

Course Syllabus

Science, Grade 5

Grade 5 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 Michigan Science Curriculum Framework provides standards and benchmarks for students in grades K-5.

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

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 explore and explain how weather changes daily, seasonally, and over long periods of time.
- 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 recognize a variety of water sources.

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- The learner will be able to explain the way in which water moves.
- The learner will be able to explain the properties of water.
- The learner will be able to explain how water exists in three states on the earth.
- The learner will be able to track the flow of rain water after it falls.
- The learner will be able to show the location of water on the earth.
- The learner will be able to find similarities and differences in the properties of the sun, moon, and earth.
- The learner will be able to explain the movement of the moon around the earth.
- The learner will be able to explain the motion of the earth in relation to the sun.
- The learner will be able to compare and contrast the earth and sun to other planets and star systems.
- The learner will be able to explain safety precautions necessary during severe weather conditions.
- The learner will be able to explain what constitutes weather.
- The learner will be able to explain weather conditions.
- The learner will be able to explore what constitutes weather.
- The learner will be able to understand the characteristics of the universe.
- The learner will be able to describe how we gain knowledge about the universe.
- The learner will be able to explain the motion of different types of solar system objects.
- The learner will be able to analyze interactions between human activities and the hydrosphere.
- The learner will be able to analyze how human activities and the atmosphere relate.
- 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 identify various kinds of earth 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 describe how the features of the earth's surface alter over time.
- The learner will be able to describe natural changes in the surface of the Earth.
- The learner will be able to describe key features of the earth's surface.
- The learner will be able to explain the surface of the earth.
- The learner will be able to analyze how technology impacts the surface of the earth.
- The learner will be able to explain Michigan's seasonal weather changes.
- The learner will be able to describe what causes various types of weather.
- The learner will be able to recognize how water is used.

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.

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- The learner will be able to describe the ways that behavioral and physical adaptations give animals the capability to respond to the needs of life.
- The learner will be able to describe the basic needs living things require for survival.
- The learner will be able to describe objects found in the environment.
- The learner will be able to understand the interactions within an environment.
- The learner will be able to explain the way in which materials are reused in the 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 describe properties and functions of various animals' observable body structures.
- The learner will be able to explain how characteristics are passed on through generations.
- The learner will be able to comprehend the life cycles of living things.
- The learner will be able to describe the life cycle of living things.
- The learner will be able to find differences in the life cycles of a variety of organisms.
- The learner will be able to compare ways that organisms are adapted to survive and reproduce in their environments.
- The learner will be able to recognize common living things as components of a food chain or food web.
- The learner will be able to explain the feeding relationships among organisms within a particular food web.
- The learner will be able to describe the reasons that living things within a species differ.
- The learner will be able to describe how species alter over time.
- The learner will be able to describe the way in which scientists form and scientifically test the theories pertaining to the evolution of species.
- The learner will be able to explain how humans both positively and negatively affect the environment.
- The learner will be able to examine the ecological impact of human interactions with the environment.
- The learner will be able to apply knowledge of the function of cells in multicellular living things, including cell growth, development, and reproduction.
- The learner will be able to describe the distribution of energy to organisms in an ecosystem.
- 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 find similarities and differences in familiar living things based on observable physical properties.
- The learner will be able to describe how organisms obtain and utilize energy.
- The learner will be able to explain the way in which organisms transform energy.
- The learner will be able to explore how organisms obtain and utilize energy.
- The learner will be able to explain groups of organisms by utilizing classification systems.
- The learner will be able to classify organisms based on various observable characteristics.
- The learner will be able to show comprehension of the structure of organisms.

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- The learner will be able to analyze how the structures of organisms are adapted to perform specific functions.
- The learner will be able to analyze how technology impacts the resources of the earth.
- The learner will be able to develop an understanding of environmental adaptation.
- The learner will be able to describe the way in which scientists form and scientifically test theories pertaining to the origin of life.
- The learner will be able to describe how organism communities alter over time.
- The learner will be able to explore the alterations in communities of organisms over time.
- The learner will be able to describe how gene manipulation or alteration can establish new traits.
- The learner will be able to provide evidence that traits are passed from parents to offspring.
- The learner will be able to explore how traits are passed from one generation to the next.
- The learner will be able to explain the functions of certain parts in seed plants.
- The learner will be able to show methods to conserve natural resources by reducing, reusing, and recycling synthetic materials.
- The learner will be able to show methods to reduce pollution by reducing, reusing, and recycling synthetic materials.
- The learner will be able to describe how parts of an ecosystem interact.
- The learner will be able to describe the relationships between parts of ecosystems.
- The learner will be able to explain how materials cycle through an ecosystem.

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.
- The learner will be able to explain changes in matter.
- The learner will be able to explain how matter changes due to organisms.
- The learner will be able to explain how matter changes due to technology.
- The learner will be able to describe how observable matter alterations are associated with molecules and atoms.
- The learner will be able to investigate alterations in matter.
- The learner will be able to analyze alterations in matter.
- The learner will be able to describe how objects move.
- The learner will be able to explain color.
- The learner will be able to describe shadows and other light phenomena.
- The learner will be able to utilize prisms with sources of light to create differently colored light.
- The learner will be able to utilize filters with sources of light to create differently colored light.
- The learner will be able to explain sounds.
- The learner will be able to describe electrical hazards that may be found at school or at home.
- The learner will be able to explain how energy is transformed by technology.
- The learner will be able to associate energy transformations with motion.

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- The learner will be able to describe how changes in matter and energy are related.
- The learner will be able to build basic electrical circuits that are useful.
- 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 properties of materials that make them beneficial.
- The learner will be able to explain typical physical changes of matter: size, shape, melting, freezing, dissolving.
- The learner will be able to explain typical physical changes of matter including evaporation.
- The learner will be able to describe the ways that the motion of objects can be controlled.
- The learner will be able to show the ways that the motion of objects can be controlled.
- The learner will be able to classify objects based on their observable properties.
- The learner will be able to explain sounds based on their characteristics.
- The learner will be able to explain sound waves.
- 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 describe how matter interacts with electricity and magnetism.
- The learner will be able to utilize electrophoresis to separate molecules.
- The learner will be able to create mixtures and separate them into their component parts.
- The learner will be able to explain the transfer of energy through waves.
- The learner will be able to describe the way that vibrations transfer energy.
- 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 measure vibrations.
- The learner will be able to explain waves.
- The learner will be able to measure waves.
- The learner will be able to have a comprehension of mechanics.
- The learner will be able to describe the reasons objects move in particular ways.
- The learner will be able to develop an understanding of energy.
- The learner will be able to associate energy with motion.
- The learner will be able to identify the different types of energy.
- The learner will be able to explain various types of energy.
- The learner will be able to recognize types of energy related to everyday occurrences.
- The learner will be able to apply an understanding of changes of matter.
- The learner will be able to know the properties of matter.

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 develop an awareness of the importance of evidence in making scientific decisions.
- The learner will be able to handle simple devices that help in observation and data collection.
- The learner will be able to acquire an awareness of scientific contributions by people of various cultures and backgrounds.
- The learner will be able to handle basic mechanical devices.
- The learner will be able to acquire an awareness of and sensitivity to the natural world.
- The learner will be able to express findings of explorations using suitable technology.
- The learner will be able to use observation skills to develop scientific questions about the world.
- The learner will be able to pose questions that assist him/her to gain knowledge about the world.
- The learner will be able to analyze claims to determine their scientific merit.
- The learner will be able to describe the composition of their surroundings.
- 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 create summaries of observations from graphs and charts.
- The learner will be able to describe how science and other ways of comprehension are related.
- The learner will be able to demonstrate how ideas in science can be exhibited through creative expression.
- The learner will be able to learn from books and additional information sources.
- The learner will be able to describe the ways in which technology is used in daily life.
- The learner will be able to demonstrate how our society is affected by science and technology.
- The learner will be able to recognize simple machines.
- The learner will be able to explain how simple machines alter effort.
- The learner will be able to utilize simple machines.
- 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 plan explorations utilizing suitable technology.
- The learner will be able to utilize simple measurement tools in scientific explorations.
- The learner will be able to describe how the components of basic mechanical devices function together.
- The learner will be able to perform explorations using suitable methodology.
- The learner will be able to plan explorations using suitable methodology.
- The learner will be able to perform explorations using suitable technology.
- The learner will be able to describe how scientists decide what is considered scientific knowledge.
- The learner will be able to develop skills for collecting data.

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- The learner will be able to develop plans for collecting data and solving problems.