

| Grade | Strand                                   | Substrand                                   | Standard "Understand that ...                                                                                                                         | Code      | Benchmark                                                                                                                                                                                                                                                                                                                               |
|-------|------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3     | 3. Earth Science                         | 3. The Universe                             | 1. The sun and moon have locations and movements that can be observed and described.                                                                  | 3.3.3.1.1 | Observe and describe the daily and seasonal changes in the position of the sun and compare observations.                                                                                                                                                                                                                                |
| 3     | 3. Earth Science                         | 3. The Universe                             | 1. The sun and moon have locations and movements that can be observed and described.                                                                  | 3.3.3.1.2 | Recognize the pattern of apparent changes in the moon's shape and position.                                                                                                                                                                                                                                                             |
| 3     | 3. Earth Science                         | 3. The Universe                             | 2. Objects in the solar system as seen from Earth have various sizes and distinctive patterns of motion.                                              | 3.3.3.2.1 | Demonstrate how a large light source at a great distance looks like a small light that is much closer. <i>For example:</i> Car headlights at a distance look small compared to when they are close.                                                                                                                                     |
| 3     | 3. Earth Science                         | 3. The Universe                             | 2. Objects in the solar system as seen from Earth have various sizes and distinctive patterns of motion.                                              | 3.3.3.2.2 | Recognize that the Earth is one of several planets that orbit the sun, and that the moon orbits the Earth.                                                                                                                                                                                                                              |
| 3     | 4. Life Science                          | 1. Structure and Function of Living Systems | 1. Living things are diverse with many different characteristics that enable them to grow, reproduce and survive.                                     | 3.4.1.1.1 | Compare how the different structures of plants and animals serve various functions of growth, survival and reproduction. <i>For example:</i> Skeletons in animals and stems in plants provide strength and stability.                                                                                                                   |
| 3     | 4. Life Science                          | 1. Structure and Function of Living Systems | 1. Living things are diverse with many different characteristics that enable them to grow, reproduce and survive.                                     | 3.4.1.1.2 | Identify common groups of plants and animals using observable physical characteristics, structures and behaviors. <i>For example:</i> Sort animals into groups such as mammals and amphibians based on physical characteristics. <i>Another example:</i> Sort and identify common Minnesota trees based on leaf/needle characteristics. |
| 3     | 4. Life Science                          | 3. Evolution in Living Systems              | 2. Offspring are generally similar to their parents, but may have variations that can be advantageous or disadvantageous in a particular environment. | 3.4.3.2.1 | Give examples of likenesses between adults and offspring in plants and animals that can be inherited or acquired. <i>For example:</i> Collect samples or pictures that show similarities between adults and their young offspring.                                                                                                      |
| 3     | 4. Life Science                          | 3. Evolution in Living Systems              | 2. Offspring are generally similar to their parents, but may have variations that can be advantageous or disadvantageous in a particular environment. | 3.4.3.2.2 | Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction.                                                                                                                                                                                                         |
| 4     | 1. The Nature of Science and Engineering | 2. The Practice of Engineering              | 1. Engineers design, create, and develop structures, processes, and systems that are intended to improve society and may make humans more productive. | 4.1.2.1.1 | Describe the positive and negative impacts that the designed world has on the natural world as more and more engineered products and services are created and used.                                                                                                                                                                     |

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| 4     | 1. The Nature of Science and Engineering | 2. The Practice of Engineering                                     | 2. Engineering design is the process of identifying problems, developing multiple solutions, selecting the best possible solution, and building the product. | 4.1.2.2.1 | Identify and investigate a design solution and describe how it was used to solve an everyday problem. <i>For example:</i> Investigate different varieties of construction tools.                    |
| 4     | 1. The Nature of Science and Engineering | 2. The Practice of Engineering                                     | 2. Engineering design is the process of identifying problems, developing multiple solutions, selecting the best possible solution, and building the product. | 4.1.2.2.2 | Generate ideas and possible constraints for solving a problem through engineering design. <i>For example:</i> Design and build an electromagnet to sort steel and aluminum materials for recycling. |
| 4     | 1. The Nature of Science and Engineering | 2. The Practice of Engineering                                     | 2. Engineering design is the process of identifying problems, developing multiple solutions, selecting the best possible solution, and building the product. | 4.1.2.2.3 | Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively.                                                        |
| 4     | 1. The Nature of Science and Engineering | 3. Interactions Among Science, Engineering, Technology and Society | 3. The needs of any society influence the technologies that are developed and how they are used.                                                             | 4.1.3.3.1 | Describe a situation in which one invention led to other inventions.                                                                                                                                |
| 4     | 2. Physical Science                      | 1. Matter                                                          | 1. Objects have observable properties that can be measured.                                                                                                  | 4.2.1.1.1 | Measure temperature, volume, weight and length using appropriate tools and units.                                                                                                                   |
| 4     | 2. Physical Science                      | 1. Matter                                                          | 2. Solids, liquids and gases are states of matter that each have unique properties.                                                                          | 4.2.1.2.1 | Distinguish between solids, liquids and gases in terms of shape and volume. <i>For example:</i> Liquid water changes shape depending on the shape of its container.                                 |
| 4     | 2. Physical Science                      | 1. Matter                                                          | 2. Solids, liquids and gases are states of matter that each have unique properties.                                                                          | 4.2.1.2.2 | Describe how the states of matter change as a result of heating and cooling.                                                                                                                        |
| 4     | 2. Physical Science                      | 3. Energy                                                          | 1. Energy appears in different forms, including heat and electromagnetism.                                                                                   | 4.2.3.1.1 | Describe the transfer of heat energy when a warm and a cool object are touching or placed near each other.                                                                                          |
| 4     | 2. Physical Science                      | 3. Energy                                                          | 1. Energy appears in different forms, including heat and electromagnetism.                                                                                   | 4.2.3.1.2 | Describe how magnets can repel or attract each other and how they attract certain metal objects.                                                                                                    |
| 4     | 2. Physical Science                      | 3. Energy                                                          | 1. Energy appears in different forms, including heat and electromagnetism.                                                                                   | 4.2.3.1.3 | Compare materials that are conductors and insulators of heat and/or electricity. <i>For example:</i> Glass conducts heat well, but is a poor conductor of electricity.                              |
| 4     | 2. Physical Science                      | 3. Energy                                                          | 2. Energy can be transformed within a system or transferred to other systems or the environment.                                                             | 4.2.3.2.1 | Identify several ways to generate heat energy. <i>For example:</i> Burning a substance, rubbing hands together, or electricity flowing through wires.                                               |

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| 4     | 2. Physical Science                      | 3. Energy                                  | 2. Energy can be transformed within a system or transferred to other systems or the environment.                                                                              | 4.2.3.2.2 | Construct a simple electrical circuit using wires, batteries, and light bulbs.                                                                                                                                                                                                                            |
| 4     | 2. Physical Science                      | 3. Energy                                  | 2. Energy can be transformed within a system or transferred to other systems or the environment.                                                                              | 4.2.3.2.3 | Demonstrate how an electric current can produce a magnetic force.<br><i>For example:</i> Construct an electromagnet to pick up paperclips.                                                                                                                                                                |
| 4     | 3. Earth Science                         | 1. Earth Structure and Processes           | 3. Rocks are an Earth material that may vary in composition.                                                                                                                  | 4.3.1.3.1 | Recognize that rocks may be uniform or made of mixtures of different minerals.                                                                                                                                                                                                                            |
| 4     | 3. Earth Science                         | 1. Earth Structure and Processes           | 3. Rocks are an Earth material that may vary in composition.                                                                                                                  | 4.3.1.3.2 | Describe and classify minerals based on their physical properties.<br><i>For example:</i> Streak, luster, hardness, reaction to vinegar.                                                                                                                                                                  |
| 4     | 3. Earth Science                         | 2. Interdependence within the Earth system | 3. Water circulates through the Earth's crust, oceans and atmosphere in what is known as the water cycle.                                                                     | 4.3.2.3.1 | Identify where water collects on Earth, including atmosphere, ground, and surface water, and describe how water moves through the Earth system using the processes of evaporation, condensation and precipitation.                                                                                        |
| 4     | 3. Earth Science                         | 4. Human Interaction with Earth Systems    | 1. In order to maintain and improve their existence, humans interact with and influence Earth systems.                                                                        | 4.3.4.1.1 | Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.                                                                                                                                                                       |
| 4     | 4. Life Science                          | 4. Human Interactions with Living Systems  | 2. Microorganisms can get inside one's body and they may keep it from working properly.                                                                                       | 4.4.4.2.1 | Recognize that the body has defense systems against germs, including tears, saliva, skin, and blood.                                                                                                                                                                                                      |
| 4     | 4. Life Science                          | 4. Human Interactions with Living Systems  | 2. Microorganisms can get inside one's body and they may keep it from working properly.                                                                                       | 4.4.4.2.2 | Give examples of diseases that can be prevented by vaccination.                                                                                                                                                                                                                                           |
| 5     | 1. The Nature of Science and Engineering | 1. The Practice of Science                 | 1. Science is a way of knowing about the natural world, is done by individuals and groups, and is characterized by empirical criteria, logical argument and skeptical review. | 5.1.1.1.1 | Explain why evidence, clear communication, accurate record keeping, replication by others, and openness to scrutiny are essential parts of doing science.                                                                                                                                                 |
| 5     | 1. The Nature of Science and Engineering | 1. The Practice of Science                 | 1. Science is a way of knowing about the natural world, is done by individuals and groups, and is characterized by empirical criteria, logical argument and skeptical review. | 5.1.1.1.2 | Recognize that when scientific investigations are replicated they generally produce the same results, and when results differ significantly, it is important to investigate what may have caused such differences. <i>For example:</i> Measurement errors, equipment failures, or uncontrolled variables. |