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

**Unifying Concept:** Earth & Space Science and Life Science
**Resource Kit:** Water

**Enduring Understanding:**
Water has properties that allow the water cycle to operate within the Earth’s system.

Water is a critical element in all communities.

**Essential Questions:**
- How does water flow?
- How does changing the slope or quantity of water affect the speed at which water flows downhill?
- What happens to water when it is heated? When it is cooled?
- What effect does temperature have on the density of water? On evaporation?
- How does water behave as a liquid? A solid? A gas?
- What is the water cycle?
- What role do plants play in the water cycle?
- How do people get clean water?

**Academic Vocabulary:**
- Atmosphere
- Clouds
- Coastal Erosion
- Condensation
- Conservation
- Density
- Earthquakes
- Floods
- Flow
- Fog
- Freshwater
- Ground Water
- Lakes
- Organization
- Precipitation
- Rain
- Severe Weather
- Slope
- Snow
- Stream
- Transpiration
- Tsunamis
- Vapor
- Volcanic Eruptions

**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.

L4: The unity and diversity of organisms, living and extinct, is the result of evolution.

**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. 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:**
- Ask questions and define problems
- Analyze and interpret data
- Construct explanations and design solutions
- Engage in argument from evidence

**Crosscutting Concepts:**
- Patterns
- Cause & Effect
- Systems & System Models
- Stability & Change
- Energy & Matter
**Standards**

**2018 AZ Science Standards**

**Focus:** Water has properties that allow the water cycle to operate within the Earth’s system. Water is a critical element in all communities.

**Earth & Space Science Standards**

4.E1U3.9: **Construct and support an evidence-based argument** about the availability of water and its impact on life.

4.E1U2.10: **Define problem(s) and design solution(s)** to minimize the effects of natural hazards.

**Life Science Standards**

4.L4U1.11: **Analyze and interpret** environmental data to demonstrate that species either adapt and survive or go extinct over time.

**Learning Progressions:**

Water is found almost everywhere on Earth: as vapor; as fog or clouds in the atmosphere; as rain or snow falling from clouds; as ice, snow, and running water on land and in the ocean; and as groundwater beneath the surface. The downhill movement of water as it flows to the ocean shapes the appearance of the land. Nearly all of Earth’s available water is in the ocean. Most **freshwater** is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. A variety of **hazards** result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions, severe weather, floods, coastal erosion). Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

When the **environment changes** in ways that affect a place’s physical characteristics, **temperature**, or availability of **resources**, some **organisms** **survive** and **reproduce**, others move to new locations, yet others move into the transformed environment, and some die. **Fossils** provide evidence about the types of organisms (both visible and microscopic) that lived long ago and also about the nature of their environments. Fossils can be compared with one another and to living organisms according to their similarities and differences. \(^{(p. 162)}\) Changes in an organism’s **habitat** are sometimes **beneficial** to it and sometimes **harmful**. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

**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 and 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. \((Ac.3-5.116)\)

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

**Adopted Texts and Materials**


**Multicultural Books aligned with Unifying Concept:**

-
2019-2020 Science Curriculum Map, Grade 4

Textbook:
- “Earth Materials” materials unit/kit
- Teacher’s manual for “Earth Materials”
- 8 copies of Earth Materials (Science Stories)
- Water Resources Outreach Program- Water Education Posters
- FOSS Website: www.fossweb.com

<table>
<thead>
<tr>
<th>Scholastic Leveled Readers</th>
<th>Multicultural Inclusive Strategies</th>
<th>Science Kit Supplemental Resources</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Instructional and Assessment Guides</th>
<th>Additional Instructional Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Phenomena:</td>
<td></td>
</tr>
<tr>
<td>Condensation: Why does my cup get wet on the outside? – 1</td>
<td></td>
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<tr>
<td>Condensation: Why does my cup get wet on the outside? – 2</td>
<td></td>
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<tr>
<td>Videos:</td>
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<tr>
<td>What is the Rain shadow effect? - Video 1</td>
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<tr>
<td>What is the Rain shadow effect? - Video 2</td>
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<tr>
<td>NGSS Phenomena How and why to use phenomena.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre/Post Unit Assessment:</th>
<th>Additional Resources:</th>
</tr>
</thead>
<tbody>
<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>See Resources Tab in Water Teacher Edition</td>
</tr>
<tr>
<td>Concept Map - pre and post with linking phrases to indicate relationships of concepts and processes</td>
<td>TUSD Science Resource Center Website</td>
</tr>
<tr>
<td>Formative/Performance Assessment – examples:</td>
<td>Crosscutting Concepts</td>
</tr>
<tr>
<td>- Quick writes and drawings in notebooks (e.g., a data table to show how calcite was detected in rocks.)</td>
<td>National Academies Press</td>
</tr>
<tr>
<td>- Draw and label a diagram of mock rock ingredients with water in vials, using scientific vocabulary.</td>
<td>Science and Engineering Practices</td>
</tr>
<tr>
<td></td>
<td>The Rock Cycle</td>
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<td>The Rock Cycle</td>
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<tr>
<td></td>
<td>Rocks and Minerals</td>
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<td>Bill Nye Volcanoes Video</td>
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<td>Kids Discover</td>
</tr>
</tbody>
</table>
- Engage in arguments with evidence and reasoning
## Reading Focus: Literature, Informational
Writing Focus: Narrative, Informative/Explanatory, Opinion

### Unifying Concept: Physical Science
Resource Kit: Electric Circuits

<table>
<thead>
<tr>
<th>Enduring Understanding:</th>
<th>Essential Questions:</th>
<th>Academic Vocabulary:</th>
</tr>
</thead>
</table>
| Electricity is a technological tool that provides energy to objects and has certain properties. | • What are properties of electricity?  
• What characteristics make an item an insulator or a conductor? What are examples of each type?  
• How are circuits built and how do they work?  
• How do open circuits, closed circuits and parallel circuits compare and differ?  
• How do engineers develop and build electric circuits?  
• How is electricity used to create a magnet? | Bulb Socket  
Circuit  
Closed circuit  
Concentrate energy  
Conductors  
Dam  
Diode  
Electric current  
Electricity  
Electricity flow  
Electromagnet  
Energy  
Filament  
Heat  
 Illuminate  
Insulators  
Light  
Magnetism  
Open circuit  
Parallel circuit  
Radiated  
Series circuit  
Switch  
Transferred  
Troubleshooting  
Turbine generator |

### Core Ideas for Knowing Science:

<table>
<thead>
<tr>
<th>P2: Objects can affect other objects at a distance.</th>
<th>Core Ideas for Using Science:</th>
</tr>
</thead>
</table>
| 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. | 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.  
U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications. |

### Science & Engineering Practices:

| Develop and Use Models  
Engage in Argument from Evidence | Cause & Effect  
Systems & System Models  
Energy & Matter |

### Crosscutting Concepts:

2018 AZ Science Standards

**Focus:** Electricity is a technological tool that provides energy to objects and has certain properties.
Physical Science Standards

4.P4U1.2: **Develop and use a model** that explains how energy is moved from place to place through electric currents.

4.P4U1.1: **Develop and use a model** to demonstrate how a system transfers energy from one object to another even when the objects are not touching.

4.P2U1.3: **Develop and use a model** to demonstrate magnetic forces.

4.P4U3.4: **Engage in argument from evidence** on the use and impact of renewable and nonrenewable resources to generate electricity.

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. Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy (e.g., moving water driving a spinning turbine which generates electric currents). 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.) 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. The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use—for example, the stored energy of water behind a dam is released so that it flows downhill and drives a turbine generator to produce electricity. Food and fuel also release energy when they are digested or burned. When machines or animals “use” energy (e.g., to move around), most often the energy is transferred to heat the surrounding environment. The energy released by burning fuel or digesting food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (Boundary: The fact that plants capture energy from sunlight is introduced at this grade level, but details of photosynthesis are not.) It is important to be able to concentrate energy so that it is available for use where and when it is needed. For example, batteries are physically transportable energy storage devices, whereas electricity generated by power plants is transferred from place to place through distribution systems.

Social Justice Standards

**Identity 4** – I can feel good about my identity without making someone else feel badly about who they are.

**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.

**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.

**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.
### 2019-2020 Science Curriculum Map, Grade 4

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

**Adopted Texts and Materials**

|---------------------------------|------------------------------------------------------------------------------------------------------------------|

**Textbook:**
- “Electric Circuits” materials unit/kit
- Teacher’s manual for “Electric Circuits”
- 8 copies of Electric Circuits (Science Stories)
- FOSS website: [www.fossweb.com](http://www.fossweb.com)

**Multicultural Books aligned with Unifying Concept:**
- Blackout (2011) (IL:K-3  RL:1.4)

<table>
<thead>
<tr>
<th>Scholastic Leveled Readers</th>
<th>Multicultural Inclusive Strategies</th>
<th>Science Kit Supplemental Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="lightbulb.png" alt="Icon" /></td>
<td><img src="lightning-bolt.png" alt="Icon" /></td>
<td><img src="cable.png" alt="Icon" /></td>
</tr>
</tbody>
</table>

**Instructional and Assessment Guides**

**Culturally Responsive Practices** ([TUSD SPARKS, SPARKS Strategies](#))

**Anchor Phenomena:**
- Phenomena Electrical Circuits
- Electrical Circuits Video

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

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

**Formative/Performance Assessment**
- Conduct research and construct explanations using words, visuals and data (e.g. What are different electrical sources and how do they compare?) Engage in arguments with evidence and reasoning (e.g. is solar energy better than coal produced electricity?)
- Use data from electrical energy usage (in your home, at school’s solar project, wind farm example) and compare/contrast the efficiency of each source.

**Additional Instructional Resources**

- [TUSD Science Resource Center Website](#)
- Crosscutting Concept Resources
- [National Academies Press](#)
- Science and Engineering Practices
- [Understanding & Applying Science & Engineering Practices](#)
- [Electricity for Kids Website](#)
- Introduction to Electricity for Kids Video
- See Resources Tab in Electric Circuits Teacher Edition
## Reading Focus: Literature, Informational

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

### Unifying Concept: Earth & Space Science

#### Resource Kit: The Changing Earth

<table>
<thead>
<tr>
<th>Enduring Understanding:</th>
<th>Essential Questions:</th>
<th>Academic Vocabulary:</th>
</tr>
</thead>
</table>
| Rapid and slow processes are continuously changing the surface of the earth. | - How does weather affect earth materials?  
- Why do scientists use stream models to study effects of erosion?  
- How do engineers use scientific knowledge about downhill movement to solve problems?  
- How are fast changes in the Earth’s surface related to the very slow changes on Earth’s surface?  
- How does the surface of the earth affect how water flows?  
- In what ways do humans change the surface of the Earth? | Atmosphere  
Biosphere  
Chemical Weathering  
Deposition  
Earth Materials  
Earthquakes  
Erode  
Erosion  
Fast Land Changes  
Floodplain  
Geosphere  
Gravity  
Hydrosphere  
Landforms  
Ocean  
Physical Weathering  
Plate Tectonics  
Rainfall  
Recycle  
Reduce  
Reuse  
Rock Formations  
Slow Land Changes  
Weathering |

### 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  
- Plan and Carry Out Investigations  
- Analyze and Interpret Data  
- Construct Explanations and Design Solutions

### Crosscutting Concepts:

- Patterns  
- 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 & Space Science Standards:**

  - **4.E1U1.5 Use models** to explain seismic waves and their effect on the Earth.

- **Learning Progressions:**

  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. The **ocean** supports a
4.E1U1.6: Plan and carry out an investigation to explore and explain the interactions between Earth’s major systems and the impact on Earth’s surface materials and processes.

4.E1U1.7: Develop and/or revise a model using various rock types, fossil location, and landforms to show evidence that Earth’s surface has changed over time.

variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. Rainfall helps shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. Human activities affect Earth’s systems and their interactions at its surface. Earth has changed over time. Understanding how landforms develop, are weathered (broken down into smaller pieces), and erode (get transported elsewhere) can help infer the history of the current landscape. Local, regional, and global patterns of rock formations reveal changes over time due to Earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.

### 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. (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


Textbook:
- “Changing Earth” materials unit/kit
- Teacher’s manual for “Changing Earth”
- 8 copies of Changing Earth (Science Stories)
- FOSS website: [www.fossweb.com](http://www.fossweb.com)

**Multicultural Books aligned with Unifying Concept:**
- Window (1991) (IL: K–5)

### Additional Resources

- Scholastic Leveled Readers
- Multicultural Inclusive Strategies
- Science Kit Supplemental Resources

### Instructional and Assessment Guides

Office of Curriculum, Instruction, and Professional Development
### Culturally Responsive Practices (TUSD SPARKS, SPARKS Strategies)

#### Anchor Phenomena:
**Forces that Change the Earth**

**NGSS Phenomena** How and why to use phenomena.

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

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

#### Formative/Performance Assessment – examples:
- Quick writes (e.g. compare and contrast how sand moves under different wind speeds)
- Conduct research and construct explanations using words, visuals, and data (e.g. How rocks and minerals are related and their relationship to weathering and erosion)
- Engage in arguments with evidence and reasoning (e.g. are the outcomes of the Glen Canyon Dam good, bad, or neutral?)
- Use observational data from stream tables to construct an explanation of how moving water affects the surface of the Earth.

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### Educational Materials Center Resources, including books, kits, panels, and videos:

#### Additional Resources:
- See *Resources* Tab in Changing Earth Teacher Edition
- **TUSD Science Resource Center Website**
- **Crosscutting Concepts**
- **National Academies Press**
- **Science and Engineering Practices**
- **Learning Progressions for K – 5 Science**
- **Understanding & Applying Science & Engineering Practices**
- **Geology for Kids Website**
- **Weathering and Erosion for Kids Video**
- **Slot canyons**
- **Cave Formations - 1**
- **Cave Formations - 2**
- **Power of Water**
- **3 Little Pigs: Volcanoes, Landslides, Faults**
- **Earthquakes for Kids**
- **Weather Wiz Kids: Earthquakes**
### 2019-2020 Science Curriculum Map, Grade 4

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

#### Unifying Concept: Earth & Space Science
Resource Kit: Weather (mini-kit)

<table>
<thead>
<tr>
<th>Suggested Duration: 2-3 Weeks</th>
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</table>

#### Enduring Understanding:
Weather is observed and studied to help people in their daily lives.

#### Essential Questions:
- How do scientists measure weather?
- Why do meteorologists study weather patterns?
- How does weather vary across Arizona? Across the United States? Across the world?
- How do climate and weather differ?

#### Academic Vocabulary:
- Altitude
- Anemometer
- Atmosphere
- Barometer
- Cardinal Direction
- Climate
- Clouds
- Cold Front
- Elevation
- Fog
- Forecasting
- Hygrometer
- Latitude
- Meteorology
- Precipitation
- Rain
- Rain Gauge
- Snow
- Stationary Front
- Temperature
- Thermometer
- Vapor
- Warm Front
- Weather
- Weather Station
- Wind Vane

#### 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:
- Analyze and Interpret Data
- Obtain, Evaluate and Communicate Information

#### Crosscutting Concepts:
- Cause & Effect
- Systems & System Models
- Stability & Change
- Energy & Matter

#### Standards
**2018 AZ Science Standards**

#### Focus:
Weather is observed and studied to help people in their daily lives.

#### Learning Progressions:
*Weather* is the minute-by-minute to day-by-day variation of the atmosphere’s condition on a local scale. Scientists record the patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. *Climate* describes the ranges of an area’s typical...
### Social Justice Standards

| Identity 4 | I can feel good about my identity without making someone else feel badly about who they are. |
| 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. |
| 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. |
| 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. |

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

### Adopted Texts and Materials


**Textbook:**
- “Weather” materials mini-kit
- Teacher’s manual for “Weather”
- Weather Forecasting Delta Readers
- FOSS website: [www.fossweb.com](http://www.fossweb.com)

**Scholastic Leveled Readers**

**Multicultural Inclusive Strategies**

**Science Kit Supplemental Resources**

### Instructional and Assessment Guides

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

**Anchor Phenomena:**
- Mega Haboob, July 2018 Utah, Heavy Debris
- Arizona

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

**Additional Instructional Resources**


**Additional Resources:**
- See Resources Tab in Structures of Life Teacher Edition
- [TUSD Science Resource Center Website](https://www.tusd1.org/Departments/Educational-Materials-Center/Bibliographies/General-Bibliographies)
- Crosscutting Concepts
- National Academies Press
**Concept Map** - pre and post with linking phrases to indicate relationships of concepts and processes

**Formative/Performance Assessment** - examples:
- Quick writes and drawings in science journals.
- Observe trends and patterns in the weather they recorded over the weeks

<table>
<thead>
<tr>
<th>Concept Map - pre and post with linking phrases to indicate relationships of concepts and processes</th>
<th>Formative/Performance Assessment - examples:</th>
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</table>
| | • **Science and Engineering Practices**
| | • **Understanding & Applying Science & Engineering Practices**
| | • **Weather For Kids Website**