

Science in the Elementary Schools

A Curriculum for the Schools of the Diocese of Tucson

Department of Catholic Schools
Diocese of Tucson
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Acknowledgement

The Department of Catholic Schools deeply appreciates the work of the curriculum committee who worked so tirelessly in ensuring that our science standards meet and exceed those of the State of Arizona. Most assuredly, the teachers who will facilitate the learning of science concepts and skills will also appreciate the format of the document, accenting accountability to the instruction, and the suggested activities and assessments provided to enhance instruction of the science objectives. Thank you to all members who contributed to the formation of the Elementary Science Curriculum.

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Vision Statement

This curriculum guide is designed to instill an understanding of the fundamental scientific principles that are needed for our students to succeed and thrive in a rapidly changing world. It encourages the use of processes and tools that will enable them to develop into responsible, scientifically literate world citizens. It stresses science as an ever-changing process that evolves with additional knowledge. This curriculum also encourages respect for science as both mysterious and familiar to everyday life. Through exposure to the material in this curriculum, students will be empowered to develop curiosity and a sense of wonder as well as the skills needed to make rational moral decisions based upon scientific principles integrated with Catholic values. Through the development of this guide, we have maintained respect for the students at all stages of their emotional, spiritual and intellectual growth in their unique life situations. Through exposure to this curriculum, students will develop integrated critical thinking skills and problem-solving strategies which will be applicable to other curriculum areas. Finally, it is our goal to provide science educators with useful direction as they make logical, creative and practical curriculum decisions in their unique school settings.

INTRODUCTION

The Diocese of Tucson Science Curriculum is based on and exceeds the Arizona State Science Education Standards. The curriculum was made to be user friendly. There are six standards:

Standard 1: Science as Inquiry

Students understand and use the processes of scientific investigation and scientific ways of knowing. They are able to design, conduct, describe and evaluate these investigations. They are able to understand and apply concepts that unify scientific disciplines.

Standard 2: History and Nature of Science

Students understand the nature of scientific ways of thinking. Students understand that scientific investigation grows from the contributions of many people.

Standard 3: Personal, Social, and Spiritual Perspectives in Science and Technology

Students understand the impact of science on human activity, the environment, and Catholic decision making and are proficient in the uses of technology as they relate to science.

Standard 4: Life Science

Students understand the characteristics of living things, the diversity of life and how organisms change over time in terms of biological adaptation and genetics. Students understand the interrelationships of matter and energy in living organisms and the interactions of living organisms with the environments.

Standard 5: Physical Science

Students understand the nature of matter and energy including their forms, the changes they undergo, and their interactions.

Standard 6: Earth and Space Science

Students understand the composition, formative processes, and history of the Earth and the universe, the solar system and the universe to make informed decisions about issues affecting the planet on which we live.

Content standards describe what students will understand and be able to do in science from kindergarten through eighth grade. Learning outcomes are set forth by grade level from kindergarten through fifth grade and by grade span from sixth through eighth grades. This curriculum guide can serve as the basis for designing a science program upholding Catholic values, while allowing flexibility depending on a school's overall science program and the needs of the students. Suggestions for activities, experiments, and assessments are given to support an effective science curriculum.

Standard 1: Science as Inquiry

Preschool

Date	Objective: Students will	Activity/ Assessment/Experiment
P.1.1	Demonstrate care for materials or creatures used in all science activities	Model and describe care/expectations Allow children to use materials ex. scratched vs. non-scratched magnifying glass
P.1.2	Demonstrate curiosity about objects, living things, and other natural events in the environment	Provide regular opportunities for observation during outside time, science table, nature walks
P.1.3	Use one or more of five senses to observe and explore objects, living things, and natural events in the environment	Nature walks focusing on one sense, record each child's observations
P.1.4	Formulate questions about the natural world	Present/notice materials for observation and think out loud to model forming questions
P.1.5	Examine, organize (i.e. compare, classify, categorize, sequence), and describe attributes of objects, organisms, and events in different ways.	Sort rocks by size/color/shape; monthly weather graph; incorporate descriptive language regarding weight, texture, flavor, scent, sound, etc.
P.1.6	Form and communicate a simple hypothesis (prediction) about various cause and effect relationships in the environment	Color mixing; ice melting; bubbles pop with dry hands.
P.1.7	Test predictions through active experimentation and persist with investigation despite distractions and interruptions.	Plant seeds and watch growth over time, record observations; experiment with balancing using blocks.
P.1.8	Demonstrate ability to change experiment plan if results are different than expected and continue testing.	Predict which items will sink/float; which items will attract magnets
P.1.9	Communicate observations, comparisons, investigations, and known facts through various means such as pictographs, pictures, models, words, journals.	Provide opportunities to describe what they observe with each task - draw observations, write in journals, participate in group discussions, use graphs.

	P.1.10	Observe and describe the relationships between objects, living things and natural events.	As seasons change talk about the change in clothes, activities; the sun's effects on skin, shadows, chocolate, a puddle
	P.1.11	Describe changes observed in objects, living things, and natural events in the environment.	Provide regular opportunities for observation and model descriptive language; Butterfly life stages; a simple system (i.e. a plant terrarium, worm farm, butterfly hatchery, weather, etc.).
	P.1.12	Perform simple measurements and comparisons.	Use a simple balance scale; Use non-standard units of measurement (blocks, cubes, paper clips, string); Compare and contrast objects and organisms by visible components ex. boys/girls, hair color, type of shoes etc.

Standard 2: History and Nature of Science

Preschool

Date		Objective: Students will	Activity/ Assessment/Experiment
	P.2.1	Understand that all people can and do participate in science.	Through books and discussion, show specific examples of how diverse people (e.g., children, weather forecasters, cooks, healthcare workers, gardeners) participate in science. Highlight examples of children participating in science in class. Use appropriate scientific terms.

Standard 3: Personal, Social, and Spiritual Perspectives in Science and Technology Kindergarten

Date		Objective: Students will	Activity/ Assessment/Experiment
	P.3.1	Distinguish between natural and man-made objects	present a collection of items or pictures and sort; in group discussions or presentation, integrate natural/man-made concept with materials, having
	P.3.2	Use simple technology (tools) and materials to complete a planned task or investigation	use scales, balances, and magnifying glass in tasks
	P.3.3	Describe and explain the inter-relationships between populations and resources	Show examples and explain that people can cause changes in their environment (build homes, pollution, care of classroom, playground, etc); activities that stress the importance of recycling, reusing, and reducing in order to help the environment

Standard 4: Life Science

Preschool

Date		Objective: Students will	Activity/ Assessment/Experiment
	P.4.1	Identify and describe living from non-living things	Identify a living object as something that breathes, grows, and changes; Classify objects as living or non-living; Identify people, animal, and plants as living; Identify rocks, buildings, and books as non-living
	P.4.2	Describe the basic needs of living things	Identify food, water, air, and shelter as basic needs of people and animals; Identify sun, water, air, and soil as basic needs of plants

	P.4.3	Examine and describe similarities and differences in diverse species	Match animal babies to their parents; Identify similar and different body parts and coverings; Describe how animals move and what they eat; Be introduced to the difference between mammals and non-mammals
	P.4.4	Recognize that component parts make up the human body systems	Recognize basic body parts including face, ankle, knees, hips, waist, etc.; Identify the five senses; Classify objects according to smell, taste, touch, sight, and sound

Standard 5: Physical Science

Preschool

Date		Objective: Students will	Activity/ Assessment/Experiment
	P.5.1	Compare objects in terms of common physical properties	Classify objects according to simple size, shape, and color;- Classify objects as objects that either sink or float; Classify objects as to whether they are attracted to magnets or not

Standard 6: Earth and Space Science

Preschool

Date		Objective: Students will	Activity/ Assessment/Experiment
	P.6.1	Identify basic phenomena and changes in the sky	Identify the stars and moon as objects in the night sky; Identify the sun and clouds as objects in the day sky; offer moon tickets as a home/school learning connection for children to document the moon phase with family
	P.6.2	Understand that the sun heats and lights the earth	make solar smores; experiment with a dish of water in the sun and one in the shade, notice the difference in temperature
	P.6.3	Identify how the weather affects daily activities	Provide different clothing samples and photos of different times of the year/weather; In group, discover how the weather can determine what outside activities or sports we can play (i.e. swimming, skiing, etc.)

	P.6.4	Develop growing awareness of ideas and language related to attributes of time and temperature	Use daily schedule with pictures to help children see sequence of school day; model use of temperature language to describe changes throughout the day.
	P.6.5	Identify basic earth materials	Examine rocks, dirt, water, and air (empty bottle or bubbles) in the science center or sensory table; find examples of materials on playground
	P.6.6	Identify the seasons and their characteristics	Identify spring, summer, fall, and winter during each season; incorporate pictures and descriptive language on calendar board

Standard 1: Science as Inquiry

Kindergarten

Date	Objective: Students will	Activity/ Assessment/Experiment
K.1.1	Demonstrate safe procedures and behavior in all science inquiry	Appropriate use and care of simple technology, materials, and organisms- T-chart of what expected behavior looks like
K.1.2	Formulate questions about objects, organisms, events and relationships in the natural world	Present/notice materials for observation and model how to process through forming a question (How do trees grow? Why is the sky blue? Where does rain come from?)
K.1.3	Participate in learning experiences using careful observation	Play I spy, 20 questions, What’s Missing? as group games. When changing something in the room, ask if anyone has any observations. Have guided questions focus on tiny details, ex. How many spots on this ladybug?
K.1.4	Demonstrate ability to sort, classify and sequence objects, organisms and events by different characteristics	Provide materials or photographs to manipulate and a way to organize by size, color, attribute. Take photos of tree throughout year and discuss changes
K.1.5	State simple hypotheses about cause and effect relationships	Conduct simple experiments and talk about what they think the outcome will be; complete science observation forms used as each stage of longer experiments. Will green beans or jellybeans grow?
K.1.6	Demonstrate ability to perform simple measurements and comparisons	Use balance scale to determine difference in weight of several items using block cubes.
K.1.7	Communicate observations through various means such as pictures, pictographs, models, verbalization, or gesture	Allow time for describing what they observe, ask questions, draw observation; which include verbalized details. Share observations in group. Demonstrate use of graphs to record observation and can verbalize results, “red has the most”
K.1.8	Demonstrate ability to identify the five senses and can classify items according to smell, taste, touch, sight, and sound	Use feely box/bag and have children describe and guess contents. Smelling jars with different scents, taste test, animal sound bingo
K.1.9	Describe changes observed in a simple system	Provide regular opportunities for observation and model descriptive language- ant farm, plant terrarium, aquarium

Standard 2: History and Nature of Science

Kindergarten

Date		Objective: Students will	Activity/ Assessment/Experiment
	K.2.1	Communicate examples of how all people can and do participate in science	Communicate specific examples of how diverse people (e.g., children, weather forecasters, cooks, healthcare workers, gardeners) participate in science
	K.2.2	Demonstrate ability to work with a team and share findings with others	Each group is given a particular animal and works together to design color patterns (tiger, cheetah) Children work together to collect a sample, ex. leaves

Standard 3: Personal, Social, and Spiritual Perspectives in Science and Technology Kindergarten

Date		Objective: Students will	Activity/ Assessment/Experiment
	K.3.1	Describe differences between natural and man-made objects through verbalization, sorting and selection	Present a collection of materials and allow students to sort
	K.3.2	Demonstrate respect for natural objects and man made objects	Model appropriate use and care of materials and organisms T- chart of what expected behavior looks like
	K.3.3	Demonstrate the proper use of simple technology	Use scale to weigh children throughout year and record Use balance to compare weight of sea shells or any type of thematic material Use magnifying glass during observations
	K.3.4	Recognize a relationship between populations and resources	People cause changes in their environment(build homes, pollution) Introduce concept of recycling, reducing/reusing as practices of your classroom (reuse paper at writing center)

Standard 4: Life Science

Kindergarten

Date		Objective: Students will	Activity/ Assessment/Experiment
	K.4.1	Identify and describe differences between living and non-living things	Characteristics of living things- breathing, growing, making offspring
	K.4.2	Describe the basic needs of living organisms for survival	Know that animals require air, water, food and shelter Know that plants require air, water, nutrients, and light
	K.4.3	Recognize that component parts make up the human body system	ability to classify objects according to smell, touch, taste, sights and sound Identify corresponding body part
	K.4.4	Identify observable similarities/ differences among diverse species	Use graph to sort animal pictures by characteristic Use Venn diagram to sort food animals eat Match animals to babies
	K.4.5	Identify similarities and differences that offspring can have within a family	Introduce characteristics of an animal as well as differences possible in color, size, geography, etc. All horses have hooves, mane, etc. but many varieties

Standard 5: Physical Science

Kindergarten

Date		Objective: Students will	Activity/ Assessment/Experiment
	K.5.1	Compare objects in terms of common physical properties	Classify by texture, weight, size, shape, color, reflection Classify by type of material (wood, plastic, metal) Classify by sink or float
	K.5.2	Describe the basic concepts about the structure and properties of matter	Incorporate language solid, liquid, wet, dry, etc. when cooking Observe changes in ice/dry ice Sink/float activities

Standard 6: Earth and Space Science

Kindergarten

Date	Objective: Students will	Activity/ Assessment/Experiment
	K.6.1 Identify basic Earth materials and their uses	Explore samples of each- discuss where they have seen materials Talk about plant survival Incorporate Creation study Compare with other planets
	K.6.2 Identify the seasons and their characteristics	Identify how a tree or cactus looks in each season Identify animal changes- new life in spring
	K.6.3 Identify how weather affects daily activity	Identify what weather and clothing go with each season Talk about typical activities in each season and how that is related to weather
	K.6.4 Identify basic weather phenomena	Have a weather helper to record weather each day Have thermometer and record temperature throughout year Make wind socks to observe wind's movement
	K.6.5 Identify basic phenomena and changes in the sky	Day sky- sun and clouds Night sky- stars and moon Have children make observation of moon as part of homework to track moon phases Take photo or draw different types of clouds and label near window
	K.6.6 Demonstrate knowledge that the sun heats and lights the Earth	Discuss during Creation study Experiment with how they feel standing in sun/ shade Track shadow to see the shadow move as the sun moves Discuss elements of sun and fire

Standard 1: Science as Inquiry

Grade 1

Date	Objective: Students will	Activity/ Assessment/Experiment
1.1.1	Identify and use safe procedures in all science activities	Model safe procedures
1.1.2	Ask, record and research questions	What makes a rainbow? KWL chart
1.1.3	Plan, design, predict, conduct, record data and report on the conclusions of basic experiments	Class experiment Use pictures, models, words, graphs, charts, logs
1.1.4	Construct models that illustrate simple concepts and compare these models to what they represent	Construct a model of a bat skeleton using toothpicks
1.1.5	Identify and record changes and patterns of change in a familiar system	Freeze ice cubes, Water can be liquid or solid
1.1.6	Identify and describe relationships among parts of a familiar system	Describe or draw a park or clock and its parts
1.1.7	Use tools to collect data	Model, explore and use rulers, thermometers, magnifiers, and balances

Standard 2: History and Nature of Science

Grade 1

Date	Objective: Students will	Activity/ Assessment/Experiment
1.2.1	Identify and describe how diverse people both past and present have used science and technology in daily life	Invite speakers (parents, firefighters) into the classroom Discuss everyday experience of the children Interview people
1.2.2	Identify and describe how diverse people/cultures both past/present have made important contributions to scientific innovations and inventions	Read books View videos about people like Sally Ride (teacher/scientist) Explore previous experiments and observations and how these activities helped people learn more about science

	1.2.3	Identify the ways that people have used what is known about science to learn more	
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Standard 3: Personal, Social, and Spiritual Perspectives in Science and Technology **Grade 1**

Date		Objective: Students will	Activity/ Assessment/Experiment
	1.3.1	Describe and explain the interaction between population, resources and environments based in Christian values	Read “The Lorax” by Dr. Seuss Use games to illustrate habitat loss
	1.3.2	Evaluate scientific findings to identify, propose solutions and assess the end result	Food scarcity, pollution, habitat loss activities and games
	1.3.3	Identify and describe simple technologies and how they contribute to solving problems	Paper clips, zip lock bags, computers
	1.3.4	Identify occupations that require the application of science and technology	Invite parents, public speakers

Standard 4: Life Science **Grade 1**

Date		Objective: Students will	Activity/ Assessment/Experiment
	1.4.1	Describe and explain cause/ effect relationships in living systems	Use camouflage activities
	1.4.2	Trace the life cycles of various life cycles of various organisms including humans	Use pictures, paper plates, to illustrate a life cycle
	1.4.3	Identify and compare basic structures and structure functions of plants and animals	Compare a tree trunk and plant stem and their functions Use pictures, go outside, observe, draw, etc
	1.4.4	Identify and compare the basic characteristics of plants and animals that allow them to live in a specific environment	Research living and non-living aspects of the desert
	1.4.5	Identify major organ systems and their importance	

Standard 5: Physical Science

Grade 1

Date	Objective: Students will	Activity/ Assessment/Experiment
1.5.1	Classify objects by common observable properties	shape, texture, color, size, weight, material buoyancy, magnetic, non-magnetic
1.5.2	Identify different states of matter (solid, liquid, gas)	Use the children's own experiences Demonstrate using real water, balloons, blocks
1.5.3	Demonstrate that matter can change and exist in one or more states	Identify procedures to change some properties Use an ice cube, pass it around (cold potato game)
1.5.4	Create mixtures- separate based on the differences in properties	Use breakfast cereal to demonstrate- taste
1.5.5	Demonstrate that light, heat, cold, motion, magnetism, and sound can cause changes	Light bulb/ heat Magnets move around other magnets Sound travels through some materials
1.5.6	Demonstrate the way things move	Playground activities

Standard 6: Earth and Space Science

Grade 1

Date	Objective: Students will	Activity/ Assessment/Experiment
1.6.1	Identify, describe the physical properties of water, soil, rocks, and gases (basic Earth materials)	Rock and soil collections Use magnifiers, pennies to observe color, hardness, float or not etc "Pet Rocks"
1.6.2	Identify the seasons of the Earth and their characteristics	Lengthening/ shortening of the day Write observations in logs Have a fashion show to demonstrate changes in clothing Measure shadows at different times of day

	1.6.3	Describe the Sonoran Desert environment- including living and non-living elements	Make a diorama after research on the net or reading books Field trip
	1.6.4	Identify and describe the importance of fossils	Create fossils out of clay and toy animals imprints

Standard 6, Cont'd.

	1.6.5	Identify natural forces and processes that shape the surface of the Earth	Weathering, ice, wind, erosion, water, volcanoes Sand box play with water Use sugar cubes shaken up to demonstrate weathering Fill an empty yogurt container with water and freeze- note how the lid pops up
	1.6.6	Identify the following as being natural resources: air, water, soil, trees, wildlife	Use pictures to classify Go outside Create a science journal
	1.6.7	Identify common uses of Earth materials: construction, decoration	Identify jewelry, bricks, chalk, etc Use everyday experiences of the children
	1.6.8	Identify ways to conserve natural resources- reduce, reuse, recycle, rethink, refuse	Invite recycling speakers
	1.6.9	Identify evidence that the sun is the natural source of heat and light on Earth	Warm surfaces, shadows Go outside and observe- skin, feel the heat, cool of the shade. Integrate with the five senses Build solar oven
	1.6.10	Compare celestial objects(sun, moon, stars) with transient objects in the sky (birds, planes, clouds)	Go outside, draw, observe Cut out pictures
	1.6.11	Describe observable changes that occur in the sky	Clouds forming and moving Apparent changes in moon shapes Position of the moon
	1.6.12	Identify the planets and their relationships to the sun	Use songs, finger plays
	1.6.13	Measure, record, and interpret changes in weather conditions (temperature, precipitation, clouds)	Use the paper to acquire rain measurement information Record on calendar Keep a thermometer outside and record daily temperatures on a line graph Demonstrate writing a weather report Use the newspaper to explore weather symbols. Measure rainfall

Standard 1: Science as Inquiry

Grade 2

Date	Objective: Students will	Activity/ Assessment/Experiment
	2.1.1 Identify and use safe procedures in all science activities	Observation
	2.1.2 Ask questions about the natural world	What makes a rainbow? Where does the wind come from?
	2.1.3 Plan, design, predict, conduct and report on the conclusions of basic experiments	Keep a Science Journal, KWL Use pictures and graphs
	2.1.4 Construct models that illustrate simple concepts and compare these models to what they represent	A solar system, a volcano, a paper plane
	2.1.5 Identify and record changes and patterns of change in a familiar system	Water can be solid or liquid
	2.1.6 Describe relationships among parts of a familiar system	A clock, a bike

Standard 2: History and Nature

Grade 2

Date	Objective: Students will	Activity/ Assessment/Experiment
	2.2.1 Identify scientific contributions that have been made by all kinds of people	Automobile – Henry Ford Airplane – Wilber and Orville Wright Telephone – Alexander Graham Bell Identify science-related career opportunities
	2.2.2 Describe how scientific inquiry has produced much knowledge about the world.	Timeline of inventions Simple to mechanized tools Predicting weather patterns Research and report
	2.2.3 Ask and answer questions involving science and compare results to what is already known	The Scientific Method See appendix “Doing Science” Explain how asking and answering questions is part of a scientific investigation.

Standard 3: Personal, Social and Spiritual Perspectives in Science and Technology Grade 2

Date		Objective: Students will	Activity/ Assessment/Experiment
	2.3.1	Identify occupations that require the application of science and technology	Guest speakers: construction workers, medical profession KWL
	2.3.2	Evaluate scientific findings to identify a problem, propose solutions and assess the end result	Consider: Pollution, malnutrition, fire hazards
	2.3.3	Describe and explain the interrelationship of populations, resources, and environment based on Christian values	Habitat, ecosystem, food chain, natural resources Web of Life charts, graphs, games
	2.3.4	Identify and describe how technology contributes to solving problems	Paper clips, zip-lock bags, computers

Standard 4: Life Science

Grade 2

Date		Objective: Students will	Activity/ Assessment/Experiment
	2.4.1	Describe and explain cause-effect relationships in living systems	Tell what most organisms need to stay alive
	2.4.2	Trace the life cycle of various organisms	Illustrate butterfly, frog
	2.4.3	Identify the basic structures and functions of plants and animals	Describe the properties of a plant/animal and illustrate
	2.4.4	Identify the basic characteristics of plants and animals that allow them to live in a specific environment	Classify animals by habitat, skin covering, movement, reproduction Classify plants by habitat, how they grow, reproduce Chart and graph
	2.4.5	Identify the parts that make up the human body	Digestive, muscular, skeletal- Trace the body and label
	2.4.6	Identify the major parts and systems involved in vital functions of digestion, circulation and respiration	Circulatory System Digestive System Respiratory System

Standard 5: Physical Science

Grade 2

Date		Objective: Students will	Activity/ Assessment/Experiment
	2.5.1	Create mixtures and separate them based on differences in properties	Salt and sand Iron fillings and soil
	2.5.2	Demonstrate that light, heat, cold, motion, magnetism and sound can cause changes	Plant seeds Light helps a plant grow and stay green. Lack of light causes it to yellow Water will freeze in cold. Heat applied to the frozen water will cause it to melt. Demonstrate magnetic poles

Standard 6: Earth Science

Grade 2

Date		Objective: Students will	Activity/ Assessment/Experiment
	2.6.1	Describe the basic earth materials, the physical properties of rocks, soils, water and gases.	Journal entries, displays, collages
	2.6.2	Identify the seasons on the earth	Pictures and illustrations
	2.6.3	Identify natural forces and processes that shape the surface of the earth	Use pictures to identify: ice, wind, water, weathering, volcanic activity, erosion, global warming, floods, earthquakes
	2.6.4	Describe the Sonoran Desert environment including the plants, animals, weather and land structures	Field Trip, docents to come to the classroom with programs, KWL, vocabulary cards, diorama
	2.6.5	Describe the importance of fossils and how they provide evidence about the plants and animals that lived long ago and the nature of the environment at the time.	Make fossils with play dough, plaster of paris, clay
	2.6.6	Measure, record and interpret changes in weather conditions	Temperature, precipitation, clouds Chart and graph

Standard 1: Science as Inquiry

Grade 3

Date		Objective: Students will	Activity/ Assessment/Experiment
	3.1.1	Formulate relevant questions about the properties of objects	
	3.1.2	Categorize objects, organisms and events in different ways	Charts, graphs, tables, journals and logs
	3.1.3	Predict the results of an investigation by forming a hypothesis	
	3.1.4	Demonstrate safe behavior while using scientific equipment	
	3.1.5	Plan and conduct a simple investigation using the scientific method	
	3.1.6	Record data from investigation in an organized format	
	3.1.7	Use metric and U.S. units to perform simple measurement and comparisons	
	3.1.8	Construct reasonable interpretations of the collected data by comparing it to the original hypothesis	
	3.1.9	Generate and record questions for possible future investigations based on the conclusion of the investigation	
	3.1.10	Communicate the investigation and results to others in a way that other students could repeat investigation	

Standard 2: History and Nature of Science

Grade 3

Date		Objective: Students will	Activity/ Assessment/Experiment
	3.2.1	Identify how diverse people and or cultures have made important contributions to science, past or present	
	3.2.2	Describe science related career opportunities	
	3.3.3	Describe how in a system with many components the components usually influence one another	Terrarium Human body
	3.3.4	Explain why a system may not work if a component is defective or missing	

Standard 3: Personal, Social, and Spiritual Perspectives in Science and Technology Grade 3

Date		Objective: Students will	Activity/ Assessment/Experiment
	3.3.1	Describe the major factors that could impact a human population	Famine, drought, flooding, improved vaccination, medical breakthroughs
	3.3.2	Describe the beneficial impacts of humans on the environment	Irrigation
	3.3.3	Describe the harmful impacts of humans on the environment	Excessive use of natural resources
	3.3.4	Discuss why humans need to practice conservation	Recycling, carpooling, water conservation
	3.3.5	Identify ways in which people use tools and technology to solve problems	
	3.3.6	Describe the development of different types of technology in response to resources, needs and values	
	3.3.7	Use simple technology in the classroom	Computers

Standard 4: Life Science

Grade 3

Date	Objective: Students will	Activity/ Assessment/Experiment
3.4.1	Describe the function of plant structures	Roots, stems, leaves, flowers
3.4.2	Identify and describe the function of the systems of the human body	Nervous system Skeletal system Muscular system Digestive system Respiratory system
3.4.3	Identify the basic characteristics of animals that allow them to live	
3.4.4	Compare the life cycles of various organisms	Plants, insects, frogs
3.4.5	Explain how growth, death and decay are part of the life cycle	
3.4.6	Classify the living and nonliving components of an ecosystem	
3.4.7	Examine an ecosystem to identify microscopic organisms	Explain how various disease causing organisms enter the human body and cause illness Describe preventive measures for illness
3.4.8	Explain interrelationships among plants and animals in different environments and habitats	Describe the basic needs of an organism Recognize and distinguish similarities and differences of various species- male vs. female, herbivore/carnivore/omnivore, wild vs. domestic, producers/ consumers/ decomposers
3.4.9	Describe and explain cause and effect relationships in living systems	Tell what factors influence the growth of an organism Demonstrate through sequencing the “food chain”
3.4.10	Describe how environmental factors may affect an organism’s ability to grow, reproduce and thrive	Soil composition, temperature, light, water
3.4.11	Identify adaptations of plants and animals that allow them to live in specific environments	Cactus

Standard 4, Cont'd.

	3.4.12	Describe ways that species adapt when introduced to new environments	
	3.4.13	Cite examples of how a species' inability to adapt to changing conditions in the ecosystem led to the extinction of that species	

Standard 5: Physical Science**Grade 3**

Date		Objective: Students will	Activity/ Assessment/Experiment
	3.5.1	Compare and contrast objects in terms of common physical properties	Texture, shape, size, color, weight, magnetism
	3.5.2	Demonstrate that light has various properties	Reflected with mirrors, refracted with prisms, absorbed by dark surfaces
	3.5.3	Describe how light behaves on striking objects	Transparent, Translucent, Opaque
	3.5.4	Demonstrate that vibrating objects produce sound	
	3.5.5	Demonstrate that the pitch of sound depends on the rate of the vibration	Long rubber band has a lower pitch than a short rubber band

Standard 6: Earth and Space Science**Grade 3**

Date		Objective: Students will	Activity/ Assessment/Experiment
	3.6.1	Identify the layers of the Earth	Crust, mantle, core
	3.6.2	Describe the different types of rocks and how they are formed	Metamorphic, sedimentary, igneous
	3.6.3	Classify rocks based on the following physical properties	Color, texture, hardness
	3.6.4	Describe fossils as records of past life forms	
	3.6.5	Describe how fossils are formed	
	3.6.6	Explore the theory of Continental Drift	Alfred Wagener and Pangaea
	3.6.7	Describe the ways humans use Earth materials	Fuel, building materials

Standard 1: Science as Inquiry

Grade 4

Date	Objective: Students will	Activity/ Assessment/Experiment
	4.1.1 Identify a question, formulate a hypothesis using the variables, find results and record conclusion	Conduct a simple experiment- will larger or smaller pieces of alka seltzer dissolve quicker?
	4.1.2 Create a model to predict changes in the environment	Create a model to predict weather changes
	4.1.3 Organize/ present data gathered from previous investigations	Use appropriate graphs to present data from experiments
	4.1.4 Identify and refine questions from previous investigations	Review questions and answers from previous experiments
	4.1.5 Comprehend/ analyze the parts, subsystems and processes of a mechanical device	Describe and draw the parts found in common mechanical devices- bicycle, clock
	4.1.6 Analyze scientific reports from magazines, television and other media	Find, summarize, and analyze a scientific report found on the Internet
	4.1.7 Understand all people can and do participate in science	Interview an individual who participates in science- cook, weather forecaster

Standard 2: History and Nature of Science

Grade 4

Date	Objective: Students will	Activity/ Assessment/Experiment
	4.2.1 Identify that scientific contributions have been made by various cultural groups	Research and write a report on a famous inventor, a scientist, and/or teacher
	4.2.2 Understand that scientific inquiry has produced much knowledge about the world	Create a timeline of important inventions
	4.2.3 Understand that science involves asking and answering questions	Conduct a class experiment using the scientific method
	4.2.4 Identify major milestones in science that have revolutionized the thinking at the time	Journal entry
	4.2.5 Describe how science and technology are interrelated	Describe benefits of technology, such as computers or medicine

	4.2.6	Provide different explanations for natural processes and events	Erosion, plant life cycles, weather
	4.2.7	Identify characteristics of scientific ways of thinking	KWL chart and science experiment
	4.2.8	Explain how scientific theory, hypothesis generation and experimentation are related	

Standard 3: Personal, Social and Spiritual Perspectives in Science and Technology Grade 4

Date		Objective: Students will	Activity/ Assessment/Experiment
	4.3.1	Distinguish between natural and man-made objects	Research a dam and reasons they were created by man
	4.3.2	Use simple technology	Scales, balances, magnifiers
	4.3.3	Identify occupations that require the application of science and technology	Cook, nurse as guest speakers
	4.3.4	Use scientific findings to propose and evaluate solutions to problems	Create and implement a class plan to help with pollution problems
	4.3.5	Describe and explain the interrelationship of populations and resources	Recognize how a variety of resources meet the needs of a population
	4.3.6	Identify and describe how technology contributes to solving problems	
	4.3.7	Recognize how scientific knowledge, thinking processes and skills are applied to careers	Guest speakers
	4.3.8	Develop/use a systematic approach to comprehend/ analyze risks associated with hazards	Journal entry
	4.3.9	Identify a specific need and propose a solution or product that addresses this need	Create a family fire evacuation plan
	4.3.10	Implement a proposed solution or design and evaluate its merits	

Standard 4: Life Science

Grade 4

Date	Objective: Students will	Activity/ Assessment/Experiment
4.4.1	Distinguish living from non-living things	Draw pictures
4.4.2	Describe the basic needs of living organisms	Explain how body parts and behaviors help organisms meet their needs
4.4.3	Recognize and distinguish similarities and differences in diverse species	Research two different species on the Internet and create a compare and contrast graph/chart
4.4.4	Describe and explain cause and effect relationships in living systems	Have a class caterpillar and watch its life cycle Draw pictures of any change
4.4.5	Trace the life cycles of various organisms	Understand how organisms grow, die, decay, and new organisms are produced
4.4.6	Identify the basic structures and functions of animals	Compare, contrast, and analyze structures of plants and animals- graphs, charts
4.4.7	Identify the basic characteristics of plants and animals that allow them to live	Book/ video
4.4.8	Recognize that component parts make up the human body systems	Create a life-like skeleton of a human body
4.4.9	Recognize that offsprings within families have both similarities and differences	Research your family and find differences and similarities between you and your parents
4.4.10	Explain the interaction of living and non-living components within ecosystems	Draw pictures
4.4.11	Construct classification based on structures, components, and functions of various cells	Use a microscope and slides to view cells and non-cells
4.4.12	Explain various levels of organization in relation to structure and function within a cell	
4.4.13	Identify the systems involved in such vital functions as digestion, respiration,	Explain how all parts function together for the growth and development of the body
4.4.14	Describe changes or constancy in groups of organism over geologic time	

	4.4.15	Introduce and describe the roles of genes in hereditary	
	4.4.16	Explain and model the interaction and interdependence of living and non-living components	

Standard 5: Physical Science

Grade 4

Date		Objective: Students will	Activity/ Assessment/Experiment
	4.5.1	Compare objects in terms of common physical properties	Categorize objects into groups based on size, shape, or state
	4.5.2	Create mixtures and separate them based on property differences	In groups, separate different compounds according to differences in property
	4.5.3	Demonstrate that light, heat, motion, magnetism, and sounds can cause changes	Heat: The sun warms the Earth to a temperature for human living
	4.5.4	Demonstrate and explain that materials exist in different states and can change	Describe the three states of matter and show how the states of matter can change
	4.5.5	Recognizes that light travels in a straight line and can be reflected, refracted, or absorbed	
	4.5.6	Examine, describe, compare, measure and classify objects and mixtures based on properties	States of matter, mass, volume
	4.5.7	Classify and describe matter in terms of elements, compound, mixtures based on properties	Understand that matter can be classified in terms of elements, compounds, mixtures, atoms
	4.5.8	Show that energy is a property of many substances and can be transferred in many ways	
	4.5.9	Identify/predict what will change or remain unchanged when matter experiences external force or energy change	Boiling a liquid, comparing the force
	4.5.10	Describe, measure and calculate characteristics of moving objects and interactions	

Standard 6: Earth and Space Science

Grade 4

Date	Objective: Students will	Activity/ Assessment/Experiment
	4.6.1 Identify basic phenomena and changes in the sky	
	4.6.2 Understand that the sun heats and lights the Earth	Describe how the sun provides the light and heat necessary for Earth
	4.6.3 Identify how weather affects daily activities	Describe ways of protecting people from dangerous weather activities
	4.6.4 Identify basic Earth materials and their common uses	Explain the importance of soil as a renewable resource
	4.6.5 Describe the basic Earth materials and their physical properties	Describe how water, wind, and ice change the shape of the land- display with pictures
	4.6.6 Identify the seasons and their characteristics	Explain the cause of seasons
	4.6.7 Identify and describe the patterns of movement of objects in the sky	Moon Book- Students will record and draw pictures of the moon daily
	4.6.8 Identify major features of natural processes that shape the Earth's surface	Explain how the Earth's surface changes
	4.6.9 Describe natural events and how humans are affected by them	Describe how humans are affected by natural events such as earthquakes
	4.6.10 Measure and record changes in weather conditions	Use instruments such as a rain gauge, barometer, and weather balloon
	4.6.11 Describe and model the motions of the Earth in relation to the sun	Create a human model, using students as the Earth and the sun
	4.6.12 Describe common objects in the solar system and explain their relationships	Describe the physical and chemical properties of Earth materials
	4.6.13 Provide evidence of how life and environmental conditions have changed	Write a report on the greenhouse effect
	4.6.14 Explain how Earth processes seen today are similar to those that occurred in the past	Describe how wind shapes the land and forms sand dunes
	4.6.15 Describe the distribution and circulation of the world's water	Explain how the movement of water shapes the land

	4.6.16	Describe the composition and physical characteristics of the Earth's bodies of water	Explain the causes and effects of water pollution
	4.6.17	Describe and model large-scale and local weather systems	Explain how weather maps are useful in predicting weather
	4.6.18	Describe the composition, properties and structure of the atmosphere	Name the gases and other substances making up the Earth's atmosphere
	4.6.19	Explain how technology has impacted both Earth and space science	Research and report on how technology can be helpful or harmful

Standard 1: Science as Inquiry

Grade 5

Date	Objective: Students will	Activity/ Assessment/Experiment
5.1.1	Identify a question through observation	
5.1.2	Formulate a hypothesis based on observation	
5.1.3	Identify control and manipulate variables	
5.1.4	Devise experiments	Based on student questions
5.1.5	Predict outcomes based on data	
5.1.6	Compare and analyze results	
5.1.7	Defend conclusions, evaluate reasonableness	
5.1.8	Develop new investigations based on questions	
5.1.9	Record data in organized format	
5.1.10	Organize data using graphic representation	
5.1.11	Predict an outcome using different situations	
5.1.12	Show predictions using various models	
5.1.13	Construct models to show how predictions occur	
5.1.14	Analyze scientific reports	

Standard 2: History and Nature of Science

Grade 5

Date	Objective: Students will	Activity/ Assessment/Experiment
5.2.1	Identify individual, cultural and technological contributions to scientific knowledge	
5.2.2	Identify discoveries that have changed the course of history	
5.2.3	Demonstrate how science and technology are interrelated	Choose a specific example(telephone) show how it has changed over time
5.2.4	Describe how scientific knowledge is subject to change	Explain how challenges of prevailing theories change and create new theories- Earth flat or round
5.2.5	Identify characteristics of scientific thinking	Explain scientific method
5.2.6	Explain scientific theory begins as hypothesis	
5.2.7	Explain hypothesis tested by experimentation	

Standard 3: Personal, Social, and Spiritual Perspective in Science and Technology Grade 5

Date	Objective: Students will	Activity/ Assessment/Experiment
5.3.1	Identify occupations that require the application of science and technology	
5.3.2	Recognize and demonstrate how scientific knowledge, thinking processes and skills are applied in careers	Guest lectures, website job applications
5.3.3	Explain the impacts of natural hazards on habitats	Global warming, flooding
5.3.4	Propose a solution, resource or product that addresses a specific human, animal or habitat	
5.3.5	Technology contributes to solving problems	Laws that regulate natural resources
5.3.6	Evaluate possible strengths and weaknesses of a given solution to a problem	
5.3.7	Describe and explain the interrelationship of populations and resources	Conservation, how it affects Earth, overuse of water, coal, gas, oil result in lower use and higher prices

Standard 4: Life Science

Grade 5

Date		Objective: Students will	Activity/ Assessment/Experiment
	5.4.1	List characteristics of all living things	
	5.4.2	Explain interaction of living/non living components within ecosystems	
	5.4.3	Describe how scientists classify living things	Classify into kingdoms
	5.4.4	Describe basic needs of living organisms	
	5.4.5	Describe cause/effect relationship in living things	Sun is important, oxygen/carbon dioxide cycle
	5.4.6	Trace the life cycles of various organisms	Frog, insect, human being
	5.4.7	Identify basic structures/ functions of plants and animals	Diagram human body, plant parts
	5.4.8	Compare/ contrast basic structures, components, function of various cells	Microscope
	5.4.9	Identify vital systems involved in vital functions	Digestion, respiration
	5.4.10	Describe changes or consistency in groups of organisms over geological time	
	5.4.11	Introduce roles of genes in heredity	Offspring within families- similarities and differences

Standard 5: Physical Science

Grade 5

Date		Objective: Students will	Activity/ Assessment/Experiment
	5.5.1	Compare objects in terms of common physical properties	Create mixtures and separate based on property differences
	5.5.2	Demonstrate and explain that materials exist in different states and can change	Physical- cutting wood, ripping paper Chemical- burning of wood, milk turning sour
	5.5.3	Demonstrate that light, heat, motion, magnetism, and sounds can cause changes	

	5.5.4	Recognize that light travels in a straight line and can be reflected, refracted, or absorbed	
	5.5.5	Classify and describe matter in terms of elements, compound, mixtures, and atoms	Periodic chart, experiments involving acids, bases, etc. using scientific method
	5.5.6	Show that energy is a property of many substances and can be transferred in many ways	Keep log of observations
	5.5.7	Describe, measure and calculate characteristics of moving objects and interactions	Inertia experiments, act against a force requires an equal amount of force
	5.5.8	Identify/predict what will change or remain unchanged when matter experiences change	Demonstrate a moving object: force, inertia, energy, and work function

Standard 6: Earth and Space Science

Grade 5

Date		Objective: Students will	Activity/ Assessment/Experiment
	5.6.1	Identify a solar eclipse and lunar eclipse	Describe location and function
	5.6.2	Identify an asteroid, meteor, and comet	Describe location
	5.6.3	Describe characteristics of the sun	
	5.6.4	Describe common objects in the solar system and explain their relationships	Name planets and order of planets
	5.6.5	Identify the patterns of movement of objects in the sky	

Standard 1: Science as Inquiry

Grade 6-8

Date	Objective: Students will	Activity/ Assessment/Experiment
6-8.1.1	Demonstrate ability to apply scientific inquiry skills	Identify question, formulate hypothesis, manipulate variables, use appropriate tools
6-8.1.2	Create a model to predict change and outcome	Provide content applicable experimental materials: Students design their own experiments.
6-8.1.3	Organize data	Use mathematics and technology to gather data
6-8.1.4	Present data	Analyze and quantify results of investigations
6-8.1.5	Identify and refine questions from previous investigations	Use previous investigations to generate new questions about topic
6-8.1.6	Evaluate published scientific reports	Create reviews on scientific reports

Standard 2: History and Nature of Science

Grade 6-8

Date	Objective: Students will	Activity/ Assessment/Experiment
6-8.2.1	Identify milestones that have changed thinking over time	Construct/present content applicable timelines
6-8.2.2	Science/ Technology interrelated	Research topics showing change over time(yesterday-today-tomorrow) Extended life spans, disease treatment/prevention then and now
6-8.2.3	Provide, define, and refute different explanations	Use natural processes and events
6-8.2.4	Identify characteristics of scientific thinking	Steps using scientific processes: employ experimental models, such as SSCS (Search, Solve, Create, Share)
6-8.2.5	Demonstrate that scientific explanations emphasize evidence and logically consistent arguments	Debate; Incorporate Crime Scene Investigations with a trial at the conclusion
6-8.2.6	Provide evidence for theories that result for investigations and experimentation	Reenactment of original experimentations; Space Science: Elementary Rocketry

Standard 3: Personal, Social, and Spiritual Perspective in Science and Technology Grade 6-8

Date	Objective: Students will	Activity/ Assessment/Experiment
6-8.3.1	Recognize and demonstrate how scientific knowledge, thinking processes and skills are applied in careers	Guest lectures, use website job applications to identify scientific requirements
6-8.3.2	Identify regulations and safety rules	Laboratory rules; Classroom safety inspectors: How to maintain a safe working environment
6-8.3.3	Identify risks associated with natural hazards, chemical hazards, and social hazards	Prepare a Documentary: How we interact with our environment. Sample topics: Living on the fault line, The air we breathe: Big City/Bad Air? Prepare bids for a construction project: Space The Next Frontier, Students design and construct sample space colonies
6-8.3.4	Propose a solution, resource, or product that addresses a specific human, animal, or habitat need	

Standard 4: Life Science

Grade 6-8

Date	Objective: Students will	Activity/ Assessment/Experiment
6-8.4.1	Construct classification system based on the structure of organisms	Phyla and classes; In the classroom classify buttons, seeds or sea shells. Students create their own dichotomous keys
6-8.4.2	Compare and contrast basic structures, components, functions of various cells	Use microscope to identify parts of cell: plant/animal/bacteria Cell factory: Identify a product, design a manufacturing factory, all components of the factory must provide an analogy to a particular cell and its organelles
6-8.4.3	Explain various levels of organization in relation to structure and function in a cell	Relationship between cell, tissue, organ, system, and organism
6-8.4.4	Identify vital systems involved in vital functions	Digestion, respiration, circulation

	6-8.4.5	Describe changes or consistency in groups of organisms over geologic time	Geologic/biologic timelines; Fossil evidence
	6-8.4.6	Introduce and describe roles of genes in heredity	How genes influence the transmission of traits from parents to offspring; Mendel's Experiments
	6-8.4.7	Model interaction and interdependence of living and non-living components	Interrelationship of food chains in a food web Oceans: Our environmental barometer

Standard 5: Physical Science

Grade 6-8

Date		Objective: Students will	Activity/ Assessment/Experiment
	6-8.5.1	Classify and describe matter in terms of elements, compounds, mixtures, and atomic structures	Electron dot diagrams: Modeling atomic structure; Create a fictitious Periodic Table of Elements
	6-8.5.2	Investigate the properties of mixtures	What is the relationship between sunsets and suspensions? Why is light scattered by fog? Visible light beams and the Tyndall effect; Students design a plan to demonstrate the differences among mixtures.
	6-8.5.3	Understand energy as a property of many substances	Use a concept map to list forms of energy, relate sources of this energy. Students demonstrate as change: bouncing balls; chemical reactions
	6-8.5.4	Demonstrate understanding of physical and chemical properties and changes	Kitchen Chemistry: reactions around the home Weathering: Physical or chemical change? Dry Ice Investigations
	6-8.5.5	Understand characteristics of moving objects, forces, and interaction affecting motion	Construct a model roller coaster

Standard 6: Earth and Space Science

Grade 6-8

Date		Objective: Students will	Activity/ Assessment/Experiment
	6-8.6.1	Describe and model the motion of the Earth in relation to the sun	Difference between rotation and revolution, seasons
	6-8.6.2	Describe common objects in the solar system and explain their relationships	Inner and outer planets, describe comets, meteoroids, asteroids, etc.
	6-8.6.3	Describe the composition and structure of the earth	Describe Earth's layers, main features, types of rocks Construct a scale model of the Earth's layers
	6-8.6.4	Provide evidence of how life and environmental conditions have changed	Use fossils as evidence of change; Pangaea and Plate tectonics: map current plate movement and predict future positioning based on the evidence
	6-8.6.5	Explain how Earth processes are similar to the past processes	Use examples of weathering, deposits, formation of sedimentary rock to show change
	6-8.6.6	Describe the distribution and circulation of water on Earth	Water cycle, river systems, ocean currents
	6-8.6.7	Describe the physical characteristics of the Earth's water	Major oceans, composition of ocean water, fresh water and drainage basins
	6-8.6.8	Describe large scale and local weather systems	Factors affecting weather, differences between weather and climate: Classroom Meteorologist: weather reporting
	6-8.6.9	Describe the Earth's atmosphere	Compare layers of the Earth's atmosphere
	6-8.6.10	Explain how technology has impacted both Earth and space science	Advancements in space exploration; Principles of basic rocketry and the human imagination; Mining our resources; Oil and natural gas exploration

DIOCESE OF TUCSON SCIENCE CURRICULUM RESOURCES

American Association for the Advancement of Science <http://www.aaas.org>

Animal and habitat information www.enchantedlearning.com

Arizona Game and Fish Department Project Wild in Arizona 1-800-824-2456

Arizona Project WET at the University of Arizona Water Resources Research Center and the Bureau of Reclamation (602) 771-8422

www.ag.arizona.edu/AZWATER/WET for discovering the waters of Arizona and workshops in different areas of the state

Arizona-Sonora Desert www.desertmuseum

Bear Essentials Classroom Presentations (520) 792-9930

Core Knowledge Lesson Plan www.coreknowledge.org/CK/resrcs/lessons/1.htm

Desert Museum- Desert Ark Program

Discovery Education <http://school.discovery.com/lessonplans/>

Facts, activities, and research on tigers www.savethetigerfund.org/index.htm

Flandrau Planetarium University of Arizona

Human Body <http://exhibits.pacsci.org/nutrition/default.html> <http://www.innerbody.com/>

International Wildlife Museum www.thewildlikemuseum.org

K-6 Physical Science www.physics.rutgers.edu/hex/visit/lesson/lesson_links1.html

National Geographic Explorer nationalgeographic.com/ngexplorer/pioneer/teacher

National Science Teachers Association www.nsta.org

National Science Teachers Association www2.nsta.org/sciencesites/

Outreach Education Coordinator Environmental Education Exchange outreach@eeexchange.org (520) 670-1442

PBS Teacher Source www.pbs.org/teachersource/sci_tech.htm

Plants and Animals www.urbanext.uiuc.edu/gpe/

Predator prey relationships www.dallasdino.org/predators/index.htm

Reid Park Zoo www.tucsonzoo.org

Resources from the Department of the Interior www.doi.gov/teachers

Saguaro National Park (520) 733-5158

Traveling Trunks (520) 733-5157

Scholastic <http://teacher.scholastic.com/activities/>

Science Links www.curriculum.edu.au/science/

Science Net Links www.MarcoPolo

The Educator's Reference Desk www.eduref.org/cgi_bin/lessons.cgi/science

Tohono Chul Park www.tohonochulpark.org

Tucson Electrical Power (a power company in different areas of the state) TEP.com

Tucson Water and Recycling Presentations (recycling place in other parts of AZ) (520) 670-1442

The University of Arizona K-12 Science & Mathematics Outreach Directory <http://samec.lpl.arizona.edu/>

Virtual Frog Dissection Kit <http://froggy.lbl.gov/virtual/>

Wildlife Conservation Society Education and Conservation www.wcs.org

Wildlife Museum Collections for Loan iwm@wildlifemuseum.org (520) 629-0100 ext. 311

Suggested Student Learning Objectives from Bloom's Taxonomy

Explanation		Application		Assessment	
Remember	Understand	Apply	Analyze	Evaluate	Create
List	Compare	Demonstrate	Separate	Recommend	Develop
Write	Relate	Use	Examine	Criticize	Create
Recite	Associate	Arrange	Divide	Justify	Imagine
Identify	Categorize	Apply	Dissect	Judge	Produce
Find	Match	Road	Outline	Value	Invent
Group	Group	Write	Investigate	Evaluate	Fabricate
Say	Contrast	Practice	Sequence	Esteem	Construct
Tell	Classify	Complete	Graph	Measure	Summarize
Name	Distinguish	Execute	Focus	Estimate	Predict
Locate	Discriminate	Experiment	Distribute	Grade	Make
Repeat	Explain	Solve	Inspect	Appraise	Originate
Copy	Reword	Propose a solution	Analyze	Decide	Devise
Label	Draw or recognize	Make use of	Sort	Choose	Design
Memorize	Restate	Employ	Discover	Put in order	Hypothesis
Duplicate	Outline	Try	Separate	Award	Compose
Define	Translate	Develop a plan for	Identify- parts	Rate	
	Summarize		Reduce	Rank	
	Select		Inspect	Grade	
	Example from non-examples		Categorize	assess	
			Compare and contrast		

Higher Level Thinking Objectives



Doing Science

This brief outline will help you and your students think about science. It is the same method used by professional scientists.

- “I noticed” (observation): done with the eyes, ears, nose, sense of taste or touch. It is preferable if your child makes the observation directly, not something noticed on T.V.
- “I wonder why. Maybe it is ... X.” (hypothesis): a good guess
- “Check it out!” (test): this can be a survey (collection of more observations) or an experiment (comparing one set of subjects to another; often comparing a treatment to a control group.) The reason we do testing is to see which variable has an effect on what you measure. The kids call variables “different things”.
- If you find one variable has no effect, you have disproved your hypothesis. Science is all about disproving hypotheses. If a hypothesis has been subjected to repeated testing and no one can disprove it, it is then called a “theory”

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