

Course Syllabus

Science, Grade 4

Grade 4 Science, Final
Guardian Angels School

The ITBS Form A for science measures the skills and achievement of students.

The MEAP assesses student progress in Science.

The Science performance standards are built upon the National Research Council's "National Science Education Standards" (1996) and the American Association for the Advancement of Science's Project 2061 "Benchmarks for Science Literacy" (1993).

Science is a way of making sense of the natural world. Scientists seek to describe its complexity, to explain its systems and events, and to find the patterns that allow for predictions. Science is the basis for the design of technologies that solve real world problems.

Not all students will become scientists or engineers. But science and technology occupy ever-expanding places in our everyday lives. As citizens, we are asked to make decisions about social issues that involve science and technology. As workers, we have occupations that increasingly involve science and technology. In the 21st century, adults will need to be comfortable and competent in a complex, scientific and technological world. Schools have the responsibility of preparing students for the future. Schools must prepare all students -- regardless of their future aspirations -- to be scientifically literate.

Therefore, all graduates of our schools should be:

*knowledgable about the important concepts and theories of the three major branches of scientific study: earth, life, and physical sciences;

*able to think scientifically and use scientific knowledge to make decisions about real world problems;

*able to construct new knowledge for themselves through research, reading, and discussion;

*familiar with the natural world, and respectful of its unity, diversity, and fragility;

*able to make informed judgments on statements and

debates claiming to have a scientific basis; and,

*able to reflect in an informed way on the role of science in human affairs.

To make this happen, education needs to:

1. emphasize understanding, not content coverage;
2. promote learning that is useful and relevant;
3. emphasize scientific literacy for ALL students; and,
4. promote interdisciplinary learning.

The "Michigan Content Standards and Benchmarks" describe three broad categories of activities that are common in scientifically literate individuals: using scientific knowledge; constructing new scientific knowledge, and reflecting o knowledge. The content strands are directly related to these types of activities.

The New Standards for Science provide Performance Standards for students in grades K-4.

Earth and Space Science

The Earth and Space Science unit addresses the composition, structure, exploration, and history of the earth and space. Topics include plate tectonics, the atmosphere, geological cycles and processes, weather, climate, the solar system, and the universe.

- The learner will be able to understand the earth's composition.
- The learner will be able to comprehend the internal and/or external structure of the Earth.
- The learner will be able to identify water sources that provide drinking water.
- The learner will be able to describe the three different states (liquid, solid, and gas) of water.
- The learner will be able to track the flow of rain water (precipitation, flow, bodies of water).

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- The learner will be able to develop an understanding of the objects in the sky.
- The learner will be able to explain the basic traits of the earth, moon, and sun.
- The learner will be able to describe how the earth and moon move around the sun.
- The learner will be able to describe natural phenomena by utilizing scientific knowledge.
- The learner will be able to explain safety precautions necessary during severe weather conditions.
- The learner will be able to explain weather conditions.
- The learner will be able to understand the characteristics of the universe.
- The learner will be able to describe the atmosphere.
- The learner will be able to describe the properties of the Earth's surface, such as rivers, oceans, and mountains.
- The learner will be able to describe how the history of the earth can be understood utilizing rocks and fossils.
- The learner will be able to develop an understanding of the various changes to the earth and sky.
- The learner will be able to recognize forms of earth's materials.
- The learner will be able to explain various kinds of earth materials.
- The learner will be able to explain various uses of earth materials.
- The learner will be able to understand the properties of Earth's materials.
- The learner will be able to describe natural changes in the surface of the Earth.
- The learner will be able to describe how the weather changes based on the seasons.
- The learner will be able to explain uses of water.

Life Science

The Life Science unit addresses the characteristics and cycles of and relationships between living things and their environments. Topics include cellular organization, classification, ecosystems, genetics, and human health issues.

- The learner will be able to describe the basic needs living things require for survival.
- The learner will be able to describe how the characteristics of living things, physical and/or behavioral, help them survive.
- The learner will be able to describe patterns of interrelationships and interdependence among living things.
- The learner will be able to comprehend that living things alter over time.
- The learner will be able to understand the interactions within an environment.
- The learner will be able to describe how organisms from long ago are evidenced in fossils.
- The learner will be able to plan systems that foster the growth of certain plants or animals.
- The learner will be able to comprehend the life cycles of living things.
- The learner will be able to explain the life cycles of particular living things.
- The learner will be able to develop an understanding of personal health.
- The learner will be able to explain how humans both positively and negatively affect the environment.
- The learner will be able to compare and contrast living things in terms of food, energy, and environmental needs.
- The learner will be able to develop an understanding of organisms' characteristics.

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- The learner will be able to classify organisms based on physical attributes.
- The learner will be able to compare the physical attributes of organisms.
- The learner will be able to recognize common living things as components of a food chain.
- The learner will be able to show comprehension of the structure of organisms.
- The learner will be able to use observable body parts and attributes to explain vertebrates.
- The learner will be able to develop an understanding of environmental adaptation.
- The learner will be able to develop an understanding of organisms and the environments in which they live.
- The learner will be able to provide evidence that traits are passed from parents to offspring.
- The learner will be able to explain the functions of certain parts in seed plants.
- The learner will be able to show a disposition toward recycling.
- The learner will be able to show ways of recycling manufactured materials.
- The learner will be able to measure materials in terms of weight, dimensions, and temperature.
- The learner will be able to develop an understanding of light.
- The learner will be able to develop an understanding of heat.
- The learner will be able to develop an understanding of electricity.
- The learner will be able to describe electrical hazards that may be found at school or at home.
- The learner will be able to describe how electrically charged materials interact with other charged and uncharged materials.
- The learner will be able to use properties, such as color and brightness, to describe light.
- The learner will be able to develop an understanding of magnetism.
- The learner will be able to describe how magnetic materials interact with other magnetic and non-magnetic materials.
- The learner will be able to recognize the characteristics of materials that enable them to be specifically suited to certain purposes.

Physical Science

The Physical Science unit includes concepts related to matter, forces, motion, and energy, as well as their interactions. Topics include chemical and physical changes, electricity, magnetism, heat, light, sound, machines, work and power.

- The learner will be able to explain or compare the direction and speed of the motions of objects.
- The learner will be able to measure objects in terms of weight, dimensions, and temperature.
- The learner will be able to build simple objects that satisfy a technological purpose.
- The learner will be able to begin to understand the properties of materials.
- The learner will be able to explain typical physical changes of matter: size, shape, melting, freezing, dissolving.
- The learner will be able to begin to understand the properties of objects.
- The learner will be able to classify objects based on their observable properties.
- The learner will be able to begin to understand the position of objects.

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- The learner will be able to use properties, such as pitch and loudness, to describe sounds.
- The learner will be able to explain how sounds are produced.
- The learner will be able to classify substances based on their observable properties.
- The learner will be able to apply an understanding of changes of matter.
- The learner will be able to create mixtures and separate them into their component parts.
- The learner will be able to explain how objects are illuminated by light.
- The learner will be able to understand forces and motion.
- The learner will be able to explain that in order to change the direction or speed of an object or to stop an object in motion, forces are required.
- The learner will be able to explain how shadows are formed.
- The learner will be able to have a comprehension of mechanics.
- The learner will be able to know the properties of matter.
- The learner will be able to begin to understand the motion of objects.
- The learner will be able to develop an understanding of energy.
- The learner will be able to recognize energy types related to common events.
- The learner will be able to describe or analyze an observation using information and previous knowledge.
- The learner will be able to plan and perform explorations utilizing systematic observations.
- The learner will be able to develop an appreciation for the natural world.
- The learner will be able to communicate information and ideas individually and in a group.
- The learner will be able to utilize data to resolve a dispute.
- The learner will be able to use scientific evidence to reach explanations.
- The learner will be able to understand the importance of evidence in making scientific decisions.
- The learner will be able to evaluate written and oral explanations.
- The learner will be able to summarize observation findings.
- The learner will be able to use observation skills to develop reasonable questions about the world.
- The learner will be able to ask questions pertaining to organisms.
- The learner will be able to ask questions pertaining to objects.
- The learner will be able to ask questions pertaining to events.
- The learner will be able to formulate questions about the natural world.
- The learner will be able to utilize suitable instruments to extend the senses.
- The learner will be able to communicate results utilizing various media.
- The learner will be able to utilize appropriate math to collect data.

Research and Inquiry

The Research and Inquiry unit focuses on the knowledge, processes, and real world issues associated with science and technology. Topics include experimentation, data analysis, science related careers, and technological advances.

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- The learner will be able to utilize appropriate math to analyze data.
- The learner will be able to identify a problem.
- The learner will be able to implement a proposed solution to a problem.
- The learner will be able to suggest a solution to a problem.
- The learner will be able to develop the skills of problem solving.
- The learner will be able to devise solutions to unfamiliar problems by using reasoning, observation, and/or experimentation.
- The learner will be able to make charts.
- The learner will be able to construct graphs.
- The learner will be able to comprehend the fundamental concepts, principles, and facts of science.
- The learner will be able to come to conclusions based on scientific evidence.
- The learner will be able to describe the ways in which technology is used in daily life.
- The learner will be able to utilize technology to extend the senses.
- The learner will be able to use simple machines and explain how they work.
- The learner will be able to utilize simple machines to simplify work.
- The learner will be able to utilize various types of instruments to gather data.
- The learner will be able to differentiate between fact and opinion.
- The learner will be able to understand the skills required to do scientific inquiry.
- The learner will be able to understand methods of scientific inquiry.
- The learner will be able to comprehend that analysis and interpretation are components of scientific inquiry.
- The learner will be able to comprehend how science and technology both create useful interactions between the natural and designed worlds.
- The learner will be able to know that scientists from a variety of backgrounds contribute to science.
- The learner will be able to create concepts and strategies to approach problems.
- The learner will be able to create plans to utilize in learning activities.
- The learner will be able to perform metric measurements using simple measurement instruments.
- The learner will be able to judge the accuracy, design and results of explorations.
- The learner will be able to perform a scientific investigation.
- The learner will be able to comprehend science as a human endeavor.
- The learner will be able to assess various viewpoints using experience, knowledge and observation.
- The learner will be able to utilize technology in gathering data.
- The learner will be able to gather facts using an assortment of electronic and print resources for a research project.
- The learner will be able to develop information gathering skills.
- The learner will be able to develop techniques for collecting information.
- The learner will be able to gather scientific data from a variety of sources.
- The learner will be able to gather data with a partner or in a small group.

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- The learner will be able to create representations of data in a variety of forms.
- The learner will be able to communicate in a manner appropriate to the purpose and audience.