

MAP SCIENCE ACHIEVEMENT LEVEL DESCRIPTORS

GRADE 5

Below Basic—(470-625)

Students

- identify the relationship between mass and force
- classify bodies of water
- identify weather instruments and their uses
- identify characteristics of the solar system
- compare amounts/measurements given in a simple format
- identify appropriate tools for simple scientific measurements
- identify how technological advances may be helpful to humans

Basic—(626-668)

Students

- explain the relationship between mass and force
- describe how specialized body structures help animals survive
- match different environments to the plants and animals they support
- identify environmental problems and find solutions
- construct one part of a graph
- determine the appropriate scientific tool and its function in an investigation
- determine how technological advances address problems and enhance life

Proficient—(669-691)

Students

- describe changes in physical properties of matter
- use scientific tools
- compare the mass of different objects
- identify properties and uses of simple machines and explain how work is done on objects
- identify forces of magnetism
- describe the motion of objects in terms of speed, distance, and time
- identify the main parts of plants and their functions
- classify vertebrates and invertebrates according to characteristics and behavior
- identify how plants progress through life cycle stages to reproduce
- classify populations of organisms as producers, consumers, or decomposers
- predict the effect of removing an organism from a food chain
- identify the effects of human activities on other organisms
- identify multiple specialized structures and describe how they help animals survive in their environment
- describe a relationship/pattern in weather data collected over time
- identify properties of bodies of water
- describe the Sun as a source of light and heat, or the moon as a reflector of light

- explain the day/night cycle on Earth
- identify some variables in experimental design
- identify characteristics and variables of a fair test
- interpret data and make a prediction using information from a graph
- draw a conclusion based on evidence
- partially construct a graph (x/y axis) based on given data
- distinguish between man-made and natural objects and identify how man-made objects enhance human life
- apply problem solving skills to a given situation

Advanced—(692-855)

Students

- identify evidence of energy transformations
- predict the effect of heat energy on the physical properties of water as it changes states
- construct/diagram a complete, closed, electrical circuit
- predict how simple machines affect the force needed to do work
- explain the functions of all major parts of a plant
- describe the effects of weathering and erosion on Earth's surface
- describe multiple relationships in weather data over time
- identify that Earth is round and this affects what is seen from a given location
- explain how the Sun's position in the sky and the length and position of shadows relate to the time of day
- describe our Sun as a star that provides light and heat, and describe the moon as a reflector of light
- interpret and apply knowledge from a data table
- identify steps in experimental design
- identify appropriate tools and metric units in an investigation
- construct a graph and plot given data
- formulate a question that can lead to an investigation
- apply advanced problem solving skills to a given situation

MAP SCIENCE ACHIEVEMENT LEVEL DESCRIPTORS

GRADE 8

Below Basic—(540-670)

Students

- identify simple terms related to matter and energy
- demonstrate beginning understanding of properties of light and how it travels
- identify structures of plants and animals needed for survival
- identify levels of organization in multicellular organisms
- read simple graphs and make simple data comparisons

Basic—(671-702)

Students

- identify an example of a force
- demonstrate simple understanding of how traits are passed from one generation to the next
- demonstrate basic understanding of climate
- identify a simple hypothesis
- recognize a trend in a data table
- demonstrate some awareness of how various factors influence, and are influenced by, science and technology

Proficient—(703-734)

Students

- classify and describe different types of motion (e.g. straight line, projectile, circular, vibrational)
- calculate speed of an object in motion (distance/time)
- make predictions of an object's motion based on knowledge of Newton's Laws of Motion
- interpret a graph of distance over time
- demonstrate simple understanding of life processes (e.g. cellular respiration and photosynthesis) necessary for survival
- use physical characteristics to classify and/or show relationships between organisms
- explain how an organism's adaptations help it survive in its environment
- explain how species in an ecosystem are affected by changes in their environment
- classify species within a food web and define their roles
- explain how rock and fossil evidence can show changes in the Earth over time
- explain how Earth's systems interact with one another and cause change
- read and interpret geographs, topographic maps, and charts
- describe how the location of celestial bodies and the structure of the universe affects its appearance from Earth
- demonstrate and understanding of concepts relating to the relative motion of objects in the solar system (years, days, moon phases)
- recognize the need to average data for accurate experimental results

- utilize appropriate tools to collect data and measure to the appropriate units
- calculate the average from a set of data points
- draw a conclusion from a data table or graph
- identify and recognize the importance of constants in the design of a valid experiment
- identify and describe technological tools and scientific discoveries that advance scientific knowledge
- describe difficulties scientists experience as they propose new ideas that contradict accepted beliefs

Advanced—(735-895)

Students

- describe and compare the physical and chemical properties of types of matter in problem-solving situations
- identify and apply knowledge of forms of energy, and explain how energy can be transferred and transformed into various forms but is conserved
- evaluate the effects of balanced and unbalanced forces on an object's motion (e.g. simple machines, objects and rest)
- demonstrate solid knowledge of physical and chemical processes that multicellular organisms use to survive
- predict the impact of an environmental change in an ecosystem
- justify how an organism's adaptations help it to survive in its environment
- describe changes in the form of water as it moves through the water cycle
- compare and contrast weather and climate and the factors affecting each
- identify and explain the cause of seasons on Earth
- demonstrate solid knowledge of force and motion within the solar system
- apply the concept of light years in real world situations
- construct a graph with all information labeled and data accurately plotted
- evaluate the design of an experiment
- create a testable question
- write a testable hypothesis that predicts an effect (or lack thereof) on the independent or the dependent variable
- apply awareness of how various factors influence, and are influenced by, science and technology in real-world contexts

MAP SCIENCE ACHIEVEMENT LEVEL DESCRIPTORS

GRADE 11

Below Basic—(550-701)

Students

- describe that matter is made up of particles too small to be seen
- describe how the mass of an object affects its motion
- identify that organisms are made up of cells
- define a species in terms of ability to reproduce
- identify major gasses that make up the atmosphere
- identify an advantage or disadvantage of tools used to study the universe
- identify a valid justification of a conclusion
- communicate minimal information about the data collected in a experiment
- identify how one environmental factor can be impacted by technology

Basic—(702-728)

Students

- identify some properties that can be used to classify substances
- perform basic calculations related to force and motion of an object when given a formula
- identify and describe cell structures and their functions
- explain community interaction to maintain a balanced ecosystem
- identify the processes involved in the rock cycle
- identify a property of the electromagnetic spectrum as it relates to the universe
- select appropriate investigation methods
- use data to formulate an explanation
- describe a reason theories change

Proficient—(729-769)

Students

- describe chemical and physical properties and changes in matter
- explain the gravitational force of objects relative to their masses and the distances between them
- apply Newton's Laws of Motion to real-world situations
- describe the relationship between force and work
- describe photosynthesis and cellular respiration
- describe energy flow in a food web
- explain how natural selection is related to environmental changes or species adaptations
- identify the processes involved in the water cycle
- explain natural phenomenon by using the motions of the Earth and moon relative to the Sun
- identify properties of the electromagnetic spectrum as it relates to the universe
- communicate information about data collected in an investigation
- determine scientific conclusions based on observations
- identify constants and variables in an investigation

- formulate testable hypotheses
- use patterns and extrapolate data to form conclusions
- identify factors required to make investigative results reliable
- analyze quantitative data
- design scientific investigations consisting of at least three steps
- identify technology used to collect data to increase scientific knowledge

Advanced—(770-970)

Students

- compare and contrast the properties of objects and the materials from which they are made
- describe different forms of energy and explain how they are transferred
- apply the current model of atomic structure
- explain and analyze the organization of the Periodic Table
- apply the Law of Conservation of Matter and Energy
- evaluate the Law of Universal Gravitation
- compare the mechanical efficiency of different machines
- predict patterns of inheritance using principles of Mendelian genetics
- compare and explain types of cell division
- analyze genetic diversity with regard to reproduction
- predict the impact of changes within a food web
- identify factors that influence climate and explain their impact on the climate
- justify the development of land and use based upon availability of natural resources, geomorphology, water and economics
- explain the internal processes and sources of energy within the geosphere that cause changes in Earth's crustal plates
- provide evidence for the revolution and rotation of Earth
- identify advantages and disadvantages of tools in the study of the universe
- use quantitative data to calculate results
- communicate information from investigations in data tables and appropriate graphical forms
- identify and justify constants and variables in a repeatable scientific investigation
- design a repeatable multi-step scientific investigation
- gather evidence in qualitative and quantitative forms
- determine how technological advances can affect real-world situations