

# Odyssey Science Content Map – DRAFT March, 2015

<b>Grade level: K</b>	<b>Standards Domain/Topic:</b> Life Science/Animal Classification
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
<ol style="list-style-type: none"> <li>1. What do living things have in common?</li> <li>2. What characteristics are useful for sorting and classifying organisms?</li> <li>3. How do the needs of plants and animals differ?</li> <li>4. What helps a specific plant or animal survive?</li> <li>5. In what ways do offspring resemble their parents?</li> </ol>	
<b>Case Studies</b>	
<p><b>Possible narrowed topics:</b> Insects</p> <p><b>Possible case studies:</b></p> <ul style="list-style-type: none"> <li>● Bess bugs</li> <li>● Ants</li> </ul>	<p><b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u> K Life Science 1: Organisms can be described and sorted by their physical characteristics K Earth Science 1: The sun provides heat and light to Earth</p> <p><u>Standards from other grade levels to be assessed:</u> 1<sup>st</sup> Life Science 1: Offspring have characteristics that are similar to but not exactly like their parents' characteristics 1<sup>st</sup> Life Science 2: An organism is a living thing that has physical characteristics to help it survive</p>
<p><b>Specific Content:</b> Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b></p> <p><u>Structure and Function</u> 1. The physical characteristics of an organism directly impact its survival.</p> <p><u>Interdependence</u> 1. Organisms depend on one another and on their environment.</p> <p><u>Constancy and Change</u> 1. Organisms have predictable patterns of change in growth and development.</p>

<b>Grade level: 1</b>	<b>Standards Domain/Topic:</b> Life Science and Earth Systems Science/Plant life cycles, rock cycle
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
<ol style="list-style-type: none"> <li>1. What are the basic needs of plants?</li> <li>2. How do living things depend on their environment?</li> <li>3. How does weather affect living things?</li> <li>4. Where does food come from?</li> </ol>	
<b>Case Studies</b>	
<p><b>Possible narrowed topics:</b> From Farm to Table</p> <p><b>Possible case studies:</b></p> <ul style="list-style-type: none"> <li>● Seasons: When we plant outdoors</li> <li>● Life cycle of rocks: Soil</li> <li>● Life cycle of plants: Pumpkins or carrots or...</li> </ul>	<p><b>Colorado State Standards:</b></p> <p><u>Grade Level Standards assessed:</u></p> <p>2<sup>nd</sup> Life Science 2: Each <b>plant</b> or animal has different structures or behaviors that serve different functions</p> <p>2<sup>nd</sup> Earth Systems Science 1: Weather and the changing seasons impact the environment and organisms such as humans, plants, and other animals</p> <p>3<sup>rd</sup> Life Science 1: The duration and timing of life cycle events such as reproduction and longevity vary across organisms and species</p> <p>3<sup>rd</sup> Earth Systems Science 1: Earth’s materials can be broken down and/or combined into different materials such as rocks, minerals, rock cycle, formation of soil, and sand – some of which are usable resources for human activity</p> <p><u>Standards from other grade levels to be assessed:</u></p> <p>1<sup>st</sup> Earth Systems Science 1: Earth’s materials can be compared and classified based on their properties</p> <p><u>Standards to be Assessed Outside the Curriculum:</u></p> <p>K Physical Science 2: Objects can be sorted by physical properties, which can be observed and measured</p>
<p><b>Specific Content:</b> Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b></p> <p><u>Structure and Function</u></p> <p>3. Organisms need energy to survive.</p> <p><u>Constancy and Change</u></p> <p>1. Organisms have predictable patterns of change in growth and development</p> <p>3. Forces of nature continuously change the Earth.</p>

<b>Grade level: 2-3, Year A (2011-2012)</b>	<b>Standards Domain/Topic:</b> Physical Science/Movement
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
<ol style="list-style-type: none"> <li>1. What can change how fast or slow an object travels?</li> <li>2. What indicates which objects will be easier or harder to move?</li> </ol>	
<b>Case Studies</b>	
<p><b>Possible narrowed topics:</b> Tools for Disabilities Bikes?</p> <p><b>Possible case studies:</b></p> <ul style="list-style-type: none"> <li>• Simple Machines</li> <li>• Simple machines in prosthetics &amp; other tools</li> </ul>	<p><b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u> 2<sup>nd</sup> Physical Science 1: Changes in speed or direction of motion are caused by forces such as pushes and pulls</p> <p><u>Standards from other grade levels to be assessed:</u> K Physical Science 1: Objects can move in a variety of ways that can be described by speed and direction</p>
<p><b>Specific Content:</b> Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b> <u>Models</u> 1. Models can be used to represent observable science phenomenon. 2. Models involving hypothesized relationships and process can be used to find, articulate, and test theories. <u>Constancy and Change</u> 2. New technologies can cause change, and change can lead to new technologies. (Perhaps – if a project involves designing or advocating for a tool for a disability)</p>
<p><b>Grade level Colorado state standards assessed <i>outside</i> of the expedition:</b> 1<sup>st</sup> Physical Science 1: Solids and liquids have unique properties that distinguish them 3<sup>rd</sup> Physical 1: Matter exists in different states such as solids, liquids, and gases and can change from one state to another by heating and cooling</p>	

<b>Grade level: 2/3</b> <b>Year B (2012-2013)</b>	<b>Standards Domain/Topic:</b> Life Science/Prehistoric Life
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
1. What patterns do we notice in the fossil record? 2. What can these patterns tell us about current animals?	
<b>Case Studies</b>	
<b>Possible narrowed topics:</b> Extinction: Dinos to Prairie Dogs Dinos to Choice Animal  <b>Possible case studies:</b> <ul style="list-style-type: none"> <li>● Extinction: Dinosaur Fossil Analysis</li> <li>● Structure &amp; Function of specific parts.</li> <li>● Animal study: Structure &amp; Function &amp; Edangerment</li> <li>● Choice Animal study: Threatened &amp; Endangered Species</li> </ul>	<b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u>  <u>Standards from other grade levels to be assessed:</u> 4 <sup>th</sup> Life 1: All living things share similar characteristics, but they also have differences that can be described and classified 4 <sup>th</sup> Life 2: Comparing fossils to each other or to living organisms reveals features of prehistoric environments and provides information about organisms today
<b>Specific Content:</b> Documented by teachers on expedition planners	<b>Big Ideas:</b> <u>Structure &amp; Function:</u> 2: When an environment changes, an organism must adapt, move or die. <u>Models</u> 3: Models involving hypothesized relationships and process can be used to find, articulate and test theories.

<b>Grade level: 4-5</b> <b>Year A – (2011-12)</b>	<b>Standards Domain/Topic:</b> Physical Science / Mixtures and Energy
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
1. What types of energy sources exist on Earth? 2. How are those energy sources created? 3. Are there some forms of energy that are better than others?	
<b>Case Studies</b>	
<b>Possible narrowed topics:</b> <ul style="list-style-type: none"> <li>• Alternative energy sources (wind, solar, coal-fire)</li> </ul> <b>Possible case studies:</b> <ul style="list-style-type: none"> <li>• Electricity</li> <li>• Comparing solar &amp; wind energy.</li> <li>• Comparison of how a family here gets clean water, electricity, other energy in their home vs. a family in an African country</li> </ul>	<b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u> <ul style="list-style-type: none"> <li>• 4<sup>th</sup> Physical 1: Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical</li> <li>• 5<sup>th</sup> Earth 1: Earth and sun provide a diversity of renewable and nonrenewable resources</li> <li>• 5<sup>th</sup> Earth 3: Weather conditions change because of the uneven heating of Earth’s surface by the Sun’s energy. <b>Weather</b> changes are measured by differences in temperature, air pressure, wind and water in the atmosphere and type of precipitation.</li> </ul>
<b>Specific Content:</b> Documented by teachers on expedition planners	<b>Big Ideas:</b> <u>Systems</u> 1. A system consists of related objects that form a whole. 2. A change in one part of a system can change the whole system. <u>Constancy and Change</u> 4. Energy can change forms but cannot be created or destroyed.
	<b>Standards Assessed Outside the Expedition:</b> <ul style="list-style-type: none"> <li>• 5<sup>th</sup> Physical 1: Mixtures of matter can be separated regardless of how they were created; all weight and mass of the mixture are the same as the sum of weight and mass of its parts</li> <li>• 6<sup>th</sup> Physical 4: Distinguish among, explain and apply the relationships among mass, weight, volume and density</li> </ul>

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<b>Grade level: 4-5 Year B – (2012-13)</b>	<b>Standards Domain/Topic:</b> Life Science & Earth Science /Human Body; Earth, Atmosphere and Weather
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
1. How do changes on Earth’s surface impact humans? 2. Why does the weather change from day to day? 3. How does Earth compare to other objects orbiting the Sun? 4. How do we study the solar system?	
<b>Case Studies</b>	
<p><b>Possible narrowed topics:</b> Life on Earth, Life on Mars</p> <p><b>Possible case studies:</b></p> <ul style="list-style-type: none"> <li>• Cardiovascular System</li> <li>• Earth’s Atmosphere</li> <li>• Comparison of Atmosphere’s in the Solar System</li> <li>• Position Statement to NASA – Should we continue to explore?</li> </ul>	<p><b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u></p> <ul style="list-style-type: none"> <li>• 5<sup>th</sup> Life 1: All organisms have structures and systems with separate function</li> <li>• 5<sup>th</sup> Life 2: Human body systems have basic structures, functions and needs</li> <li>• 4<sup>th</sup> Life 3: There is interaction and interdependence between and among living and nonliving components of systems</li> <li>• 5<sup>th</sup> Earth 2: Earth’s surface changes constantly through a variety of processes and forces</li> <li>• 4<sup>th</sup> Earth 1: Earth is part of the solar system, which includes the Sun, Moon, and other bodies that orbit the Sun in predictable patterns that lead to observable paths of objects in the sky as seen from Earth.</li> </ul>
<p><b>Specific Content:</b> Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b></p> <p><u>Structure and Function</u> 2. When an environment changes, an organism must adapt, move, or die.</p> <p><u>Models</u> 2. Models can be used to test theories of science phenomenon that are not directly observable.</p> <p><u>Scale</u> 1. Some things are so immense or minute that they are difficult to measure or understand.</p>





<b>Grade level: 6</b>	<b>Standards Domain/Topic:</b> Life Science/Ecosystem Study
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
<ol style="list-style-type: none"> <li>1. What do organisms depend on for their survival?</li> <li>2. What happens when they don't survive?</li> <li>3. How do humans impact the survival of organisms?</li> </ol>	
<b>Case Studies</b>	
<p><b>Possible narrowed topics:</b></p> <ul style="list-style-type: none"> <li>• Platte River Study</li> <li>• Endangered Species (not prairie dog)</li> </ul> <p><b>Possible case studies for Platte River:</b></p> <ul style="list-style-type: none"> <li>• Ecosystem Mapping</li> <li>• Controlling various environmental factors to see how that impacts macroinvertebrates.</li> <li>• Looking at how one human input impacts macroinvertebrates</li> </ul>	<p><b>Colorado State Standards:</b></p> <p><u>Grade Level Standards assessed:</u></p> <p>6<sup>th</sup> Life 1: Changes in environmental conditions can affect the survival of individual organisms, populations, and entire species</p> <p>6<sup>th</sup> Life 2: Organisms interact with each other and their environment in various ways that create a flow of energy and cycling of matter in an ecosystem</p> <p>6<sup>th</sup> Earth 2: Water on Earth is distributed and circulated through oceans, glaciers, rivers, ground water, and the atmosphere</p> <p>8<sup>th</sup> Life 1: Human activities can deliberately or inadvertently alter ecosystems and their resiliency</p> <p>4<sup>th</sup> Life 1: All living things share similar characteristics, but they also have differences that can be described and classified.</p> <p>4<sup>th</sup> Life 2: There is interaction and interdependence between and among living and nonliving components of systems</p>
<p><b>Specific Content:</b></p> <p>Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b></p> <p><u>Interdependence</u></p> <p>1: Organisms depend on one another and on their environment.</p> <p><u>System</u></p> <p>2: A change in one part of a system can change the whole system.</p>

<b>Grade level: 7/8</b> <b>Year A-1 (2011-12)</b>	<b>Standards Domain/Topic:</b> Physical and Earth Science/Engines, Energy and Oil
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
<ol style="list-style-type: none"> <li>1. How do we store and use energy for transportation?</li> </ol>	

<p>2. How can we improve our use of energy for transportation?</p> <p>3. How can we impact the use of energy for transportation?</p>	
<p><b>Case Studies</b></p>	
<p><b>Possible narrowed topics:</b></p> <ul style="list-style-type: none"> <li>● Sustainability and efficiency of engines</li> </ul> <p><b>Possible case studies:</b></p> <ul style="list-style-type: none"> <li>● Engine efficiency</li> <li>● Oil Sustainability</li> <li>● Combustion Reaction</li> </ul>	<p><b>Colorado State Standards:</b></p> <p><u>Grade Level Standards assessed:</u></p> <p>8<sup>th</sup> Physical 2: There are different forms of energy, and those forms of energy can be changed from one form to another – but total energy is conserved</p> <p>8<sup>th</sup> Physical 3: Distinguish between physical and chemical changes, noting that mass is conserved during any change</p> <p>7<sup>th</sup> Physical 1: Mixtures of substances can be separated based on their properties such as solubility, boiling points, magnetic properties, and densities</p> <p>6<sup>th</sup> Physical 1: All matter is made of atoms, which are far too small to see directly through a light microscope. Elements have unique atoms and thus, unique properties. Atoms themselves are made of even smaller particles</p> <p>6<sup>th</sup> Physical: Atoms may stick together in well-defined molecules or be packed together in large arrangements. Different arrangements of atoms into groups compose all substances.</p> <p>6<sup>th</sup> Physical: The physical characteristics and changes of solid, liquid, and gas states can be explained using the particulate model</p> <p>6<sup>th</sup> Earth: Earth’s natural resources provide the foundation for human society’s physical needs. Many natural resources are nonrenewable on human timescales, while others can be renewed or recycled</p>
<p><b>Specific Content:</b></p> <p>Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b></p> <p><u>Systems</u></p> <p>1: A system consists of related objects that form a whole.</p> <p>2: A change in one part of a system can change the whole system.</p> <p><u>Models</u></p> <p>2: Models can be used to test theories of science phenomenon that are not directly observable.</p> <p><u>Constancy and Change</u></p> <p>4. Energy can change forms but cannot be destroyed.</p>
<p><b>Grade level Colorado State standards assessed <i>outside</i> of the expedition:</b></p> <p>8<sup>th</sup> Physical 1. Identify and calculate the direction and magnitude of forces that act on an object, and explain the results in the object’s change of motion</p>	

<b>Grade level: 7/8 Year A-2 (2011-12)</b>		<b>Standards Domain/Topic: Earth Science/Climate</b>
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>		
<ol style="list-style-type: none"> <li>1. What different theories exist about climate change?</li> <li>2. How can data be used to inform and strengthen my ideas about climate change?</li> <li>3. Why is data sometimes misinterpreted?</li> </ol>		
<b>Case Studies</b>		
<p><b>Possible narrowed topics:</b> Global Climate Change</p> <p><b>Possible case studies for plant sorting:</b></p> <ul style="list-style-type: none"> <li>● Carbon Cycle</li> <li>● Climate vs. Weather</li> <li>● Earth’s Atmosphere vs. Other Planets’</li> <li>● Photosynthesis</li> </ul>	<p><b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u>  8<sup>th</sup> Life 1: Human activities can deliberately or inadvertently alter ecosystems and their resiliency.  8<sup>th</sup> Earth 1: Weather is a result of complex interactions of Earth's atmosphere, land and water, that are driven by energy from the sun, and can be predicted and described through complex models.  8<sup>th</sup> Earth 2: Earth has a variety of climates defined by average temperature, precipitation, humidity, air pressure, and wind that have changed over time in a particular location  8<sup>th</sup> Earth 3: The solar system is comprised of various objects that orbit the Sun and are classified based on their characteristics  7<sup>th</sup> Life 4: Photosynthesis and cellular respiration are important processes by which energy is acquired and utilized by organisms</p>	
<p><b>Specific Content:</b> Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b>  <u>Constancy and Change</u>  2. New technologies can cause change and change can lead to new technologies.  <u>Models</u>  3. Models involving hypothesized relationships and process can be used to find, articulate, and test theories.  <u>Scale</u>  1: Some things are so immense or minute that they are difficult to measure and understand.  2: The ways in which things work my change with changes to scale.</p>	

<b>Grade level: 7/8 Year B-1 (2012-13)</b>		<b>Standards Domain/Topic: Life Science/Feast or Famine?</b>
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>		
<ol style="list-style-type: none"> <li>1. How does food become energy?</li> <li>2. How can food impact my health?</li> <li>3. How can I act to positive impact my own health?</li> <li>4. How can I act to impact the health of my community?</li> </ol>		
<b>Case Studies</b>		
<p><b>Possible narrowed topics:</b> Healthy Human Body Digestion</p> <p><b>Possible case studies:</b></p> <ul style="list-style-type: none"> <li>• Digestive System</li> <li>• Carbs, Fats &amp; Proteins</li> <li>• Cellular Respiration</li> </ul>	<p><b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u> 7<sup>th</sup> Life Science 2: The human body is composed of atoms, molecules, cells, tissues, organs, and organ systems that have specific functions and interactions 7<sup>th</sup> Life Science 3: Cells are the smallest unit of life that can function independently and perform all the necessary functions of life 7<sup>th</sup> Life Science 4: Photosynthesis and cellular respiration are important processes by which energy is acquired and utilized by organisms</p>	
<p><b>Specific Content:</b> Documented by teachers on expedition planners</p>	<p><b>Big Ideas:</b> <u>Systems</u> 1: A system consists of related objects that form a whole. 2: A change in one part of a system can change the whole system. <u>Models</u> 1. Models can be used to represent observable science phenomenon.</p>	

<b>Grade level: 7/8</b> <b>Year B-2 (2012-13)</b>	<b>Standards Domain/Topic:</b> Life & Earth Science/Genetics & Evolution
<b>Starting Points for Guiding Questions (based on the Colorado State Standards)</b>	
1. What evidence supports the theory of evolution? 2. How do organisms evolve? 3. Should evolution be taught in schools?	
<b>Case Studies</b>	
<b>Possible narrowed topics:</b> Human Genome Project Cloning Stem-cell science  <b>Possible case studies for plant sorting:</b>	<b>Colorado State Standards:</b> <u>Grade Level Standards assessed:</u> 8 <sup>th</sup> – Life 2: Organisms reproduce and transmit genetic information (genes) to offspring, which influences individuals’ traits in the next generation 7 <sup>th</sup> – Life 1: Individual organisms with certain traits are more likely than others to survive and have offspring in a specific environment 7 <sup>th</sup> Life 5: Multiple lines of evidence show the evolution of organisms over geologic time 7 <sup>th</sup> Earth 2: Geologic time, history, and changing life forms are indicated by fossils and successive sedimentation, folding, faulting, and uplifting of layers of sedimentary rock
<b>Specific Content:</b> Documented by teachers on expedition planners	<b>Big Ideas:</b> <u>Structure and Function</u> 1: The physical characteristics of an organism directly impact its survival. 2: When an environment changes, an organism must adapt, move or die. <u>Models</u> 2: Models can be used to test theories of science phenomenon that are not directly observable.
<b>Grade level Colorado State standards assessed <i>outside</i> of the expedition:</b> 7 <sup>th</sup> Earth 1: Major geologic events such as earthquakes, volcanic eruptions, mid- ocean ridges, and mountain formation are associated with plate boundaries and attributed to plate motions.	