Grade Level Expectations (Grades 5)
Models and Designs

DRAFT

FOSS Investigations	Essential Learning Indicators Targeted
Investigation 1: **Black Boxes** Part 1 – Black Box Investigations Part 2 – Building Black Boxes Part 3 – The Drought Stopper **Investigation 2:** Part 1 – Exploring Hum Dingers Part 2 – Model Hum Dingers Part 3 – Reveal and Replicate **Investigation 3:** **Go-Carts** Part 1 – Free-Rolling Go-Carts Part 2 – Self-Propelled Carts Part 3 – The Two- Meter Run **Investigation 4:** **Cart Tricks** Part 1 – The Run-Around Cart Part 2 – Advanced Tricks Part 3 – Choosing Your Own Investigation	*1.1.2 Understand the relative position and motion of objects. W (Investigations 3 & 4) • Describe the motion of an object in terms of distance, time, and direction as the object travels in a straight line. *1.2.1 Analyze how the parts of a system go together and how these parts depend on each other. W • Describe a simple system that can perform a task and illustrate how the parts depend on each using common classroom materials. • Explain how one part of a system depends upon other parts of the same system. • 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. *1.2.2 Understand that energy can be transferred from one object to another and can be transformed from one form to another. W (Investigations 2-4) • Identify where or when a part of a simple system has the greatest or least energy. • Describe transfers of energy. • Identify sources of energy in systems. • Describe transformations of energy. 1.3.1 Understand forces in terms of strength and direction. W (Investigations 3 & 4) • Describe a force that is acting on an object in terms of strength and direction. *1.3.2 Understand that forces can change the motion of common objects. W (Investigations 3 & 4) • Investigate and report how the position and motion of objects can be changed by a force. • Investigate and report how a larger force acting on an object causes a greater change in motion of that object. 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. *2.1.3 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 object, events, or processes. W • List similarities and differences between a model and what the model represents. • Create a simple model to represent common objects, events, systems, or processes (e.g. diagram or map and/or physical model). • 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. W • Report observations or data of simple investigations without making inferences. • Summarize an investigation by describing: reasons for selecting the investigation 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. • 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. • Explain why honest acknowledgement of the contributions of others and information sources are necessary.

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	2.2.2 Understand that scientific facts are measurements and observations of phenomena in the natural world that are repeatable and/or verified by expert scientists. W • Describe whether measurements and/or observations of phenomena are scientific facts. • Describe whether a report of an observation is a scientific fact or an interpretation. 2.2.3 Understand why similar investigations may not produce similar results. W • Describe reasons why two similar investigations can produce different results (e.g. identify possible sources of error) • Explain whether sufficient information has been obtained to make a conclusion. 2.2.4 Understand how to make the results of scientific investigations reliable. W (Investigations 1, 3 & 4) • Describe how the method of investigation insures reliable results (i.e. reliability means that repeating an investigation gives similar results) • Identify and describe ways to increase the reliability of the results of an investigation. 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 2-4) • 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 2-4) • 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 solutions; document the scientific design process. • Describe possible solutions to a problem. • Describe 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 2-4) • 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. *3.2.3 Understand how knowledge and skills of science, mathematics, and technology are used in common occupations.* • *Identify science, math, and technology skills used in a career.* • *Identify occupations using scientific, mathematical, and technological knowledge and skills.*

* GLE's assessed in formative assessments found in WA Assessment Folio.
GLE's 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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