

Science Curriculum Parent Guide

School: Burke/Memorial
Course Description:

Grade: PreK

The preschool program is a play-based program where special needs children learn alongside their typically developing peers. The teacher's and children's interest serve as a springboard for the curriculum. The children learn in an environment that acknowledges, respects and accommodates each learner's background and individuality. Through the four strands: Inquiry Domains of Science, Technology, Science, Technology and Human Affairs, children will gain strategies that they will need in order to become scientifically and technological literate.

Unit	Concepts
Transportation	Students will be able to recognize, identify and describe: Different types of vehicles; Wheels, engines, and safety; Different vehicles travel on different surfaces; Vehicles transport people and goods.
Living Things Growing a Plant	Students will be able to recognize that plants and animals are living things that grow, reproduce, and need food, air, and water. Parts of a plant and what comes from a plant. Feeding birds.
Seasons	The students will be able to: Identify some events around us that hve repeating patterns including seasons of the year, day and night; Describe the weather changes form day to day and over the seasons; Describe different types of precipitation: rain, snow. Students will participate in nature walks in fall, winter, spring and summer (observing changes)
Water	Students will be able to: Identify objects and materials as solid, liquid, or gas. Compare and contrast (wet/dry),(Float/sink), and (Warm /cold) What is the Ocean?
Recycling/Pollution	Earth day; Too much trash –The Trash barrel and the Recycling bin; Keeping our playground clean; The role of Trees

Suggestions for Parental Involvement

Parents who drive special vehicles such as police cars, ambulances, 18 wheelers, and fire-trucks have brought the vehicles to school to show the children.
 Plants grown go home with children to care for.
 Parents send their children prepared to go outside in all seasons.
 Class books made regarding seasonal hikes go home with children to be read by parents and then are sent back to school.

Course Description:

During the kindergarten year the students will be exposed to five major topics; pumpkins, magnets, rocks, recycling and plants. Through the exploration of these topics, the students will learn to raise questions and to try to answer them. They will not only ask the questions, but they will “own the questions” by actively participating with materials and their environment in order to answer the questions. The students will ask questions about the natural world, as well as create the tools to solve their problems or questions. In addition, the students will learn how their questions and solutions are part of our every day lives and impact human life.

Unit Concepts

Pumpkins	The student will be able to: Identify a pumpkin as a living thing; Demonstrate an understanding of the life cycle of a pumpkin; Explain the decomposition of a pumpkin.
Rocks	The student will be able to: Identify a rock as a non-living thing; Demonstrate that there are many different shapes, sizes, colors, weights, and textures of rocks; Identify some uses of rocks in society; Name a geologist as a scientist that studies rocks; Recognize that water, rocks, soil, and living organisms are found on Earth’s surface; Explain that fossils give us information about living things long ago.
Magnets	The student will be able to: Predict which things will stick to a magnet; Show that some magnets are stronger than others are; Identify some uses of magnets in society; Demonstrate that magnets either push or pull other magnets.
Seasonal Calendar Activities	The student will be able to: Describe weather changes form day to day and over the seasons; Identify that seasons and day and night occur in repeated patterns; Describe the changes that a tree goes through as the seasons change; Describe ways in which technology helps to make life more comfortable during the seasons (i.e. air conditioners, fans, heating systems, warm clothes).
Living Things- Growing a Plant	The student will be able to: Describe the life cycle of a plant; Identify that a plant is a living thing; Recognize that the sun and water are necessary for plants to grow.
Design it! Build it!	The student will be able to: Identify and describe characteristics of natural and human-made materials; Describe some possible uses for natural and human-made materials; Identify and describe the safe and proper use of classroom tools and materials; Identify items that can be recycled.

Suggestions for Parental Involvement

All units-	Parents help at science center during center time.
Rock unit-	Parents send in or bring in and talk about their own personal rock collection. Parents help children find pictures of things made out of rock.
Plant Unit-	Parents contribute bulbs, plants, or seeds for classroom indoor or outdoor garden or terrarium. Parents help children to prepare, plant and tend to class garden.
Build it Unit-	Parents help children to make a list of the materials that were used to build their houses. Parents help children find an item around the home that was designed for a specific purpose. Parents and children record what the item is, what it is made out of, what its function is (i.e. a can opener, bread box.

Course Description:

First grade students will be introduced to four major topics which include Push and Pull (Balls and Ramps), Living & Non-Living Things, Properties of Matter, and Life Cycles of a Frog. Children will explore the topics by observing, exploring, demonstrating, asking questions, and making predictions. Students will learn to interpret, describe and communicate their findings.

Units	Concepts
<p>Push and Pull (Ball and Ramps)</p>	<p>First Graders will: Make predictions based on past experience with a particular material or object; Extend observations using simple tools; Experience and describe how and object’s motion can be changed through the action of a push or pull on the object; Identify a simple current technological problem; Implement a solution by constructing a device using materials provided; Evaluate the solution in terms of whether it meets the goals; Communicate a problem and design a solution using drawings and words; Propose the ways to improve the solution; Demonstrate use and care of simple tools.</p>
<p>Living and Non-Living Things</p>	<p>First Graders will: Plan and conduct a simple investigation knowing what is to be compared or looked for; Recognize and communicate simple patterns in data; Explore and describe plants and animals as living things with characteristics that differentiate them from non-living things; Demonstrate awareness that there are millions of kinds of living things on Earth, and that the number of species is not known.</p>
<p>Properties of Matter</p>	<p>First Graders will: Observe and describe familiar objects and events, identifying details, similarities, and differences; Identify the observable properties of objects such as size, weight, shape, and color; Represent and understand that the sun supplies heat and light to the earth; Differentiate between solid, liquid, gas and how they are changeable.</p>
<p>Life Cycle of a Frog</p>	<p>First Graders will: Describe ideas about “how,” “why,” and “what would happen if…” Demonstrate an understanding that and plants and animals go through predictable life cycles and explain the stages of the cycle; Observe and describe that plants and animals have different structures which serve different functions in growth, survival, and reproduction; Give examples of how different plants and animals have features that help them thrive in different kinds of places; Recognize that these features may be external, internal, or behavioral; Observe and illustrate ways that individuals of the same kind differ in some of their characteristics, and that some of the differences give individuals an advantage in surviving and reproducing; Provide evidence that all organisms use some basic building blocks, including water and oxygen; Provide examples of living organisms meeting their needs by interacting with living and non-living parts of the environment in which they live.</p>

Suggestions for Parental Involvement

Let the child take the lead, and then build on his or her interests.

Take time to 'do' science, helping the child explore his or her world.

Talk with your child and listen to his or her explanations and questions instead of just giving answers.

Be prepared to say "I don't know." Ask questions to help the child learn to search for solutions.

Be enthusiastic! Let the child see your curiosity.

Be ready for teachable moments.

Explore science in and around the community.

Develop a resource library at home!

Be an active participant in the homework assignments/projects.

Take pictures!

School: _____ McGovern _____

Grade: 2

Course Description:

During the second grade year, the students will be exposed to four science units. Through the use of observation, description, questioning, prediction, investigation, and interpretation, the students will be able to communicate their knowledge of the four required science units for second grade. They will be able to apply the knowledge learned to the world around them.

Unit	Concepts
Earth-Moon-Sun	<p>The students will be able to:</p> <ul style="list-style-type: none">List, recognize, and discuss the phases of the moon;Define the terms new moon, waxing, crescent, waxing first quarter, waxing gibbous, full moon, waning gibbous, waning last quarter, waning crescent, moonrise, and moonset;Identify the difference between daytime and nighttime;Identify and describe rotation as the cause of night, day, and worldwide time zones;Identify, discuss, and classify stars as huge, round balls of hot, glowing gas varying in size, color, and temperature;Identify and explain the relationships between stars, stars and the earth, the earth and other planets, the earth and the sun, and the earth and the moon;Define the terms orbit, rotation, revolution, and axis;Describe the shape of the earth, to identify earth as a planet of oceans and land, and to demonstrate that the earth is made of different layers with specific names;Recognize the earth as having a an atmosphere made up of multiple layers of gas.
Weather	<p>The student will be able to:</p> <ul style="list-style-type: none">Define the term weather, explain how weather occurs, and discuss the effects of weather on our lives and the world around us;Identify and use different weather tools;Show that weather occurs in predictable ways;Analyze climate and relate it to geography;Identify, analyze, and explain the different phases of the water cycle;Describe and classify different types of clouds.
Dinosaurs	<p>The students will be able to:</p> <ul style="list-style-type: none">Explain the importance of fossils;Identify the different types of dinosaurs;Discuss the difference between the environment of different periods and today;Analyze different theories surrounding the extinction of dinosaurs.
Animal Habitats	<p>The student will be able to:</p> <ul style="list-style-type: none">Define, give examples of, describe the different habitats of, and discuss the specific needs of vertebrates and invertebrates;Classify a butterfly and recognize, explain, and diagram the life cycle of a butterfly;List, examine, and compare different animal adaptations;Summarize and connect different aspects of the food chain;Recognize the importance of an animal's environment and explain the effects of changes to it;Create positive changes in order to protect the environment.

Suggestions for Parental Involvement

1. Parents keep moon chart for one month with students recording moon phases.
2. Parents involved with assigned writing projects for all units- poetry, illustrations, etc.
3. Hands-on activities in classroom require parental involvement-ex.) making globes, moon cookies, fossils, weather flags.
4. Helping with butterfly garden.

Course Description:

During the Third Grade year, the students will explore topics in each of the following domains of science: Physical Science, Life Sciences, and Earth & Space Science. Students will develop an understanding of the scientific process through an inquiry-based approach. Students will engage in numerous hands-on activities that encourage them to make observations, ask questions, test ideas, and share results. Concept development will be enhanced through the use of reading, writing, listening, and speaking. The Science Curriculum will be presented to all third grade students using a multisensory approach with a focus on the multiple intelligences. It is hoped that third graders will enjoy science as a fun, rewarding, and meaningful part of their school experience.

Unit

Concepts

Plants	The student will be able to: Observe and infer the needs of seeds, germination, and ways in which seeds are scattered; Understand the plant life cycle; Describe and identify the structures of plants and their functions; Describe and understand the process of photosynthesis and the structures that enable the process; Identify green plants as producers and understand that living things depend on photosynthesis for food; Identify fungi as decomposers and understand the place of decomposition in the life cycle.
Magnetism	The student will be able to: Understand what metals magnets are made from; Analyze the attracting and repelling forces of magnets; Observe that magnets have magnetic fields and it is possible to magnetize iron or steel objects.
Electricity	The student will be able to: Explain the ways electricity is used in our lives; List ways and reasons for energy conservation; Build an electric circuit and understand an electric current. Examine the history of electricity; Identify and contrast the different types of electricity; Asses proper precautions when working with electricity.
Water Cycle	The student will be able to: List, compare, and analyze the steps in the water cycle; Recognize the importance of the water cycle; Differentiate between types of precipitation; Explain the importance of and examine methods of water conservation.
Fresh Water Ecosystems	The student will be able to: Describe the characteristics of a pond and differentiate between the three types of ponds; Analyze ecosystems, food webs, and food chains; Identify and explain the stages of a fresh water ecosystem and a river; Evaluate the effect of people and pollution on fresh water ecosystems.
Inner Earth	The student will be able to: List and describe the four main parts of Earth (crust, mantle, inner core, outer core); Understand the movement of tectonic plates and the geographic effects of these movements (such as volcanoes and earthquakes); Describe the formation and eruption of volcanoes; Differentiate between lava and magma; Explain the occurrence of earthquakes.

Suggestion for Parental Involvement

Study guides are sent home with each unit-and parents should review information in preparation for test. Parents should review notes from units with students.

School: _____ Memorial _____

Grade: ___ 4 ___

Course Description:

The Fourth grade students will be able to make observations, compare the similarities and differences of various objects, ask questions and utilize hands-on activities that will test and analyze the hypotheses. Through reading, writing, listening to lectures, hands-on activities, audio-visual equipment, and cooperative groups, the fourth graders will be able to complete all topics outlined in the curriculum. The curriculum will be presented to all the students in the fourth grade. The curriculum will be presented through a structured format, using a multisensory approach with a focus on multiple intelligence.

Units

Concepts

Solar System	The student will be able to: Recognize that the earth is part of a system known as the solar system. List and describe the nine planets in order from the sun; Discuss how the sun, planet, and many moons make up our solar system; Make connections between the rotation of the earth and other planets, and discuss the relationships between the time it takes a planet to make one revolution around the sun; Observe and record the phases of the moon.
Organisms	The student will be able to: Identify and describe the characteristics of insects; Identify and describe each stage in the life cycle of an insect (complete metamorphosis and incomplete metamorphosis); Gain an understanding that vertebrates are animals with backbones (including fish, amphibians, birds, and mammals); Differentiate among types of vertebrates; Gain an understanding that invertebrates are animals without backbones; Identify characteristics that distinguish invertebrates; Discuss how all animals share the need for food, water, and shelter.
Rocks and Minerals	The student will be able to: Identify the three forms of rocks (igneous, metamorphic, sedimentary), and explain the natural and physical processes that create these rocks; Explain and identify physical properties of minerals (including hardness, color, luster, and streak); Identify and discuss the rock cycle.
Properties of Matter	The student will be able to: Differentiate between properties of objects (size, shape, and weight); Differentiate between properties of materials (color, texture, and hardness); Compare and contrast properties of solids, liquids, and gases; Describe how matter changes when heat or cold is added; Describe the process of a physical change of matter; List and explain different types of physical changes; Understand that a chemical change is the change of one kind of matter into another kind of matter and list different chemical changes.
Technology and Simple Machines	The student will be able to: Identify and explain the differences between simple and complex machines that include wheel and axle, incline plane, and wedges; Create a simple machine and explain how it is used as a building tool.

Suggestions for Parental Involvement

Parents should check and initial the child's homework assignment book.
Parents should make sure that homework is done thoroughly and neatly.
Parents should reinforce study guides for tests with their children.
Assist child in making flashcards to help study science vocabulary terms.
Assist with hands on science projects at home.
Sign and return tests, quizzes, and class grades as requested by the teacher.

School: Memorial

Grade: 5

Course Description

The fifth grade science program continues to build upon the scientific concepts introduced in the lower grades, with emphasis placed on developing process skills. The Inquiry Strand focuses on hands on experimentation using the Scientific Method. Note taking is introduced and a lab notebook is used to contain the daily notes and to record in-class experimentation. This program is designed to provide the students with a basic understanding of their world and to provide building blocks for further study.

Scientific concepts are also integrated into the Reading, Science, and Language Arts programs. Reading, writing and art activities are all incorporated into each unit of study. Science homework is included into the nightly one hour total expected of grade 5 students. Extra work may be assigned to accompany special unit projects

Unit	Concepts
Animals	<p>The student will be able to:</p> <ul style="list-style-type: none">Explain the classification system using the five major kingdoms and listing the characteristics of each major group: plants, animals, monerans, protists, and fungi;Use an identification key to identify both a plant and an animal;Compare characteristics of vertebrates and invertebrates emphasizing the invertebrate categories found in the oceans;Demonstrate knowledge of animal interaction in a food chain on both land and in water;Identify animal behaviorists Konrad Lorenz, Ivan Pavlov, B. F. Skinner, or Dr. Francine Patterson and tell about their work with animals and knowledge learned about animal behavior;Compare and contrast conditioned and learned responses;Demonstrate methods of learning for both animals and humans;Observe live animals and their response to different stimuli;Explain different methods of animal communication;Explain how animal behavior adapts to changes in the environment;Identify how certain animal adaptations contribute to their survival in a particular environment
Weather	<p>The student will be able to:</p> <ul style="list-style-type: none">Identify conditions necessary to produce weather and demonstrate how a meteorologist uses weather maps to predict future weather conditions;Demonstrate knowledge of weather instruments by creating and using, barometers, hygrometers, wind vanes, thermometers, and rain gauges to predict local weather;Identify the layers of the Earth's atmosphere and where weather occurs;List types of commonly occurring clouds and understand how they can be used to predict the weather;Compare techniques available for weather forecasting: weather balloons, radiosondes, satellites, and computers;Create a weather balloon to be sent aloft with an attached note;Explain how the water cycle is connected to our weather and review forms of precipitation;Investigate how acid rain forms and how it affects the Earth;Investigate the Greenhouse Effect, its causes, effects, and how we can solve the problem;Examine how severe weather forms, its effect on the Earth's surface, and appropriate safety precautions.

Oceans	<p>The student will be able to:</p> <ul style="list-style-type: none"> Demonstrate a knowledge of the names and locations of Earth’s major oceans, seas, gulfs, bays, and straits; Compare and contrast ancient and modern methods associated with undersea exploration. Explain how explorers such as Jacques Cousteau and Robert Ballard have contributed to new technologies and discoveries of the ocean; Show and label the layers of the ocean floor and demonstrate how an echo locator works to outline the shape of the ocean floor; Explore the theory of drifting continents and theories concerning the formation of the ocean; Demonstrate how waves and tides occur and what their affect is upon the Earth’s shoreline; Discuss how warm and cold water currents form; Identify the natural resources obtained from the sea and how they could be protected and used wisely; Investigate the diversity of life in the ocean and locate the particular zones where each is found; Explain the needs and adaptations of plants and animals found between the tides, continental shelf, coral reefs, and open ocean; Illustrate an ocean food chain; Identify causes of ocean pollution and how ocean life is affected and investigate technologies used for ocean clean up of polluted waters.
Cells and Heredity	<p>The student will be able to:</p> <ul style="list-style-type: none"> Investigate how lenses magnify objects and how a microscope operates. Compare early microscopes with modern ones; Compare and contrast plant and animal cells, labeling their organelle structures; (nucleus, cell wall, cell membrane, cytoplasm, vacuoles, mitochondria, ribosomes, chloroplasts); Identify and illustrate characteristics of three common protists; amoeba, paramecium and euglena; Compare and contrast mitosis (cell division) with meiosis (sex cell formation) and explore the structure and importance of DNA to the passing on of hereditary traits to offspring; Explore the use of DNA in solving crimes; Compare and contrast dominant and recessive genes and purebred and hybrid plants and animals; Create a kid using dominant and recessive traits (computer program); Examine common heredity traits in humans, animals, and plants . Explain how some traits or mutations can lead to special adaptations to make a plant or animal better suited to a particular environment; Examine the history of the study of heredity research and discuss new developments affecting life today.
Ecosystems	<p>The student will be able to:</p> <ul style="list-style-type: none"> Identify the parts of an ecosystem and compare and contrast niches and habitats; Compare land and water ecosystems and how the organisms interact in each; Demonstrate where producers, consumers, scavengers and decomposers occur in food chains, energy pyramids, and food webs; Discuss photosynthesis and the carbon dioxide-oxygen cycle; Compare and contrast herbivores, carnivores, and omnivores and their function in an ecosystem; Define symbiotic relationships (commensalisms, mutualism parasitism); Examine owl pellets and predator –prey relationships and how they can create a change in an ecosystem; Create a closed ecosystem and record changes over time; Discuss how environmental changes affect an ecosystem; Compare and contrast two land biomes.

	Identify and research endangered species and discuss ways to protect animals from extinction
Technology and Simple Machines	<p>The student will be able to:</p> <ul style="list-style-type: none"> Use and investigate differences in screws and screwdrivers and how they are used; Apply knowledge of the use of screws to create an object from cut wood and screws; Identify screws used in home building structures. (wooden wall structures, sheetrock, cabinets, roof etc.); Explore different kinds of gears and how they make work easier. Observe motion of multiple gears working together; Create a moving object using gears; Identify how simple machines make work easier. (levers, pulleys, incline planes, wheel and axles, wedges, screws, and gears); Identify simple machines that make up common complex machines. (hand egg beaters, hand juicers, toy cars); Create an edible vehicle using at least two simple machines that can travel a specified distance on wax paper.
Sound and Light	<p>The student will be able to:</p> <ul style="list-style-type: none"> Define how scientists describe light and list some of its sources; Describe how light waves act: reflected, refracted, and compare and contrast opaque and transparent surfaces; Investigate laser light; Explain how the electromagnetic spectrum and color are related; Define how sound is produced and how sounds differ. (volume, pitch, decibel scale); Demonstrate how humans hear sounds and label the parts of the human ear; Compare and contrast music and noise; Create an instrument that illustrates sound in music; Investigate radiant energy waves.

Suggestions for Parental Involvement

1. Check homework notebook frequently to help review for tests.
2. Review class work notes to assess child's understanding of concepts.
3. Guidance in finding materials for research and projects: actual work should be child's own doing.

