Anoka Hennepin K-12 Curriculum Unit Plan

Department: Elementary Science **Course/Grade Level: 2nd Grade**

Unit Title: Physical Science - Motion **Number of Lessons/Days: 8- One Hour Sessions**

Unit Summary: In this unit, students will explore and describe that the motion of an object can be changed by forces, such as a pushes and pulls. Students will solve problems through trial and error; develop persistence in tackling a problem. They will discover different ways to produce rotational motion by constructing and observing toys that spin. Through these explorations, students will describe variables that influence the spinning of objects and how objects can change position over time. Additionally, students will explore and describe the motion of rolling spheres. The knowledge obtained will be assessed through the GRASPSS.

DESIRED RESULTS (STAGE 1)

Program Understanding and/or Minnesota State/Local/Core Standards and Technology Standard(s) addressed:

- III. Students will understand that scientists use the properties and interactions of energy and matter to explain how the physical world works.
- IV. Students will understand the study of science involves processes that unify science disciplines and provide students with ideas and structures to help them understand the natural world.
- V. Students will understand the process of inquiry is the collection of information verified through observation and experimentation which allow scientists to critically analyze, draw conclusions and make inferences about the natural world.
- VI. Students will understand scientists use various communications to share knowledge and promote understanding about our natural world.
- VIII. Students will understand scientists use and design technology to answer questions, share information and solve problems.

MN Standards

- 2.1.1.2 Scientific inquiry is a set of interrelated processes incorporating multiple approaches that are used to pose questions about the natural world and investigate phenomena.
  - 2.1.1.2.1 Raise questions about the natural world and seek answers by making careful observations, noting what happens when you interact with an object, and sharing the answers with others.
- 2.1.2.2 Engineering design is the process of identifying problems and devising a product or solution.
  - 2.1.2.2.1 Identify a need or problem and construct an object that helps to meet the need or solve the problem. *For example:* Design and build a tool to show wind directio *Another example:* Design a kit and identify the materials to use.
  - 2.1.2.2.2 Describe why some materials are better than others for making a particular object and how materials that are better in some ways may be worse in other ways. *For example:* Objects made of plastic or glass.
  - 2.1.2.2.3 Explain how engineered or designed items from everyday life benefit people.
- 2.2.2.1 The motion of an object can be described by a change in its position over time.
  - 2.2.2.1.1 Describe an object's change in position relative to other objects or a background. *For example:* Forward, backward, going up, going down.
  - 2.2.2.1.2 Demonstrate that objects move in a variety of ways, including a straight line, a curve, a circle, back and forth, and at different speeds. *For example:* Spinning to and rocking toy. *Another example:* Construct objects that will move in a straight line or a curve such as a marble or toy car on a track.
- 2.2.2.2 The motion of an object can be changed by push or pull forces.
  - 2.2.2.2.1 Describe how push and pull forces can make objects move. *For example:* Push and pull objects on smooth and rough surfaces.
  - 2.2.2.2.2 Describe how things near Earth fall to the ground unless something holds them up.

Overarching Understanding(s) from Curriculum Map/Course Understandings:

Students will understand that….

- objects move in a variety of ways.
- there are patterns that help make connections in the world.
- scientists ask questions and make observations to gather data to support their thinking about the world.
- scientists work individually and collaboratively to understand the natural world and learn from one another.
- engineers use a design process to identify problems and devise a product or solution.

Topical Understanding(s) Specific to Unit:

Students will understand that….

- the motion of an object can be described by its change of position over time.
- a force such as a push or a pull changes the position of an object.
- scientists see patterns, raise questions, seek answers, make observations and communicate with others in order to make connections in the natural world.
- there is a process that engineers use to solve a problem or meet a need.

Essential Question(s) from Curriculum Map/Course Essential Questions:

To understand, student will need to consider such questions as…

- What makes objects move in a particular way?
- How do scientists find and use patterns?
- How accurate does an observation have to be?
- What makes a good question?
- Why and how do scientists share what they know with others?
- What is the engineering design process?

Topical Essential Questions for Unit:

To understand, student will need to consider such questions as…

- How does a force of push or pull change the position of an object?
- How does the position of an object change?
- What makes a good question?
- How do scientists learn and share about the world around them?
- How do engineers solve problems or meet needs?

To understand, student will need to…	
know…Student will need to know the following in order to…(e.g. facts, concepts, generalizations, rules, theories, principles) • positional words. • objects move in a variety of ways and on different paths. • that pushing and pulling an object will change how it moves. • gravity causes things near the earth fall to the ground unless something holds the object up. • inquiry process is the way scientists learn and study the world around them. • physical properties of materials impact the way they can be used. • objects have been designed to benefit people in their everyday life. • the steps in the engineering process.	**be able to…**(Students will be able to DO…skills, procedures, processes • describe an object's change in position relative to other objects. • demonstrate that objects move in a variety of ways. • describe how push and pull forces can make objects move. • explain how objects near earth fall to the ground unless something holds it up. • ask testable questions and investigate to answer the student's questions. • describe why some materials are better than others in making a particular object. • explain how an engineered or designed item benefits people's lives. • identify a need or problem and construct an object that helps to meet the need or solve the problem.
Essential new vocabulary: o **axis:** a straight line that something rotates around o **design:** a plan an engineer uses to solve a problem o **engineering:** the process of designing the human-made world o **force:** the push or pull of objects o **gravity:** a force that pulls things toward the Earth o **motion:** a change in position of an object, when something moves o **pull:** to move or try to move something closer o **push:** to move or try to move something away o **rotate:** to turn in circles a lot of times; to spin o **inquiry:** steps that are used to find answers to questions about the world around us o **slope:** a surface that is higher on one end Common misunderstanding(s): • An object a person is sitting or standing on doesn't push back with equal force. The person is just resting on it. • A moving object has a force within it that keeps it moving. • A force is required to keep an object moving. • Objects slow down and stop if a force is not maintained. • The faster an object is moving the greater the force on it. • Objects move in the direction of the strongest force. • All scientists conduct experiments in a lab. • All Engineers are auto mechanics or construction workers.	