

5th Grade

FOSS: Mixtures and Solutions

NYS Performance Indicators

STANDARD 1: Mathematical Analysis

M1.1 Extend mathematical notation and symbolism to include variables and algebraic expressions in order to describe and compare quantities

M2.1 Use inductive reasoning to construct, evaluate, and validate conjectures and arguments, recognizing patterns can assist in explaining and extending math phenomena

M3.1 Apply math knowledge to solve real-world problems

STANDARD 1: Scientific Inquiry

S1.1 Formulate questions independently with the aid of references appropriate for guiding the search for explanations of observations

S1.2 Construct explanations independently for natural phenomena

S1.3 Represent, present, and defend proposed explanations

S2.1 Use conventional techniques and those of their own design to make further observations and refine explanations

S2.2 Develop, present, and defend formal research proposals

S2.3 Carry out research proposals, recording observations and measurements

S3.1 Design charts, tables, graphs and other visual representations of observations in conventional and creative ways

S3.2 Interpret organized data to answer the research question and to gain insight into the problem

S3.3 Modify their personal understanding of phenomena based on evaluation of their hypothesis

STANDARD 1: Engineering Design

T1.2 Locate and utilize a range of printed, electronic, and human information sources to obtain ideas

T1.3 Consider constraints and generate several ideas for alternative solutions, using group and individual ideation techniques, defer judgment, evaluate ideas, explain optimal choice

T1.4 Develop plans and construct a model of the solution

T1.5 In a group setting, test their solution against design specs, present and evaluate results, describe how solution might be modified, and discuss tradeoffs

STANDARD 2: Information Systems

1: Information technology is used to retrieve, process, and communicate information and is a tool for learning

2: Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use

3: Information technology can have a positive and negative impact on society, depending on its use

STANDARD 4: Physical Environment

3.1a Substances have characteristic properties.

3.1b Solubility can be affected by the nature of the solute and solvent, temperature, and pressure.

3.1c The motion of particles helps to explain the phases of matter as well as changes from one phase to another.

3.1d Gases have neither a determined shape nor a definite volume.

3.1e A liquid has a definite volume, but takes the shape of his container.

3.1f A solid has a definite volume and shape.

3.1g Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components.

3.1h Density can be described as the amount of matter that is in a given amount of space.

3.2a During a physical change a substance keeps its chemical composition and properties.

3.2b Mixtures are physical combinations of materials and can be separated by physical means.

3.2c During a chemical change, substances react in ways to form new substances with different properties.

3.2d Substances are often placed in categories if they react in similar ways; for example metals, nonmetals, noble gases

3.2e The Law of Conservation of Mass states that during an ordinary chemical reaction, matter cannot be created or destroyed.

3.3a All matter is made up of atoms.

3 Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.

3.3c Atoms join together in well-defined molecules or may be arranged in regular geometric patterns.

3.3d Interactions among atoms/molecules result in chemical reactions.

3.3e The atoms of any one element are different from atoms of other elements.

3.3f There are more than 100 elements. Elements combine to produce compounds.

3.3g The periodic table is one useful model for classifying elements. The table can be used to predict properties.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

4.2e Temperature affects solubility of some substances in water.

4.3a In chemical reactions, energy is transferred into or out of a system.

4.5a Energy cannot be created or destroyed, but only changed from one form into another.

4.5b Energy can change from one form to another, although in the process some energy is always converted to heat.

STANDARD 6: Interconnectedness

1: Through systems thinking, they recognize commonalities that exist and how parts of a system interrelate and combine to perform special functions

2: Models are simplified representations

3: Grouping by magnitudes into a series provides a useful way to deal with the immense range and changes in scale

4: Equilibrium is a state of stability

5: Identifying patterns for change is necessary for making predictions about future behavior and conditions

6: In order to arrive at the best solution to meet criteria and constraints, trade-offs are often necessary

STANDARD 7: Interdisciplinary Problem Solving

1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems

2: Solving interdisciplinary problems involves a variety of skills and strategies such as effective work habits, gathering information, generating ideas, making connections, and presenting ideas

5th Grade

FOSS: Levers and Pulleys

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STANDARD 4: Physical Environment

3.1a Substances have characteristic properties.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

5.2c Machines transfer mechanical energy from one object to another.

5.2d Friction is a force that opposes motion.

5.2e A machine can be made more efficient by reducing friction.

5.2f Machines can change the direction or amount of force, or the distance or speed of force required to do work.

5.2g Simple machines include a lever, pulley, a wheel and axle, and an inclined plane. A complex machine uses a combination of interacting simple machines.

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STANDARD 4: Physical Environment

2.2j Climate is the characteristic weather that prevails from season to season and year to year.

2.2r Substances enter the atmosphere naturally and from human activity.

3.1a Substances have characteristic properties.

4.1a The Sun is a major source of energy for Earth.

4.1b Fossil fuels contain stored solar energy and are considered nonrenewable resources. Solar energy, wind, moving water, and biomass are some examples of renewable energy resources.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

STANDARD 4: Living Environment

1.1 Compare and contrast the parts of plants, animals, and one-celled organisms

2.1 Describe sexual and asexual mechanisms for passing genetic materials from generation to generation

2.2 Describe simple mechanisms related to the inheritance of some physical traits to offspring

3.1 Describe sources of variation in organisms and their structures and relate the variations to survival

3.2 Describe factors responsible for competition within species and the significance of that competition

4.1 Observe and describe the variations in reproductive patterns of organisms, including asexual and sexual

reproduction

4.3 Observe and describe developmental patterns in selected plants and animals

5.1 Compare the way a variety of living specimens carry out basic life functions and maintain a dynamic equilibrium

5.2 Describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms

6.1 Describe the flow of energy and matter through food chains and food webs

6.2 Provide evidence that green plants make food and explain the significance of this process to other organisms

7.1 Describe how living things, including humans, depend upon the living and nonliving environment for survival

7.2 Describe the effects of environmental changes on humans and other populations

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EiE: Environmental Engineering- Water Filter

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FOSS: VARIABLES

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STANDARD 4: Physical Environment

3.1a Substances have characteristic properties.

3.1i Buoyancy is determined by comparative densities.

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4.1e Energy can be considered to be either kinetic energy or potential energy.

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JASON Project: TECTONIC FURY

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STANDARD 4: Physical Environment

2.1c The rock at Earth's surface forms a nearly continuous shell around Earth called the lithosphere

2.1d The majority of the lithosphere is covered by a relatively thin layer of water called the hydrosphere

2.1e Rocks are composed of minerals. Minerals are identified on the basis of physical properties.

2.1f Fossils are usually found in sedimentary rocks. They are used to study the past

2.1g The dynamic processes that wear away the Earth's surface include weathering and erosion.

2.1h The process of weathering breaks rocks down to form sediment.

2.1i Erosion is the transport of sediment.

2.1j Water circulates through the atmosphere, lithosphere, and hydrosphere in what is called the water cycle.

2.2a The interior of the Earth is hot. Heat flow and movement of materials within Earth cause sections of Earth's crust to move. This may result in earthquakes, volcanoes, and the creation of mountains and ocean basins.

2.2b. Analysis of earthquake data leads to the conclusion that there are layers within Earth. These layers have distinct properties.

2.2c Folded, tilted, faulted and displaced rock layers suggest past crustal movement.

2.2d Continents fitting together like puzzle parts and fossil correlations provided initial evidence that continents were once together.

2.2e The Theory of Plate Tectonics explains how the "solid" lithosphere consists of a series of plates that "float" on the partially molten section of the mantle.

2.2f Plates may collide, move apart, or slide past one another.

2.2g Rocks are classified according to their method of formation (sedimentary, igneous, and metamorphic)

2.2h The rock cycle model shows how types of rock or rock material may be transformed from one type of rock to another.

3.1a Substances have characteristic properties.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

4.1e Energy can be considered to be either kinetic energy or potential energy.

4.2a Heat moves in predictable ways, flowing from warmer objects to cooler ones, until they both reach the same temperature.

4.2b Heat can be transferred through matter by the collisions of atoms and/or molecules (conduction) or through space (radiations). In a liquid or gas, currents will facilitate the transfer of heat (convection).

4.2c During a phase change, heat energy is absorbed or released.

4.2d Most substances expand when heated and contract when cooled. Water is an exception.

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FOSS: WEATHER AND WATER

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STANDARD 4: Physical Environment

1.1e Most objects in the solar system have a regular and predictable motion

1.1f The latitude and longitude coordinate system and our time system are based on celestial observations

1.1h The apparent motions of the Sun, Moon, planets, and stars across the sky can be explained by Earth's rotation and revolution

1.1i The tilt of Earth's axis and its revolution cause seasons

2.1a Nearly all the atmosphere is confined to a thin shell surrounding Earth. It is in layers and nearly all weather occurs in the lowest layer

2.1b As altitude increases, air pressure decreases

2.1j Water circulates through the atmosphere, lithosphere, and hydrosphere in what is called the water cycle.

2.2i Weather describes the conditions of the atmosphere at a given location for a short period of time.

2.2j Climate is the characteristic weather that prevails from season to season and year to year.

2.2k The uneven heating of Earth's surface is the cause of weather.

2.2l Air masses form when air remains nearly stationary over a large section of Earth's surface and takes on the

conditions of temperature and humidity from that location.

2.2m Most local weather condition changes are caused by movement of air masses.

2.2n The movement of air masses is determined by prevailing winds and upper air currents.

2.2o Fronts are boundaries between air masses. Precipitation is likely to occur at these boundaries.

2.2p High-pressure systems generally bring fair weather. Low-pressure systems usually bring cloudy, unstable conditions. The general movement of highs and lows is from west to east.

2.2q Hazardous weather conditions include thunderstorms, tornadoes, hurricanes, ice storms, and blizzards.

2.2r Substances enter the atmosphere naturally and from human activity.

3.1a Substances have characteristic properties.

3.1b Solubility can be affected by the nature of the solute and solvent, temperature, and pressure.

3.1c The motion of particles helps to explain the phases of matter as well as changes from one phase to another.

3.1d Gases have neither a determined shape nor a definite volume.

3.1e A liquid has a definite volume, but takes the shape of his container.

3.1f A solid has a definite volume and shape.

3.1h Density can be described as the amount of matter that is in a given amount of space.

3 Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.

4.1a The Sun is a major source of energy for Earth.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

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EiE: ELECTRICAL ENGINEERING/ SECURITY SYSTEM

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4.1e Energy can be considered to be either kinetic energy or potential energy.

4.4a Different forms of electromagnetic energy have different wavelengths.

4.4b Light passes through some materials, sometimes refracting in the process. Materials absorb and reflect light, and may transmit light.

4.4c Vibrations in materials set up wave-like disturbances that spread away from the source.

4.4d Electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy.

4.4e Electrical circuits provide a means of transferring electrical energy.

4.4f Without touching them, material that has been electrically charged attracts uncharged material, and may either attract or repel other charged material.

4.4g Without direct contact, a magnet attracts certain materials and either attracts or repels other magnets. The attractive force is greatest at its poles.

5.2b Electrical currents and magnets can exert a force on each other.

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7th Grade

FOSS: Chemical Interactions

NYS Performance Indicators

STANDARD 1: Mathematical Analysis

M1.1 Extend mathematical notation and symbolism to include variables and algebraic expressions in order to describe and compare quantities

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M3.1 Apply math knowledge to solve real-world problems

STANDARD 1: Scientific Inquiry

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S3.3 Modify their personal understanding of phenomena based on evaluation of their hypothesis

STANDARD 1: Engineering Design

T1.2 Locate and utilize a range of printed, electronic, and human information sources to obtain ideas

T1.3 Consider constraints and generate several ideas for alternative solutions, using group and individual ideation techniques, defer judgment, evaluate ideas, explain optimal choice

T1.4 Develop plans and construct a model of the solution

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STANDARD 2: Information Systems

1: Information technology is used to retrieve, process, and communicate information and is a tool for learning

2: Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use

3: Information technology can have a positive and negative impact on society, depending on its use

STANDARD 4: Physical Environment

3.1a Substances have characteristic properties.

3.1b Solubility can be affected by the nature of the solute and solvent, temperature, and pressure.

3.1c The motion of particles helps to explain the phases of matter as well as changes from one phase to another.

3.1d Gases have neither a determined shape nor a definite volume.

3.1e A liquid has a definite volume, but takes the shape of his container.

3.1f A solid has a definite volume and shape.

3.1g Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components.

3.1h Density can be described as the amount of matter that is in a given amount of space.

3.2a During a physical change a substance keeps its chemical composition and properties.

3.2b Mixtures are physical combinations of materials and can be separated by physical means.

3.2c During a chemical change, substances react in ways to form new substances with different properties.

3.2d Substances are often placed in categories if they react in similar ways; for example metals, nonmetals, noble gases

3.2e The Law of Conservation of Mass states that during an ordinary chemical reaction, matter cannot be created

or destroyed.

3.3a All matter is made up of atoms.

3 Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.

3.3c Atoms join together in well-defined molecules or may be arranged in regular geometric patterns.

3.3d Interactions among atoms/molecules result in chemical reactions.

3.3e The atoms of any one element are different from atoms of other elements.

3.3f There are more than 100 elements. Elements combine to produce compounds.

3.3g The periodic table is one useful model for classifying elements. The table can be used to predict properties.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

4.1e Energy can be considered to be either kinetic energy or potential energy.

4.2a Heat moves in predictable ways, flowing from warmer objects to cooler ones, until they both reach the same temperature.

4.2b Heat can be transferred through matter by the collisions of atoms and/or molecules (conduction) or through space (radiations). In a liquid or gas, currents will facilitate the transfer of heat (convection).

4.2c During a phase change, heat energy is absorbed or released.

4.2d Most substances expand when heated and contract when cooled. Water is an exception.

4.2e Temperature affects solubility of some substances in water.

4.3a In chemical reactions, energy is transferred into or out of a system.

4.5a Energy cannot be created or destroyed, but only changed from one form into another.

4.5b Energy can change from one form to another, although in the process some energy is always converted to heat.

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7th Grade

FOSS: Planetary Science

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STANDARD 1: Engineering Design

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STANDARD 2: Information Systems

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STANDARD 4: Physical Environment

1.1a Earth's Sun is a star more than a million times greater in volume than Earth

1.1b Other stars are like the Sun but are so far away they look like points of light

1.1c The Sun and the planets that revolve around it are the major bodies of the solar system

1.1d Gravity is the force that keeps planets in orbit around the Sun and the Moon in orbit around Earth

1.1e Most objects in the solar system have a regular and predictable motion

1.1f The latitude and longitude coordinate system and our time system are based on celestial observations

1.1g Moons are seen by reflected light. The phases repeat in a cyclic pattern in about one month.

1.1h The apparent motions of the Sun, Moon, planets, and stars across the sky can be explained by Earth's rotation and revolution

1.1i The tilt of Earth's axis and its revolution cause seasons

1.1j The shape of Earth is nearly spherical.

2.1a Nearly all the atmosphere is confined to a thin shell surrounding Earth. It is in layers and nearly all weather occurs in the lowest layer

3.1a Substances have characteristic properties.

4.1a The Sun is a major source of energy for Earth.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

5.2a Every object exerts gravitational force on every other object. The force depends on how much mass the objects have and on how far apart they are.

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7th Grade

FOSS: Force and Motion

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STANDARD 1: Engineering Design

T1.1 Identify needs and opportunities for technical solutions from an investigation of situations of general or social interest

T1.2 Locate and utilize a range of printed, electronic, and human information sources to obtain ideas

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4.1e Energy can be considered to be either kinetic energy or potential energy.

5.1a The motion of an object is always judged with respect to some other object or point.

5.1b The motion of an object can be described by its position, direction or motion, and speed.

5.1c An object's motion is the result of the combined effect of all forces acting on the object.

5.1d Force is directly related to an object's mass and acceleration.

5.1e For every action there is an equal and opposite reaction.

5.2a Every object exerts gravitational force on every other object. The force depends on how much mass the objects have and on how far apart they are.

5.2d Friction is a force that opposes motion.

5.2e A machine can be made more efficient by reducing friction.

5.2f Machines can change the direction or amount of force, or the distance or speed of force required to do work.
5.2g Simple machines include a lever, pulley, a wheel and axle, and an inclined plane. A complex machine uses a combination of interacting simple machines.

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8th Grade

FOSS: Diversity of Life

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3.1a Substances have characteristic properties.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

STANDARD 4: Living Environment

1.1 Compare and contrast the parts of plants, animals, and one-celled organisms

2.1 Describe sexual and asexual mechanisms for passing genetic materials from generation to generation

2.2 Describe simple mechanisms related to the inheritance of some physical traits to offspring

3.1 Describe sources of variation in organisms and their structures and relate the variations to survival

3.2 Describe factors responsible for competition within species and the significance of that competition

4.1 Observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction

4.2 Explain the role of sperm and egg cells in sexual reproduction

4.3 Observe and describe developmental patterns in selected plants and animals

4.4 Observe and describe cell division at the microscopic and its macroscopic effects

5.1 Compare the way a variety of living specimens carry out basic life functions and maintain a dynamic

equilibrium

5.2 Describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms

6.1 Describe the flow of energy and matter through food chains and food webs

6.2 Provide evidence that green plants make food and explain the significance of this process to other organisms

7.1 Describe how living things, including humans, depend upon the living and nonliving environment for survival

7.2 Describe the effects of environmental changes on humans and other populations

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8th Grade

FOSS: Populations and Ecosystems

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STANDARD 4: Physical Environment

2.2j Climate is the characteristic weather that prevails from season to season and year to year.

2.2r Substances enter the atmosphere naturally and from human activity.

3.1a Substances have characteristic properties.

4.1a The Sun is a major source of energy for Earth.

4.1b Fossil fuels contain stored solar energy and are considered nonrenewable resources. Solar energy, wind, moving water, and biomass are some examples of renewable energy resources.

4.1c Most activities in everyday life involve one form of energy being transformed into another.

4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical.

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8th Grade

STC: Human Body

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STANDARD 4: Living Environment

1.2 Explain the functioning of the major human organ systems and their interactions

2.1 Describe sexual and asexual mechanisms for passing genetic materials from generation to generation

2.2 Describe simple mechanisms related to the inheritance of some physical traits to offspring

3.1 Describe sources of variation in organisms and their structures and relate the variations to survival

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