**4th Grade**

| Big Idea | Standard | Breakdown |
|---|---|---|
| 1. The Practice of Science | SC.4.N.1.1 Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations. (High) | • Researches *questions* about the how things work; can site the resources.<br>• Writes their own *hypothesis (testable question)* to investigate the question more.<br>• Designs an *experiment* to tests their hypothesis.<br>• Conducts the experiment individually or in a team. |
| | SC.4.N.1.2 Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups. (High) | • Knows an *observation* is something you directly see, hear, smell, taste, or touch and *data* are recorded observations.<br>• Understands science knowledge comes from data, collected and recorded doing experiments (tests) to seek answers the hypothesis.<br>• Understands that *accurate* and *precise* observations gathered with *scientific tools* over multiple trials and/or samples are important for validity.<br>• Explains why the same experiment carefully done by different groups/teams should yield the same results. |
| | SC.4.N.1.3 Explain that science does not always follow a rigidly defined method ("the scientific method") but that science does involve the use of observations and empirical evidence. (Moderate) | • Understands some scientists follow the 'traditional' *Scientific Method* - Research, Hypothesis, Procedure, collect and analysis Data, and write Conclusions used to investigate science questions.<br>• Recognizes other scientist use the 'Engineering Design Process' - Ask, Imagine, Plan, Create, and Improve to solve problems and develop new technologies. |
| 1. The Practice of Science | SC.4.N.1.4 Attempt reasonable answers to scientific questions and cite evidence in support. (High) | • Uses learning strategies that link claims *(statements about the results of an experiment)* to evidence *(the data collected in the experiment)* support their conclusions. |
| | SC.4.N.1.5 Compare the methods and results of investigations done by other classmates. (Moderate) | • Knows that for experimental data to be *verified* the same outcomes should occur when other individuals/teams repeat the same experiment.<br>• Routinely repeats the same set of tests (*trials)* to confirm and validate their results then discusses the results with other teams. |
| | SC.4.N.1.6 Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations. (High) | • Knows good *observation* are something directly experienced.<br>• Knows *inferences* are explanation based on past experiences, and <u>not</u> what was observed.<br>• Differentiates *inferences* from *observations* when investigating science. |
| | SC.4.N.1.7 Recognize and explain that scientists base their explanations on evidence. (Moderate) | • Knows scientists ask questions, conduct experiments, record observations, and repeat trials to verify and validate findings.<br>• Understands that *data* becomes *evidence* when it is correctly linked to true statements *(claims)* made about the results of an investigation. |

 

| | | |
|---|---|---|
| | | • Understands that any *claim(s)* made about an investigation must be based on the *evidence* of the investigation. |
| 1. The Practice of Science (continued) | SC.4.N.1.8 Recognize that science involves creativity in designing experiments. (Moderate) | • Knows that an *experiment* tests a hypothesis.<br>• Understands that a demonstration show how something works, but is <u>not</u> an experiment unless they test something.<br>• Understands that a models illustrates how something works but is <u>not</u> the real thing or an experiment on the real thing. |
| | | |
| 2. The Characteristics of Scientific Knowledge | SC.4.N.2.1 Explain that science focuses solely on the natural world. (Moderate) | • Understands that science can only answer questions that are testable through direct observation about things that exist *(physically)* in the world around us. |
| | | |
| 3. The Role of Models | SC.4.N.3.1 Explain that models can be three dimensional, two dimensional, an explanation in your mind, or a computer model. (Moderate) | • Understands that models can be flat drawings (2D), structures, or 3D graphics illustrations, thought experiments, or computer solutions (algorithms). |
| | | |
| 5. Earth in Space and Time | SC.4.E.5.1 Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons. (High) | • Knows c*onstellations* are smaller groups stars that look like a dot-to-dot picture in the sky.<br>• Understand c*onstellations* change their position in the night sky from one season to another, but they are <u>not</u> moving. Instead the *Earth* move is revolving around the sun, and we are changing our position and "point of view" with relation to the constellations. |

 

| | | |
|---|---|---|
| 5. Earth in Space and Time | SC.4.E.5.2 Describe the changes in the observable shape of the moon over the course of about a month. (Moderate) | • Know the *moon* is a natural satellite that revolves *(circles)* the Earth.<br>• Understands the moon appears to change shape about every three to four days.<br>• Observes and records *(draws)* the changes that take place in the 'shape of the moon' over the period of one month (30 days).<br>• Identifies and describes the seven (7) visible phases (shapes) the moon cycles through in order *(i.e., waxing and waning, crescents, quarters, gibbous, and full moon)*.<br>• Understands that for about three to four days there is no moon at night *(the new moon phase)* because the moon is tracking and is visible in the day-time sky only.<br>• Knows the moon completes one *lunar cycle* (including the new moon) in about 28 days (exactly 27.3) [And each phase lasts about 3.5 days].<br>• Given four (4) consecutive phases of the moon, can predict the next phase. |
| 5. Earth in Space and Time (continued) | SC.4.E.5.3 Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day. (Moderate) | • Knows that *time* is a measure of how long it takes an object to move a certain distance.<br>• Understands the *sun*, is a *star*, at the center of the *solar system*.<br>• Understands the *Earth*, is a planet, in orbit *(a circular path)* around the sun.<br>• Understands one Earth *orbit (revolution)* around the sun takes about 365 days or 1 year *(exactly 365.25)*. [*corrected by adding 1, day to the calendar every 4 years or leap year*]<br>• Understands that as the Earth revolves *(circles)* the sun it also *rotates* (spins) on its axis.<br>• One complete rotation takes 24 hours or 1 day.<br>• Using your body *(as a model for the Earth)* and your teacher *(to represent the sun)* demonstrate how Earth rotates and revolves over time. |
| | SC.4.E.5.4 Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected. (High) | • Understands the moon goes through 8 phases as it revolves around the Earth about every 28 days.<br>• Using four (4) students, one representing the sun, another representing Earth, a third representing the sun, and fourth representing a constellation – demonstrate the motion of the Earth relative to the moon, sun and constellations in space. |

 

**4th Grade**

| Big Idea | Standard | Breakdown |
|---|---|---|
| 5. Earth in Space and Time (continued) | SC.4.E.5.5 Investigate and report the effects of space research and exploration on the economy and culture of Florida. (High) | • Knows a *decade* is 10 years.<br>• Understands man has been engaged in space exploration for over *5 decades (Oct. 1957/sputnik 1 to today)*<br>• Researches a Florida based, space program from the past 1960 to the present day.<br>• Reports the purpose of the program and how the program impacted the economy and culture of the people living in Florida at that time. |
| | | |
| 6 Earth Structures | SC.4.E.6.1 Identify the three categories of rocks: igneous, (formed from molten rock); sedimentary (pieces of other rocks and fossilized organisms); and metamorphic (formed from heat and pressure). (Low) | • Knows *sedimentary* rocks are formed under the water when sediments are pressed and cemented together naturally, over millions of years.<br>• Knows *igneous* rocks form when *magma* or *lava* cools and becomes solid.<br>• Knows *metamorphic* rocks are existing rocks that have changed again, under the ground, by the pressure and heat caused by rock layer above them over millions of years.<br>• Label how rocks change over time on a diagram of the *rock cycle*. |
| | SC.4.E.6.2 Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks. (Moderate) | • Knows *minerals* are naturally formed, solid substances with a 'crystal structure' which were formed from nonliving things.<br>• Understands that different minerals have different properties that can identify them.<br>• Can use the *properties* of color, luster, cleavage, streak color and a 'mineral field-guide' to identify various minerals by name. |
| | SC.4.E.6.3 Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable. (Moderate) | • Knows a *natural resources* like minerals, water, fossil fuels, and food are used by humans.<br>• Understands *renewable* resources are those that are regularly replaced or replenished by nature.<br>• Understands *nonrenewable* resources can only be used once and cannot be replaced by nature as quickly as they are used.<br>• Research the natural resources found in the state of Florida, Identify which are renewable and which are nonrenewable. |

 

| Big Idea | Standard | Breakdown |
|---|---|---|
| 6 Earth Structures (continued) | SC.4.E.6.4 Describe the basic differences between physical weathering (breaking down of rock by wind, water, ice, temperature change, and plants) and erosion (movement of rock by gravity, wind, water, and ice). (Moderate) | • Understands weathering breaks up rocks into smaller pieces or sediments.<br>• Knows ways rocks are physically weathered by wind, water, ice, temperature change, and the action of plants.<br>• Understands erosion is when weathered material is moved from one place to another by water, wind, ice or the force of gravity.<br>• Can model the weathering and erosion processes. |
| | SC.4.E.6.5 Investigate how technology and tools help to extend the ability of humans to observe very small things and very large things. (High) | • Knows that there are limits to what the naked eye can see.<br>• Understands some tools can be used to magnify smaller or distant objects.<br>• Know to magnify is to make an object appear (look) larger than it really is.<br>• Understands hand lens is a tool that magnifies small objects making them look bigger.<br>• Understands that a microscope is a tool that makes very small objects look much bigger and can magnify more than a hand lens can.<br>• Understands a telescope is a tool that makes far-away objects look larger and clearer. |
| | SC.4.E.6.6 Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy). (Low) | • Research the natural resources found in Florida.<br>• Differentiate which resources are renewable and which are nonrenewable.<br>• Describe the impact on the culture or economy when they run out. |
| | | |

 

| Big Idea | Standard | Breakdown |
|---|---|---|
| 8. Properties of Matter | SC.4.P.8.1 Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets. (Moderate) | • Knows a *physical property* is an observable characteristic of an object or substance.<br>• Knows the *mass* is the amount of matter in an object or substance measured in grams (g).<br>• Knows the *shape* describes the outline of an objects body.<br>• Knows the *volume* is the amount of space an object or substance takes up measured in liters (L) or cubic centimeters (cc).<br>• Understands *color* describes the light reflected off an objects surface.<br>• Understands *hardness* measures how well one substance will resist scratching by another substance.<br>• Understands *texture* describes how and object or substance feels.<br>• Knows *odor* is how something smells.<br>• Knows *taste* can be a sweet, sour, bitter or salty experience.<br>• Knows *attract* means to pull an object or substance.<br>• Knows a *magnet* is a tool that attracts iron.<br>• Understands being *magnetic* is a property of matter.<br>• Can observe, measure, and describe *(record)* the physical properties of an object or substance from using the descriptions above. |
| | SC.4.P.8.2 Identify properties and common uses of water in each of its states. (Low) | • Knows examples of water that are solids, liquid or gaseous *(including water vapor)*. |
| | SC.4.P.8.3 Explore the Law of Conservation of Mass by demonstrating that the mass of a whole object is always the same as the sum of the masses of its parts. (Moderate) | • Knows *mixtures* can be separated.<br>• Knows materials can *decompose.*<br>• Understands that matter (objects or substances) <u>can be</u> changed physically or chemically from one form into another, <u>but</u> that the total amount of the matter at the end of the change <u>will not</u> change *(in a closed system)*.<br>• Understands that when it comes to the mass of a material, the sum of the parts equals the whole in a closed system. |

 

| | Standard | Breakdown |
|---|---|---|
| | SC.4.P.8.4 Investigate and describe that magnets can attract magnetic materials and attract and repel other magnets. (High) | • Knows a *magnet* is a tool that attracts some metals.<br>• Knows *attract* means to pull and *repel* means to push<br>• Understand a *force* is a push or pull that changes the position *(or moves)* an object.<br>• Investigate which metals are attracted by a magnet *(like iron, steel, tin etc.)* and which are not *(like copper, aluminum, silver)*.<br>• Investigate what happens when two magnets come close to each other and explain what happens and why. |
| | | |
| 9. Changes in Matter | SC.4.P.9.1 Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking. (Low) | • Knows a *chemical change* happens when two or more substances change into one or more new substances *(with new properties, different form the original substances)*.<br>• Can identify examples of chemical changes *(i.e., burning, rusting, cooking, and decaying)*. |
| | | |
| 11. Energy Transfer and Transformations | SC.4.P.11.1 Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature. (Low) | • Understands that *heat* is the flow of moving particles.<br>• Design an experiment to trace the flow of heat energy form a cup of hot water through a metal spoon. |
| | SC.4.P.11.2 Identify common materials that conduct heat well or poorly. (Low) | • Understand a *conductor* is any materials that allows heat to pass through it easily.<br>• Understands an *insulator* is a materials that does <u>not</u> allow heat to pass through it easily.<br>• Design and experiment to test which utensils in your kitchen are good conductors and which a poor conductors of heat, record, and report you findings to the class. |
| | | |
| 12. Motion of Objects | SC.4.P.12.1 Recognize that an object in motion always changes its position and may change its direction. (Low) | • Knows that *motion* is a change in the position of an object.<br>• Understands the motion of an object is relative to your *point of view*.<br>• Understands the tendency of an object to resist a change in its motion or *inertia <u>(Newton's 1st law of Motion).</u>*<br>• Understands an object in motion tends to stay in motion unless acted on by a 'resistance' force *(like friction or drag)*.<br>• Knows *friction* is a resistance force.<br>• Understands *direction* is used to determine where an object is in relation to another object *(or place)* – and a change in an objects motion can cause a change in its direction or vice-versa and the change in an objects direction can change its motion.<br>• Investigate ways objects start moving and why they stop moving. |

 

| | | |
|---|---|---|
| 12 Motion of Objects (continued) | SC.4.P.12.2 Investigate and describe that the speed of an object is determined by the distance it travels in a unit of time and that objects can move at different speeds. (Moderate) | • Knows *speed* is a change in position over a period of time.<br>• Understands an objects speed can change over the time it takes to travels from one point to another – it can speed up, slow down or stop and start again.<br>• Record the number of times your stop, start, speed-up, or slow down on the way to and from school on the bus. |
| | | |
| 16 Heredity and Reproduction | SC.4.L.16.1 Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination. (Moderate) | • Knows *flowering plants* reproduce sexually when the male and female reproductive cells join to make a seed.<br>• Knows the parts of a plant involved in reproduction.<br>• Knows *pollen* is the powdery particles that carry the male reproductive *(sperm)* cells.<br>• Knows the *eggs* are the female reproductive cell.<br>• Understands *pollination* is the transfer from the male part of the plant to the female part.<br>• Understands fertilization joins the male sperm cell and female egg cell to form a seed.<br>• Understand ways fertilized seeds are seed dispersed.<br>• Understands germination is the process in which plants begin to sprout and grow. |
| | SC.4.L.16.2 Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment. (High) | • Knows an inherited trait is a feature *(characteristic)* passed from parent to offspring<br>• Understands other features are caused by and or learned from the environment. |
| | SC.4.L.16.3 Recognize that animal behaviors may be shaped by heredity and learning. (High) | • Knows an instinct is a behavior inherited from a parent at birth, like a fish knows how to swim at birth.<br>• Understands that other behavior can be learned from experiences in an environment over time. |
| | SC.4.L.16.4 Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants. (Moderate) | • Knows a life cycle is the changes that a living thing goes through during a lifetime.<br>• Compare and contrast complete and incomplete metamorphosis, the life cycles of a frog and a sea turtle, the germination of a plant from seed *(like beans)*, with other plants that grow from spores *(like ferns)*. |
| | | |
| 17. Interdependence | SC.4.L.17.1 Compare the seasonal changes in Florida plants and animals to those in other regions of the country. (Moderate) | • Knows *migrate* means to move from one place to another in search of food, water, and warmer temperatures.<br>• Knows *hibernate* means to go into a deep sleep to stay alive during the winter.<br>• Understands why some plants shed their leaves in the winter.<br>• Compare how other Florida plants and animals react to changes in temperature. |

 

| | | |
|---|---|---|
| | SC.4.L.17.2 Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them. (Moderate) | • Knows animals need food, water, shelter and living space to survive<br>• Understands that survival means being able to live long enough to reproduce offspring.<br>• Can describe different ways animals get the food they need to survive. |
| | SC.4.L.17.3 Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers. (Moderate) | • Know a *food chain* is the path of energy form one living thing to another in an ecosystem.<br>• Understands why sun is the source of energy for <u>all</u> food chains.<br>• Understands a *producer* is an organism that makes its own food and can identify the *producers* in a habitat.<br>• Understands that a consumer is an animal that gets food by eating plants or other animals.<br>• Can trace the flow of energy through a food chain from producers to consumers. |
| | SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment. (High) | • Knows helpful and harmful ways plants animals and humans can change their environment and or affect each other. |

 