DESTINATION SCIENCE:

The Quest for Quality Instruction

Brevard Public Schools

Grade 6

Brevard Public Schools 2018

Destination Science: The Quest for Quality Instruction

Curriculum Guide

Grade 6

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Overview: This curriculum guide was developed as a resource for teachers to use to help students achieve mastery of the Florida Next Generation Sunshine State Science (NGSSS) benchmarks. This guide has three main sections:

- ***Learning Targets within a Performance Scale:*** Each benchmark was unpacked for content, key terms, and possible misconceptions.
- ***Benchmark Blocks:*** Once the benchmarks were unpacked and scales written, the committee grouped benchmarks into blocks: concepts that could build upon each other, to facilitate student mastery. The committee then sought out the best available resources to help teachers build students' conceptual understanding.
- ***Pacing and Sequence:*** The committee used teacher feedback, naturally occurring cycles, and the complexity of the benchmarks to sequence the blocks for the year.

Learning Targets within a Performance Scale

Building on the work of Carla Moore, Libby H. Garst, and Robert J. Marzano, the committee developed a performance scale for each science benchmark. Within each scale is a list of learning targets. These were derived by unpacking a benchmark to identify all of the foundational vocabulary and processes needed to master that benchmark. If you look at a performance scale, you will see four levels:

- **Level 3** is the benchmark itself. This is the level where students have reached mastery of the benchmark.
- **Level 2** contains all of the foundational vocabulary and processes that are embedded within the benchmark. If a student can independently demonstrate and understand all of the Level 2 targets, she or he should be able to reasonably master the Level 3 benchmark.
- **Level 4** takes the students a step further--to the real-world applications of the science concept.
- **Level 1:** Students are able to master some of the Level 2 tasks with support from the teacher.

Learning Targets can be used in a variety of ways with the students.

- Targets can be turned into objectives for daily lessons within the benchmark blocks.
- The Level 2 processes can be turned into a student self-evaluation checklist for benchmark mastery.
    - ***Caution:*** The key terms are not intended as terms for a vocabulary test. They are words that are important for benchmark mastery, but students should not have to memorize all of them. They should understand the words in the context of the benchmark investigations.

Benchmark Blocks

The benchmark blocks can be used as a curriculum guide for each segment of science learning. The blocks build upon each other, slowly leading to mastery of all grade-level benchmarks.

In this guide, we've embedded several best practices into each benchmark block:

1. 5E Model of Unit Planning: The benchmark blocks are written in the nationally-recognized, research-based 5E model, developed by the BSCS team. The five steps of the 5E model are:
    - **ENGAGE:** In this phase, students become engaged in the new concept through a short, high-interest activity. It should help focus the students' attention on the learning to come and activate prior learning. It could be a natural phenomenon (see below), short video clip, a thoughtful question, reading aloud part of a related book, showing students a "mystery" and asking them to explain what is happening, a discrepant event, or any experience that hooks your students' attention. An Engage activity may not take more than a few minutes, but it is an important starting place.

- **EXPLORE:** Students now begin to explore the process of conceptual understanding. They generate new ideas and explore their thinking. Students need the opportunity to explore materials and/or new content before new information and vocabulary is explicitly taught. This idea follows the ABC model – "Activity Before Concept." Providing exploration time serves two important functions:
    - ➢ You are leveling the playing field by providing an experience that allows *all* your students some understanding of the material they will be learning and a way to attach the new learning to their own experiences.
    - ➢ You are also giving your students a chance to naturally formulate their own questions about the new content. They will be motivated to find the answers as you go on to provide direct instruction.
- **EXPLAIN:** Teachers can now guide students in building an explanation for what they observed in the Explore phase. This is the part of the unit where teachers can facilitate student understanding, encourage vocabulary acquisition, and provide opportunities for students to demonstrate their learning. It is also the phase where teachers help the students confront their own understanding of misconceptions they might have. At this point in the lesson, the teacher is focused on the students gaining new understanding of the science content. However, the word "explain" can be misleading. It does not mean the teacher or the text have to be the *only* ones explaining. Direct instruction will certainly come from both of these places, but remember that allowing students the opportunity to explain (verbally and in writing) their understanding at this point is an important piece of the process. Teachers listen to (and read in students' science notebooks) students' explanations and use this very informal formative assessment to guide the next instruction. This is the point where teachers can explicitly teach vocabulary, within context, and provide multiple ways for students to discuss, practice and write about the new material.
    - ➢ ***Teacher Note***: Students can move back and forth between the Explore and Explain phases as they build a conceptual understanding of the concepts embedded in the benchmark block.
- **ELABORATE:** Students develop a deeper understanding of the concepts of the benchmark block and how they are all connected. These may seem like "extra" activities, but they are critical to the transfer of learning to a new situation. Activities such as engineering challenges, model eliciting activities, and science in art, allow students to apply the learning they've just gained to a new situation, helping to solidify the new knowledge.
- **EVALUATE:** This allows the students and teacher to assess progress toward mastering the science benchmarks. Evaluating our students' understanding of new science content is a critical part of the 5E model, but it is misleading to see it last on this list. Evaluation, or assessment of understanding, is done throughout the entire process, as formative assessment. As your students work through new content, explore and discuss materials, and discuss and write about their own understandings, the teacher is constantly assessing where they are in the process. Students are also a part of this process, as they are taught to constantly asses their own understanding of the content. After multiple opportunities for practice has been provided, the teacher can give a summative assessment, including items that require application of the content to new situations, to determine if true mastery has been obtained.
    - ➢ ***Formative and Summative Assessments:*** The committee has created a formative assessment for each benchmark, with an average of 3-5 multiple choice questions per benchmark. Each benchmark block also has a multiple choice summative assessment.

2. Science Safety: Every benchmark block contains a link to the BPS Science Safety Manual. Teachers should refer to this manual before conducting scientific investigations. If there is a specific safety concern for a benchmark, this is noted in the Safety section.

3. Nature of Science: A separate "Introduction to Science" is included at the beginning of each grade level. Some specific lessons and ideas for concepts to include in the first two weeks of school are listed. Then the Nature of Science benchmarks should be explicitly referred to as you complete other science investigations. Some ideas for ways to embed specific Nature of Science benchmarks are included with each benchmark block.

4. Natural Phenomena: Natural phenomena are observable events that occur in the universe. The goal of building knowledge in science is to develop general ideas, based on evidence, that can explain and predict phenomena. A great example of this is the phenomenon of fire tornados. Firefighters observed this phenomenon while fighting wildfires. Scientists then studied the phenomenon to uncover what caused them to happen and how they worked. When you use natural phenomena in the classroom, you are connecting your students to the work of scientists and engineers. Teachers can refer back to natural phenomena throughout the benchmark block to help students build a deeper understanding of scientific concepts.
   How can you use phenomena to drive teaching and learning? (excerpted from the Georgia Science Teachers Association website https://www.georgiascienceteacher.org/phenomena
   - The point of using phenomena to drive instruction is to help students engage in practices to develop the knowledge necessary to explain or predict the phenomena. Therefore, the focus is not just on the phenomenon itself. *It is the phenomenon plus the student-generated questions about the phenomenon that guides the learning and teaching.* The practice of asking questions or identifying problems becomes a critical part of trying to figure something out.
   - Begin in the Engage phase of the 5E. Present a phenomenon to your class without any teacher direction. As students view it, questions will arise. Collect the questions that students generate, but don't rush to answer or try to build understanding. Students should be able to make sense of phenomenon, but not immediately, and not without investigating the science concepts underlying the phenomenon. With instruction and guidance, students should be able to figure out, step by step, how and why the phenomenon works. This should happen over the course of the benchmark block, not only in the Engage phase.
   - *An effective phenomenon does not always have to be flashy or unexpected.* Students might not be intrigued by an everyday phenomenon right away because they believe they already know how or why it happens. It takes careful teacher facilitation to help students become dissatisfied with what they can explain, helping them discover that they really can't explain it beyond a simple statement such as "smells travel through the air" or a vocabulary word, such as "water appears on cold cans of soda because it condenses."
   - Through all subsequent activities, keep bringing the students back to the phenomenon. Ask how their new learning might apply to the phenomenon. Keep the students focused on trying to explain what is going on in the natural world that can be explained by what we are doing in the classroom. Connecting classroom learning to the outside world is a powerful way to engage students.

5. Claim, Evidence, Reasoning (CER) Framework: (excerpted from *Science Teacher Tool Kit of Instructional Practices*, Brevard Public Schools, Summer 2016)
   Science deals with explaining the natural world around us. Scientists do this by collecting and interpreting data and using it as evidence to support ideas. By using the Claim, Evidence, and Reasoning (CER) framework, students learn to answer a question, use evidence to support their answer, and then tie their evidence to a scientific concept. By doing this, we are asking

students to follow the same practice that scientists follow. This framework can also be used when reading informational text, conducting research, or analyzing data. Our writers inserted opportunities to use the CER framework for written responses in several lessons.

- **CLAIM:** Students write a statement or conclusion that answers a question.

- **EVIDENCE:** Students support their claim by using evidence from an activity, text, or data set. The evidence must be sufficient and relevant.

- **REASONING:** Student justify their evidence by connecting it to a scientific principle.

    - ➢ ***Teacher Note***: There is a fourth step--REBUTTAL--but it is only used once students have mastered the CER and can begin to look at alternative explanations and why those explanations are ***not*** supported by the evidence.
    - ➢ *See the above link for examples of CER responses. Be aware that the examples were written for a junior high/high school teacher.*

Pacing and Sequence

Included in this guide are two one-page representations of the pacing and sequence of the Benchmark Blocks. Each of these will be useful in planning throughout the year:

- *At-A-Glance:* This representation gives a quick reference for the benchmarks associated with each benchmark block.

- *Sequence:* This representation is a calendar of the year, broken into nine-week terms.

Other Resources

There are other resources you can use on your journey to quality science instruction.

- CSI: Brevard 2.0: In-depth information about best practices, science notebooking, Science Fair, etc.

- Elementary Leading and Learning Science website: one-stop place for district-created resources

- Science Fair handbook

- BPS Science Safety Manual

Grade 6 Science Benchmark Block Sequence

Order Taught	Title	Time Frame	Benchmarks
1	Introduction to Science	2 weeks	Nature of Science (also explicitly integrated into other blocks)
2	Forces and Gravity	4 weeks	SC.6.P.13.1 SC.6.P.13.2 SC.6.P.13.3
3	Conservation of Energy	1 week	SC.6.P.11.1
4	Describing and Graphing Motion	2 weeks	SC.6.P.12.1
	Destination Space: This block should be moved to the time period in the Second Nine Weeks specific to your Study Trip date.	2 weeks	See Destination Space Resource Guide
5	Interactions Between Earth's Spheres	2 weeks	SC.6.E.7.4 SC.6.E.7.9
6	Heat Transfer	1 week	SC.6.E.7.1
7	Climate and Global Patterns	5 weeks	SC.6.E.7.5 SC.6.E.7.3 SC.6.E.7.2 SC.6.E.7.7 SC.6.E.7.8 SC.6.E.7.6
8	Weathering, Erosion, Deposition, and Landforms	2 weeks	SC.6.E.6.1 SC.6.E.6.2
9	Cell Structure, Processes, and Theory	4 weeks	SC.6.L.14.4 SC.6.L.14.3 SC.6.L.14.2
10	Classification of Living Things	4 weeks	SC.6.L.15.1
11	Body Systems	7 weeks	SC.6.L.14.1 SC.6.L.14.5 SC.6.L.14.6

Brevard Public Schools
Grade 6 Science Pacing and Sequence

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
First Nine Weeks	Introduction to Science *(2 weeks)*		Forces and Gravity *(4 weeks)*				Conservation of Energy *(1 week)*	Describing and Graphing Motion *(2 weeks)*	
Second Nine Weeks	Interactions Between Earth's Spheres *(2 weeks)*		**DESTINATION SPACE** *(2 weeks)*		Heat Transfer *(1 week)*	Climate and Global Patterns *(5 weeks)* →			
	The **DESTINATION SPACE** block should be moved to the time period in the Second Nine Weeks specific to your Study Trip date.								
Third Nine Weeks	Climate and Global Patterns *(5 weeks)*	Weathering, Erosion, Deposition, and Landforms *(2 weeks)*		Cell Structure, Processes, and Theory *(4 weeks)*				Classification of Living Things *(4 weeks)* →	
Fourth Nine Weeks	Classification of Living Things *(4 weeks)*		Body Systems *(7 weeks)*						

Benchmark Block Key – Grade 6

Conservation of Energy
Time Frame - 1 Week

SC.6.P.11.1: Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.

Safety: Safety glasses/goggles should be used any time there is a possibility of eye injuries from splashes or projectiles. BPS Safe Science Manual

***Florida Science Course 1* Text Pages**

These pages best target the benchmark(s).

215-225, 232- 237, 246-247

EVALUATE - Formative

BPS Formative Assessment
•A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.
***Florida Science Course 1* TEXT**
•Probe: What is energy? (219)

ENGAGE options

Natural Phenomenon
•Law of Conservation of Energy (video)

EXPLORE options

***Florida Science Course 1* TEXT**
•Energy to Space (221)
•Woosh! (233)
CPALMS
•Conservation of Energy Mini Stations (see mini stations attachment)

EXPLAIN options

***Florida Science Course 1* LAB BOOK**
•**Lab 5.1 MiniLab** (Can a Moving Object Do Work?)
•**Virtual Lab:** What Are the Relationships Between Kinetic Energy and Potential Energy?
•**Lab 5.2 Skills Practice**, **Physical Lab** (Pinwheel Power), and **MiniLab** (How Does Energy Change Form?)
***Florida Science Course 1* ONLINE RESOURCES**
•BrainPop: Forms of Energy
•Tutor: Energy Transformation
•Video: Gravitational Potential Energy
CPALMS
•Bouncing Balls Lab (Lesson)

ELABORATE options

CPALMS
•Punkin Chunkin (Engineering Design Challenge)

EVALUATE - Summative

BPS Summative Assessment
•Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

This section shows the title of the benchmark block and the time frame for teaching it.

This section shows the science benchmarks that are taught in this block.

This section shows specific safety concerns for this block, with a link to the BPS Safe Science Manual.

Start here!
This section includes the pages from *Florida Science Course 1* (the BPS adopted resource).

EVALUATE - Formative:
Formative Assessments are progress monitoring tools.

ENGAGE:
This section includes a variety of ways to hook student interest and spark discussion.

EXPLORE:
This section includes a variety of ways for students to investigate the content of the benchmark(s).

EXPLAIN:
This section includes a variety of ways to help the student explain the content of the benchmark(s).

ELABORATE:
This section includes a variety of ways for students to extend and apply the content of the benchmark(s).

EVALUATE – Summative:
Summative Assessments evaluate student mastery of this benchmark block.

Introduction to Science

Time Frame - 2 Weeks

The Nature of Science benchmarks are the scientific practices that should be used to teach science content. The first two weeks of school are set aside to introduce the Nature of Science. These benchmarks will also be explicitly integrated into your other science lessons throughout the school year to ensure mastery.

Nature of Science Benchmarks

SC.6.N.1.1: Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2: Explain why scientific investigations should be replicable.
SC.6.N.1.3: Explain the difference between an experiment and other types of scientific investigations, and explain the relative benefits and limitations of each.
SC.6.N.1.4: Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5: Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1: Distinguish science from other activities involving thought.
SC.6.N.2.2: Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3: Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1: Recognize and explain that in a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2: Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3: Give several examples of scientific laws.
SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks.

Some suggested concepts for this block are:

- science safety
- science tools
- science notebooks
- Science Fair
- scientific process skills

Suggestions of resources that can be used for this two-week period:

- Science is By Everyone and For Everyone (CPALMS Florida Original Student Tutorial)
- Models in Science (CPALMS Florida Original Student Tutorial)
- What is Science? (CPALMS presentation)
- Introducing Models to Elementary School Students (Online lesson)

Forces and Gravity

Time Frame - 4 Weeks

SC.6.P.13.1: Investigate and describe types of forces including forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
SC.6.P.13.2: Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that they force depends on how much mass the objects have and how far apart they are.
SC.6.P.13.3: Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.

Safety: Safety glasses/goggles should be used any time there is a possibility of eye injuries from splashes or projectiles. BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

SC.6.P.13.1	282-290, 329-331, 356-359 (through Earth as a Magnet)
SC.6.P.13.2	290-292
SC.6.P.13.3	293-315

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

***Florida Science Course 1* TEXT**

- Probe: Ball Toss (285)

Page Keeley Probes

- *Uncovering Student Ideas in Science Vol. 3:* Apple on a Desk
- *Uncovering Student Ideas in Science Vol. 1:* Talking About Gravity

ENGAGE options

Natural Phenomena

- Duck lands on an icy pond (GIF of contact force of friction)
- Human Loop the Loop with Damien Walters (video)
- Human Loop the Loop (GIF from full video "Human Loop the Loop with Damien Walters")

Video

- Tug of War: Kids vs Teachers

EXPLORE options

***Florida Science Course 1* TEXT**

- Push and Pull (287)
- Force Interactions (299)

CPALMS

- Societal Laws vs. Scientific Laws (see attachment)

Other Online Sources

- How do Balanced and Unbalanced Forces Affect the Motion of a Ball? (investigation)
- Investigating Contact and Non-contact Forces (investigation)

EXPLAIN options
***Florida Science Course 1* LAB BOOK** ● **Lab 7.1 MiniLab** (How Does Friction Affect an Object's Motion?) and **Skills Practice** ● **Lab 7.2 MiniLab** (How Does Inertia Affect an Object?) and **Physical Lab** (Design an Amusement Park Attraction Using Newton's Laws) ***Florida Science Course 1* ONLINE RESOURCES** ● Tutor: Gravity ● Tutor: Net Force ● Video: What's Science Got to Do with It? A Fraction of the Friction ● BrainPop: Newton's Laws of Motion **Florida Original Student Tutorials** ● Types of Forces ● Gravity ● Scientific Laws
ELABORATE options
CPALMS Model Eliciting Activity ● Skateboard Design ● Cosmic Nose Cones ● Lightyear Rockets
EVALUATE - Summative
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

Ideas For Embedding the Nature of Science Benchmarks Into ***Forces and Gravity*** Block

SC.6.N.1.1: Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions. ● Students can take what they have learned from exploring forces and create their own controlled experiment. Investigation of forces is a natural place to teach the process of experimentation.
SC.6.N.1.2: Explain why scientific investigations should be replicable. ● As students work on scientific investigations, discuss the importance of following specific steps and collecting detailed data. Students should understand that investigations should be replicable so that results and conclusions are valid.
SC.6.N.1.3: Explain the difference between an experiment and other types of scientific investigations, and explain the relative benefits and limitations of each. ● Discuss the differences between an experiment and other types of scientific investigation as students are conducting investigations of forces and gravity. Point out benefits and limitations of using different types of investigations.
SC.6.N.1.4: Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation. ● As students are investigating forces, they have the opportunity to discuss and compare their methods and results.
SC.6.N.3.2: Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws. ● While students are exploring the concept of gravity, they will build their conceptual ideas of The Law of Gravity. This is also a good opportunity to point out that scientific laws are different from societal laws.
SC.6.N.3.3: Give several examples of scientific laws. ● Students can explore the Law of Gravity in this Benchmark Block.

Conservation of Energy

Time Frame - 1 Week

SC.6.P.11.1: Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.

Safety: Safety glasses/goggles should be used any time there is a possibility of eye injuries from splashes or projectiles. BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

215-225, 232- 237, 246-247

EVALUATE - Formative

BPS Formative Assessment

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***Florida Science Course 1* TEXT**

- Probe: What is energy? (219)

ENGAGE options

Natural Phenomenon

- Law of Conservation of Energy (video)

EXPLORE options

***Florida Science Course 1* TEXT**

- Energy to Space (221)
- Woosh! (233)

CPALMS

- Conservation of Energy Mini Stations (see mini stations attachment)

EXPLAIN options

***Florida Science Course 1* LAB BOOK**

- **Lab 5.1 MiniLab** (Can a Moving Object Do Work?)
- **Virtual Lab:** What Are the Relationships Between Kinetic Energy and Potential Energy?
- **Lab 5.2 Skills Practice**, **Physical Lab** (Pinwheel Power), and **MiniLab** (How Does Energy Change Form?)

***Florida Science Course 1* ONLINE RESOURCES**

- BrainPop: Forms of Energy
- Tutor: Energy Transformation
- Video: Gravitational Potential Energy

CPALMS

- Bouncing Balls Lab (Lesson)

ELABORATE options

CPALMS

- Punkin Chunkin (Engineering Design Challenge)

EVALUATE - Summative

BPS Summative Assessment

- Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

Ideas For Embedding the Nature of Science Benchmarks Into ***Conservation of Energy*** Block

SC.6.N.3.2: Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws. ● While students are exploring the concepts of potential and kinetic energy, they will build their conceptual ideas of The Law of Conservation of Energy. This is also a good opportunity to point out that scientific laws are different from societal laws.
SC.6.N.3.3: Give several examples of scientific laws. ● Point out that the Law of Conservation of Energy is an example of a scientific law.

Describing and Graphing Motion

Time Frame - 2 Weeks

SC.6.P.12.1: Measure and graph distances versus time for an object moving at a constant speed. Interpret this relationship.

Safety: Safety glasses/goggles should be used any time there is a possibility of eye injuries from splashes or projectiles. BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

248-281

EVALUATE - Formative

BPS Formative Assessment

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***Florida Science Course 1* TEXT**

- Probe: Train Ride (251)

ENGAGE options

Natural Phenomena

- Slow Moving Sloth (video clip)
- Cheetah Running Full Speed (video clip)

EXPLORE options

***Florida Science Course 1* TEXT**

- Where? Here! (253)
- Turtle Travels (267)

Online Lesson

- Interpreting Time Distance Graphs

EXPLAIN options

***Florida Science Course 1* LAB BOOK**

- **Lab 6.1 MiniLab** (How Can You Determine Average Speed?) and **Skill Practice**
- **Lab 6.2 MiniLab** (How Can You Graph Motion?), **Physical Lab** (Calculate Average Speed From a Graph)

***Florida Science Course 1* ONLINE RESOURCES**

- Video: Distance vs. Time Graph
- Tutor: Average Speed

CPALMS Florida Original Student Tutorials

- Tracking Distance Over Time
- The Notion of Motion, Part 1 - Time Measurements
- The Notion of Motion, Part 2 - Position vs Time

ELABORATE options
CPALMS ● Spark Timer Motion Lab (Lesson)
EVALUATE - Summative
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

Ideas For Embedding the Nature of Science Benchmarks Into ***Describing and Graphing Motion*** Block

SC.6.N.1.1: Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions. ● The nature of this benchmark easily allows for students to design and carry out experiments in order to measure and graph motion. The CPALMS lesson, Spark Timer Motion Lab, provides an excellent example of a scientific experiment.
SC.6.N.1.2: Explain why scientific investigations should be replicable. ● As students work on scientific investigations, discuss the importance of following specific steps and collecting detailed data. Students should understand that investigations should be replicable so that results and conclusions are valid..
SC.6.N.1.3: Explain the difference between an experiment and other types of scientific investigations, and explain the relative benefits and limitations of each. ● Discuss the difference between an experiment and other types of scientific investigation as students are conducting investigations to measure and graph speed. Point out benefits and limitations of using different types of investigations.
SC.6.N.1.4: Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation. ● As students are measuring and recording the speed of objects, they have the opportunity to discuss and compare their methods and results.

Interactions Between Earth's Spheres

Time Frame - 2 Weeks

SC.6.E.7.4: Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
SC.6.E.7.9: Describe how the composition and structure of the atmosphere protects life and insulates the planet.

Safety: BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

SC.6.E.7.4	4-11, 15-22, 24-29, 34
SC.6.E.7.9	12-14

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

***Florida Science Course 1* TEXT**

- Probe: Earth, Our Planet (7)

ENGAGE options

***Florida Science Course 1* ONLINE RESOURCES**

- Color Transparencies: Our Planet - Earth (1)

Video

- Introduction to Earth Science

EXPLORE options

***Florida Science Course 1* TEXT**

- Pieces of Earth (9)
- Floating Fish (25)

AIMS *Earth Book*

- Layers of the Atmosphere (307-316)

EXPLAIN options

***Florida Science Course 1* ONLINE RESOURCES**

- Our Planet: Earth (vocabulary activity)
- Visualizing the Layers of the Atmosphere

AIMS *Earth Book*

- Hydrosphere (25-26)
- Earth's Spheres (377-378)

CPALMS Florida Original Student Tutorials

- Earth's Spheres
- Our Atmospheric Blanket

WeatherSTEM

- Data Mining

ELABORATE options
CPALMS ● Bottle Earth (Lesson) ● Earth's Awesome Spheres (Lesson) ● Story of Interactions Between Earth's Spheres (Lesson)
EVALUATE - Summative
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

Ideas For Embedding the Nature of Science Benchmarks Into ***Interactions Between Earth's Spheres*** Block

SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks. ● Exploring the atmosphere and its layers is an excellent opportunity to discuss how models help us to see and understand things that are very large.

Destination Space

Time Frame: 2 Weeks

SC.6.N.1.5: Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1: Distinguish science from other activities involving thought.
SC.6.N.2.2: Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3: Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.

Safety: BPS Safe Science Manual

Destination Space (All materials and resources listed below are on the website)

Destination Space Teacher Website: https://tinyurl.com/destinationspace
Destination Space Student Website: https://tinyurl.com/bpsspacestudents
Destination Space Guidebook (distributed at teacher training)
Giant Mars Map
Welcome to Mars: Making a Home on the Red Planet by Buzz Aldrin (10 copies per school)

PRIOR TO PRE-LAUNCH ACTIVITIES

Evaluate (Formative)

- Destination Space pre-test (form A and form B) *is REQUIRED for all 6th grade students.*

Mr. Jim Kennedy Presentation

- Anticipation Guide
- Follow-up Thank You letters for Mr. Kennedy
- An Inside Tour of the International Space Station (recommended video)

PRE-LAUNCH ACTIVITIES

Time Frame: 7 Days (immediately prior to KSC Study Trip)

Destination Space Pre-Launch Plans

DAY OF STUDY TRIP ACTIVITIES

Teacher Information Guide
Student-Led "Tour Talks"

POST-LAUNCH ACTIVITIES

Time Frame: 3 Days (immediately following KSC Study Trip)

Destination Space Post-Launch Plans

ELABORATE options

The following lessons support Destination Space throughout the year in other Benchmark Blocks.

Forces and Gravity

- 3-2-1 Pop!
- How to Land Softly on a Hard Planet
- Paper Rockets
- Cosmic Nose Cones (CPALMS Model Eliciting Activity)
- Lightyear Rockets (CPALMS Model Eliciting Activity)

Body Systems

- Puffy-Face, Bird-Legs Syndrome
- Life in Space

EVALUATE - Summative

Evaluate (Summative)

- Destination Space post-test (form A and form B) *is REQUIRED for all 6th grade students.*

Ideas For Embedding the Nature of Science Benchmarks Into ***Destination Space*** Block

SC.6.N.1.5: Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.

- As students research and discuss living and work in space, talk about the creativity that scientists need to design experiments that enable humans to live in space. Discuss the creativity needed in coming up with explanations that fit evidence as you learn about and discuss Mars.

SC.6.N.2.1: Distinguish science from other activities involving thought.

- Exploring different STEM careers will provide many opportunities to distinguish science from other careers in the STEM field. Students will have the opportunity to view “The Real Martians” before visiting KSC and also to consider the many different careers involved in the space industry.

SC.6.N.2.2: Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.

- Discussing space travel and living in space provides many opportunities to talk about the durability of scientific knowledge. As humans explore more of space, we continually find new evidence that changes our current knowledge. Consider exploring research experiments that has been conducted on the ISS and discuss how those results have enhanced our understanding of living in space.

SC.6.N.2.3: Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.

- When students research STEM careers and jobs in the space industry, there is a good opportunity to discuss how scientists come from various backgrounds and bring a variety of talents, interests, and goals to the space industry. Living and working in space requires people from many different backgrounds and with various talents to be successful in space.

Heat Transfer

Time Frame - 1 Week

SC.6.E.7.1: Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.

Safety: Ensure that students are mindful that heat energy can burn. They need to use insulating materials when working with heat energy. BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

46-60

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

Paige Keeley Probe

- *Uncovering Student Ideas in Science Vol.1*: The Mitten Problem

ENGAGE options

Natural Phenomenon

- Let's Learn S'more about Heat Transfer

EXPLORE options

***Florida Science Course 1* TEXT**

- Sunny Destinations (47)

CPALMS

- The Various Forms of Heat Transfer (lab stations in lesson)

EXPLAIN options

***Florida Science Course 1* LAB BOOK**

- **Lab 2.1 Earth Lab** (Radiant Energy Absorption) and **Skills Practice**

***Florida Science Course 1* ONLINE RESOURCES**

- Tutor: Conduction, Convection, and Radiation
- VivEd 3D: Water Cycle

AIMS *Earth Book*

- Sunsational Changes (379-386)

CPALMS

- The Transfer of Heat Energy (text resource)
- The Transfer of Heat (Florida Original Student Tutorial)

Other Online Resources

- Radiation- Conduction- Convection (BPS 5E lesson)
- Heat Transfer Song (video)
- Heat Transfer (CK-12)

WeatherSTEM

- Solar Radiation and Wind

ELABORATE options
CPALMS Model Eliciting Activity ● Feel the Heat! ● Cool Special Effects ● See the Unseen
EVALUATE - Summative
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

Ideas For Embedding the Nature of Science Benchmarks Into ***Heat Transfer*** Block

SC.6.N.1.3: Explain the difference between an experiment and other types of scientific investigations, and explain the relative benefits and limitations of each.

- While students are exploring ways heat energy can transfer, it is a good opportunity to point out that not all science investigations are experiments, and there is value to all valid investigations.

Climate and Global Patterns

Time Frame - 5 Weeks

SC.6.E.7.5: Explain how energy provided by the Sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.
SC.6.E.7.3: Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.
SC.6.E.7.2: Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.
SC.6.E.7.7: Investigate how natural disasters have affected human life in Florida.
SC.6.E.7.8: Describe ways human beings protect themselves from hazardous weather and sun exposure.
SC.6.E.7.6: Differentiate between weather and climate.

Safety:. BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

SC.6.E.7.5; SC.6.E.7.3; SC.6.E.7.2	62-72, 74-85, 92, 102-114
SC.6.E.7.7; SC.6.E.7.8	116-130
SC.6.E.7.6	132-144

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

SC.6.E.7.5 SC.6.E.7.3 SC.6.E.7.2	***Florida Science Course 1* TEXT** ● Probe: Moving Ocean Water (45) ● Probe: Air Pressure Ideas (89)
SC.6.E.7.6	**CPALMS** ● Climate vs. Weather (use the attached weather/climate KWL chart)

ENGAGE options

SC.6.E.7.5 SC.6.E.7.3 SC.6.E.7.2	**Natural Phenomena** ● Super Cell Thunderstorm (image) ● Introduction to our Atmosphere (video clip)
SC.6.E.7.7 SC.6.E.7.8	**Natural Phenomena** ● Sun Exposure (video clip) ● Storm Video (video clip) **Video Clip** ● Introduction to Hurricanes
SC.6.E.7.6	**Natural Phenomenon** ● Global Weather February 2018 (video clip)

EXPLORE options	
SC.6.E.7.5 SC.6.E.7.3 SC.6.E.7.2	***Florida Science Course 1* TEXT** ● Feelin' the Breeze (63) ● If the Shoe Floats (75) ● Human Hair Predicts Weather (9) ● Warm v. Cold (103) **AIMS *Earth Book*** ● Vertical Ocean Currents (85-90) ● Horizontal Ocean Currents (91-98) ● Colorful Currents (99-105) ● Out Front (351-364) ● Fronting the Weather (365-376) ● Worldwide Highs (387-396) ● The Great Moderator (399-405)
SC.6.E.7.7 SC.6.E.7.8	***Florida Science Course 1* TEXT** ● Weather Safety (117)
SC.6.E.7.6	***Florida Science Course 1* Text** ● Rain, Rain Go Away...or Stay? (133) **WeatherSTEM** ● Data Mining
EXPLAIN options	
SC.6.E.7.5 SC.6.E.7.3 SC.6.E.7.2	***Florida Science Course 1* LAB BOOK** ● **Lab 2.2 Skill Practice** and **MiniLab** (Can You Model Global Wind Patterns?) ● **Lab 2.3 Skill Practice** and **MiniLab** (How Do Oceanographers Study Ocean Currents?) ● **Lab 3.2 MiniLab** and **Skill Practice** (How Can You Observe Air Pressure?) ***Florida Science Course 1* ONLINE RESOURCES** ● Virtual Lab: The Atmosphere in Motion ● Video: What's Science Got to Do with It? Electrifying Wind ● BrainPop: Ocean Currents ● Tutor: Coriolis Effect ● Video: Fronts ● What's Science Got to Do with It? Weather Effects ● Weather Map: Fronts **CPALMS Florida Original Student Tutorials** ● The Sun Fuels Our Weather ● Water in Our World ● What Causes Weather? **CPALMS** ● Air Masses and Fronts (video) ● The Jet Stream: Rivers of Air (text resource) ● Wind, you blow me away! (full 5E lesson) **Video** ● Air Masses and Fronts
SC.6.E.7.7 SC.6.E.7.8	***Florida Science Course 1* LAB BOOK** ● **Lab 3.3 MiniLab** (What Is the "Recipe" For a Tornado?) and **Earth Lab** (Hurricanes and Their Effects) ***Florida Science Course 1* ONLINE RESOURCES** ● Animation: Tornado Formation

	AIMS *Earth Book* ● Hurricanes and Thunderstorms (4087-409) ● Hurricane (411-426) **CPALMS** ● Natural Disasters (Florida Original Student Tutorial) ● Hazards of Hurricane (CIS)
SC.6.E.7.6	***Florida Science Course 1* LAB BOOK** ● **Lab 3.4 Skill Practice** and **MiniLab** (What Factors Affect Climate?) ***Florida Science Course 1* Online Resources** ● BrainPop: What Is Weather? **CPALMS** ● Weather vs. Climate (Florida Original Student Tutorial) **Video** ● NASA The Ocean: A Driving Force for Weather and Climate **WeatherSTEM**
ELABORATE options	
SC.6.E.7.5 SC.6.E.7.3 SC.6.E.7.2	**CPALMS** ● Storm-Chasers: Weather and Climate (Model Eliciting Activity)
SC.6.E.7.7 SC.6.E.7.8	**CPALMS Model Eliciting Activities** ● Block the Rays ● Building Materials and Locations ● See the Unseen
SC.6.E.7.6	**CPALMS** ● Family Fishing Trip (**Model Eliciting Activity)**
EVALUATE - Summative	
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.	

Ideas For Embedding the Nature of Science Benchmarks Into ***Climate and Global Patterns*** Block

SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks.

- Using models while studying difficult earth science concepts makes the content more understandable and student-friendly. Using models is a solid scientific practice. Scientists who study weather patterns, for example, use models to predict and explain the natural phenomena.

Weathering, Erosion, Deposition, and Landforms

Time Frame - 2 Weeks

SC.6.E.6.1: Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
SC.6.E.6.2: Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.

Safety: BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

SC.6.E.6.1	148-166, 168-178, 180-192, 195, 200-202
SC.6.E.6.2	203-207

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

***Florida Science Course 1* TEXT**

- Probe: What is Erosion? (151)

ENGAGE options

Natural Phenomena

- Erosion (image)
- Changing river path seen through satellite images (video clip)
- Formation of Providence Canyon (video clip)
- Jekyll Island Shoreline Change (image)

EXPLORE options

***Florida Science Course 1* TEXT**

- Candy Rocks (153)
- On the Move! (169)
- Which Will It Be: Water or Wind? (181)
- Ice Cube Glaciers (195)

AIMS *Earth Book*

- Modeling Rivers (429-434)
- Weathering Activity Cards (449-454)
- Chalk It up to Weathering (455-4569)
- Sandy Beaches (471-480)

EXPLAIN options
Florida Science Course 1* LAB BOOK** ● **Lab 4.1 Skill Practice** and **MiniLab (**How Are Rocks Chemically Weathered?) ● **Virtual Lab:** Weathering: How Are Materials on the Earth Broken Down? ● **Lab 4.2 MiniLab** (How Can Wind Change Earth's Surface?) ● **Virtual Lab:** Water Erosion and Deposition ● **Lab 4.3 Skill Practice** and **MiniLab** (How Do Stalactites Form?) ● **Lab 4.4 Earth Lab** (Earth's Changing Surface) ***Florida Science Course 1* ONLINE RESOURCES** ● BrainPop: Weathering ● Tutor: Weathering, Erosion, Deposition ● Video: Stream Development ● BrainPop: Glaciers ● Video: Glacier Formation **AIMS *Earth Book ● Earth Changes (427) ● Weathering (445-446) ● Erosion (447-448) **CPALMS Florida Original Student Tutorials** ● Tear Me Down and Build Me Up: The Story of Weathering, Erosion, and Deposition ● Models in Science **WeatherSTEM** ● Climate and Soil Composition
ELABORATE options
CPALMS Model Eliciting Activity ● Protecting Our Dunes ● Save Our Soccer Field
EVALUATE - Summative
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

Ideas For Embedding the Nature of Science Benchmarks Into ***Weathering, Erosion, Deposition, Landforms*** Block

SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks. ● Exploring concepts of weathering, erosion, and deposition is the perfect opportunity to invite students to build and use models in order to better understand the processes and how they are related.

Cell Structure, Processes, and Theory

Time Frame - 4 Weeks

SC.6.L.14.4: Compare and contrast the structure and function of major organelles of plant and animals cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
SC.6.L.14.2: Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.
SC.6.L.14.3: Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.

Safety: BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

SC.6.L.14.4	422-427, 440-452
SC.6.L.14.2	428-430, 435-436, 497-498
SC.6.L.14.3	468 (cellular respiration), 471-472, 486

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

***Florida Science Course 1* TEXT**

- Probe: The Basic Unit of Life (425)
- Probe: Getting Bigger (483)

ENGAGE options

Videos

- Introduction to Biology
- Life Inside a Cell

EXPLORE options

SC.6.L.14.4	***Florida Science Course 1* TEXT** • Building Blocks (427) • The Right Tools For the Job (441) • For the Birds (455)
SC.6.L.14.2	***Florida Science Course 1* TEXT** • Making More Cells (485)
SC.6.L.14.3	***Florida Science Course 1* TEXT** • Out of the Blue (467)

EXPLAIN options	
SC.6.L.14.4	***Florida Science Course 1* LAB BOOK** ● **Lab 10.2 MiniLab** and **Skill Practice** (How Are Plant Cells and Animal Cells Similar and How Are They Different?) ***Florida Science Course 1* ONLINE RESOURCES** ● BrainPop: Cell Structures ● BrainPop: Cell Specialization ● Animal Cell ● Plant Cell ● VivEd 3D: Human Cell **CPALMS Florida Original Student Tutorials** ● Investigating Plant and Animal Cells ● The Cell Theory ● Models in Science **Video** ● Introduction to Cells
SC.6.L.14.2	**Video** ● All living Things Are Made of Cells
SC.6.L.14.3	***Florida Science Course 1* LAB BOOK** ● **Lab 10.3 MiniLab** (How is a Balloon Like a Cell Membrane?) ● **Lab 10.4 Life Lab** (Photosynthesis and Life)
ELABORATE options	
CPALMS ● A Cell is Like… (Lesson)	
EVALUATE - Summative	
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.	

Ideas For Embedding the Nature of Science Benchmarks Into ***Cell Structure, Processes, Theory*** Block

SC.6.N.1.5: Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence. ● The contributors to cell theory were not designing experiments, but were exploring in order to create an explanation of cells and how they work.
SC.6.N.2.2: Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered. ● As you teach about cell theory, point out that scientific knowledge is durable and open to change. Discuss how cell theory changed as new evidence was encountered.
SC.6.N.2.3: Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals. ● While exploring the history of cell theory, discuss how different scientists from different parts of the world built upon and contributed to cell theory.
SC.6.N.3.1: Recognize and explain that in a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life. ● While students are exploring the history behind cell theory, they will be learning the important differences between a scientific theory and the “everyday” idea of theory. The three components of cell theory were accepted only after they were well-supported and based on evidence.
SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks. ● Exploring cells and their parts is an excellent opportunity build and use models and discuss how models can help us to see and understand things that are very small.

Classification of Living Things

Time Frame - 4 Weeks

SC.6.L.15.1: Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.

Safety: BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

394-408

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

***Florida Science Course 1* TEXT**

- Probe: Classification Systems (377)

ENGAGE options

Natural Phenomenon

- Dead Sea Mushrooms (image)

EXPLORE options

***Florida Science Course 1* TEXT**

- Sorting Leaves (395)
- Magnify It (411)

CPALMS

- Classification of Organisms (use the attachment *Classification of Organisms Initial Sort*)

EXPLAIN options

***Florida Science Course 1* LAB BOOK**

- **Lab 9.2 MiniLab** (How Would You Name an Unknown Organism?), **Skill Practice**, and **Life Lab** (Constructing a Dichotomous Key)

***Florida Science Course 1* ONLINE RESOURCES**

- BrainPop: Six Kingdoms
- Video: Neurons
- Virtual Lab: How Are Living Things Classified into Groups?

CPALMS Florida Original Student Tutorial

- Classifying Living Things

ELABORATE options
CPALMS ● Organization Classification Using a Dichotomous Key (Model Eliciting Activity) ● Alien Attributes (Lesson)
EVALUATE - Summative
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.

Ideas For Embedding the Nature of Science Benchmarks Into ***Classification of Living Things*** Block

SC.6.N.2.2: Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.

- The classification system, including the addition of Domains, is a perfect opportunity to point out that science ideas change as we gain new information. The original Linnaean System has been modified and added to, as our knowledge of living things has grown.

Body Systems

Time Frame - 7 Weeks

SC.6.L.14.1: Describe and identify patterns in the hierarchal organization of organisms from atoms to molecules and cells to tissues to organs to organ systems.
SC.6.L.14.5: Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.
SC.6.L.14.6: Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.
***HE.6.C.1.3:** Identify environmental factors that affect personal health.
***HE.6.C.1.5:** Explain how body systems are impacted by hereditary factors and infectious agents.
*These health standards are the responsibility of those who teach science standards, ELA standards, and PE standards.

Safety: Samples/organisms MUST NOT be collected, isolated and/or cultured from the environment as they are potentially pathogenic. This includes, but is not limited to projects involving blood, animal waste, soil, pond water, and culturing swabs. BPS Safe Science Manual

Florida Science Course 1 Text Pages

These pages best target the benchmark(s).

SC.6.L.14.1	501-517
SC.6.L.14.5	522-531, 533-541, 548-561, 564-574, 576-591
SC.6.L.14.6	592-598, 606-607, 612-616 (through Viruses and Organisms), 619-621, 632-633, 642, 648

EVALUATE - Formative

BPS Formative Assessment

- A formative assessment for each benchmark, with an average of 3-5 multiple choice questions, is available in both Unify and the AP SharePoint site.

SC.6.L.14.1	Page Keeley Probes ● Human Body ● Atoms and Cells
SC.6.L.14.5	***Florida Science Course 1* TEXT** ● Probe: Oxygen In, Carbon Dioxide Out (525)
SC.6.L.14.6	***Florida Science Course 1* TEXT** ● Probe: Is It an Organism? (595)

ENGAGE options

Natural Phenomena

- Severe Chickenpox - Caused by a Virus (image)
- T-cell Killing a Cancer Cell (video clip)

EXPLORE options	
SC.6.L.14.1	***Florida Science Course 1* TEXT** ● Get Organized (505)
SC.6.L.14.5	***Florida Science Course 1* TEXT** ● Supportive Skeletons (549) ● The Ball Is in Your Court (565) ● At the Drop of a Hat (577)
SC.6.L.14.6	***Florida Science Course 1* TEXT** ● Tiny Bacteria (596) ● Tiny Virus Strand (613)
EXPLAIN options	
SC.6.L.14.1	***Florida Science Course 1* LAB BOOK** ● **Lab 11.2 MiniLab** (How Do cells Work Together to Make an Organism?) and **Life Lab** (Cell Differentiation) ***Florida Science Course 1* ONLINE RESOURCES** ● Video: Cell Organization ● BrainPop: Cell Specialization **CPALMS** ● The Six Kingdoms (Argument Driven Inquiry) ● Levels of Organization (Florida Original Student Tutorial)
SC.6.L.14.5	***Florida Science Course 1* LAB BOOK** ● **Lab 12.1 Life Lab** (Model Digestion from Start to Finish), **MiniLab** (How Can You Model the Function of a Kidney?), and **Skill Practice** ● **Lab 12.2 MiniLab** (How Does the Skeleton Protect Organs?), **Skill Practice**, and **MiniLab** (How Does Your Sight Help You Keep Your Balance?) ● **Lab 12.4 MiniLab** (How Do the Different Layers of Your Skin Protect Your Body?) and **Life Lab** (Model the Body Systems) ***Florida Science Course 1* ONLINE RESOURCES** ● BrainPop: Digestion ● BrainPop: Circulatory System ● BrainPop: Respiratory System ● VivEd 3D: Human Skeleton ● BrainPop: Immune System **CPALMS Florida Original Student Tutorials** ● The Nervous System ● The Respiratory System ● The Circulatory System ● The Musculoskeletal System ● The Digestive System ● The Excretory System ● The Reproductive System ● The Immune System ● Homeostasis **Video** ● How the Digestive Systems Works

SC.6.L.14.6	***Florida Science Course 1* LAB BOOK** ● **Lab 13.2 MiniLab** (How Do Antibodies Work?) and **Life Lab** (Bacterial Growth and Disinfectants) ***Florida Science Course 1* ONLINE RESOURCES** ● Virtual Lab: How Does the Body Protect Itself Against Foreign Substances? ● Tutor: Antibodies ● Video: What's Science Got to Do with It? Epidemic ● BrainPop: Bacteria ● VivEd 3D: Bacillus ● Video: Active Virus Cycle **CPALMS Florida Original Student Tutorial** ● Infectious Agents: Agent Icky
Healthy Body Systems (HE.6.C.1.3, HE.6.C.1.5)	● Your Body- Changes PowerPoint ● 6th Grade Bowl of Milk Activity ● Activity: Mission Possible ● Healthy Body Systems 6th Grade Lessons ● Healthy Body Systems Guide ● Frequently Asked Questions and Answers ● Healthy Body Systems Parent Presentation
ELABORATE options	
CPALMS ● Hooray for Bone Health! (Model Eliciting Activity) ● Out of this World Workout: Exercise in Space to Prevent Bone Loss (Model Eliciting Activity) ● Body Systems Homeostasis (Model Eliciting Activity) ● Journey Through the Body (Engineering Design Challenge)	
EVALUATE - Summative	
BPS Summative Assessment ● Each benchmark block summative assessment is available in Unify and the AP SharePoint site.	

Ideas For Embedding the Nature of Science Benchmarks Into ***Body Systems*** Block

SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks.

- Exploring cells, organs and organ systems provides an excellent opportunity explore the usefulness of models when learning about things that are very small or things we do not have easy access to observe.

SC.6.N.1.1: Define a problem from the sixth grade curriculum: use appropriate reference materials to support scientific understanding; plan and carry out scientific investigations of various types, such as systematic observations or experiments; identify variables; collect and organize data; interpret data in charts, tables, and graphics; analyze information; make predictions; and defend conclusions. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Define a problem from the sixth grade curriculum: use appropriate reference materials to support scientific understanding; plan and carry out scientific investigations of various types, such as systematic observations or experiments; identify variables; collect and organize data; interpret data in charts, tables, and graphics; analyze information; make predictions; and defend conclusions.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● question* ● natural world* ● observation* ● **empirical evidence*** ● reliable source* ● experiment* ● variable* ● **test variable** (independent) ● data* Processes: ● Generate an explanation using evidence collected and information from reliable sources. ● Analyze and interpret data, using graphs. ● Organize data from scientific investigations. ● Collect data in charts and tables. ● Plan and carry out an investigation, individually and/or as a team, to explore a problem. ● Identify variables of an experiment. ● Make predictions based on information gathered from reliable sources. ● Define a problem from the sixth grade curriculum. ● Observe the natural world, individually and as a team. *Previous grade level benchmarks require students to do everything in this benchmark except define a problem from the sixth grade curriculum.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.N.1.2: Explain why scientific investigations should be replicable. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Explain why scientific investigations should be replicable.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● replicable* ● evidence* ● investigation* ● procedure* Processes: ● Explain differences in results, focusing on how precisely the procedures were carried out. ● Compare evidence. ● Carry out an investigation using the same procedure as others. *Previous grade level benchmarks require students to compare the methods and results of investigations and explain that investigations should be replicable.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students often confuse replication with repetition. Repetition is repeating trials within an experiment. Replication is the ability of another scientist to conduct the same experiment and collect similar results as the original experiment.

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SC.6.N.1.3: Explain the difference between an experiment and other types of scientific investigations, and explain the relative benefits and limitations of each. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Explain the difference between an experiment and other types of scientific investigations, and explain the relative benefits and limitations of each.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● investigation* ● experiment* ● **test variable (independent)** ● relative benefit ● relative limitation Processes: ● Explore the relative limitations of different types of investigations. ● Explore the relative benefits of different types of investigations. ● Identify which investigations from the list are experiments. ● Discuss what makes an investigation an experiment. ● Generate a list of science investigations. ● **SC.6.N.1.1:** Define a problem from the sixth grade curriculum: use appropriate reference materials to support scientific understanding; plan and carry out scientific investigations of various types, such as systematic observations or experiments; identify variables; collect and organize data; interpret data in charts, tables, and graphics; analyze information; make predictions; and defend conclusions. *Previous grade level benchmarks require students to explain the difference between experiments and other types of scientific investigations.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.N.1.4: Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● method (procedure)* ● result* ● investigation* ● explanation* Processes: ● Discuss how different results are connected to different methods. ● Discuss the methods (procedures) used for the investigation. ● Compare results. ● Investigate a scientific question using a common procedure. *Previous grade level benchmarks require students to compare the methods and results of investigations done by classmates.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.N.1.5: Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● experiment***** ● design* ● creativity* Processes: ● Explore how creativity was used in order to form explanations from evidence. ● Track the historical path of a scientific concept (for example, cell theory), focusing on how explanations change over time. *Previous grade level benchmarks require students to recognize that science involves creativity in designing experiments.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.N.2.1: Distinguish science from other activities involving thought. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Distinguish science from other activities involving thought.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Term: ● science* Processes: ● Brainstorm different activities involving thought (religion, philosophy, mythology, mathematics, etc.). ● Discuss the characteristics of science.
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.N.2.2: Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● durable ● evidence* ● interpretation Processes: ● Recognize that scientific knowledge is durable because it continues to change to reflect information. ● Discuss how new evidence changes scientific understanding. ● Brainstorm list of science knowledge that has changed (for example, Pluto was a planet, flat Earth, geocentric model of the universe, etc.).
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.N.2.3: Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals. **(Low)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● contribution ● scientist* Processes: ● Recognize the variety of talents, interests, and goals that go into scientific thought. ● Discuss how those scientists came from various backgrounds. ● Recognize scientists who made significant contributions to their fields.
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.N.3.1: Recognize and explain that in a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Recognize and explain that in a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● **scientific theory** ● claim Processes: ● Discuss how a scientific theory differs from the everyday use of the word "theory." ● Recognize criteria of a scientific theory. ● Discuss examples of familiar scientific theories (such as The Big Bang Theory, black holes, and dinosaur extinction theories). ● Discuss the concept of scientific theory. ● Explore the concept of scientific theory.
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may think that scientific theories can eventually become scientific laws. Theories ***explain*** natural phenomena, while scientific laws ***describe*** natural phenomena.

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SC.6.N.3.2: Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● **scientific law** ● societal law Processes: ● Discuss how a scientific laws differ from societal laws. ● Recognize criteria of a scientific law. ● Discuss examples of familiar scientific laws (such as Newton's Laws of Motion and the Law of Gravity). ● Discuss the concept of scientific law. ● Explore the concept of scientific law. ● **SC.6.P.13.2:** Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are.
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may think that scientific theories can eventually become scientific laws. Theories ***explain*** natural phenomena, while scientific laws ***describe*** natural phenomena.

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SC.6.N.3.3: Give several examples of scientific laws. **(Low)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Give several examples of scientific laws.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Term: ● **scientific law** Processes: ● Brainstorm a list of scientific laws. ● **SC.6.N.3.2:** Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may think that scientific theories can eventually become scientific laws. Theories ***explain*** natural phenomena, while scientific laws ***describe*** natural phenomena.

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SC.6.N.3.4: Identify the role of models in the context of the sixth grade science benchmarks. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Identify the role of models in the context of the sixth grade science benchmarks.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● model* ● three dimensional* ● two dimensional* ● explanation* ● computer model* Processes: ● Explore how a computer model could be used in a sixth grade topic. ● Explore how a two dimensional model could be used in a sixth grade topic. ● Explore how a three dimensional model could be used in a sixth grade topic. *Previous grade level benchmarks require students to recognize that models can be useful to explore scientific concepts.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may think that only three dimensional representations are models. A model is anything that is not the actual item under discussion. So, a visualization in your mind, a drawing, a photograph, a video, a computer simulation, and three dimensional items are all considered forms of models. For example, if you are discussing a hummingbird, picturing it in your head, holding a picture, or watching a video are all considered models of a hummingbird.

Teacher Note:

- Models have limitations. Have students discuss the limitations of models (scale, size, distance, time, etc.).

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SC.6.E.6.1: Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● physical weathering ● chemical weathering ● erosion* ● deposition ● gravity* ● sediment* Processes: ● Discuss how Earth's surface is built up by deposition. ● Explore examples of deposition. ● Discuss how Earth's surface is torn down by erosion. ● Explore erosion (by wind, water, gravity, ice). ● Discuss how Earth's surface is torn down by both physical and chemical weathering. ● Discuss the common characteristic of all chemical weathering (rock composition has chemically changed). ● Explore chemical weathering by animals. ● Explore chemical weathering by plants. ● Explore chemical weathering by oxidation. ● Explore chemical weathering by carbon dioxide (carbonic acid). ● Explore chemical weathering by water (hydrolysis). ● Discuss the common characteristic of all physical weathering (rock composition has physically changed, but chemically remains the same). ● Explore physical weathering by animal activities. ● Explore physical weathering by plant roots. ● Explore physical weathering by ice. ● Explore physical weathering by water. ● Explore physical weathering by wind. *Previous grade level benchmarks require students to 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).*
1	With help and support, the student can do some of the Level 2 targets.

Teacher Note:

- Students can successfully explore and describe examples of chemical weathering without using the terms hydrolysis, carbonic acid and oxidation.

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SC.6.E.6.2: Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Term: ● landform (coastlines, dunes, rivers, mountains, glaciers, deltas, lakes) Processes: ● Discuss which of these landforms can be found in present-day Florida. ● Identify a glacier as a landform. ● Identify a delta as a landform. ● Identify a dune as a landform. ● Identify a mountain as a landform. ● Identify a coastline as a landform. ● Identify a river as a landform. ● Identify a lake as a landform. ● Explore a variety of landforms on Earth's surface using physical maps. ● **SC.6.E.6.1:** Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
1	With help and support, the student can do some of the Level 2 targets.

Teacher Notes:

- While mountains are rare in Florida, they do exist (for example, Sugarloaf Mountain in Lake County).
- Glaciers did not have a *direct* impact on Florida, but they had an *indirect* impact, as they have melted and re-melted over Earth's history, and the rising water has weathered and eroded Florida into its current peninsula shape.

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SC.6.E.7.1: Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● radiation* ● conduction* ● convection ● transfer ● system Processes: ● Discuss how conduction, radiation and convection are different from each other. ● Discuss how heat energy can transfer from one material to another by conduction. ● Explore heat energy transferring from one material to another by convection. ● Discuss how heat energy can transfer from one material to another by radiation. ● Explore heat energy transferring from one material to another by radiation. ● Discuss how heat energy can transfer from one material to another by conduction. ● Explore heat energy transferring from one material to another by conduction. *Previous grade level benchmarks require students to understand conduction in terms of electricity, but in sixth grade, the focus is on conduction of heat energy.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students often think that heat energy is created by "warm" things (such as mittens or blankets) but heat energy is moved (transferred) from areas of higher concentration to areas of lower concentration. Mittens and blankets do not produce heat energy.

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SC.6.E.7.2: Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● cycle* ● atmosphere ● hydrosphere ● weather** ● climate* Processes: ● Discuss how the water cycle affects climate. ● Explore how the water cycle affects climate. ● Discuss how the water cycle affects weather patterns. ● Explore how the water cycle affects weather patterns. ● **SC.6.E.7.4:** Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere. *Previous grade level benchmarks require students to understand the water cycle and to recognize that the atmosphere is constantly moving, through weather (winds, currents) and other systems, so the water that evaporated in one area may precipitate over a different area, then run off to a different area, connecting all the bodies of water around the world.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.E.7.3: Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● global pattern ● jet stream ● ocean current ● weather***** ● **temperature*** ● air pressure* ● wind direction* ● wind speed* ● humidity* ● precipitation* Processes: ● Investigate how the jet stream influences air pressure. ● Investigate how the jet stream affects humidity and precipitation. ● Investigate how the jet stream affects temperature. ● Investigate how wind direction and wind speed affect ocean currents. ● Investigate how ocean currents affect air pressure. ● Investigate how ocean currents affect humidity and precipitation. ● Investigate how ocean currents affect temperature. *Previous grade level benchmarks require students to recognize how air temperature, barometric pressure, humidity, wind speed and direction, and precipitation determine the weather in a particular place and time. They also require students to distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.E.7.4: Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● interaction ● geosphere ● hydrosphere ● cryosphere ● atmosphere ● biosphere Processes: ● Discuss examples of interactions between the spheres (water cycle, weather, erupting volcanoes, etc.) ● Compare and contrast all five of Earth's spheres. ● Compare and contrast the biosphere, geosphere and the atmosphere. ● Investigate the atmosphere. ● Investigate the geosphere. ● Investigate the biosphere. ● Compare and contrast the hydrosphere and the cryosphere. ● Investigate the cryosphere. ● Investigate the hydrosphere. *Previous grade level benchmarks require students to understand the water cycle. They also were required to recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may confuse the names of Earth's spheres with the names of atmospheric layers, as they sound similar.

Teacher Note:

- Different sources may group Earth's spheres slightly differently. For example, the cryosphere is not always pulled out as a separate sphere but rather, included in the hydrosphere. Some sources will use the term lithosphere in place of geosphere, and there are differences in definitions of both, depending on the source. This document uses the term geosphere only, since that is the term used in the benchmark wording.

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SC.6.E.7.5: Explain how energy provided by the Sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Explain how energy provided by the Sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● energy* ● Sun* ● global pattern ● atmosphere ● **temperature*** Processes: ● Discuss how the movement of heat energy can influence global patterns. ● Discuss how energy from the Sun is moved from land to to water to air (and so forth) through convection. ● Explore how energy from the Sun is moved from land to to water to air (and so forth) through convection. ● Discuss how the energy from the Sun is conducted from air to water to land, and so forth. ● Explore how the energy from the Sun is conducted from air to water to land, and so forth. ● Discuss how the Sun's energy is radiated to earth's atmosphere and surface. ● Explore how the Sun's energy is radiated to earth's atmosphere and surface. ● **SC.6.E.7.4:** Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere. ● **SC.6.E.7.1:** Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.E.7.6: Differentiate between weather and climate. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Differentiate between weather and climate.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● weather* ● climate* ● latitude ● ocean current ● elevation (relief) ● **temperature*** Processes: ● Discuss how the factors affecting weather are related, but different. ● Explore the ways elevation affects climate. ● Explore the ways wind and air masses affect climate. ● Explore the ways temperature of ocean currents affects climate. ● Explore the way latitude (distance north or south from the equator) affects climate. ● Explore the ways proximity to large bodies of water affect an area's climate. ● Briefly explore and review factors that affect weather of a certain place at a certain time (temperature, moisture, air pressure, wind). *Previous grade level benchmarks require students to recognize how air conditions determine weather and to distinguish among the various forms of precipitation.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- The concepts of weather and climate can be confusing to an sixth grade student, as they share many common attributes. The focus of this standard is not about memorizing all the factors of weather vs. climate. Instead, students should understand that weather is a set of atmospheric conditions, in a certain area, in a certain time. Climate is an averaged set of atmospheric conditions and other factors which occur over a long period of time, in a specific area.

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SC.6.E.7.7: Investigate how natural disasters have affected human life in Florida. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Investigate how natural disasters have affected human life in Florida.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Term: ● natural disaster* Processes: ● Discuss how natural disasters affect human life in Florida. ● Explore natural disasters that impact Florida. *Previous grade level benchmarks require students to design a family preparedness plan for natural disasters and identify the reasons for having such a plan.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.E.7.8: Describe ways human beings protect themselves from hazardous weather and sun exposure. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Describe ways human beings protect themselves from hazardous weather and sun exposure.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● hazardous weather ● sun exposure Processes: ● Discuss ways sun exposure can be dangerous. ● Explore ways sun exposure can be dangerous. ● Discuss ways to be safe in hazardous weather. ● Explore examples of hazardous weather. *Previous grade level benchmarks require students to design a family preparedness plan for natural disasters and identify the reasons for having such a plan.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Many students think that when it is overcast outside, the sun cannot be harmful. Sun exposure can be hazardous during cloudy weather.

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SC.6.E.7.9: Describe how the composition and structure of the atmosphere protects life and insulates the planet. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Describe how the composition and structure of the atmosphere protects life and insulates the planet.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● atmosphere ● insulate Processes ● Discuss how each layer of the atmosphere has distinct qualities (including composition and structure). ● Discuss the thermosphere layer of the atmosphere. ● Explore the thermosphere layer of the atmosphere. ● Discuss the mesosphere layer of the atmosphere. ● Explore the mesosphere layer of the atmosphere. ● Discuss the stratosphere layer of the atmosphere. ● Explore the stratosphere layer of the atmosphere. ● Discuss the troposphere layer of the atmosphere. ● Explore the troposphere layer of the atmosphere.
1	With help and support, the student can do some of the Level 2 targets.

Teacher Note:

- This benchmark can be difficult for students to master, as much of the vocabulary sounds similar (with “sphere” being a base word). The important idea for students to come away with is that the atmosphere of Earth is composed of complex layers that support life on Earth.

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SC.6.P.11.1: Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● Law of Conservation of Energy ● potential energy ● kinetic energy ● transform* Processes: ● Explore how kinetic energy can be transformed into potential energy. ● Explore how potential energy can be transformed into kinetic energy. ● Discuss examples of potential energy. ● Explore examples of potential energy. ● Discuss examples of kinetic energy. ● Explore examples of kinetic energy. *Previous grade level benchmarks require students to investigate and explain that electrical energy can be transformed into heat, light, and sound energy, as well as the energy of motion. Students were also required to investigate, observe, and explain basic forms of energy (light, heat, sound, electrical, and mechanical).*
1	With help and support, the student can do some of the Level 2 targets.

Student Misconception:

- Some sources refer to mechanical energy, and this can be confusing to students, based on the source's definition of mechanical energy. Mechanical energy is best defined as the combination of potential and kinetic energy, but in this document, the term mechanical energy is left out (based on benchmark wording) for clarity in differentiating between kinetic and potential energy.

Teacher Note:

- All types of energy can be classified into potential and kinetic energy. While is not essential that sixth grade students fully master this concept, it is important for teachers to recognize this concept. At the sixth grade level, students need to recognize that potential energy is the possible use of energy, due to position or condition, while kinetic energy is the energy of movement.

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SC.6.P.12.1: Measure and graph distances versus time for an object moving at a constant speed. Interpret this relationship. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Measure and graph distances versus time for an object moving at a constant speed. Interpret this relationship.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● measure* ● graph ● distance* ● time* ● constant speed Processes: ● Discuss various time/distance graphs. ● Analyze various time/distance graphs. ● Discuss various time/distance data tables. ● Analyze various time/distance data tables. ● Discuss how a mathematical relationship between distance and time is defined as speed (speed = distance divided by time). ● Explore how a mathematical relationship between distance and time is defined as speed (speed = distance divided by time). ● Discuss how speed is measured (the amount of distance covered in relation with the time it took to cover that distance). ● Explore how speed is measured (the amount of distance covered in relation with the time it took to cover that distance). ● Discuss the concept of constant speed. ● Explore the concept of constant speed. ● Compare and discuss the results of these investigations. ● Measure and record the time it takes for different objects to move a determined distance. ● Discuss that objects move at different speeds. ● Explore objects moving at different speeds (rolling balls, toy cars, wind-up toys). *Previous grade level benchmarks require students to 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.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.P.13.1: Investigate and describe types of forces including forces and forces acting at a distance, such as electrical, magnetic, and gravitational. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Investigate and describe types of forces including forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Vocabulary/key terms: ● electrical* ● magnetic* ● gravitational ● distance ● force* ● contact force ● non-contact force Processes: ● Discuss the non-contact force of gravity, and its power to move/change things with no direct contact. ● Explore the non-contact force of gravity, and its power to move/change things with no direct contact. ● Discuss the non-contact force of electricity, and its power to move/change things with no direct contact. ● Explore the non-contact force of electricity, and its power to move things/cause change with no direct contact. ● Discuss the non-contact force of magnets, and their power to move things/cause change with no direct contact. ● Explore the non-contact force of magnets, and their power to move things/cause change with no direct contact. ● Discuss contact forces in terms of making direct contact to push or pull objects. ● Explore contact forces (such as pushing a toy car or blowing on a dandelion). *Previous grade level benchmarks require students to explore the Law of Gravity, investigate and describe how magnets attract and repel, identify familiar forces that cause objects to move, such as pushes and pulls (including gravity acting on falling objects), and investigate and explain electrical energy.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.P.13.2: Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that they force depends on how much mass the objects have and how far apart they are. **(Low)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that they force depends on how much mass the objects have and how far apart they are.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● Law of Gravity* ● gravitational force ● mass* Processes: ● Discuss how gravitational force is dependent on distance between objects. ● Explore how gravitational force is dependent on distance between objects. ● Discuss how gravitational force is dependent on the mass of an object. ● Explore how gravitational force is dependent on the mass of an object. ● Explore how all matter (even outside of Earth) exerts a gravitational (pulling) force. ● Review how the force of gravity pulls materials on the Earth's surface toward the center of the Earth. *Previous grade level benchmarks require students to identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects and to explore the Law of Gravity by demonstrating that gravity is a force that can be overcome.*
1	With help and support, the student can do some of the Level 2 targets.

Teacher Note:

- Students have explored gravity in earlier grade levels. In sixth grade, they are challenged with understanding concepts of gravity that are not as easily observed, as they master the ideas that gravitational force acts in all places (outside of Earth), and that mass and distance are important components to the force of gravity.

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SC.6.P.13.3: Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● unbalanced force ● balanced force ● speed* Processes: ● Discuss how unbalanced forces cause changes in speed, direction of movement or both. ● Discuss how forces can be unbalanced. ● Explore how forces can be unbalanced. ● Discuss how forces can be balanced. ● Explore how forces can be balanced. *Previous grade level benchmarks require students to recognize that an object in motion always changes its position and may change its direction and Investigate and describe that the greater the force applied to an object, the greater the change in motion.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may think that objects that are not moving *are not* being acted on by any forces. In fact, non-moving objects are being acted on by forces, but these forces are balanced, so no change in position or speed is happening.

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SC.6.L.14.1: Describe and identify patterns in the hierarchal organization of organisms from atoms to molecules and cells to tissues to organs to organ systems. **(Low)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Describe and identify patterns in the hierarchal organization of organisms from atoms to molecules and cells to tissues to organs to organ systems.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● organism ● **molecule** ● atom ● cell ● specialized ● tissue ● organ* ● organ system Processes: ● Explore organ systems as a combination of specialized organs. ● Explore organs as a combination of specialized tissue. ● Explore body tissue as a combination of specialized cells. ● Explore cells and their parts as combinations of molecules. ● Identify molecules as different combinations of atoms. ● Identify atoms as the smallest units of matter. ● **SC.6.L.14.2:** Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life. ● **SC.6.L.14.3:** Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing. ● **SC.6.L.14.4:** Compare and contrast the structure and function of major organelles of plant and animals cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles. *Previous grade level benchmarks require students to identify organs of the human body and describe their functions.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may be confused about how atoms and molecules fit into this organization, as they are the basis of all matter, whereas cells, tissues, organs, and organ systems are the continued hierarchy of living things. Sixth grade students do not need to understand the full complexity of atoms and molecules in order to master this benchmark.

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SC.6.L.14.2: Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● **scientific theory** ● cell ● cell theory ● organism ● single-celled ● multi-cellular Processes: ● Discuss how cells are the basic unit of life. ● Explore how cells are the basic unit of life. ● Discuss how cells come from pre-existing cells. ● Explore how cells come from pre-existing cells. ● Discuss how all living things are made of cells (singular or multi-celled). ● Explore how all living things are made of cells (singular or multi-celled). ● Discuss the history behind the creation of cell theory. ● Explore the history behind the creation of cell theory. ● **SC.6.L.14.4:** Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles. *Previous grade level benchmarks require students to differentiate between living and nonliving things and to compare and contrast the basic needs of living things.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may be confused with the idea of living and nonliving things. They may not understand that dead things are in the “living” category and are therefore made of cells.

Teacher Note:

- Sixth grade students do **not** need to identify names and stages of mitosis and meiosis.

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SC.6.L.14.3: Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● cell ● **homeostasis** ● diffusion ● osmosis ● energy* ● waste ● reproduction* Processes: ● Discuss how cells reproduce. ● Explore how cells reproduce. ● Explore how cells move needed materials (water, oxygen,food) across the cell membrane and waste materials (such as carbon dioxide) back out of the call. ● Discuss diffusion and how it relates to the process osmosis. ● Explore diffusion. ● Discuss permeability of a cell's membrane. ● Explore the concept of permeability. ● **SC.6.L.14.4:** Compare and contrast the structure and function of major organelles of plant and animals cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
1	With help and support, the student can do some of the Level 2 targets.

Teacher Note:

- Sixth grade students do **not** need to identify names and stages of mitosis and meiosis.

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SC.6.L.14.4: Compare and contrast the structure and function of major organelles of plant and animals cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Compare and contrast the structure and function of major organelles of plant and animals cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● cell ● organelle ● cell wall ● cell membrane ● nucleus ● cytoplasm ● chloroplast ● mitochondria ● vacuole Processes: ● Discuss the role of chloroplasts in plant cells. ● Explore the role of chloroplasts in plant cells. ● Discuss the role of the cell wall in plant cells. ● Explore the role of the cell wall in plant cells. ● Discuss the role of mitochondria in cells. ● Explore the role of mitochondria in cells. ● Discuss the role of vacuoles in cells. ● Explore the role of vacuoles in cells. ● Discuss the role of cytoplasm in cells. ● Explore the role of cytoplasm in cells. ● Discuss the role of the nucleus in cells. ● Explore the role of the nucleus in cells. ● Discuss the role of the cell membrane in cells. ● Explore the role of the cell membrane in cells. ● Explore and manipulate multiple models of both animal and plant cells. *Previous grade level benchmarks require students to identify the characteristics of living and non-living things.*
1	With help and support, the student can do some of the Level 2 targets.

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SC.6.L.14.5: Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● system ● digestive system ● respiratory system ● circulatory system ● reproductive system ● excretory system ● immune system ● nervous system ● musculoskeletal system ● **homeostasis** Processes: ● Explore and discuss the organs that make up the immune system and its main function. ● Explore the organs that make up the reproductive system and its main function. ● Explore and discuss the organs that make up the nervous system and its main function. ● Explore and discuss the organs that make up the excretory system and its main function. ● Explore and discuss the organs that make up the musculoskeletal system and its main functions. ● Explore and discuss the organs that make up the circulatory system and its main function. ● Explore and discuss the organs that make up the respiratory system and its main function. ● Explore and discuss the organs that make up the digestive system and its main function. *Previous grade level benchmarks require students to identify the organs in the human body and describe their functions.*
1	With help and support, the student can do some of the Level 2 targets.

Teacher Note:

- Body systems have many functions in maintaining homeostasis. Sixth grade students should be focused on the **most important** function of each body system.

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SC.6.L.14.6: Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites. **(Moderate)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● infectious agent (pathogen) ● virus ● bacteria ● fungi ● parasite Processes: ● Discuss how some bacteria, fungi, and viruses are parasites in the human body. ● Explore the concept of parasites. ● Discuss examples of viruses that are infectious agents in the human body. ● Explore basic characteristics of viruses. ● Discuss examples of fungi that are infectious agents in the human body. ● Explore basic characteristics of fungi. ● Discuss examples of bacteria that are infectious agents in the human body. ● Explore basic characteristics of bacteria.
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may think that all bacteria, fungi, and viruses are dangerous to humans. This is not alway correct. Many forms of bacteria are essential to a human health and many forms of fungi and viruses are harmless to human health. It is important to stress the importance of human safety, while acknowledging the role and importance of these microorganisms.

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SC.6.L.15.1: Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains. **(High)**

4	The student is able to apply the content of this benchmark to an authentic, real-world situation.
3	Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.
2 *Think of the Level 2 process bullets as a ladder of learning. Start at the bottom and climb towards benchmark mastery (Level 3).* 	Key Terms: ● organism* ● classification ● characteristic* ● Linnaean system ● Domain Processes: ● Explore the newest system of Domains, which has been added as an "umbrella" classification of living things, on top of the Linnaean system, based on new, scientific knowledge. ● Discuss the changes (over the years) to the Linnaean system, as new scientific evidence was added. ● Discuss the long-reaching impact and limitations of the Linnaean system. ● Explore and discuss how to re-classify the original group of living things (or models), based on the Linnaean system. ● Discuss how the Linnaean system of classification is based primarily on physiological structure, means of reproduction and means to gain energy. ● Explore how the Linnaean system of classification is based primarily on physiological structure, means of reproduction and means of gaining energy. ● Discuss which characteristics were essential to each group and justify reasoning. ● Explore various ways to group (classify) living things, based on common characteristics. ● Observe a variety of living things and/or models (plastic animals/plants, outside observations, digital images, etc.). *Previous grade level benchmarks require students to classify animals with backbones into groups based on recognized, common characteristics. These groups include mammal, reptiles, fish, amphibians and birds.*
1	With help and support, the student can do some of the Level 2 targets.

Common Misconception:

- Students may think classification (under the Linnaean system) is based on common habits or "superficial" characteristics. For example, a whale and and a tuna are not closely related, in the Linnaean system, even though they share a similar habitat and common structures (such as fins). When more closely examined, whales are air-breathing, warm-blooded mammals and tuna have gills and are cold-blooded fish.

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