

## Arizona Grade 4-5 Science

- |   |                               |  |   |
|---|-------------------------------|--|---|
| 1 | Science as Inquiry            |  | <b>1 Identify a question, formulate a hypothesis, control and manipulate variables, devise experiments, predict outcomes, compare and analyze results, and defend conclusions</b><br><i>Interprets text and diagrams to plan a fair experiment that tests how different soil types can effect the growth of a plant.<br/>Students state whether an experiment tests a hypothesis.<br/>Students analyze experimental data to identify if the hypothesis is disproved or supported.</i>   |
|   |                               |  | <b>2 Create a model (e.g., a computer simulation, a stream table) to predict change</b><br><i>Interprets electrical diagrams to predict the behaviour of electrical components connected in series.<br/>Uses a model of the Earth to identify the changes in time between different time zones.<br/>Students identify how populations can be affected by changes in a food chain.<br/>Uses a shadow trainer to find out why shadows change shape during the day.</i>  |
|   |                               |  | <b>3 Organize and present data gathered from their own experiences, using appropriate mathematical analyses and graphical representations</b><br><i>Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.<br/>Students reorder data into logical sequences to identify patterns in results.<br/>Uses graphs to plot the change of temperature over periods of time.<br/>Students analyze experimental data to identify if the hypothesis is disproved or supported.<br/>Constructs a windlass to observe that a gear will increase the amount of lift for each turn of its handle.<br/>Compares the heat loss in different materials using graphs.<br/>Discovers that the stretch of spring is proportional to the weight placed on it.</i> |
|   |                               |  | <b>4 Identify and refine questions from previous investigations</b><br><i>N/A</i>   |
|   |                               |  | <b>5 Analyze the processes, parts and subsystems of a bicycle, a clock or other mechanical or electrical device</b><br><i>Constructs a pendulum to observe the relationship between pendulum weight and length with its swing time.<br/>Observes the effect of changing the length of a pendulum on the time of its swing.<br/>Observes the effect of the changing the weight of a pendulum on the time of its swing.</i>   |
|   |                               |  | <b>6 Analyze scientific reports from magazines, television or other media</b><br><i>N/A</i>   |
| 2 | History and Nature of Science |  | <b>1 Identify major milestones in science that have revolutionized the thinking of the time</b><br><i>N/A</i>   |
|   |                               |  | <b>2 Describe how science and technology are interrelated</b><br><i>N/A</i>   |



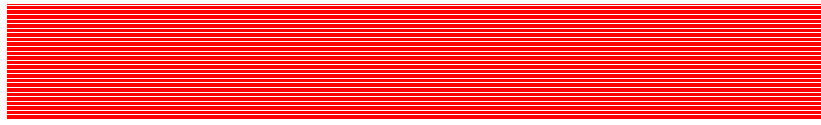


		<p><b>3 Provide different explanations for a phenomenon; defend and refute the explanations</b>  <i>Debates issues that relate to life science.</i>  <i>Debates issues that relate to Earth and space science.</i>  <i>Debates issues that relate to physical science.</i></p> <p><b>4 Identify characteristics of scientific ways of thinking</b>  <i>Students identify the typical stages in a scientific experiment.</i></p> <p><b>5 Explain how scientific theory, hypothesis generation and experimentation are interrelated</b>  <i>Students state whether an experiment tests a hypothesis.</i>  <i>Students analyze experimental data to identify if the hypothesis is disproved or supported.</i>  <i>Students identify the typical stages in a scientific experiment.</i></p> <p><b>6 Demonstrate how Science is an ongoing process of gathering and evaluating information, assessing evidence for and against theories and hypotheses, looking for patterns, and then devising and testing possible explanations.</b>  <i>Students identify the typical stages in a scientific experiment.</i>  <i>Students analyze experimental data to identify if the hypothesis is disproved or supported.</i>  <i>Students state whether an experiment tests a hypothesis.</i>  <i>Students identify tools that could be used in measurement of physical phenomena.</i></p>
<b>3</b>	<b>Personal and Social Perspectives in Science and Technology</b>	<p><b>1 Recognize how scientific knowledge, thinking processes and skills are used in a great variety of careers</b>  <i>N/A</i></p> <p><b>2 Develop and use a systematic approach to analyze the risks associated with natural and biological hazards</b>  <i>Students identify safety signs that could be used in a science lab.</i></p> <p><b>3 Identify a specific need and propose a solution or product that addresses this need, taking into consideration various factors</b>  <i>Constructs models from three different designs and compares the advantages and disadvantages of each design.</i></p> <p><b>4 Implement a proposed solution or design and evaluate its merit</b>  <i>Constructs a bridge to span a gap.</i>  <i>Observes the weakness of a beam bridge.</i>  <i>Constructs models from three different designs and compares the advantages and disadvantages of each design.</i>  <i>Uses different supports to make a bridge stronger.</i></p>
<b>4</b>	<b>Life Science</b>	<p><b>1 Construct classification systems based on the structure of organisms</b>  <i>Inserts questions into the correct places in a classification key so that it can be used to sort a series of dogs.</i>  <i>Uses classification keys to sort animals.</i>  <i>Creates questions in a classification key to sort a group of farmyard animals.</i></p> <p><b>2 Compare and contrast the basic structures, components and functions of various cells</b>  <i>Uses a microscope to view the cells of plants.</i>  <i>Interprets text and diagrams to identify the structure of a plant leaf and how it is given its green color.</i></p>



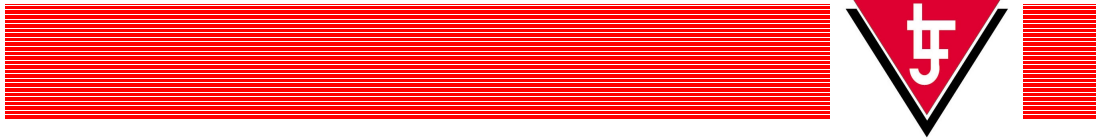


	<b>3</b>	<b>Explain the various levels of organization in relationship to structure and function within an organism, including cells, tissues and organs</b> <i>Investigates the heart of the human body.</i> <i>Investigates the lungs of the human body.</i> <i>Interprets text and diagrams to identify the structure of a plant leaf and how it is given its green color.</i> <i>Investigates the stomach of the human body.</i>
	<b>4</b>	<b>Identify the systems involved in such vital functions as digestion, respiration, reproduction, circulation, excretion, movement, control and coordination</b> <i>Uses software to find what parts of the human body give each of the five senses.</i> <i>Investigates the lungs of the human body.</i> <i>Investigates the stomach of the human body.</i> <i>Investigates the heart of the human body.</i>
	<b>5</b>	<b>Describe changes or constancy in groups of organisms over geologic time</b> <i>N/A</i>
	<b>6</b>	<b>Describe the role of genes in heredity</b> <i>Students identify that heredity traits are those that are passed between parent and offspring.</i> <i>Students identify the differences between learnt and inherited traits.</i>
	<b>7</b>	<b>Explain and model the interaction and interdependence of living and non-living components within ecosystems, including the adaptation of plants and animals to their environment</b> <i>Discovers the characteristics of animals that allow them to survive in their natural habitats.</i> <i>Uses a checklist of the seven life processes to identify if things are living or not living.</i> <i>Students identify how populations can be affected by changes in a food chain.</i> <i>Discovers the habitats of different animals.</i> <i>Students identify how living organisms have adapted to become suited to the environment in which they grow.</i>
<b>5</b>	<b>Physical Science</b>	<b>1</b> <b>Examine, describe, compare, measure, and classify objects and mixtures of substances based on common physical and chemical properties (e.g., states of matter, mass, volume, electrical charge, density, boiling points, pH, magnetism, solubility)</b> <i>Uses a simple classification key to sort three different types of metal.</i> <i>Measures and compares the heat insulation properties of different materials.</i> <i>Separates mixtures using a sieve.</i> <i>Discovers the elastic properties of metal springs.</i> <i>Separates solids and liquids using filter paper.</i>
		<b>2</b> <b>Classify and describe matter in terms of elements, compounds, mixtures, atoms and molecules</b> <i>N/A</i>

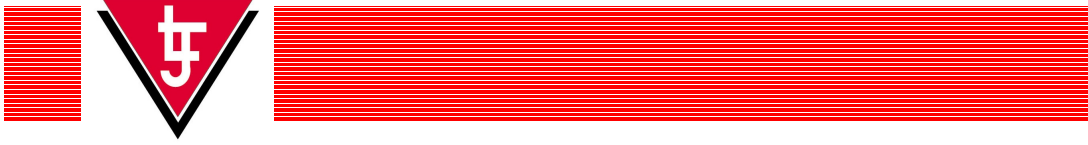


	<p><b>3 Show that energy exists in many forms and can be transferred in many ways</b> <i>Discovers where kinetic, potential, chemical, light, heat and sound energy can occur.</i> <i>Modifies a crawler so that it can store enough energy to reach the top of a slope.</i> <i>Uses a model car on a track to find when the car has enough energy to travel over a hill.</i> <i>Finds the effects of giving a crawler more energy.</i></p> <p><b>4 Identify and predict what will change and what will remain unchanged when matter experiences an external force or energy change (e.g., boiling a liquid; comparing the force, distance and work involved in simple machines)</b> <i>States if illustrated movements are pushes or pulls.</i> <i>Observes the magnetic attraction and repulsion forces between the poles of magnets.</i> <i>Squashes a ball and stretches a spring to observe the effects of pushing and pulling forces.</i> <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i> <i>Describes the changes that occur in different materials when they are cooled.</i> <i>Describes the changes that occur in different materials when they are heated.</i> <i>States if changes in different materials, caused by heating and cooling, can be reversed.</i> <i>Uses a lever to balance weights.</i> <i>Measures pulling forces using a newton meter.</i> <i>Interprets text and diagrams to identify if forces are balanced or unbalanced.</i> <i>Discovers the effect of forces on a lever.</i> <i>Observes how a varying incline effects the speed of a model car.</i> <i>Compares the force of friction between different materials.</i> <i>Observes the force of friction.</i></p> <p><b>5 Describe, measure and calculate characteristics (e.g., speed, distance, mass, force, gravity) of moving objects and their interactions (e.g., force, velocity, acceleration, potential energy, and kinetic energy) within a system</b> <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i> <i>Observes how a varying incline effects the speed of a model car.</i> <i>Uses a motion sensor to measure distances.</i> <i>Uses a ruler and a motion sensor to measure height.</i> <i>Measures pulling forces using a newton meter.</i> <i>Identifies units of measurement that would be most suitable for measuring a series of different items.</i> <i>Students identify tools that could be used in measurement of physical phenomena.</i> <i>Measures the effect that the force of gravity has on a mass placed on an inclined plane.</i></p>
<b>6 Earth and Space Science</b>	<p><b>3 Describe the composition (including the formation of minerals, rocks and soil) and the structure of the earth</b> <i>Sorts rocks into sedimentary, metamorphic and igneous rock types.</i></p>





- 4 Provide evidence of how life and environmental conditions have changed**  
*Uses a virtual excavation to find different fossils.*  
*Uses symbols to represent different types of fossil.*  
*Uses software to find out how different types of fossils are formed.*
- 5 Explain how earth processes seen today, including erosion, movement of lithospheric plates, and changes in atmospheric composition, are similar to those that occurred in the past**  
*Interprets text and diagrams to identify physical, chemical and biological forms of weathering.*
- 6 Describe the distribution and circulation of the world's water through ocean currents, glaciers, rivers, ground water and atmosphere**  
*States the different forms of water in the water cycle.*  
*Interprets text and diagrams to identify natural sources of water, such as rivers, lakes and oceans.*  
*Replicates and observes the stages of the water cycle.*
- 7 Describe the composition and physical characteristics (including currents, waves, tides and features of the ocean floor) of the earth's bodies of water**  
*N/A*
- 8 Describe and model large-scale and local weather systems**  
*Uses a virtual weather station to record temperature and rainfall.*  
*Discovers symbols that are used to represent the weather.*  
*Uses a software simulation to find out how seasons are linked to the position of the Earth in relation to the Sun.*  
*Observes the weather during different seasons in a virtual representation of New York.*
- 9 Describe the composition, properties and structure of the atmosphere**  
*N/A*
- 10 Explain how technology has impacted both earth and space science**  
*N/A*
- 1 Describe and model the motion of earth in relation to the sun, including the concepts of day, night, season and year**  
*Uses a model of the Earth to identify how the position of the Earth during different seasons effects the hours of daylight.*  
*Uses a software simulation to find out how seasons are linked to the position of the Earth in relation to the Sun.*  
*Uses software to find out why there is day and night.*  
*Uses a shadow trainer to find out why shadows change shape during the day.*  
*States the effects that the Sun has on the light levels on the planets of the solar system.*
- 2 Describe common objects in the solar system and explain their relationships**  
*Observes the effect that distance has on light levels.*  
*States the effects that the Sun has on the light levels on the planets of the solar system.*  
*States the position of the planets in the solar system.*  
*Recognises planets in the solar system.*  
*Uses software to discover facts about the Moon and its relation to the Earth.*  
*Uses software to discover the different phases of the Moon.*



- 
- 3 Describe the composition (including the formation of minerals, rocks and soil) and the structure of the earth  
*Describes the different conditions for the formation of various rocks.*

