientific design process used to solve a problem or challenge: define the problem; scientifically gather information and collect measurable data; explore ideas; make a plan; list steps to do the plan; scientifically test solution; document the scientific design process • Describe possible solutions to a problem. • Describe the reason(s) for the effectiveness of a solution to a problem or challenge. *3.1.3 Analyze how well a design or a product solves a problem. W (Investigations 3 & 5) • Identify the criteria for an acceptable solution to a problem or challenge. • Describe the reason(s) for the effectiveness of a solution to a problem or challenge using scientific concepts and principles. • Describe the consequences of the solution to a problem or challenge • Describe how to change a system to solve a problem or improve a solution to a problem. • Test how well a solution works based on criteria, and recommend and justify, with scientific concepts or principles and data, how to make it better. *3.2.1 Understand that science and technology have been practiced by all peoples throughout history.* • *Describe how individuals of diverse backgrounds have made significant scientific discoveries or technological advances.* • *Describe how advancements in science and technology have developed over time and with contributions from diverse people.* *3.2.2 Understand that people have invented tools for everyday life and for scientific investigations. W* • *Describe tools(technology) invented to advance scientific investigations.* • *Describe how scientific tools help people design solutions to human problems.* • *Describe how common tools help people design ways to adapt to different environments.* • *Describe how scientific ideas and discoveries are used to design solutions to human problems, extend human ability, or help humans adapt to different environments.*

* GLEs assessed in formative assessments found in WA Assessment Folio

GLEs in italics are not currently addressed in the investigations but could be addressed with extension activities, FOSS Science Stories, and other resources.

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