

Grade Level Expectations (Grade 5)

Levers and Pulleys

DRAFT

FOSS Investigations	Essential Learning Indicators Targeted
<p>Investigation 1: Levers Part 1 – Introduction to Levers Part 2 – Lever Experiment A Part 3 – Lever Experiment B</p> <p>Investigation 2: More Leverage Part 1 – Lever Classes Part 2 – Lever Diagrams Part 3 – Real World Levers Part 4 – Lever Pictures</p> <p>Investigation 3: Pulleys Part 1 – One-Pulley System Part 2 – Two-Pulley System Part 3 – Pulley Game</p> <p>Investigation 4: Pulleys at Work Part 1 – Effort in Pulley Systems Part 2 – Measuring Distance Part 3 – Choosing Your Own Investigation</p>	<p>*1.2.1 Analyze how the parts of a system go together and how these parts depend on each other. W a Identify the parts of a system (e.g. a device, natural or living thing) and how the parts go together. b Describe the function of a part of a system (e.g. a device, natural or living thing). c Describe a simple system that can perform a task and illustrate how the parts depend on each using common classroom materials. d Explain how one part of a system depends upon other parts of the same system. e Predict and explain how a system would work if one of its parts was missing or broken. f Describe what goes into (input) and out of (output) a system. g Describe the effect on a system when an input in the system is changed.</p> <p>*1.3.1 Understand forces in terms of strength and direction. W a Describe a force that is acting on an object in terms of strength and direction (e.g. electrical force, gravitational force, magnetic force, a push, or a pull). b Measure the force acting on an object with a spring scale calibrated in Newtons. c Compare the strength of one force to the strength of another force .</p> <p>1.3.2 Understand that forces can change the motion of objects. W a Investigate and report how the position and motion of objects can be changed by a force. b Investigate and report how a larger force acting on an object causes a greater change in motion of that object, 2nd Law of Motion.</p> <p>*2.1.1 Understand how to ask a question about objects, organisms, and events in the environment. W a Identify the question being answered in an investigation. b Ask questions about objects, organisms, and events based on observations of the natural world. c Develop a new question that can be investigated with the same materials and/or data as a given investigation.</p> <p>*2.1.2 Understand how to plan and conduct simple investigations following all safety rules. W a Make predictions of the results of an investigation. b Generate a logical plan for, and conduct, a simple controlled investigation with the following attributes: prediction ; appropriate materials, tools, and available computer technology; variables kept the same(controlled); one changed variable (manipulated); measured (responding) variable; gather, record and organize data using appropriate units, charts, and/or graphs; multiple trials d Identify and use simple equipment and tools (such as magnifiers, rulers, balances, scales, and thermometers) to gather data and extend the senses. e Follow all safety rules during investigations.</p> <p>*2.1.3 Understand how to construct a reasonable explanation using evidence. W a Generate a scientific conclusion including supporting data from an investigation. b Describe a reason for a given conclusion using evidence from an investigation. c Generate a scientific explanation of an observed phenomenon using given data. d Predict what logically might occur if an investigation is changed.</p> <p>*2.1.4 Analyze how models are used to investigate objects, events, systems, and processes. W a List similarities and differences between a model and what the model represents . b Create a simple model to represent common objects, events, systems, or processed (e.g. diagram or map and/or physical model). c Investigate phenomena using a simple physical or computer model or simulation.</p> <p>*2.1.5 Understand how to report investigations, and explanations of objects, events, systems, and processes. W a Report observations or data of simple investigations without making inferences. b Summarize an investigation by describing: reasons for selecting an investigative plan; materials used in the investigation; observations, data, results; explanations and conclusions in written, mathematical, oral, and information technology presentation formats; safety procedures.</p> <p>2.2.1 Understand that all scientific observations are reported accurately and honestly even when the observations contradict expectations. a Explain why scientific observations are recorded accurately and honestly.</p>

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	<p>b Explain why scientific records of observations are not changed even when the records do not match initial expectations. c Explain why honest acknowledgement of the contributions of others and information sources are necessary.</p> <p>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. <i>W</i> a Describe whether measurements and/or observations of phenomena are scientific facts.</p> <p>2.2.3 Understand why similar investigations may not produce similar results. <i>W</i> a Describe reasons why two similar investigations can produce different results (e.g. identify possible sources of error). b Explain whether sufficient information has been obtained to make a conclusion.</p> <p>2.2.4 Understand how to make the results of scientific investigations reliable. <i>W</i> a Describe how the method of an investigation insures reliable results. b Identify and describe ways to increase the reliability of the results of an investigation.</p> <p>2.2.5 Understand that scientific comprehension of systems increases through inquiry. <i>W</i> a Describe how scientific inquiry results in new facts, evidence, unexpected findings, ideas, and explanations. b Describe how results of scientific inquiry may change our understanding of the systems of the natural and constructed world. c Explain how ideas about the natural and/or constructed world have changed because of scientific inquiry.</p> <p>*3.1.1 Understand problems found in ordinary situations in which scientific design can be or has been used to design solutions. <i>W</i> a Describe an appropriate question that can lead to a possible solution to a problem. b Describe how science and technology could be used to solve a human problem. c Describe the scientific concept, principle, or process used in a solution to a human problem. d Describe how to scientifically gather information to develop a solution.</p> <p>*3.1.2 Understand how the scientific design process to develop and implement solutions to human problems. <i>W</i> a 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 the solution; document the scientific design process. b Describe possible solutions to the problem. c Describe the reason(s) for the effectiveness of a solution to a problem or challenge.</p> <p>*3.1.3 Analyze multiple solutions to a problem or challenge. <i>W</i> a Identify the criteria for an acceptable solution to the problem or challenge. b Describe the reason(s) for the effectiveness of a solution to a problem or challenge using scientific concepts and principles. c Describe the consequences of the solution to the problem or challenge. d Describe how to change a system to solve a problem or improve a solution to a problem. e 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.</p> <p>3.2.1 <i>Understand that science and technology have been practiced by all peoples throughout history.</i> a <i>Describe how individuals of diverse backgrounds have made significant discoveries or technological advances.</i> b <i>Describe how advancements in science and technology have developed over time and with contributions from diverse people.</i></p> <p>3.2.2 <i>Understand that people have invented tools for everyday life and for scientific investigations. W</i> a <i>Describe how common tools help people design ways to adapt to different environments.</i> b <i>Describe how scientific ideas and discoveries are used to design solutions to human problems, extend human ability, or help humans adapt to different environments.</i></p> <p>3.2.3 <i>Understand how knowledge and skills of science, mathematics, and technology are used in common occupations.</i> a <i>Identify science, math, and technology skills used in a career.</i> b <i>Identify occupations using scientific, mathematical, and technological knowledge and skills.</i></p>

* 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, or other resources.

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