UNIT 1 – STEM BASICS

KEY VOCABULARY

LESSON 1: WHAT IS STEM?

STEM: (acronym for Science, Technology, Engineering, Mathematics –STEM) is an educational program developed to prepare primary and secondary students for college and graduate study in the fields of science, technology, engineering, and mathematics. In addition to subject-specific learning, STEM aims to foster inquiring minds, logical reasoning, and collaboration skills.

STEAM: (science, technology, engineering, and mathematics, together with art). STEAM is designed to integrate STEM subjects and the art of design in education. These programs aim to teach students to think critically and have an engineering or design approach towards real-world problems while building on their mathematics and science base. STEAM programs add art to STEM curriculum by drawing on design principles and encouraging creative solutions.

Science: Is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe.

Engineering: Is the branch of science concerned with the design, building, and use of engines, machines and structures. The application of science and mathematics by which the properties of matter and the sources of energy in nature are made useful to people. Engineering focuses on things like the designs of roads and bridges, but also tackles the challenges of changing global weather and environmentally friendly changes to our home.

Mathematics: The science of numbers and their operations. Algebra, arithmetic, calculus, geometry, and trigonometry are branches of mathematics. It is in every occupation, every activity we do in our lives.

Analysis: A detailed examination of anything complex in order to understand its nature or to determine its essential features: a thorough study doing a careful analysis of the problem.

Bachelor's degree: A degree that is given to a student by a college or university usually after four years of study.

Requirement: Something that is necessary for something else to happen or be done i.e. He/she has met the basic/minimum requirements for graduation or He/she has fulfilled/satisfied the general requirements of the course.

Blog: A website that contains online personal reflections, comments, and often hyperlinks, videos, and photographs provided by the writer; also, the contents of such a site.
Commerce: Transactions (sales and purchases) having the objective of supplying commodities (goods and services).

Evidence: Something that furnishes proof.

Knowledge: The fact or condition of knowing something with familiarity gained through experience or association.

Measurements: Determining the physical quantity of something such as length, time, temperature, or volume in terms of a unit of measurement such as feet, seconds, or degrees.

Opinions: A view, judgment, or appraisal formed in the mind about a particular matter.

Paradigm: A philosophical and theoretical framework of a scientific school or discipline within which theories, laws, and generalizations and the experiments performed in support of them are formulated.

Technical: Having a special and usually practical knowledge especially of a mechanical or scientific subject, which can be marked by, or characteristic of specialization.

Video: A digital recording of an image or set of images.

Vlog: A blog in which the postings are primarily in video form.

LESSON 2: ARE SPORTS PART OF STEM?

3D Printing engineers: A person who has studied the process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is created.

Biochemical engineer: A person who studies a branch of chemical engineering which applies technological advancements to biological materials. Biochemical engineers combine knowledge of biology, chemistry and engineering to create products from raw materials and develop the processes for achieving this.

Coach, Head coach: Manager is a professional at training and developing athletes. They typically hold a more public profile and are paid more than other coaches.

Exercise Physiologists: Study how the body works and how exercise can affect someone's body. They can use this information to test athletes and create fitness plans and new forms of exercise!

Material design: Material Design (codenamed Quantum Paper) is a design language that Google developed in 2014. Expanding on the "card" motifs that debuted in Google Now, Material Design uses more grid-based layouts, responsive animations and transitions, padding, and depth effects such as lighting and shadows.

Nutrition: The process of providing or obtaining the food necessary for health and growth.

Nutritionist: A person who studies or is an expert in nutrition.

Ollie: The Ollie, a skater's technique for flying through the air, showcases the principles of flight by demonstrating that you have to overcome gravity with lift, and friction (or drag) with thrust.

Physics: A science that deals with matter and energy and their interactions.

Skateboard: The skateboard is a compound machine, as it's a device that includes more than one simple machine.

Sports Engineer: A person who applies the technological components of math and physics to solve sporting problems. These might include: designing equipment, building facilities, analyzing athlete performance, regulating standards, ensuring safety requirements are met, developing coaching tools.

Sports statistician: Sports statisticians analyze data pertaining to sporting events, usually for major sports such as baseball, football or basketball. Sometimes called a scorer, sports statisticians record data live as it occurs.

Sports: An activity involving physical exertion and skill in which an individual or team competes against another or others for entertainment.

LESSON 3: DEAF PEOPLE IN STEM, YES!

Famous: To be well known within your community or across a large population.

Laboratory: A place where experiments are done in a careful way so as to identify the cause and effect.

Physicist: A person who studies how matter and energy behave in our world or in the universe.

Barometer: A small instrument for measuring pressure in the atmosphere; used in predicting

the weather.

Thermometers: A small instrument used to tell temperature.

Naturalist: An expert in natural history related to plants, nature, natural laws.

Fertilization: The process of fusing sperm in an egg to produce a zygote; the first stage in a pregnancy.

Aphids: Small insects that eat sap off trees.

Nobel Prize: A set of annual international awards: awards are for recognition in academic, cultural or scientific advances.

Paleoneurologist: Person who studies how brains in humans have developed over time.

Bacteriologist: Person who studies bacteria.

Inquisitive: To be very curious and ask lots of questions so as to learn.

Experiment: A scientific procedure to test a hypothesis (question).

Rational: To be reasonable or have a good reason based on facts.

Methodical: To follow clear methods.

Analytical: To analyze a situation clearly and carefully.

Persistent: To not give up.

Independent: To be able to work on your own without giving up; to complete a task as assigned.

Teamwork: To work well with other people.

Research: To read a lot about one topic.

Substances: A particular kind of matter.

Opportunity: A chance to do something.

Opportunities: Plural of opportunity; multiple chances to do something.

Industry: One sector of work that produces an item or provides a services.

Government: A system or group of people that govern an organized community; there are four kinds of government; America is a democracy.

Education: A process of learning or the acquisition of knowledge, skills, values and habits.

LESSON 4: IS COOKING PART OF STEM?

Accuracy: occurs when measurements are close to a quantity's actual value.

Acid: a substance that ionizes in water to produce hydrogen ions (H+).

Active Cultures: also called a live culture; this is a colony of living microorganisms (e.g. bacteria), growing within a substance such as yogurt. Active cultures are responsible for turning milk into yogurt through fermentation.

Added Sugars: sugars such as sucrose (table sugar), corn syrups, and artificial sweeteners that are added to food to increase sweetness.

Aerobic: a chemical reaction that must have oxygen to occur.

Albumen: the white of an egg, which contains predominantly water and proteins.

Allicin: an active enzyme component of garlic with a broad-spectrum of antibacterial properties.

Amino Acids: An organic compound that links together to build a protein. Amino acids have three different structural components: a side chain of carbon and hydrogen, a carboxylic acid group, and an amino group.

Amylose: a component of starch consisting of long, straight chains of glucose units.

Amylopectin: a component of starch that has a branched glucose structure and does not gel in aqueous solutions.

Anaerobic: a chemical reaction that functions best in an oxygen-free environment.

Anthocyanins: a natural pigment producing blue, purple, and red coloring in flowers and plants.

Antioxidants: a substance present in foods which is capable of decreasing the harmful effects of free radicals in the body. Several vitamins and minerals are classified as antioxidants (e.g. Vitamin E, Vitamin C, Zinc).

Autoimmune Diseases: disorders in the body when the immune system attacks and destroys healthy body tissues by mistake.

Bacteria: single celled organisms that can multiply through cell division.

Baking Soda: a baking term for sodium bicarbonate that is used as a leavening agent in baking products.

Base: a substance that ionizes in water to produce hydroxide ions (OH-).

Beta-Carotene: a form of the pigment carotene that is found in dark green, dark yellow, and orange vegetables and fruits.

Betalains: a group of pigments parallel to Anthocyanins (betacyanins and betaxanthins) that occurs only in some families of Caryophyllales.

Bi-metallic Stemmed Thermometer: a specialized thermometer used for reading internal temperatures of meats and other food items. The thermometer consists of a head with a temperature dial connected to a stem. The distal end of the stem is the sensing area where the temperature is read from. The calibration nut is located underneath the head and is used to calibrate the thermometer by adjusting the dial for accuracy.

Boiling Water Thermometer Calibration Method: a method of calibration in which the thermometer is placed in boiling water and then adjusted to read 212°F.

Bomb Calorimeter: a vessel for measuring heat of combustion by igniting a sample.

Bran: the outer covering of a cereal grain; a source of dietary ber.

Calcium: an abundant chemical element that makes up the body's bones, and is essential to most physiological processes in the body.

Calories: a unit of heat energy; the amount of heat required to raise the temperature of one gram of water one degree Celsius. It is used to indicate the amount of energy that food will produce in the human body.

Carbohydrate: an organic compound that is the main source of energy for the body; composed of carbon, oxygen, and hydrogen atoms.

Carotenoids: a group of pigments that are various colors from yellow to red.

Casein: a protein that makes up about 80% of milk.

Catabolism: the process of breaking down complex materials in the body, resulting in the release of energy.

Celiac Disease: a chronic disease of the intestines that occurs from the inability to absorb the gliadin portion of gluten, which results in an immune response that damages the mucosa layer of the intestines.

Cell Wall: the outer layer of a cell that provides structure and mechanical support.

Cells: the smallest structural unit for all living things.

Cellular Respiration: the process by which the body breaks down sugar molecules for energy in the mitochondrial cells.

Celsius: a temperature scale characterized by a freezing point of 0 degrees and a boiling point as 100 degrees.

Chemical Change: the change in a substance that alters its chemical identity, resulting in the formation of a new chemical with different physical properties. This type of change is usually not reversible.

Chemical Digestion: the breakdown of food molecules by digestive enzymes and chemicals.

Chemical Energy: energy that is stored in the bonds of chemical compounds and can be released in chemical reactions as heat.

Chlorophyll: the green pigment found in plants that absorbs light energy in the process of photosynthesis.

Chlorophyllin: the bright green plant pigment which is the product of the breakdown of chlorophyll by an alkaline, such as baking soda.

Cis Molecular Configuration: the formation of a double bond on a fatty acid chain when both hydrogens are on the same side of the double bond; creates a v shape in the chain.

Coagulation: changing a liquid to a soft semi-solid or solid mass.

Colloidal Dispersion: a substance in which particles are evenly dispersed within a medium (e.g. milk, because milk proteins and fat are dispersed in water).

Colloidal System: a mixture of two substances, one of which, called the dispersed phase (or colloid), is uniformly distributed in a finely divided state through the second substance, called the dispersion medium.

Complementary Protein: two or more proteins that work together to provide adequate amounts of the essential amino acids.

Complex Carbohydrates: polysaccharides that contain hundreds or thousands of monosaccharide units. They are found in foods such as starch and ber and have to be broken down completely for absorption.

Conversion: the process of changing one unit of measurement to another.

Cream of Tartar: an acidic compound (potassium hydrogen tartate) used in baking to make the product rise.

Cross-Contamination: the process by which bacteria is unintentionally transferred from one substance or contaminated object to another.

Cup: a unit of volume that is most commonly used to measure most liquids, but can also measure dry ingredients.

Curds: clumps of casein (coagulated protein) that separates from the liquid when milk coagulates.

Cured: a method of food preservation and flavoring that uses salt and nitrates to dehydrate meat; also called adding/ripening in cheese production.

Cytoplasm: the water based substance inside of a cell, which contains the nucleus and organelles of the cell.

DNA: (Deoxyribonucleic acid) – a complex molecule that encodes the genetic information used in the development and functioning of all known living organisms and many viruses.

Density: the mass of a substance per unit of volume.

Diabetes: a disorder of the body that creates insulin production or the body's response to insulin.

Digestion: the chemical and mechanical breakdown of food, resulting in the release of nutrients for use by the body.

Disaccharides: two monosaccharides bonded together.

Dry Measurement: a unit of measurement designed for dry ingredients, such as our and sugar.

Elongation: the step in translation where the correct amino acids are brought to the ribosome and joined to the new polypeptide chain. This process repeats as the entire assembly moves along the mRNA strand.

Emulsion: a mixture of two immiscible liquids where one is dispersed in the other in droplet form.

Endosperm: the part of the grain seed that contains primarily starch with protein and other nutrients.

Energy Balance Equation: the biological homeostasis of energy in a living system; relation between intake of food and output of work. When balance is positive, the body stores extra energy as fat; when balance is negative, the body uses stored energy (fat), resulting in weight loss.

Enzymatic Browning: the changes observed in fruits and vegetables caused by a reaction between enzymes and oxygen.

Enzymes: proteins that help chemical reactions proceed without it being changed by the reaction.

Essential Amino Acids: certain amino acids that cannot be synthesized in sufficient quantities in the body to meet the demands of the body's normal processes.

Evaporation: the process of a liquid becoming vapor and dispersing into the air due to increased temperature.

Fahrenheit: a temperature scale characterized by a freezing point of 32 degrees and the boiling point of 212 degrees.

FATTOM: mnemonic device used in food service to describe the six conditions bacteria needs to grow: Food, Acidity, Time, Temperature, Oxygen, and Moisture.

Fermentation: a food-based reaction caused by the action of enzymes that breaks compounds into simpler substances; used for food preservation and preparation.

Fiber: plant material that cannot be digested, but that aids in digestion.

Flavonoids: a broad category of biological pigments that emits a yellow to red color, including anthocyanins and the anthoxanthins.

Flour: a powdery substance obtained by grinding grain (usually wheat), which is used to make bread and many other products.

Foam: a frothy mass of tiny bubbles formed from a liquid, such as egg whites.

Food-borne Illness: also known as food poisoning; consumption of food contaminated with pathogenic bacteria, resulting in illness such as nausea, vomiting, or diarrhea.

Food Safety: the practice of handling, preparing, and storing food in a way that prevents food-borne illness.

Freezing: the state of a substance, like water, having a temperature of less than or equal to 32 degree F and becoming solid.

Fructose: a monosaccharide found in honey and fruits.

Fungus: a broad category of eukaryotic organisms that lack plant chlorophyll; such as yeasts, rusts, smuts, mildews, molds, mushrooms, and toadstools.

Galactose: a monosaccharide sugar that typically combines with other sugars; i.e. lactose, which is glucose and galactose bound together.

Gaseous State: the state of matter in which particles have no defined size or shape and will expand to fill any enclosed container.

Gastronomy: the art and practice or preparing and eating good food.

Germ: the vitamin-rich embryo of the wheat kernel; it is usually separated before milling and incorporated into cereal or other foods.

Germs: The common term used to describe a pathogen that can cause harm to your health.

Glucose: a basic sugar molecule (monosaccharide) from which carbohydrate units are composed.

Gluten: a substance with elastic-like properties that is formed when mixing water with the proteins found in wheat, for example kneading dough.

Gram: a unit of weight equal to the mass of 1 cubic centimeter (cm3) of water at 4°C.

Heterogeneous Mixture: a solution in which one substance mixes with another but does not dissolve.

Homogeneous Mixture: a solution in which one substance is completely dissolved in another.

Household Measures: measurement techniques used at home that are not as accurate as weight measurements. These include dry cup and liquid cup measurements.

Hydrogenated Fats: fat produced from the industrial process of adding hydrogen molecules to unsaturated fat, which converts liquid fat into semisolid fat.

Hydrolysis: the chemical reaction that splits water (H_2O) into hydrogen cations (H^+) and hydroxide anions (OH^-).

Hydrophilic: any molecule that is attracted to or dissolves in water.

Hydrophobic: any molecule that is not attracted to or does not dissolve in water.

Ice Water Thermometer Calibration Method: the method of calibration in which the thermometer is placed in ice filled water and then adjusted to read 32°F.

Incomplete Protein: an amino acid chain that does not contain all of the essential amino acids.

Indoles: an organic compound that is used by the body in the process of making tryptophan, an essential amino acid.

Insulin: a hormone produced in the pancreas, which regulates the concentration of sugar (glucose) in the blood.

Insulin Resistance: the condition when the body produces insulin but the cells cannot use it efficiently. As a result, glucose builds up in the blood. This is the cause of Type 2 Diabetes.

Investigation Control: the group or object in an investigation which is used as a comparison and undergoes no experimental treatment.

Iodine: the chemical element used in medicine as a topical antiseptic. Iodine can be used to identify starch in foods because it reacts with the starch and changes color from brown to purple. It can also be used to identify Vitamin C in a solution due to the following chemical reaction where iodine turns from brown to clear.
$C_6H_8O_6$ (Ascorbic acid) + I_2 (Iodine) → 2 I^- (Iodide) + $C_6H_6O_6$ (dehydroascorbic acid)

Kilocalorie: the standard unit used to describe the amount of energy that food will produce in the human body and is reported on Nutrition Facts Labels.

Lactic Acid: an acid that is produced in milk during the fermentation process.

Lactobacillus bulgaricus: a probiotic bacteria, which is common in the digestive system and helps to regulate bad bacteria and neutralize toxins in the intestines.

Lactose: milk “sugar” or carbohydrate, composed of one glucose and one galactose molecule.

Lecithin: a phospholipid containing choline; commonly found in egg yolks and is used to emulsify water and fat together.

Limiting Amino Acid: an amino acid that cannot be synthesized in the body and can limit protein synthesis when deficient.

Liquid Measurement: a unit of measurement designed for liquids, such as water and oils.

Liquid State: the state of matter in which particles have no defined shape, but do have a defined volume.

Lipoproteins: the molecular structure in the body formed by both phospholipids and proteins; used to transport triglycerides and cholesterol in the blood.

Lycopene: a carotenoid pigment that is the red coloring matter of the tomato.

Macronutrient: a chemical substance that is required in relatively large amounts in nutrition (carbohydrates, protein, and fat).

Maltose: a disaccharide that contains a galactose and glucose molecule; found in the milk of all mammals.

Mass/Weight: a measure of the amount of matter, or a measure of the force of gravity between two objects.

Matter: a material substance that makes up all physical objects and occupies space.

Mechanical Digestion: the physical act of breaking up food particles through chewing and contractions of the stomach and intestines.

Melting Point – the temperature at which a solid changes to a liquid.

Metric Measures: the measure of length, weight, and volume using metric units. These units include meters, grams, and liters.

Miscible: capable of being mixed or blended together.

Molecular Gastronomy: a term commonly used to describe a style of cuisine in which chefs explore culinary possibilities by borrowing tools from the science lab and ingredients from the food industry. Formally, the term molecular gastronomy refers to the scientific discipline that studies the physical and chemical processes that occur while cooking.

Mold: a fungus that grows in warm, damp conditions and appears fuzzy. Mold can grow most anywhere but commonly grows on food as it ages.

Monosaccharide: a simple sugar molecule that cannot be broken down further into smaller molecules.

Monounsaturated Fats: a fatty acid with one double bond.

Natural Sugars: sugars that are naturally found in carbohydrate foods, such as fruits, starch, pure honey, etc.

Nucleus: the central part of most cells that contains the genetic material; usually enclosed in a nuclear membrane.

Nutrition Facts Label: the label on packaged food depicting its nutritional content.

Ounces: the unit of weight that is 1/16 of a pound or a unit of volume that is 1/8 of a liquid cup.

Oxidation: a chemical reaction between oxygen and other compounds.

pH : a scale that ranges from 0 to 14 indicating the level of acidity (concentration of H+ ions) with substances closer to 0 being more acidic, substances closer to 14 more basic, and substance close to 7 being neutral.

pH Indicator: a substance that indicates the degree of acidity or basicity of a solution through characteristic color changes. Cabbage juice is an example of a pH indicator that changes from neutral purple to pink under acidic conditions and green/blue under basic conditions.

Pheophytin: a gray-green plant pigment, which is the product of the breakdown of chlorophyll by an acid, such as cream of tartar.

Phosphorus: a chemical element that is found in bone and teeth and is also important to chemical body processes.

Phospholipids bi-layer: a barrier, such as the cell membrane of human cells, which is composed of two layers of phospholipids which line up end to end with their hydrophobic fatty acids in the center of the layer and their hydrophilic phosphorus end on the outside of the barrier.

Phospholipids: a compound similar to a triglyceride, but with a phosphorus-containing acid in place of one fatty acid; the structure is a glycerol with two fatty acids and a phosphorus-containing acid attached.

Physical Change: a change in a substance that does not alter its chemical identity, including changes in shape, physical state, size, or temperature. This type of change is usually reversible.

Phytochemicals: the broad term for a chemical compound that is naturally produced by plants.

Pigment: the chemical compound that produces color.

Polysaccharide: a long chain of sugar consisting of three to thousands of monosaccharides that makes up many carbohydrate-containing foods.

Polyunsaturated Fats: fatty acids with two or more double bonds.

Potential Energy: stored energy; energy that something has because of its position or the arrangement of its parts.

Percent Error: the percentage difference between the approximate value and the exact value. Found using the equation: (Approximate-exact)/exact= percentage error.

Phase (State) Change: the change from one state (solid, liquid, or gas) to another without changing the chemical composition of the substance.

Precision: occurs when measurements are close to each other but not necessarily accurate.

Protein: a class of organic compounds containing Nitrogen, Hydrogen, Oxygen, and Carbon that consist of molecules composed of one or more chains of amino acids.

Refined Grains: made from wheat or other grains that have been significantly modified by removing the bran and germ of the grain.

Ripened: the step in cheese production in which the cheese is matured to develop flavor, odor, body, texture, or color.

Salivary Amylase: an enzyme found in human saliva that aids in the breakdown of starch in the mouth.

Salmonella: genus of rod-shaped, gram-negative pathogenic bacteria that commonly infect contaminated food and cause food poisoning.

Saturated Fats: a fat in which most of the fatty acids are saturated; the fatty acids contain all the hydrogen atoms their structure can hold.

Saturated Solution: a solution containing the largest concentration of the dissolved material attainable under normal conditions of pressure and temperature.

Simple Carbohydrates: carbohydrate products that contain only one or two sugar molecules; these are the quickest sources of energy because they are easily absorbed.

Solid State: a state of matter in which particles have a defined shape and volume.

Solidification: the process by which a liquid changes into a solid.

Solute: a substance that is dissolved in a solvent.

Solution: a homogeneous mixture in which one substance is dissolved in another.

Solubility: the degree of which a substance (solute) is able to dissolve in another (solvent).

Solvent: a substance, ordinarily a liquid, in which other materials are dissolved to form a solution.

Spherification: a process creating little flavored spheres that burst in your mouth when eating.

Starch: a complex carbohydrate produced in plants as a storage form of glucose.

Streptococcus thermophilus: a non-pathogenic gram-positive bacteria and facultative anaerobe that is found in fermented milk and used in the production of yogurt.

Sublimation: the transition of a substance directly from the solid to the gas phase without passing through an intermediate liquid phase.

Sugar: a general term for multiple disaccharide carbohydrates characterized by a sweet taste.

Super-Saturated Solution: an unstable state in which the concentration exceeds the saturated level; achieved by dissolving a solvent at a high temperature, then allowing the solution to cool slowly.

Sucrose: table sugar; a disaccharide containing one molecule of glucose and one molecule of fructose.

Surface Tension: cohesive forces between liquid surface molecules cause them to adhere more to each other than to those below the surface. This causes the surface to resist being broken and is what causes bubbles to form.

Synthesis: the chemical production of a substance by changing or combining similar substances.

Tare: an allowance made for the weight of a container when trying to determine the net weight of a substance.

Temperature: a measure of kinetic energy of a group of molecules; indirect measure of molecular motion.

Thermometer: an instrument used for measuring and indicating the temperature of a substance.

Trans Fats: fatty acids produced from hydrogenation in which hydrocarbon chains are in the "trans" configuration instead of the natural "cis" form.

Triglycerides: a large class of lipids, including almost all fats and oils in the human diet; structure is a glycerol with three fatty acids joined at the hydroxyl site.

Unsaturated Fats: a fat in which the fatty acids contain one or more carbon-carbon double bonds; the fatty acids do not contain all the hydrogen atoms their structures can hold.

Vaporization: the transition from the liquid phase to a vapor, which occurs through evaporation or boiling of a liquid substance.

Virus: an infectious agent that replicates only inside the living cells of other organisms. (e.g. the common cold).

Vitamin D: a family of compounds derived from cholesterol; essential for normal bone, teeth, and blood health, and is found especially in shellfish, liver oil, egg yolk, and milk.
Volume: the amount of space an object occupies.

Whole Grain: a food made from wheat from which no part (such as the bran) has been removed.

Whey: a by-product of cheese production; protein found in the liquid that remains after fat and casein are removed from milk. Whey has a watery appearance and is primarily composed of water- soluble proteins, lactose, and minerals.

Yeast: a single celled fungi that is used in bread production to make dough rise.

Yogurt: a milk-based food product that is prepared from the bacteria of fermented milk.

Yogurt Culture: the bacteria that are used to change the milk into yogurt.

Yolk: the yellow part of an egg which feeds the developing embryo in animals. The yolk contains protein, fat, cholesterol, and carbohydrates as well as many fat soluble vitamins.

Vocabulary terms taken, in part, from http://www.foodmaster.org/documents/Mid-Student-Glossary.pdf with additions.

LESSON 5: STEM AS PART OF OUR EVERYDAY LIVES

3D Animator: Using a computer, 3D animators create 3-dimensional moving images for movies, video games, ads, and more.

Actuaries: are all about figuring out the odds. They determine the likelihood that certain events will occur, and how much those events would cost after they happen. For example, they might calculate the risk of hurricanes happening in a certain area, and set insurance rates accordingly.

Aerospace Engineers: don't defy the laws of physics; they work with them to create massive machines that can fly, such as airplanes, helicopters, spacecraft, satellites and missiles. They plan, design, test and oversee the building of aircraft for commercial use, defense or space exploration. These machines need to be durable, safe and reliable.

Agricultural Engineers: develop new technologies, systems, and processes to improve farming and food production. Some of the many examples of their work include developing safe new crop cultivation systems; designing better food-processing plants; producing new biofuels; or working in aquaculture (raising fish for food).

Archaeologists: study human culture throughout history. They uncover information about the past by examining things and places that people have left behind. They may work for universities, museums, the government, or private companies. Archaeologists also serve as consultants to protect areas of archaeological importance from development.

Architects: design all types of buildings: homes, schools, skyscrapers, houses of worship, libraries, and more. They use math, technology, science and design skills to create a plan for the structure.

Astrobiologists: Do you think there is life on other planets or that it might be possible for humans to live on another planet someday? These are questions astrobiologists, or exobiologists, think about every day. They try to find out about life outside of the earth's atmosphere. Whenever you hear about the possibility of water existing on another planet, you can probably thank an astrobiologist for making this discovery. Where there is water, there could be living creatures!

Astronauts: help run and repair the International Space Station and do other high-tech work, like using robots to conduct experiments. They go through an intense training process and also need to learn to pilot a spacecraft.

Astronomer: They try to discover and learn why the universe is the way it is, and they share their findings with others. Astronomers can work in a classroom, planetarium, large observatory, or a bunch of other places.

Athletic Trainers: are the first line of defense against sports injuries. They're health care professionals who work with athletes, dancers, soldiers, and other physically active people to prevent and treat bone and muscle injuries related to their activities. They work with physicians to plan a course for injury rehabilitation. Athletic trainers can also provide emergency treatment when an injury takes place.

Automotive Designers: combine knowledge of physics with an artist's eye to create cars that are appealing while being safe, energy efficient, and fun to drive.

Automotive Service Technician: These technicians make sure vehicles are working how they are supposed to, whether they are a school bus or a brand new hot rod. Sometimes they can diagnose or fix the problem with a computer. Sometimes they get their hands dirty and work with actual mechanical parts.

Biomedical Engineers: apply engineering and scientific principles to create new solutions for the human body and health care systems. These engineers may work on tissue replacement, prosthetic devices, robots used to perform surgery, and other applications that help diagnose, prevent, treat, and rehabilitate various health conditions.

Biometrics Technician: They help develop security technology that reads and recognizes people's unique features, such as fingerprints, irises, retina, face, or voice. Imagine a world where a quick scan of your retina unlocks a lock and gives you access to a room or a vehicle or information. You can be a part of that world as a biometrics technician!

Botanist: studies plants outside in the field and inside in the lab. They figure out how plants can help people or how they might be harmful. Botanists work to conserve plants, help food crops grow, do research, and tell others about what they find out.

Building Inspector: these inspectors make sure that construction jobs are done so that they follow the laws and are safe for people. You may even get to climb on a building before anyone else can.

CAD Technicians: use software to turn architectural or engineering plans into precise technical drawings of machines or buildings to be used by builders and manufacturers. The drawings may be two- or three-dimensional.

Cartographers: gather geographic information to create or update maps for different purposes. Today, most cartographers make maps with computers using geographic information systems (GIS), which bring together geographic data to be used in creating all sorts of maps.

Chemical Engineers: use chemistry and engineering principles to solve problems related to pollution, manufacturing, energy, food production, and more. They take raw materials, such as oil or sugar, and transform them into useful and even life-saving products.

Chemists: study the atomic or molecular structure of matter. They experiment to see how various chemicals work (or don't work) together. They may use this information to develop new materials, such as alternatives to plastic or new medicines. Chemists work in many different fields and industries.

Climate or Atmospheric Scientists: study long-term weather patterns and understand global climate change. They communicate the information to the general public and policy makers.

Graphic Designers: use computers and different kinds of software to create designs that communicate ideas and messages in a visually compelling way. The next time a logo, package, magazine cover, or billboard ad catches your eye, you're appreciating the work of a graphic designer.

Computer Hardware Engineer: they make parts that keep the computer that you are using right now up and running. They also research ways to make technology more up-to-date and easier to use every day. Just look at a photo of a computer from the 1980s to see the progress these engineers have made!

Software Developers: are tech experts who think very hard about how and why people use computers. Then they plan, design, develop, and test new computer software applications and systems. Their work ranges from the games you play on your phone, to your favorite social network, to the software you use to write a paper for school, to the computer systems that keep big businesses and industries churning.

Computer Systems Analyst: these analysts study how companies use their computers and figure out ways to make sure their computers work as best as they can. Some companies need high end technology while others just need basic computer programs, so analysts figure out how companies can run efficiently and fix problems.

Ecologists: study and protect the environment. They study the relationship between the environment and living things, and between the environment and different actions. Ecologists can advise policy makers, solve environmental problems, teach others, or manage natural resources.

Educational Technologists: find innovative and exciting ways to apply new technologies to the teaching and learning process.

Electricians: install, repair, and maintain electrical systems and machinery in residential, commercial, industrial, and public spaces.

Emergency Management Specialists: the masters of disasters! They make and execute plans for disaster response and train and prepare emergency personnel. They may work to keep communities safer or organize large-scale international response missions.

Environmental Engineers: develop ways to solve problems related to the environment, such as air and water pollution and waste disposal. They may work on such issues as hazardous waste clean-up and disposal; solving problems related to global warming; or designing new recycling systems.

Food Technologists: use chemistry everyday to study food. Sounds like a win-win, right? People in this field develop new foods or new processes for producing, preserving, or packaging food.

Foresters: take care of forests by checking on the health of trees, planting trees as needed, and supervising the harvest of trees.

General Contractors: supervise the construction of a building by making sure they have enough people working on it and spending only the money they have. They get to oversee everything and make sure the project gets finished!

Geologists: study the history of the earth by looking at rocks, soil, and other natural materials. They might try to figure out when a volcano might next erupt, or figure out where, when, and how climate has change occurred throughout the history of earth. There is a lot of stuff to learn, so geologists are studying all around the world!

(HVACR) technician: These technicians make sure that they air quality is good in a building and that the heating and cooling systems in a building are working. HVACR techs make our world a more comfortable place.

High School STEM Teacher: Teachers introduce students to concepts in math and science and help build a strong foundation for their futures. Middle and high school teachers specialize in a subject and may teach the subject at many different levels. Math and science teachers are in demand—especially in chemistry and physics!

Horticulturists: figure out the best way to make fruits, vegetables, flowers, or other plants grow. They can help people figure out what pesticides are best or can help recommend what plants are grown near crops to keep bugs away. Horticulturists do a lot of work outdoors, so they can't be afraid to get their hands dirty!

Hydrologists: learn how water affects the environment and ways to keep it safe for human use. Without the work of hydrologists, you might not be able to drink out of the faucet!

Industrial Designers: identify consumers' needs and then use creative, technical, and engineering skills to create new or improved products for everyday use.

Information Security Analyst: These analysts try to prevent cyber attacks on computers and help protect top-secret data. Analysts can help keep a new product idea safe or prevent spies from hacking into government files.

Lab Research Technician: Technicians make sure a laboratory stays clean and organized while they do research for doctors and scientists. They don't create monsters like Frankenstein, but they get to do some really cool things, like see germs up close.

Landscape Architects: combine design and science to create beautiful, healthy outdoor spaces. They may design outdoor elements for parks, roadways, corporate campuses, residential properties, cemeteries, or historical sites. They may also work to restore natural spaces such as waterfronts and forests. They select and decide where different plants, trees, and shrubs will go, and where pathways, walls, and other structures will be placed.

Marine Biologist: They study and protect animals, plants and ecosystems found in the oceans and seas.

Materials Engineer: They figure out what type of materials will work best in different products and develops new or improved materials.

Mathematician: They analyze complex data and work with numbers in many ways to answer questions and solve problems.

Mechanical Engineer: They research, develop, build and test all types of machines and mechanical devices.

Medical Roboticist: They develop the super-advanced technology that allows surgery to be performed by robots while being controlled by a physician either onsite or remotely.

Meteorologists: They are scientists who study and predict weather and climate.

Microbiologist: They study microbes, which are microscopic organisms such as bacteria, algae, and fungi.

Museum conservators: They use scientific methods to clean, restore, preserve, and protect historic and artistic works for display, storage, or shipping.

Nanosystems Engineer: They use the tiniest particles, atoms and molecules, to create new products and technologies.

Naval architects: They design any kind of seafaring vessel you can think of. That includes motorboats, sailboats, tankers, aircraft carriers, and submarines.

Nuclear engineers: They look for new ways to use nuclear energy instead of using fossil fuels.

Oceanographers: They study the biology, geology, physics, and chemistry of the ocean.

Orthodontists: They straighten people's teeth, usually with braces, for better oral health.

Paleontologists: They look for and study fossils to learn about the Earth's past. **Paramedics:** They are first responders to medical emergencies and try to figure out what is wrong with the patient, and provide medical care on the way to the hospital.

Park Naturalist: They develop programs to teach people about the environment and other topics, lead educational walks through parks, and help conserve the space where you work.

Physicist: They investigate tiny atomic particles or distant galaxies.

Pilots: They fly and navigate airplanes or helicopters.

Production Engineer: They figure out how to manufacture goods efficiently throughout the production process.

Robotics technicians: They apply mechanical engineering principles to electronic systems and circuits and work closely with mechanical or electrical engineers.

Safety Engineer: They ensure that people stay safe and healthy at work (such as at a manufacturing facility).

Science Illustrators: They create precise scientific illustrations for use in places such as textbooks and other teaching materials, presentations, and court cases.

Science Reporters: They interview scientists and turn complex scientific information into content that can be readily understood and enjoyed by the general public.

Solar Technician: They install and maintain solar panels or systems, storage tanks, pumps, valves, pipes, and ducts.

Special Effects Technician: They produce on-set special effects for film, broadcast, or theatrical production.

Statistician: They take data that other people gather and analyze it.

Stockbroker: They invest in the stock market for individuals or corporations and advise clients on appropriate investments.

Structural Engineer: They work with architects to ensure that structures such as buildings and bridges are safe, strong, and durable in construction.

Surveyor: They measure land, air space, and water areas.

Urban Planner: They ensure that cities and towns function well and offer their citizens a good quality of life and a safe, healthy environment.

Video Game Designer: They combine imagination and strong technical skills to create exciting games and fantastic worlds for players to experience.

Zoologist: They focus on a specific type of animal and study that species' population, health, habitat, behaviors, and characteristics.