

STEMTaught's Next Gen SAS

Next Generation Science Standards Short and Simple

Find it hard to work with the gigantic Next Gen Standards sheet? Well that makes a few of us.

Use SAS as your go-to quick reference to Next Gen Standards.

Please e-mail if you are interested in more information on using STEMTaught's hands-on labs program in your classroom. It's pretty sweet – stemtaught@gmail.com



Next Gen SAS (Short and Simple)

Kindergarten

Engineering - Explore effects of strength of a push or a pull (Motion and Stability: Forces and interactions K-PS2-1). Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

Engineering- Change the speed of an object with a push or a pull (Motion and Stability: Forces and interactions K-PS2-2). Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Physics- Sunlight allows us to see things (Energy K-PS3-1). Make observations to determine the effect of sunlight on Earth's surface.

Engineering- Create something that makes shade (Energy K-PS3-2). Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Biology- What plants and animals need to survive (From Molecules to Organisms: Structures and Processes K-LS1-1). Use observations to describe patterns of what plants and animals (including humans) need to survive.

Weather and the Seasons (Earth's Systems K-ESS2-1). Use and share observations of local weather conditions to describe patterns over time.

Biology- Plants and animals make their own homes (Earth's Systems K-ESS2-2). Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

Biology- Animals have special abilities that help them survive in the places they live (Earth and Human Activity K-ESS3-1). Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Forecasting and responding to severe weather (Earth and Human Activity K-ESS3-2). Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

Conservation- How we can reduce our environmental impact through smart choices (Earth and Human Activity K-ESS3-3). Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.



Next Gen SAS (Short and Simple) First Grade

Physics- Explore vibrations and sound (Waves and their Applications in Technologies for Information Transfer 1-PS4-1). Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

Physics- Light allows us to see (Waves and their Applications in Technologies for Information Transfer 1-PS4-2). Make observations to construct an evidence-based account that objects can be seen only when illuminated.

Physics- Experiment with light; transparent, translucent, opaque, and reflective (Waves and their Applications in Technologies for Information Transfer 1-PS4-3). Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.

Technology- Use light or sound to send signals (Waves and their Applications in Technologies for Information Transfer 1-PS4-4). Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. (Drum beats, Morse Code, tin can telephones)

Biology- We use technologies that are also found in nature (From Molecules to Organisms: Structures and Processes 1-LS1-1). Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. (Turtle shells/helmets, thorns/barbwire, burrs/Velcro birds/airplanes)

Biology- How babies act helps them survive (From Molecules to Organisms: Structures and Processes 1-LS1-2). Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. (Babies cry and parents feed, comfort and protect)

Biology- Offspring are not exactly like their parents (Heredity: Inheritance and Variation of Traits 1-LS3-1). Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Astronomy- Patterns of movement in the Sun, Moon, and Stars (Earth's Place in the Universe 1-ESS1-1). Use observations of the sun, moon, and stars to describe patterns that can be predicted.

Astronomy- Days get shorter and longer through the seasons (Earth's Place in the Universe 1-ESS1-2). Make observations at different times of year to relate the amount of daylight to the time of year.



Next Gen SAS (Short and Simple)

Second Grade

Engineering- Sorting materials based on properties; hardness, texture, color, flexibility (Matter and its Interactions 2-PS1-1). Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Engineering- Choose a purpose for a material based on its properties (Matter and its Interactions 2-PS1-2). Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

Engineering- Many things are made of smaller pieces (Matter and its Interactions 2-PS1-3). Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.

Chemistry- Reversible and irreversible changes (Matter and its Interactions 2-PS1-4). Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

Biology- Experiment with what plants need to survive (Ecosystems: Interactions, Energy, and Dynamics 2-LS2-1). Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Biology- Seed Dispersion (Ecosystems: Interactions, Energy, and Dynamics 2-LS2-2). Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*

Biology- See the diversity of life in different habitats (Biological Evolution: Unity and Diversity 2-LS4-1). Make observations of plants and animals to compare the diversity of life in different habitats.

Earth Science- The earth's processes happen fast and slow; Earthquakes, volcanos, plate tectonics, evolution (Earth's Place in the Universe 2-ESS1-1). Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

Engineering- Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land (Earth's Systems 2-ESS2-1).

Earth science- Identify Landforms; continents, islands, lakes, rivers, ect (Earth Science 2-ESS2-2). Develop a model to represent the shapes and kinds of land and bodies of water in an area.

Earth Science- Earths water (Earth's Systems 2-ESS2-3). Obtain information to identify where water is found on Earth and that it can be solid or liquid.

Engineering- Define a problem that could be solved by engineering a solution (Engineering Design K-2-ETS1-1). Ask questions, make observations, and gather information about a

situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Engineering- Show that geometric designs can be the solution to some problems (Engineering Design K-2-ETS1-2). Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Engineering- Compare and evaluate 2 engineered solutions to the same problem (Engineering Design K-2-ETS1-3). Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.



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Third Grade

Physics- Balanced and unbalanced forces (Motion and Stability: Forces and Interactions 3-PS2-1). Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Physics- Show that an objects motion is predictable (Motion and Stability: Forces and Interactions 3-PS2-2). Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

Physics- Explore the effects of magnetism (Motion and Stability: Forces and Interactions 3-PS2-3). Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

Physics- Solve a problem using magnets (Motion and Stability: Forces and Interactions 3-PS2-4). Define a simple design problem that can be solved by applying scientific ideas about magnets.

Biology- Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death (From Molecules to Organisms: Structures and Processes 3-LS1-1).

Biology- Animals form herds, schools and flocks, colonies, and other groups to survive (Ecosystems: Interactions, Energy, and Dynamics 3-LS2-1). Construct an argument that some animals form groups that help members survive.

Biology- Animals inherit traits (Heredity: Inheritance and Variation of Traits 3-LS3-1). Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

Biology- Animals have traits and abilities that can be developed (Heredity: Inheritance and Variation of Traits 3-LS3-2). Use evidence to support the explanation that traits can be influenced by the environment.

Biology- We can tell what life was like long ago because of preserved evidence (Biological Evolution: Unity and Diversity 3-LS4-1). Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

Biology- Genetic diversity is important for the survival of a species (Biological Evolution: Unity and Diversity 3-LS4-2). Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

Biology- Some species survive better or worse than others species (Biological Evolution: Unity and Diversity 3-LS4-3). Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Biology- Habitats and the species that live in them species change over time (Biological Evolution: Unity and Diversity 3-LS4-4). Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

Earth Science- Describe weather through the seasons (Earth's Systems 3-ESS2-1). Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

Earth Science- Describe climates throughout the world (Earth's Systems 3-ESS2-2). Obtain and combine information to describe climates in different regions of the world.

Earth Science- Show how humans reduce the impact of weather hazards (Earth and Human Activity 3-ESS3-1). Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.



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Fourth Grade

Physics- Show how an object's speed is related to it's energy (Energy 4-PS3-1). Use evidence to construct an explanation relating the speed of an object to the energy of that object.

Physics- Energy changes when objects collide (Energy 4-PS3-3). Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Physics- Energy comes in many forms; Sound, light, sound, heat, electricity (Energy 4-PS3-2). Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Physics- Make something that converts energy from one form to another (Energy 4-PS3-4). Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Physics- Learn about waves; Amplitude, wavelength, and energy (Waves and their Applications in Technologies for Information Transfer 4-PS4-1). Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

Physics- Light reflecting off objects allows us to see (Waves and their Applications in Technologies for Information Transfer 4-PS4-2). Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Physics- Use patterns to communicate (Waves and their Applications in Technologies for Information Transfer 4-PS4-3). Generate and compare multiple solutions that use patterns to transfer information.

Biology- Plants and animals have internal structures that help them survive (From Molecules to Organisms: Structures and Processes 4-LS1-1). Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Biology- The 5 Senses; Animal process signals and respond to them (From Molecules to Organisms: Structures and Processes 4-LS1-2). Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

Sedimentary layers can tell the story of the earth's past (Earth's Place in the Universe 4-ESS1-1). Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

Earth Science- Observe and describe weathering and erosion (Earth's Systems 4-ESS2-1). Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Earth Science- Topographic maps of ocean and land (Earth's Systems 4-ESS2-2). Analyze and interpret data from maps to describe patterns of Earth's features. Maps can include topographic maps of land and the ocean floor, as well maps of the locations of mountains, continental boundaries, volcanos, and earthquakes.

Earth Science- All energy comes from natural resources, and using them effects the environment (Earth and Human Activity 4-ESS3-1). Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Earth Science- Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans (Earth and Human Activity 4-ESS3-2).



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Fifth Grade

Chemistry- Understanding Atoms and Molecules (*Matter and Its Interactions 5-PS1-1*).

Develop a model to describe that matter is made of particles too small to be seen.

Chemistry- The Law of Conservation of Mass (*Matter and Its Interactions 5-PS1-2*).

Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

Chemistry- Classify materials based off their properties (*Matter and Its Interactions 5-PS1-3*). Make observations and measurements to identify materials based on their properties.

Chemistry- Understand chemical and physical reactions (*Matter and Its Interactions 5-PS1-4*). Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Physics- Understand that gravity pulls toward the center of the earth (*Motion and Stability: Forces and Interactions 5-PS2-1*). Support an argument that the gravitational force exerted by Earth on objects is directed down.

Biology- All energy on earth that animals use comes from the sun (*Energy 5-PS3-1*). Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

Biology- Plants use air, water, and sunlight to grow (*From Molecules to Organisms: Structures and Processes 5-LS1-1*). Support an argument that plants get the materials they need for growth chiefly from air and water.

Biology- Show the cycle of energy and matter in an ecosystem (*Ecosystems: Interactions, Energy, and Dynamics 5-LS2-1*). Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Astronomy- The relative brightness of stars is because of their distance from us (*Earth's Place in the Universe 5-ESS1-1*). Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

Astronomy- Explain patterns in the direction and length of shadows (*Earth's Place in the Universe 5-ESS1-2*). Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Earth Science- Geosphere, biosphere, hydrosphere, and/or atmosphere (*Earth's Systems 5-ESS2-1*). Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Earth Science- Distribution of salt and fresh water on earth (*Earth's Systems 5-ESS2-2*).

Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Conservation- How communities protect the earth's resources (*Earth and Human*

***Activity 5-ESS3-1*).** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Engineering- Define a simple problem that students can solve through engineering

(*Engineering Design 3-5-ETS1-1*). Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Engineering- Find multiple solutions to the problem (*Engineering Design 3-5-ETS1-2*).

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Engineering- Choose the preferred solution, test it, and improve it (*Engineering Design 3-*

***5-ETS1-3*).** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.