# 2019-2020 Science Curriculum Map, Grade 3

## Reading Focus: Literature, Informational Writing Focus: Narrative, Informative/Explanatory, Opinion

## Unifying Concept: Life Science Resource Kit: Structures of Life

### Suggested Duration: 11 weeks

<table>
<thead>
<tr>
<th>Enduring Understanding:</th>
<th>Essential Questions:</th>
<th>Academic Vocabulary:</th>
</tr>
</thead>
</table>
| Plants and animals have identifiable characteristics. | • What is the purpose of a seed?  
• What is the life cycle of a plant?  
• How are the terms vertebrates and invertebrates used to classify animals?  
• How do animals and plants adapt to life in a desert environment?  
• What structures does a crayfish (snail) have and what functions do they serve?  
• What factors need to be considered in order to build a suitable habitat for a crayfish or a snail? | Anaerobic  
Animals  
Atmosphere  
Bacteria  
Body Repair  
Carnivores  
Deposition  
Digested  
Earth Processes  
Ecosystems  
Energy  
Erosion  
Plants  
Sense Receptors  
Stimuli  
Sun  
Weathering |
| Plants and animals have adaptations that help them survive. | | Geosphere  
Growth  
Herbivores  
Hydrosphere  
Instinctive  
Internal Conditions  
Minerals  
Sense Receptors  
Stimuli  
Sun  
Weathering |

## Core Ideas for Knowing Science

L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms.

## Core Ideas for Using Science

U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. A new evidence is discovered, models and theories can be revised.

## Science & Engineering Practices

Develop and Use Models  
Plan and Carry Out Investigations  
Engage in Argument from Evidence

## Crosscutting Concepts

Cause & Effect  
Structure & Function  
Systems & System Models  
Stability & Change  
Energy & Matter

## Standards

2018 AZ Science Standards
Focus: Students develop an understanding of the sources, properties, and characteristics of energy along with the relationship between energy transfer and the living things.

Life Science Standards

3.L2U1.6: Plan and carry out investigations to demonstrate ways plants and animals react to stimuli.

3.L2U1.7: Develop and use system models to describe the flow of energy from the Sun to and among living organisms.

3.L2U1.8: Construct an argument from evidence that organisms are interdependent.

Learning Progressions:

Animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants. Either way, they are “consumers.” Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil for plants to use. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, water, and minerals from the environment and release waste matter (gas, liquid, or solid) back into the environment.

Animals and plants alike generally need to take in air and water, animals must take in food, and plants need light and minerals; anaerobic life, such as bacteria in the gut, functions without air. Food provides animals with the materials they need for body repair and growth and is digested to release the energy they need to maintain body warmth and for motion. Plants acquire their material for growth chiefly from air and water and process matter they have formed to maintain their internal conditions (e.g., at night). Animals need food that they can break down, which comes either directly by eating plants (herbivores) or by eating animals (carnivores), which have eaten plants, or other animals. Animals are ultimately dependent on plants for their survival. The relationships among organisms can be represented as food chains and food webs. Some animals are dependent on plants in other ways as well as for food, for example for shelter and, in the case of human beings, for clothing and fuel. Plants also depend on animals in various ways. For example, many flowering plants depend on insects for pollination and on other animals for dispersing their seeds.

Social Justice Standards
2019-2020 Science Curriculum Map, Grade 3

Identity 4 – I can feel good about my identity without making someone else feel badly about who they are. (ID.3-5.4)

Diversity 8 – I want to know more about other people’s lives and experiences, and I know how to ask questions respectfully and listen carefully and non-judgmentally. (DI.3-5.8)

Justice 11 – I try to get to know people as individuals because I know it is unfair to think all people in a shared identity group are the same. (JU.3-5.11)

Action 17 – I know it’s important for me to stand up for myself and for others, and I know how to get help if I need ideas on how to do this. (AC.3-5.17)

Teaching Tolerance Anti-Bias Framework [https://www.tolerance.org/frameworks](https://www.tolerance.org/frameworks)

Adopted Texts and Materials

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<tbody>
<tr>
<td>Textbook:</td>
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<tr>
<td>• “Structures of Life” materials unit/kit</td>
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<tr>
<td>• Teacher’s manual for “Structures of Life”</td>
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<tr>
<td>• 8 copies of Structures of Life (Science Stories)</td>
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<tr>
<td>• FOSS website: <a href="http://www.fossweb.com">www.fossweb.com</a></td>
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<tr>
<td>Also check your library for the book: A Walk in the Desert, by Rebecca L. Johnson</td>
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</tbody>
</table>

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<tr>
<th>Scholastic Leveled Readers</th>
<th>Multicultural Inclusive Strategies</th>
<th>Science Kit Supp[lemental Resources]</th>
</tr>
</thead>
</table>

Instructional and Assessment Guides

Culturally Responsive Practices ([TUSD SPARKS, SPARKS Strategies](http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies))

Anchor Phenomena: Question: Kangaroo rats live in the Sonoran desert and never drink water! How is this possible? Links: [Kangaroo Rat](http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies)

Pre/Post Unit Assessment [http://intranet/science/Kit_Asmts.html](http://intranet/science/Kit_Asmts.html)

Class Concept Map - Create a Class Concept Map-pre and post with linking phrases to indicate relationships of five senses.

Formative/Performance Assessment - examples:

- Quick writes (e.g. definitions and examples of types of structures and functions of the crayfish)


Additional Resources:

- [TUSD Science Resource Center Website](http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies)
- [Crosscutting Concept Resources](http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies)
- [National Academies Press](http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies)
- [Science and Engineering Practices](http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies)
- [See Resources Tab in Structures of Life Teacher Edition](http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies)
- [Video:](https://www.pbs.org/video/natureworks-adaptation/)
- [Question:](https://www.youtube.com/watch?v=fVfV5LMXh2s) Why do plants/trees have differently shaped seeds? Links: [https://www.youtube.com/watch?v=fVfV5LMXh2s](https://www.youtube.com/watch?v=fVfV5LMXh2s)
2019-2020 Science Curriculum Map, Grade 3

- Conduct research and construct explanations using words, visuals, and data (e.g. How do specific species of plants and animals survive in the desert?)
- Engage in arguments with evidence and reasoning (e.g. write an argument the highlights effects on animals from a human endeavor that changes the environment)
- Develop an argument of the importance of the saguaro cactus in the desert.

[https://www.nps.gov/arch/learn/education/classrooms/upload/FifthGradePlantAdaptations.pdf](https://www.nps.gov/arch/learn/education/classrooms/upload/FifthGradePlantAdaptations.pdf)
### 2019-2020 Science Curriculum Map, Grade 3

<table>
<thead>
<tr>
<th>Reading Focus: Literature, Informational Writing Focus: Narrative, Informative/Explanatory, Opinion</th>
<th>Unifying Concept: Physical Science Resource Kit: Sound and Light (mini-kit)</th>
<th>Suggested Duration: 11 weeks</th>
</tr>
</thead>
</table>
| **Enduring Understanding:** Sound and light have identifiable properties that can be demonstrated. | **Essential Questions:**  
- How is sound made?  
- What are the properties of sound?  
- What are the properties of light? | **Academic Vocabulary:**  
- Absorbed  
- Detect  
- Ears and Eyes  
- Energy  
- High pitch  
- Light  
- Low pitch  
- Magnified  
- Opaque  
- Pitch  
- Transparent  
- Vibrate |  
- Prisms  
- Properties  
- Reflected  
- Sound  
- Sound wave  
- Translucent  
- Vibrate |  

| Core Ideas for Knowing Science: | Core Ideas for Using Science: | Crosscutting Concepts:  
|---|---|---|
| **P2:** Objects can affect other objects at a distance. | **U1:** Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. A new evidence is discovered, models and theories can be revised. | **Patterns**  
**Cause & Effect**  
**Structure & Function**  
**Systems & System Models**  
**Stability & Change**  
**Scale, Proportion, & Quantity**  
**Energy & Matter** |
| **P4:** The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event | |  

#### Standards

**Focus:** Students develop an understanding of the sources, properties, and characteristics of energy along with the relationship between energy transfer and the human body.

**Physical Science Standards**

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**Standards 2018 AZ Science Standards**

**Learning Progressions:**

**Light** is seen because it affects the objects it reaches, including our **eyes**. Sources give out light, which travels from them in various directions and is detected when it reaches and enters our eyes. Objects that are seen either **give out** or **reflect** light that human eyes can **detect**. **Sound** comes from things that **vibrate** and can
3.P2U1.1: Ask questions and investigate the relationship between light, objects and the human eye.

3.P2U1.2: Plan and carry out an investigation to explore how sound waves affect objects at varying distances.

3.P4U1.3: Develop and use a model to describe how light and sound waves transfer energy.

be detected at a distance from the source because the air or other material around is made to vibrate. Sounds are heard when the vibrations in the air enter our ears. An object can be seen when light reflected from its surface enters the eyes; the color people see depends on the color of the available light sources as well as the properties of the surface. Because lenses bend light beams, they can be used, singly or in combination, to provide magnified images of objects too small or too far away to be seen with the naked eye. Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. (Boundary: The discussion at this grade level is qualitative only; it can be based on the fact that two different sounds can pass a location in different directions without getting mixed up.)

The faster a given object is moving, the more energy it possesses. Energy can be moved from place to place by moving objects or through sound or light. (Boundary: At this grade level, no attempt is made to give a precise or complete definition of energy.) Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. Light also transfers energy from place to place. For example, energy radiated from the sun is transferred to Earth by light. When this light is absorbed, it warms Earth’s land, air, and water and facilitates plant growth.

### Social Justice Standards

**Identity 1** – I know and like who I am and can talk about my family and myself and describe our various group identities. (ID.3-5.1)

**Diversity 6** – I like knowing people who are like me and different from me, and I treat each person with respect. (DI.3.5-6)

**Justice 11** – I try to get to know people, as individuals because I know it is unfair to think all people in a shared identity group are the same. (JU.3-5.11)

**Action 16** – I pay attention to how people (including myself) are treated, and I try to treat others how I like to be treated. (AC.3-5.16)

**Teaching Tolerance Anti-Bias Framework:** [https://www.tolerance.org/frameworks](https://www.tolerance.org/frameworks)

### Adopted Texts and Materials


**Textbook:**
- “Sound and Light” materials unit/kit

**Multicultural Books aligned with Unifying Concept:**
-
### Anchor Phenomena:

Question: Why can we sometimes see rainbows in the spray of a garden hose or sprinkler? Why don’t we always see them?

### NGSS Phenomena

How and why to use phenomena.

### Pre/Post Unit Assessment:

[http://curriculum.tusd1.org/Subject-Areas/Science/Science-Grade-3-Curriculum](http://curriculum.tusd1.org/Subject-Areas/Science/Science-Grade-3-Curriculum)

### Class Concept Map:

Pre and post with linking phrases to indicate relationships of concepts and processes.

### Formative/Performance Assessment:

- Quick writes and drawings in notebooks (e.g. details of light moves)
- Use scientific vocabulary and explain the different paths light takes.
- Compare and contrast reflection and refraction of light.
- Compare and contrast high and low pitch sounds.
- Design and create a musical instrument and report the results.
- Teach students to annotate drawings to visually represent their thinking.
- Annotated drawings can be used to demonstrate prior knowledge and then new knowledge gained from the unit.
- Choose one of the three main writing formats (narrative, opinion, informational) and use sound or light as the theme.

### Additional Resources:

- [How the Body Works, Kids Health](#)
- [Physics of Light and Sound for Kids](#)
- [Video: How to Make a Rainbow?](#)
- [Sugar Rainbows, Why Don’t the Colors Mix?](#) (1:55)
- [Why does lightning come before thunder?](#)
- Students may choose their favorite format to demonstrate their knowledge of how sound is made.
- Human Scatterplot – a formative assessment strategy to engage students in thinking about their learning as well as ideas of classmates.
## Reading Focus:
Literature, Informational

## Writing Focus:
Narrative, Informative/Explanatory, Opinion

### Unifying Concept: Life Science
**Resource Kit: Human Body**

### Suggested Duration: 11 weeks

#### Enduring Understanding:
The human body is a system made up of integrated subsystems that coordinates and performs a variety of operations.

#### Essential Questions:
- How do the different functions of the skeletal system work together?
- In what ways are the skeletons of a rodent and a human similar and different?
- How do muscles, tendons, and ligaments attach and work together to make the body move?
- What function do joints perform in helping the body move?
- How does practice affect response time to a visual stimulus?

#### Academic Vocabulary:
- Articulated
- Ball-and-Socket Joint
- Behavior
- Bones
- Cartilage
- Cartilage
- Compensate
- Contract
- Coordination
- External
- Gliding Joint
- Growth
- Hinge Joint
- Immobilize
- Internal
- Joint
- Ligament
- Muscle
- Reproduction
- Skeleton
- Skull
- Survival
- Tendon
- Tissue
- Torso

### Core Ideas for Knowing Science:
L1: Organisms are organized on a cellular basis and have a finite life span.

### Core Ideas for Using Science:
U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products.

U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.

### Science & Engineering Practices:
- Develop and Use Models
- Obtain, Evaluate and Communicate Information

### Crosscutting Concepts:
- Structure & Function
- Systems & System Models
- Stability & Change
- Scale, Proportion, & Quantity

### Standards
2018 AZ Science Standards
Focus: The human body is a system made up of integrated subsystems that coordinates and perform a variety of operations.

Life Science Standards

3.L1U1.5: Develop and use models to explain that plant and animals (including humans) have internal and external structures that serve various functions that aid in growth, survival, behavior and reproduction.

Learning Progressions:
Animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (Boundary: Stress at this grade level focus is on understanding the macroscale systems and their function, not microscopic processes.)

Social Justice Standards

Identity 4 – I can feel good about my identity without making someone else feel badly about who they are. (ID.3-5.4)
Diversity 8 – I want to know more about other people’s lives and experiences, and I know how to ask questions respectfully and listen carefully and non-judgmentally. (D.3.5-8)
Justice 11 – I try to get to know people as individuals because I know it is unfair to think all people in a shared identity group are the same. (JU.3-5.11)
Action 17 – I know it’s important for me to stand up for myself and for others, and I know how to get help if I need ideas on how to do this. (AC.3-5.17)

Teaching Tolerance Anti-Bias Framework  https://www.tolerance.org/frameworks

Adopted Texts and Materials


Textbook:
- “Human Body” materials unit/kit
- Teacher’s manual for “Human Body”
- 8 copies of Human Body (Science Stories)

FOSS website: www.fossweb.com

Scholastic Leveled Readers  Multicultural Inclusive Strategies  Science Kit Supplemental Resources

Instructional and Assessment Guides  Additional Instructional Resources

Culturally Responsive Practices (TUSD SPARKS, SPARKS Strategies)


Educational Materials Center Resources, including books, kits, panels, and videos: http://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies

Additional Resources:
- See Resources Tab in Human Body Teacher Edition
**NGSS Phenomena** How and why to use phenomena.

**Pre/Post Unit Assessment:**
http://intranet/science/Kit_Asmts.html

**Class Concept Map** - pre and post with linking phrases to indicate relationships of concepts and processes

**Formative/Performance Assessment** - examples:
- Quick writes (e.g. definitions and examples of types of hinges found in the human skeletal system)
- Conduct research and construct explanations using words, visuals, and data (e.g. how do other species ‘skeletons compare with humans?)
- Engage in arguments with evidence and reasoning (e.g. write a paragraph to argue that the human body is like or not like a machine)
- Design and conduct a fair test experiment identifying and controlling variables and using safe procedures (Investigation 4, part 4)

**TUSD Science Resource Center Website**
**Crosscutting Concepts**
**National Academies Press**
**Science and Engineering Practices**
https://www.bendbulletin.com/home/1976848-151/humans-are-born-with-nearly-300-bones-but
Ask An Expert http://ciese.org/materials/resources/askanexpert/
FOSS Web 3-6 Modules - Human Body http://www.fossweb.com/
Learning Science Just Got Easier A great site loaded with science information for both teachers and students. http://www.scientcemaster.com/
# 2019-2020 Science Curriculum Map, Grade 3

<table>
<thead>
<tr>
<th>Reading Focus: Literature, Informational Writing Focus: Narrative, Informative/Explanatory, Opinion</th>
<th>Unifying Concept: Earth &amp; Space Science Resource Kit: None/Supplemental Materials</th>
<th>Suggested Duration: 2-3 weeks</th>
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<tbody>
<tr>
<td><strong>Enduring Understanding:</strong>  Earth systems interact with each other. Changes in one earth system affect changes in another.</td>
<td><strong>Essential Questions:</strong>  How do major Earth systems work together? How do major Earth systems contribute to the function of other earth systems?</td>
<td><strong>Academic Vocabulary:</strong>  Atmosphere, Biosphere, Carbon dioxide (CO2), Climate, Earth processes, Ecosystems, Geosphere, Hydrosphere, Landform, Sun, System, Weather</td>
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**Core Ideas for Knowing Science:**

- E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth’s surface and its climate.

**Core Ideas for Using Science:**

- U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. A new evidence is discovered, models and theories can be revised.

**Science & Engineering Practices:**

- Develop and Use Models
- Construct Explanations and Design Solutions

**Crosscutting Concepts:**

- Cause & Effect
- Systems & System Models
- Stability & Change
- Energy & Matter

**Standards**

**2018 AZ Science Standards**

**Focus:** Rapid and slow processes are continuously changing the surface of the earth.

**Earth and Space Science Standards**

- **3.E1U1.4:** Construct an explanation describing how the Sun is the primary source of energy impacting Earth systems.

**Learning Progressions:**

All Earth processes are the result of energy flowing and matter cycling within and among Earth’s systems. This energy originates from the sun and from Earth’s interior. Earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth’s surface materials and processes.

**Social Justice Standards**

- **Identity 1** – I know and like who I am and can talk about my family and myself and describe our various group identities. (ID.3-5.1)
- **Diversity 6** – I like knowing people who are like me and different from me, and I treat each person with respect. (DI.3.5-6)
- **Justice 11** – I try to get to know people, as individuals because I know it is unfair to think all people in a shared identity group are the same. (JU.3-5.11)
### Action 16 – I pay attention to how people (including myself) are treated, and I try to treat others how I like to be treated. (AC.3-5.16)

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<tr>
<td>Textbook:</td>
<td>None – supplemental materials</td>
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<th>Multicultural Inclusive Strategies</th>
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<tbody>
<tr>
<td><img src="scholastic.jpg" alt="Image" /></td>
<td><img src="inclusive.jpg" alt="Image" /></td>
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### Instructional and Assessment Guides

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<tbody>
<tr>
<td><strong>Anchor Phenomena:</strong></td>
<td><strong>Additional Instructional Resources</strong></td>
</tr>
<tr>
<td><strong>Question:</strong> Show a picture of a rock, sky, ocean, and grass. Ask students: What questions could you ask about the relationship between these pictures?</td>
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<td><strong>Pre/Post Unit Assessment:</strong></td>
<td><strong>Additional Resources:</strong></td>
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<tr>
<td><a href="http://curriculum.tusd1.org/Subject-Areas/Science/Science-Grade-3-Curriculum">http://curriculum.tusd1.org/Subject-Areas/Science/Science-Grade-3-Curriculum</a></td>
<td><strong>Lesson Ideas:</strong> <a href="https://betterlesson.com">https://betterlesson.com</a></td>
</tr>
<tr>
<td><strong>Class Concept Map</strong> - pre and post with linking phrases to indicate relationships of concepts and processes</td>
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<td><strong>Formative/Performance Assessment</strong> - examples:</td>
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<tr>
<td>• Quick writes and drawings in notebooks to show how changes in one Earth system affect others.</td>
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<td>• Use scientific vocabulary and explain the how Earth systems interact with one another.</td>
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<td>• Compare and contrast Earth Systems</td>
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<td>• Teach students to annotate drawings to visually represent their thinking.</td>
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<td>• Annotated drawings can be used to demonstrate prior knowledge and then new knowledge gained from the unit.</td>
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<td></td>
<td>Choose one of the three main writing formats (narrative, opinion, informational) and use Earth systems as the theme.</td>
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