Science 7th Grade Proficiency Scales

Physical Science Standards

7.P2U1.1 Collect and analyze data demonstrating how electromagnetic forces can be attractive or repulsive and can vary in strength.
7.P2U1.2 Develop and use a model to predict how forces act on objects at a distance.
7.P3U1.3 Plan and carry out an investigation that can support an evidence-based explanation of how objects on Earth are affected by gravitational force.
7.P3U1.4 Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion.

Core Ideas

7.P2U1.1 Collect and analyze data demonstrating how electromagnetic forces can be attractive or repulsive and can vary in strength.

● Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.

7.P2U1.2 Develop and use a model to predict how forces act on objects at a distance.

● Forces that act at a distance (gravitational, electric, and magnetic) can be explained by force fields that extend through space and can be mapped by their effect on a test object (a ball, a charged object, or a magnet, respectively). (6.P2U1.4). Note: Gravitational force is a suggested focus for 6th grade; It is suggested that all 3 forces be focused on in 7th grade.

7.P3U1.3 Plan and carry out an investigation that can support an evidence-based explanation of how objects on Earth are affected by gravitational force.

● All objects on the Earth are affected by gravitational forces. An object which stays at rest on the surface of the Earth has one or more forces acting on it counter balancing the force of gravity

7.P3U1.4 Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion.

● For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first but in the opposite direction.

● The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to change the object's motion. For any given object, a larger force causes a larger change in motion.

● All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared.

Proficiency Scale	
Priority Standard: **7.P2U1.1** Collect and analyze data demonstrating how electromagnetic forces can be attractive or repulsive and can vary in strength.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I can collect data showing how electromagnetic forces can be attractive or repulsive.
Partially Proficient **2**	I can collect data showing how electromagnetic forces can be attractive or repulsive and vary strength.
Proficient **3**	I can collect data and use it to explain how electromagnetic forces can be attractive or repulsive and vary strength.
Highly Proficient **4**	I can collect data and use it to explain how electromagnetic forces can be attractive or repulsive and vary in strength and then extend my understanding by providing a real-world use of the properties of electromagnetic forces.

Proficiency Scale	
Priority Standard: **7.P2U1.2** Develop and use a model to predict how forces act on objects at a distance.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	With help, I can use a model to predict how forces (electric, magnetic, gravitational) act on objects at a distance, but I cannot create my own model.
Partially Proficient **2**	With help, I can create AND use a model to predict how forces (electric, magnetic, gravitational) act on objects at a distance.
Proficient **3**	I can create and use a model to make my own prediction on how forces (electric, magnetic, gravitational) act on objects at a distance.
Highly Proficient **4**	I can create and use a model on my own to make my own prediction on how forces (electric, magnetic, gravitational) act on objects at a distance including multiple real-world examples and scientific vocabulary.

Proficiency Scale	
Priority Standard: **7.P3U1.3** Plan and carry out an investigation that can support an evidence-based explanation of how objects on Earth are affected by gravitational force.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I can identify an example(s) that shows how objects on Earth are affected by gravity
Partially Proficient **2**	I can carry out an investigation (but not plan) that shows how objects on Earth are affected by gravity
Proficient **3**	I can plan and carry out an investigation that explains how objects on Earth are affected by gravity
Highly Proficient **4**	I can plan and carry out an investigation that explains how objects on Earth are affected by gravity using multiple sources.

Proficiency Scale	
Priority Standard: **7.P3U1.4** Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion (LAW 1). **Newton's first law:** *An object at rest will remain at rest unless acted upon by an external and unbalanced force. An object in motion will remain in motion unless acted upon by an external and unbalanced force.*	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I understand Newton's First Law only if I am shown an example
Partially Proficient **2**	I understand Newton's First Law of Motion, but I can't explain it using a model
Proficient **3**	I can explain Newton's First Law of Motion using a model or diagram.
Highly Proficient **4**	I can explain Newton's First Law of Motion using multiple models or diagrams.

Proficiency Scale	
Priority Standard: **7.P3U1.4** Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion (LAW 2). **LAW 2:** *F = MA. The greater the mass of an object being accelerated, the greater the amount of force needed to accelerate it.*	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I understand Newton's Second Law only if I am shown an example
Partially Proficient **2**	I understand Newton's Second Law of Motion, but I can't explain it using a model
Proficient **3**	I can explain Newton's Second Law of Motion using a model or diagram.
Highly Proficient **4**	I can explain Newton's Second Law of Motion using multiple models or diagrams.

Proficiency Scale	
Priority Standard: **7.P3U1.4** Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion (LAW 3). **LAW 3:** *All forces occur in pairs, and these two forces are equal in magnitude and opposite in direction.*	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I understand Newton's Third Law only if I am shown an example
Partially Proficient **2**	I understand Newton's Third Law of Motion, but I can't explain it using a model
Proficient **3**	I can explain Newton's Third Law of Motion using a model or diagram.
Highly Proficient **4**	I can explain Newton's Third Law of Motion using multiple models and a Free-body diagrams.

Earth and Space Science Standards
7.E1U1.5 Construct a model that shows the cycling of matter and flow of energy in the atmosphere, hydrosphere, and geosphere. **7.E1U1.6** Construct a model to explain how the distribution of fossils and rocks, continental shapes, and seafloor structures provides evidence of the past plate motions. **7.E1U2.7** Analyze and interpret data to construct an explanation for how advances in technology have improved weather prediction.
Core Ideas **7.E1U1.5** Construct a model that shows the cycling of matter and flow of energy in the atmosphere, hydrosphere, and geosphere.

● All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. This energy is derived from the sun and Earth’s hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth’s materials.

● The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.

● Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.

● The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth’s materials. This does not include the identification and naming of minerals. Emphasis is also on the ways that water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.

7.E1U1.6 Construct a model to explain how the distribution of fossils and rocks, continental shapes, and seafloor structures provides evidence of the past plate motions.

● Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth’s surface and provides a framework for understanding its geological history.

● Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth’s plates have moved great distances, collided, and spread apart.

● Tectonic processes continually generate new ocean seafloor at ridges and destroy old seafloor at trenches.

7.E1U2.7 Analyze and interpret data to construct an explanation for how advances in technology have improved weather prediction.

● Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. Because these patterns are so complex, weather can be predicted only probabilistically.

Proficiency Scale	
Priority Standard: **7.E1U1.5** Construct a model that shows the ~~cycling of matter and~~ flow of energy in the atmosphere, ~~hydrosphere, and geosphere.~~	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know thing change the weather, but I can't show it using a model.
Partially Proficient **2**	Using the teacher's model, I can show how energy flow causes changes in the atmosphere (weather and climate)
Proficient **3**	I can create a model to show how energy flow causes changes in the atmosphere (weather and climate).
Highly Proficient **4**	Using my model and understanding, I can predict how energy flow will affect the atmosphere (weather and climate).

Proficiency Scale	
Priority Standard: **7.E1U1.5** Construct a model that shows the cycling of matter ~~and flow of energy~~ in the atmosphere, hydrosphere, ~~and geosphere.~~	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know that matter cycles, but I can't show it using a model.
Partially Proficient **2**	Using the teacher's model, I can show how matter cycles on the Earth (water cycle, oxygen cycle, nitrogen cycle, carbon dioxide cycle)
Proficient **3**	I can create a model to show how matter cycles on the Earth (water cycle, oxygen cycle, nitrogen cycle, carbon dioxide cycle).
Highly Proficient **4**	Using my model and understanding, I can apply the cycling of matter (water cycle, oxygen cycle, nitrogen cycle, carbon dioxide cycle) to a new situation.

Proficiency Scale	
Priority Standard: **7.E1U1.5** Construct a model that shows the cycling of matter and flow of energy in the ~~atmosphere, hydrosphere, and~~ geosphere.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know that things on the Earth's surface change, but I can't explain why.
Partially Proficient **2**	I know there is heat inside the Earth and I know the surface of the Earth changes over time, but I don't understand how those things are connected.
Proficient **3**	I can create a model to show how heat from inside the Earth changes the Earth's surfaces.
Highly Proficient **4**	Using my model and understanding, I can apply what I know about how the heat from inside the Earth changes the Earth's surface to predict how the surface of the Earth might look in the future

Proficiency Scale	
Priority Standard: **7.E1U1.6** Construct a model to explain how the distribution of fossils and rocks, continental shapes, and seafloor structures provides evidence of the past plate motions.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know that the plates have moved, but I can't explain it using evidence (fossils, rocks, continental shapes and seafloor structures)
Partially Proficient **2**	I can create a model that explains past plate motions using *some* evidence (fossils, rocks, continental shapes and seafloor structures)
Proficient **3**	I can create a model that explains past plate motions using all of the evidence (fossils, rocks, continental shapes and seafloor structures)
Highly Proficient **4**	I can create a model that explains past plate motions using all of the evidence (fossils, rocks, continental shapes and seafloor structures) and scientific vocabulary.

Proficiency Scale	
Priority Standard: **7.E1U2.7** Analyze and interpret data to construct an explanation for how advances in technology have improved weather prediction.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know we can predict weather but I don't know how technology has made the predictions better
Partially Proficient **2**	I can explain how advances in technology have improved weather prediction in one tool
Proficient **3**	I can explain how advances in technology have improved weather prediction in more than one tool
Highly Proficient **4**	I can use multiple resources to explain how advances in technology have improved weather prediction.

Life Science Standards

7.L1U1.8 Obtain, evaluate, and communicate information to provide evidence that all living things are made of cells, cells come from existing cells, and cells are the basic structural and functional unit of all living things.
7.L1U1.9 Construct an explanation to demonstrate the relationship between major cell structures and cell functions (plant and animal).
7.L1U1.10 Develop and use a model to explain how cells, tissues, and organ systems maintain life (animals).
7.L1U1.11 Construct an explanation for how organisms maintain internal stability and evaluate the effect of the external factors on organisms' internal stability.
7.L2U1.12 Construct an explanation for how some plant cells convert light energy into food energy.

Core Ideas

7.L1U1.8 Obtain, evaluate, and communicate information to provide evidence that all living things are made of cells, cells come from existing cells, and cells are the basic structural and functional unit of all living things.

● All living things are made up of cells, which is the smallest unit that can be said to be alive. All the basic processes of life are the results of what happens inside cells. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).

● Cells divide to replace aging cells and to make more cells in growth and in reproduction.

7.L1U1.9 Construct an explanation to demonstrate the relationship between major cell structures and cell functions (plant and animal).

● Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. Boundary: At this grade level, only a few major cell structures should be introduced.

7.L1U1.10 Develop and use a model to explain how cells, tissues, and organ systems maintain life (animals).

● In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions, such as respiration, digestion, elimination of waste and temperature control.

7.L1U1.11 Construct an explanation for how organisms maintain internal stability and evaluate the effect of the external factors on organisms' internal stability.

● Organisms respond to stimuli from their environment and actively maintain their internal environment.

7.L2U1.12 Construct an explanation for how some plant cells convert light energy into food energy.

● Plants, algae (including phytoplankton) and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.

Proficiency Scale

Priority Standard: **7.L1U1.8** Obtain, evaluate, and communicate information to provide evidence that all living things are made of cells, ~~cells come from existing cells~~, and cells are the basic structural and functional unit of all living things.	
No Attempt Made 0	No evidence
Minimally Proficient 1	I know living things are made of cells, but I can't explain how.
Partially Proficient 2	I can explain that living things are made of cells, but I don't have evidence to support my explanation.
Proficient 3	I can use information to explain that all living things are made of cells
Highly Proficient 4	I can use information to explain that all living things are made of cells using multiple examples

Proficiency Scale	
Priority Standard: **7.L1U1.8** Obtain, evaluate, and communicate information to provide evidence that ~~all living things are made of cells~~, cells come from existing cells, ~~and cells are the basic structural and functional unit of all living things.~~	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know that we get more cells, but I don't know how.
Partially Proficient **2**	I can use information to explain ONE of the ways that cells come from existing cells (Mitosis or Meiosis)
Proficient **3**	I can use information to explain that cells come from existing cells (Mitosis and meiosis)
Highly Proficient **4**	I can use information to explain that cells come from existing cells (Mitosis and meiosis) using proper scientific vocabulary

Proficiency Scale	
Priority Standard: **7.L1U1.9** Construct an explanation to demonstrate the relationship between major cell structures and cell functions (plant and animal).	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know cells have parts but don't know what they do.
Partially Proficient **2**	I can explain some of the major parts of a cell (organelles) and their functions in both plant and animal cells.
Proficient **3**	I can explain all the major parts of a cell (organelles) and their functions in both plant and animal cells.
Highly Proficient **4**	I can demonstrate my understanding of the major parts of a cell by creating an analogy to a non-living system.

Proficiency Scale	
Priority Standard: **7.L1U1.10** Develop and use a model to explain how cells, tissues, and organ systems maintain life (animals).	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know there are different body systems, but I don't know how they maintain life (animals).
Partially Proficient **2**	I can create a model, but cannot explain fully how the structure of an organ system helps maintain life (animals)
Proficient **3**	I can create a model to explain how the structure of organ systems helps maintain life (animals).
Highly Proficient **4**	I can demonstrate my understanding of the structure and function of organ systems by creating an analogy to a non-living system.

Proficiency Scale	
Priority Standard: **7.L1U1.11** Construct an explanation for how organisms maintain internal stability and evaluate the effect of the external factors on organisms' internal stability.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know body systems have a way to be stable, but I don't know how.
Partially Proficient **2**	I can explain how living things maintain homeostasis in some of their body systems.
Proficient **3**	I can explain how living things maintain homeostasis in each of their body systems.
Highly Proficient **4**	I can explain how living things maintain homeostasis and I can apply my understanding to different situations.

Proficiency Scale	
Priority Standard: **7.L2U1.12** Construct an explanation for how some plant cells convert light energy into food energy.	
No Attempt Made **0**	No evidence
Minimally Proficient **1**	I know plants need sunlight, but I can't explain the process of photosynthesis
Partially Proficient **2**	I can explain some of the parts in the process of photosynthesis
Proficient **3**	I can explain the process of photosynthesis in plant cells.
Highly Proficient **4**	I can explain the process of photosynthesis in plant cells using scientific vocabulary