Standard 1.0 – DEMONSTRATE LABORATORY PROCEDURES AND SAFETY PRACTICES					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
1.1	Demonstrate safe practices in a home, classroom, laboratory, and work situation	Safety precautions and procedures	Identify the first safety precaution for handling or applying chemicals: Read labels The most important first aid practice to consider when working with chemicals is to: Dilute the poison	Biohazard Dilute	X
			Describe the 5 safety colors		
1.2	Identify safety precautions that involve working with hazardous biological materials		Identify the biohazard symbol If no Sharps container is available, what could be used instead: Labeled plastic laundry soap bottle	Sharps Container	X
1.3	Examine the impact of safety compliance on business and employees	Occupational Safety Health Administration (OSHA) regulations	What agency enforces safety compliance for employees: OSHA An effective safety program increases employee morale	OSHA Morale	X
1.4	Interpret parts of an MSDS sheet		On a label what do the signal words and symbols describe on a SDS sheet: Toxicity of a chemical	Toxicity	X

			MSDS documents should be kept on the work site		
				MSDS * as of 2013 now Global Harmonization System (GHS)	
1.5	Interpret recommended personal protection equipment (PPE)		Eyes are the most critical part of the body to protect Safety glasses should be worn at all times in the lab		X
				PPE	
1.6	Safely operate and maintain equipment		Identify the reflective emblem Slow moving vehicles should display the reflective emblem Power should be disconnected when working on electrical equipment		X
			Read an owner's manual Slow moving vehicle symbol		

STANDARD 2.0 – DESCRIBE CELL BIOLOGY STRUCTURES AND PROCESSES

Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
2.1	Explore the cells, tissues, and organs		A cell wall is found in a plant cell but not an animal cell	DNA	X
			Organize terms from smallest to largest	Prokaryote Eukaryote	

			Difference between prokaryote and eukaryote Difference between plant and animal cells Describe common organelles: Nucleus Cell wall Cell membrane Chloroplast Mitochondria Ribosome	Plant Cell Animal Cell	
2.2	Recognize the structure and function of DNA		DNA has double helix structure When DNA is broken down which is not one of its nitrogen pairs: Uracil	Helix Structure	X
			Base Pairs Guanine (G) Cytosine (C) Adenine (A) Thymine (T) Uracil (U) only present in RNA	Replication	
2.3	Explain the process of creating proteins from DNA		What is mRNA transcribed from during protein synthesis: DNA During synthesis, Guanine is always paired with the nucleotide Cytosine	mRNA Uracil Guanine Cytosine Transcription Translation	X

			Dried tissues is an indicator of dehydration Two processes involved in using DNA to make protein: Transcription and Translation		
			Difference between DNA & RNA Protein synthesis	Amino Acid	
2.4	Explore the role of cell and cellular processes		Diffusion is caused by: Random movement of molecules Meiosis creates haploids	Diffusion Molecules Meiosis Haploids	X
			Difference between mitosis and meiosis Process of osmosis	Mitosis Osmosis Diploid	
2.5	Examine the molecular basis of heredity and resulting generic diversity		How is a hybrid plant created: crossing 2 purebred variety plants	Hybrid Purebred Genetics	X
			Punnett Square	Dominant Recessive	
2.6	Specify methods and requirement by which an organisms genetic code can be altered using biotechnology techniques		Bt cotton is a transgenetic product Define and identify transgenetic products Bt cotton Bt corn Golden rice	Transgenetic	X
			Discuss benefits/reasons to genetically modify an organism Pest/Drought Resistant		

			Added nutrition Lengthen shelf life		
2.7	Determine how scientists continue to investigate and critically analyze DNA cloning		Clones are genetically identical	Clone	x
			Discuss benefits/reasons to clone organisms Trait selection Endangered / extinct species Produce organs for transplants Describe the role of bioethics in biotechnology Define cloning and identify examples Dolly the sheep	Bioethics	
2.8	Outline the scientific and processes involved in biological evolution			Adaptation	
			Define evolution and provide scientific evidence Define adaptations and provide examples Define natural selection	Evolution Natural selection Cladogram	

STANDARD 3.0 – DESCRIBE BASIC PRINCIPLES OF NUTRITION

Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
3.1	Determine the essential nutrients for organisms and describe their importance		When evaluating nutrients, Fats/lipids provide the greatest amount of energy Describe essential nutrients	Fats Lipids Micro nutrients	X

			Difference between micro and macronutrients		
3.2	Explore the nutritional needs of humans, animals and/or plants		Hydrogen (H) and Oxygen(O) are supplied by water What are the primary nutrients: Nitrogen (N) Phosphorous (P), Potassium (K) Why are they called primary nutrients: Plants consume the primary nutrients in the largest amounts		X
			Humans/Animals: Protein Carbohydrates Water Minerals Fats Vitamins Plants: Nitrogen Potassium Phosphorous		
3.3	Explain the process of food digestion and nutrient absorption		Digestion begins in the mouth Most nutrients are absorbed in an animal's small intestine	Digestion Small Intestine	X
			Describe animal digestive system		

			Difference between ruminant, non-ruminant, modified and poultry Describe how plants absorb nutrients		
3.4	Identify common nutritional problems		If an organism receives twice the recommended dose of a nutrient toxicity can occur Nitrogen deficiency causes stunted growth and light green leaves	Dose Deficiency	X
STANDARD 4.0 – DESCRIBE SCIENTIFIC CLASSIFICATION					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
4.1	Investigate the seven levels of classifications (Kingdom, Division, Class, Order, Family, Genus, Species)		Correct order of how an organism is classified from broadest to most specific: kingdom, class, family genus, species Classification systems are needed to have a universal identification system	Kingdom Class Family Genus Species	X
			List the seven levels of classification from broad to specific Write scientific names using genus and species Division also known as phylum		
4.2	Investigate the five kingdoms (Bacteria, Protists, Fungi, Plants, Animals)		Heterotrophic and multicellular are two things all organisms in the kingdom Animalia have in common	Heterotrophic Multicellular Organism Animalia	X

			Insects are classified in the animal kingdom		
4.3	Create and utilize a dichotomous key		Identify various types of beans given a dichotomous key: Pinto, Red Kidney Garbanzo, Black		X
			Commonly used dichotomous keys are: Soil texture by feel chart Forestry field guide	Dichotomous Key	
STANDARD 5.0 – DESCRIBE PRINCIPLES OF PLANT GROWTH AND DEVELOPMENT					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
5.1	Identify plant parts and their function			Fibrous Tap Secondary	X
			Describe the types of roots	Root hairs	
5.2	Explore methods of classifying plants			Perennials Evergreen	X
			Life Cycle Annual, biennial, perennial Structure Monocot vs. dicot Deciduous vs. evergreen	Annual Moncot Dicot Deciduous	
5.3	Recognize the physiological needs of plants		What elements are combined during photosynthesis to create food for the plant: Carbon dioxide, water, light Characteristics of respiration	Photosynthesis Respiration	X

			Describe the transportation process and its relationship to plant temperature		
			Describe photosynthesis, write its formula, and identify reactants and products Describe respiration, write its formula, and identify reactants and products		
5.4	Explain plant sexual and asexual reproduction		The part of the flower that develops into a seed: Ovule	Ovule Style Filament	X
5.5	Demonstrate plant propagation		What is applied to stimulate root growth when performing plant cuttings: Root hormone	Stimulate	X
			Make a leaf and stem cutting	Propagation	
STANDARD 6.0 – DESCRIBE PRINCIPLES OF ANIMAL GROWTH AND PRODUCTION					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
6.1	Describe the epidermis system		The major function of the epidermis: protect from the environment The largest primary defense system: Epidermis When an animal is in flight or fight mode the epidermal system becomes warm because the blood flow increases to the blood vessels	Epidermis Flight or fight	X
			Function Protects the body		

			Acts as an outside barrier		
6.2	Describe the musculoskeletal system		The role of the muscular skeletal system in agriculture is meat and medical products Smooth muscle is usually purchased and consumed		X
			Function Support body Move body		
6.3	Describe the nervous system		The animals central nervous system includes the brain and spinal cord Mad Cow disease is spread by the consumption prions found in the brain	Prions Mad Cow Disease	X
			Function Transport messages to support reactive responses	Nerves	
6.4	Describe the circulatory system		The pulse evaluates the circulatory system in a physical exam What would a heart rating of 60 beats per minute be 15 beats/15 sec		X
			Function Move nutrients, oxygen, and waste around the body		
6.5	Describe the respiratory system		Two gases exchanged in the respiratory system: O_2 (Oxygen)and CO_2 (Carbon Dioxide)		X

			An animal's respiration rate is elevated when the animal is excited		
			Function Exchange gases within the body		
6.6	Describe the digestive system		An animal with a loose bowel movement would have a problem in its digestive system	Bowel Movement	X
			Function Break down food for nutrients/energy Remove waste		
6.7	Describe the urinary system		The urinary system filters waste away from the blood stream		X
			Function Removes excess fluid and taste/toxins	Urine	
6.8	Describe the reproductive system			Fertility	X
			Function Produce offspring		
6.9	Describe the endocrine system		Hormones are released into the blood stream that the affect the activities of cells in other parts of the body	Hormones	X
			Function Balance the chemicals in the body through the production of hormones in the glands	Glands	
6.10	Recognize the physiological needs of living animals		Yelling and loud noises create stress for animals		X
			Physiological needs: Food Water Shelter		

			Humane treatment		
6.11	Explore animal health control practices		Quarantine/Isolation may prevent a newly acquired animal from spreading disease Vaccinations help prevent disease	Quarantine Isolation Vaccination	X
			Importance of various health practices Quarantine/Isolation		
				Sanitation Vaccination	
6.12	Explain animal reproduction practices			Weaning	X
			Importance of various production practices Artificial insemination Selective breeding Line breeding	Fertilization Artificial insemination Selective breeding	
6.13	Explore benefits to health care that have resulted from advances in technology		Computing system, Microscopic system and ultrasound systems have improved health care		X
			Importance of technology in production Microchip identification Importance of technology in production In vitro Embryo transfer Ear tagging	In vitro Embryo transfer	
STANDARD 7.0 – USE SCIENTIFIC PROCESSES TO ANALYZE DATA					

Curriculum Guide
Program Area: Agribusiness Systems

Measurement Criteria		Concepts	Implementation	Terminology	Testing Item
7.1	Formulate predictions, questions, or hypotheses based on observations		A hypothesis is testable	Hypothesis	X
				Observation Prediction	
7.2	Evaluate appropriate resources for research		Information in the internet should be check by three credible sources		X
				Plagiarism	
7.3	Illustrate the scientific method		When referring to the scientific method the purpose of a hypothesis is to check the hypothesis		X
			Steps of the scientific method		
7.4	Design and conduct controlled investigations		Understand the concept of independent variable Describe the different types of observations	Qualitative Data Quantitative Data	X
				Control Independent variable Dependent variable Constants	
7.5	Design data tables, charts and graphs		Graphs are the easiest way to view a change or trend over time for collected data		X
				Line Graph Bar Graph Pie Chart	

				Data Table x-axis y-axis	
7.6	Record observations, notes, sketches, questions and ideas during the investigation		Describe the purpose and the procedures for collecting data in the scientific method		X
7.7	Analyze data to explain results and propose further investigation		Quantitative data can be measured		X
7.8	Communicate conclusions of investigations		Power Point can be used to prepare visual presentation for a large group Eye contact is important to keep an audience engaged during an oral presentation Scientific journals are used for publishing experiment results		X
STANDARD 8.0 – DESCRIBE THE PRINCIPLES OF ECOLOGY AND ENVIRONMENTAL SCIENCES					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
8.1	Analyze the organization of living systems		The difference between an earthworm and centipede: Different niches	Niches	X
			Define the organization levels from smallest to largest: species, population, communities, ecosystems, biomes		
8.2	Recognize the role of energy within living systems		Producers use solar to create their own food	Producer Consumer	X
			Discuss food chains and food webs Energy pyramids		

8.3	Analyze the symbiotic relationships among various organisms and their environment		Explain a parasitic relationship	Parasitic	X
			Define and provide examples of symbiotic relationships: Parasite Commensalism Mutualism	Commensalism Mutualism	
8.4	Discuss the different classifications of natural resources in the environment		Energy resources include: Coal Sunlight, Oil		X
			Classify renewable and non-renewable recourses	Renewable resources Non-renewable resources	
8.5	Evaluate environmental and natural resources sciences		Carrying capacity is the ability of an ecosystem to provide food and shelter for a given population	Carrying Capacity	X
8.6	Evaluate sustainable agriculture systems		Sustainable agriculture is the practice that assures the future production of crops Organic matter improves soils structure, increased water holding capacity of soil and added nutrients in the soil	Sustainable	X
STANDARD 9.0 – DISCUSS BIOTECHNOLOGY					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**

9.1	Analyze how specific cultural and/or social issues promote or hinder scientific advancements				
			Define biotechnology Methods of developing biotech products Discuss cultural views and the effect it has on import and exports	Biotechnology Bioethics Bioremediation	
9.2	Evaluate new agricultural products developed as a result of advances in technology				
			Biotechnology products Bt cotton & corn Golden rice Identify benefits and disadvantages of biotechnology products		
9.3	Examine the effects of biotechnology on food safety and processing techniques		Biotechnology can be used to extend the shelf life of a product	Pasteurization	X
9.4	Discuss how biotechnology has improved nutrition		Golden rice is a biotechnology product that has increased nutrition		X
9.5	Discuss biotechnology techniques that have contributed to improved health		Examples include Stem cell research	Stem cells	X
9.6	Explain how biotechnology has influenced medicines		Antibiotics are used to fight infection	Antibiotic	X
				Vaccine	

9.7	Compare the impact of biotechnology on the length and quality of life		Biotechnology created insulin to help diabetics	Insulin	X
9.8	Describe the effects of technology and biotechnology on the environment		GPS is used to guide tractors to apply chemicals to crops	GPS	X
9.9	Describe benefits to the environment as a result of advances in technology				x
9.10	Compare the impact of biotechnology on the production, processing, storage, and preparation of food		Pasteurization is used to kill bacteria in milk	Pasteurization	
				BST	
9.11	Discuss the effects of plant biotechnology in sustainable agriculture systems				
			Plant propagation Cuttings Tissue culture		

STANDARD 10.0 – DESCRIBE FOOD SAFETY & PROCESSING PRACTICES

Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
10.1	Identify food safety practices		35 degrees is most appropriate for food storage	Cross Contamination	**X**
			Quality Assurance		
10.2	Describe food-processing practices		Food processing is changing raw agricultural products into attractive consumable foods	Dehydration	**X**
			Describe common food processing techniques	Irradiation	

			Dehydration Irradiation Canning Blanching Fermentation		
10.3	Identify new and innovative food products developed as a result of advances in technology		Americans consume the largest amounts of GMO (genetically modified organisms) grains: in the form of oils		**X**
10.4	Investigate food labeling practices		Parts of the food label: Shelf life, Daily nutrients, address of food manufacturer Major food inspection agencies: EPA, FDA, USDA The FDA regulates food labels		**X**
			Explain the roles of the government agencies involved Food and Drug Administration (FDA) United State Department of Education (USDA) Environmental Protection Agency (EPA) Explain the components of a food label		
10.5	Compare marketing techniques in the food industry		Marketing food products should focus on product, price and promotion	**Organic**	**X**
STANDARD 11.0 – INVESTIGATE ETHICS IN THE AGRICULTURAL INDUSTRY					

Measurement Criteria		Concepts	Implementation	Terminology	Testing Item
11.1	Assess ethics in leadership and agricultural production		Patented products cannot be asexually reproduced ethically	Patented	**X**
			Describe ethics, bioethics, and/or business ethics		
11.2	Evaluate business deals with friends, family or competitors		Listening is the most important skill in dealing with customers		**X**
11.3	Evaluate pricing and sales incentives		Direct marketing eliminates whole the wholesaler		**X**
				Sale incentive Pricing incentive	
11.4	Evaluate potential environmental damage of agricultural practices		Overgrazing can cause the depletion of top soil	Environmental hazard Overgrazing Top soil	**X**
			Example include Pollution Lumber harvest Clear cutting Colony collapse disorder Acid rain		
11.5	Discuss bioethical issues		A lack of public understanding of food produced by biotechnology is a major concern		**X**
			Example include Animal testing Organic vs. traditional		

			Transgenetic / Genetically Modified Organism (GMO) Cloning		
STANDARD 12.0 – ANALYZE AGRICULTURE LITERACY TOPICS					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
12.1	Discuss the development of agriculture in America		Eli Whitney invented the cotton gin in 1793 Food costs have risen due to corn being used to create ethanol	Cotton gin Ethanol	**X**
			Discuss advancements in agriculture Cotton gin Ethanol		
12.2	Examine AZ Agriculture and its advancements		Practices used to advance Arizona Agriculture include: Harvesting mechanization and no –till farming, GPS and cell phones, and irrigation and land leveling		**X**
			Identify Arizona's top agriculture commodities (cotton, lettuce, dairy, alfalfa Arizona's 5 C's (cattle, climate, citrus, cotton, and copper)		
12.3	Discuss misconceptions in agriculture	Example include • Genetically modified organisms	About 15.1% of the world's land is suitable for farming	GMO	**X**

			The most common use for cotton is clothing, medical supplies, home furnishings and industrial products Identify advantages of genetically modified organisms: Resistance to pests, less herbicide use, feeding a growing population		
			Example include Genetically modified organisms Animal rights vs. animal welfare	BST	
12.4	Differentiate between standard operating procedures on commercial, small scale and organic production techniques		Describe controlled environmental agriculture: manipulating light temperature, and humidity to increase production		**x**
			Difference between factory farm and family farm	Organic	
12.5	Explore the facets of Agriculture		The agronomic crop soybeans can be used for the productions of adhesives, insulation, candles,, food, biodiesel and crayons	Agronomic crop Biodiesel	**X**
			Difference between agronomic and horticulture	Ornamental	
12.6	Discuss how regulatory agencies affect agriculture.		The EPA regulates the pesticide tolerance levels in agriculture Agencies include Environmental Protection Agency (EPA) Food and Drug Administration (FDA)		**x**

			United State Department of Agriculture (USDA) Arizona Department of Environmental Quality (AZDEQ)		
STANDARD 13.0 – INVESTIGATE APPROVED PRACTICES OF DISEASE CONTROL					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
13.1	Differentiate between common diseases		Describe parasite infection, airborne infection, soil and feed infection Fungi can cause an infectious disease	Noninfectious	**X**
			Difference between infectious and noninfectious	Infectious Airborne Parasite Vector	
13.2	Assess symptoms of common diseases and parasites		Describe the difference between a disease and a parasite		**X**
			Difference between visual and non-visual signs		
13.3	Evaluate economic impact of diseases on production		The economic impact of disease on production that describes the economic correlation is proportional		**X**
13.4	Compare methods by which diseases are spread		Microbial activity thrives in a warm moist environment Disease is spread in plants by soil, water and insects		**x**

13.5	Evaluate the most economical and environmentally safe disease control and prevention methods				**X**
				Economic threshold	
13.6	Conduct an investigation in an infected field/organism		A rectal thermometer is used to measure temperature		**X**
13.7	Propose corrective actions needed to treat an infected field/organism		When an organism is infected the first thing to be done is to locate the infected area		**X**
STANDARD 14.0 – INVESTIGATE APPROVED NUTRITIONAL PRACTICES					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
14.1	Research common nutrient deficiency symptoms and treatment options				**X**
			Animal include: Water Carbohydrates Protein Plants include Nitrogen Phosphorous Potassium		
14.2	Recommend nutrient and quantity requirements		A young growing animal requires higher protein in its diet Macro is used to identify mineral used in trace amounts	Trace Macro	**X**

			Plants obtain Oxygen and carbon from the air		
			Animal - Pearson Square Plants - Fertilizer Analysis		
14.3	Evaluate diagnosis, treatment, and prevention of nutrient deficiency		6.5 to 7.0 pH is the maximum availability of most essential nutrients	pH	**X**
			Animal – Feed labels Plant – affect of pH on nutrient availability		
14.4	Inspect supplemental and additive ration/fertilizer composition		Complete math problems to determine the cost of a product per pound Identify the nitrogen in a bag labeled 15-0-10: 15%	Economical	**X**
			Feed additives include Growth regulators Antibiotics/medications Feed supplements include Salt block Calcium / Mineral Block Protein	Supplement	
14.5	Prepare samples for testing and diagnosis				**X**
14.6	Test methods of fertilizer/nutrient application		Describe the purpose of soil test: application for fertilizer should always be based on soil test		**X**

14.7	Examine the relationship between nutrient practices and yield amounts		Properly applied fertilizer should lead to an increased yield on crops	Yield	**X**
			Feed gain ratios Average rate of gain		
STANDARD 15.0 – ANALYZE THE INTERACTION AMONG ENVIRONMENTAL AND NATURAL RESOURCES SCIENCES					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
15.1	Demonstrate how dynamic processes such as weathing, erosion, and sedimentation relate to redistribution of materials I the earth system				**X**
				Erosion	
15.2	Investigate soil morphology		Loam is the most productive soil type for growing crops Low soil permeability causes water to move too slowly for air to reach plant roots The pH of alkaline soil is greater than 7	Loam Permeability Alkaline	**X**
			Physical characteristics include Texture (sand, silt, clay) Color Water Holding Capacity Permeability Chemical characteristics include	Horizon	

			pH Use a soil texture by feel chart and texture triangle		
15.3	Illustrate land-use and water-use planning		Adding organic matter increases the water holding capacity of soil Platy is the result of soil compactions		**X**
			Role of conservation agencies including Environmental Protection Agency (EPA) Bureau of Land Management (BLM)		
15.4	Explain factors that impact current and future water quantity and quality including surface, ground, and local water issues		The AZ Department of Water resources is responsible for water use planning Drip irrigation was created to conserve the most water		**X**
15.5	Compare fossil fuels and biofuels and how they are affecting the environment		Ethanol is used by mixing corn and gasoline for cars		**X**
				Fossil fuels Biofuels	
15.6	Describe how human activities and natural causes can lead to pollution		Vehicle exhaust, forest fires and fertilizers cause pollution	Pollution	**X**
15.7	Evaluate the effectiveness of conservation practices on environmental quality and biodiversity		Technology by farmers can be used to decrease fertilizer application by using GPS to provide accurate locations of specific crops	GPS	**X**

			Examples include Hunting regulations Endangered Species Act	Conservation	
STANDARD 16.0 – INVESTIGATE IMPACTS OF INTEGRATED PEST MANAGEMENT OPTIONS					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
16.1	Classify common pest		Action should be taken when pests become economically threatening Move to 16.5	Economically threatening	**X**
			Insect life cycles	Metamorphosis	
16.2	Evaluate economic impact of pests on production		Economic loss caused by insects include transmitting plant disease, loss of crop yield, reducing quality of crops		**X**
			Difference between beneficial and harmful pests		
16.3	Identify methods by which pests spread		Pesticides kill all the non-resistance pests leaving only those that are resistant to reproduce		**X**
16.4	Recognize signs of pest damage		Leaf damage reduces a plants ability to photosynthesize		**X**
			Insect mouthparts		
16.5	Identify thresholds created for specific pests		A pest control advisor is the best person to determine when to spray for pest control		**X**
16.6	Select and propose the most economical and environmentally safe pest control method		Soapy water is the most economical way to control sucking pests such as white flies in a greenhouse		**X**
			Control categories include Biological Chemical Cultural / Mechanical	Pre-emergent Post-emergent Biological control	

				Chemical control Cultural control	
16.7	Identify GMO crops and their role in the agriculture industry		GMO: Genetically modified organisms Bacillus Thuringiensis (Bt) as a pest repellent is problematic because insects will become resistance		**x**
16.8	Read and interpret pesticide labels		Given labels students should be able to read information provided and answer questions		**x**
			Identify re-entry and harvest limitations after application		
STANDARD 17.0 – APPLY BUSINESSES PRACTICES IN THE AGRICULTURE INDUSTRY					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
17.1	Explore entrepreneurship opportunities in agriculture		Provide examples of entrepreneurial activities		**X**
				Entrepreneur	
17.2	Evaluate a marketing plan		Identify parts of the marketing plan including mission statement, target niche markets, and marketing and promotional strategies		**X**
			Identify the parts of a marketing plan		
17.3	Research a product and demonstrate approved sales techniques		Identify key components of presale preparation, product familiarity, researching competitors, practice		**X**
17.4	Apply record keeping principles and applications		Identify variable costs	Variable cost	**X**
			Understand inventory and balance sheets	Inventory	

17.5	Analyze tax laws and regulations		Anyone with an annual income of over $9350 must file a federal tax form		**X**
17.6	Discuss personal and business accounting practices		Income and Expenses needed for SAE projects	Income Expenses Entrepreneur	**X**
				Networth	
17.7	Explain economic principles in agriculture		Supply and demand		**X**
			Imports and exports		
17.8	Utilize technology to accomplish agribusiness objectives		Power points are used for presentations Excel is used for preparing financial spreadsheets		**X**
			Utilize AET to reach SAE objectives	Placement Research Exploratory	
17.9	Research investment opportunities		The Least risky investment is a savings accounts	Investments	**X**
				Interest rates	
17.10	Evaluate an agricultural business plan				**x**
17.11	Compare projected and actual budget to calculate business decisions		A successful entrepreneur uses a budget as a working document		**X**
				Budget Variable cost Fixed cost	
17.12	review risk management strategies such as insurance, hedging		An example of risk management strategy hedging is participating in cash and future markets		**x**

				Insurance	
STANDARD 18.0 – DEMONSTRATE AGRISCIENCE MECHANIC APPLICATIONS					
Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
18.1	Demonstrate personal and group safety		Anytime a person enters a shop environment clear safety glasses should be worn		**X**
18.2	Develop a bill of materials		Calculate the unit price of an item on a bill of materials	Bill of materials	**X**
18.3	Develop a structural plan for a specific task				**X**
			Read a ruler, tape measure and/or architect scale		
18.4	Demonstrate appropriate wood fabrication techniques		Using a handsaw what is the appropriate angle for cutting a 2x4: 45 degrees		**X**
			Demonstrate use of circular saw, jig saw, drill and sander Explain various types of fastening systems such as nails, screws		
18.5	Demonstrate appropriate metal techniques		Stick arc welding is also called Shielded Metal Arc Welding	Arc welding	**X**
			Explain different kinds of welders		
				MIG welding Oxyacetylene welding	
18.6	Demonstrate appropriate plumbing fabrication techniques used in agriculture		Water requirement is the important first step to determining the number of water zones	Primer	**X**

			What is the formula for water flow rates: Flow = V/T Concrete has four components: gravel, water, cement, and sand Move to 18.8 The green flame when heating copper pipe is caused by burning flux		
			Difference between various types of pipe (PVC, copper, steel, poly tubing)		
18.7	Demonstrate appropriate safe connection of electrical components including motors, timers and values in both high and low voltage circuits in agriculture		The terminology for an electrical cable consisting of No. 12 wire: black, red, white and 1 bare is 12-3w/g A bare wired signifies ground	Ground	**X**
			Identify types of wires used in electrical systems		
18.8	Demonstrate appropriate concrete and masonry practices commonly used in agriculture		Given a size of block calculate blocks in linear feet		**X**
			Difference between concrete and masonry		
18.9	Demonstrate operation and maintenance of appropriate mechanical systems used in agriculture				**X**
18.10	Demonstrate appropriate land measurement and construction techniques commonly used in agriculture with technology		Calculate inches in a square foot		**X**

18.11	Demonstrate principles and applications of various engines and machinery used in agriculture				**x**

STANDARD 19.0 – DEMONSTRATE AND UNDERSTANDING OF THE ROLE OF AGRIBUSINESS SYSTEMS IN THE AGRICUTURE INDUSTRY

Measurement Criteria		**Concepts**	**Implementation**	**Terminology**	**Testing Item**
19.1	Demonstrate entrepreneurship opportunities in agriculture		The FFA vice president is responsible for chapter events Identify the FFA colors FFA began in 1928 E.M Tiffany wrote the FFA Creed A SAE is a Supervised Agricultural Experience The main parts of a speech are introductions, body and conclusion A person should be contacted prior to using them as a reference for a job application The total cost of producing a good or service is the expense Certified beef is a value added product	Gross income Opportunity cost Withholding Equilibrium Logo Budget Product feature Reimbursement Depreciation expense	**X**

			Sales goals and incentives help increase sales, provide motivation and increase competition Read various charts A tracking number is essential for shipments A projected budget uses data derived from future forecasts Access is used to create data bases Explain the purpose of business receipts Proper way to deal with customer complaints A 1040 form is used to file federal taxes Describe what a saturated market is and its impact on business Explain an non-SAE labor exchange Determine the inventory value of an animal Calculate annual depreciation		

			Calculate net profit of a business Describe what current inventory is Describe a SAE placement		

Terminology

A

Adaptation: describes a variation that can help an organism survive in an environment

Agronomic: production of plants used for food, fuel, fiber, and land reclamation, examples include cotton and corn

Airborne: transported by air

Alkaline: solution/soil that has a pH higher than 7, also known as basic

Animal: eukaryotes who consume food

Animal Cell: cells without a cell wall and chloroplasts, has many small vacuoles

Antibiotic: medications used to fight bacterial infections

Arc welding: technique in which metals are welded using heat generated by electric arc, also known as stick welding

Architect Scale: a measuring tool with increments shortened to proportion (1 in = 1 foot on paper)

Artificial Insemination: intentional breeding of plant or animals, in animals the sperm is inserted into the females uterus

Asset: property of a person or business that has value

B

Bacteria: unicellular prokaryote organisms

Bar Graph: a diagram in which the numerical values of variables are represented by the height or length of lines or rectangles of equal width, used then the independent variable is a category rather than numerical

Bill of material: List of materials with specifications that are needed in a project. This includes size, dimension and cost.

Binomial Nomenclature – System of scientifically naming organisms using two names (genus and species)

Biodiesel: biofuel intended as a substitute for diesel

Biofuels: fuel derived directly from living matter

Biohazard: a risk to human health or environment arising from biological work

Biological Control: control of pests using living organisms, example include natural predators

Bioremediation: use of either naturally occurring or deliberately introduced microorganisms to consume and break down environmental pollutants in order to clean up a polluted site

Biotechnology: exploration of biological processes for industrial and other purposes

Border – a heavy line around and close to the outer edges of the paper

Breeds - A stock of animals or plants within a species having a distinctive physical traits and typically having been developed by deliberate selection.

BST: bovine somatotrophin, a growth hormone that is used to increase milk

Budget – a written plan that predicts the use of assets for an enterprise

Budget: Schedule of expected returns and costs

C

Capital – Items that have a usable life of more than one year and a value of more than $500 dollars.

Carrying Capacity: the ability of an ecosystem to provide food and shelter for a given population

Center Line - _____ _ _____ _

Chemical Control: control of pests using chemicals, example include pesticides

Chroma : refers to the purity of the dominant color

Cladogram: branching diagram showing the cladistic relationship between a number of species

Class : Classification level between phylum and order

Clone: an organism or cell produced asexually from one ancestor which is genetically identical to the ancestor

Collateral: the assets of the borrower used to guarantee a loan

Commensalism: relationship between two organisms in which one organism benefits and the other organisms is neither harmed nor helped, example barnacle on a whale

Conservation: preservation, protection or restoration for the natural environment

Constant: items that must be kept the same throughout an experiment to ensure that the results are fair and accurate

Consumable Supplies: Items that are used in a business within one year.

Consumer: obtains its energy by consuming / eating other organisms

Control: standard or normal treatment in an experiment so you can compare the results

Cotton gin: machine used for separating cotton from its seeds, invited by Eli Whitney

Cultural Control: controlling pests by modifying the environment, example include crop rotation, no-till

Current Asset – Assets that do not depreciate and are not kept for over one year.

Cutting Plane - _____ _ _ _____

Cytosine: nitrogen base found in both DNA & RNA, pairs with guanine

D

Data Table: Data are stored in sequence of records, which are equivalent to table term of a relational database, with each record having equivalent rows.

Deciduous: plants that lose their leaves each winter, example oak trees

Deficiency: lack of a particular nutrient

Dehydration: 1) food processing technique, removal of excess moisture, example food product is beef jerky 2) occurs when animals lose or use more water than they take in and the body no longer has enough water to complete normal functions

Demand: The consumers desire to purchase a product

Dependent Variable: variable that depends on the independent variable, measured by the researcher, also known as responding variable

Depreciation - The decrease in value of a business assets caused by wear and obsolescence.

Depreciation expense- an annualized cost of a capital item

Dichotomous Key – tool used to identify items based on their physical characteristics

Dicot: plants that have two cotyledons when their first sprout, have netted leaf veins, and flower parts in multiples of 4 or 5, examples include hibiscus and peas

Diffusion: intermingling of substances by the natural movement their particles

Digestion: the process of breaking down food by mechanical and enzymatic action into substances that can be used by the body

Dilute: make a liquid solution weaker by adding more water

Dimension line- |←1 5/8" →|

Diploid: a cell containing two complete sets of chromosomes, one from each parent

DNA: deoxyribonucleic acid, carrier of genetic information, located in the nucleus of a cell

Dominant: powerful/influential trait, represented with capital letters

Dose: quantity of medicine or drug taken or recommended to be taken

Double Helix: structure of dna, pair of helices intertwined around a common axis, appears like a twisted ladder or staircase

E

Economic threshold: density of pests at which control treatments will provide an economic return

Embryo Transfer: assisted reproduction in which embryos are placed into the uterus of a female with the intent to establish a pregnancy

Entrepreneur: A person who owns and operate his own business

Entrepreneurship – students create an enterprise/business

Epidermis: the outer layer of cells covering an organism, example is skin on a pig

Equilibrium: The point when the customer and the business is in balance in the amount of products to buy and produce

Erosion: loss of soil by wind, water, or other natural agents

Ethanol: colorless volatile flammable liquid that is used in fuel

Ethics – a system of moral principles governing the appropriate conduct for a person or group

Eukaryote – cells with a membrane enclosed nucleus

Evergreen: A plant that has leaves all year long, examples include pine trees

Evolution: the process by which different kinds of living organisms have developed and diversified from earlier forms during the history of the earth

Expense: the cost required for something

Exploratory – students explore career and/or project opportunities

F

Family – Classification level between order and genus

Fertility: The ability to initiate, sustain and support reproduction

Fibrous Root: A root made of many branched roots, needs to be watered for shorter periods of time but more frequently

Fixed cost: cost that does not change as the rate of production changes, examples include rent on a business, watering wand for plant production
Fixed Costs – costs that do not change with the volume of production

Fossil Fuels: natural fuel such as coal or gas

Full Scale – drawing is the same size as the object it represents

Fungi –eukaryotes who absorb food

G

Genetics: study of heredity and the variation of inherited characteristics

Genus – Second smallest level of classification, First part of a scientific name

Genus: taxonomic category that ranks above species and below family, first part of the scientific name

Glands: organ in animals that secrete hormones

GPS: global positioning system, satellite navigation system

Gross income: the amount of total income prior to any deductions

Ground wire: a lead from an electrical apparatus to the earth used for safety, usually bare or covered in green insulation

Guanine: nitrogen base in both DNA & RNA, pairs with cytosine

H

Haploid: cell with a single set of unpaired chromosomes, created during meiosis

Heterotrophic: organism that must consume other organisms to obtain its energy, also known as a consumer

Hidden Lines - ----------

Horizon: layer of soil generally parallel to the soil surface, whose physical characteristics differ from the layers above and beneath

Hormones: a regulatory substance produced in an organism

Hue – refers to the color, such as red or yellow

Hybrid: offspring of two plants or animals of different species or varieties

Hypothesis: proposed explanation made on limited evidence that can be tested

I

In vitro: reproduction taking place in a test tube

Income – money received for products sold or services provided

Independent Variable: variable that the researcher purposely changes, also known as manipulated

Infectious: type of disease that is likely to be transmitted to other organisms, also known as contagious, example is flu

Insulin: a hormone produced in the pancreases that regulates the amount of glucose in the blood

Insurance: practice or arrangement by which a company or government agency provides a guarantee of compensation for a specific loss, damage, illness, or death in return for payment of a premium

Interest rates: the proportion of a loan that is charges as interest to the borrower, typically expressed as an annual percentage of an outstanding loan

Inventory – A list of business assets and their value.

Inventory: a complete list of items as property, goods in stock, or the contents of building

Investments: the action or process of investing money for profit or material result

Irradiation: food processing technique in which food is exposed to radiation to kill bacteria, example food products are meats

Isolation: separating an organism that is sick from the others to stop the disease from spreading

K

Kingdom: largest classification taxonomy level, there are 5 major kingdoms: Animal, Plant, Fungi, Virus, Protists

Liability- item or service owed to a person or business

Line Graph: type of graph which display information in a series of data points connected by line segments

Lipids: organic compounds that are insoluble in water but soluble in organic solvents, provide the body with stored energy, also known as fats

Loam: fertile soil with roughly equal proportions of salt, silt, and clay

Logo: The name, symbol, or trademark design for recognition

Long Term Goal - a goal that will take longer than 6 months to accomplish

M

Macronutrients: nutrients needed in large amounts

Meiosis: type of cell division that results in 4 daughter cells with half the number of chromosomes of the parent cell to prepare for sexual reproduction

Metamorphosis: the process of transformation from an immature organism to an adult

Micronutrients/Trace Nutrients: Nutrients needed in small amounts

MIG welding: process in which an electric arc forms between a consumable wire electrode and the metal, also known as gas metal arc welding (GMAW)

Mitosis: type of cell division that result in 2 daughter cells each having the same number of chromosome as the parent cell to repair cells or grow

Molecule: group of atoms bonded together, example water

Monocot: plant with a single cotyledon when it first sprouts, with parallel leaf veins, and flower parts in multiples of 3, examples include spider plants and grasses

Morale: the confidence, enthusiasm, and discipline of a person or group

MSDS: material safety data sheet, document that contains information on potential hazards and how to work safely with a chemical product

Multicellular: refers to organisms that are composed of two or more cells

N

Nerves: cells that transmit impulses of sensation to the brain or spinal cord to or from muscles and organs

Net worth Statement – financial document that reports net worth (assets minus liabilities) of a person or business

Net worth: total assets minus the total liabilities of an individual or company

Niches: special role an organism plays in an ecosystem

Non-Current Asset - Assets that are kept for over one year and have a value of $100 or more.

Noninfectious: type of disease that cannot be transferred to neighboring animals, also called contagious, examples include tetanus

Non-renewable resources: resource from the earth that exists in limited supply and cannot be replaced if it is used up, examples include oil and coal

O

Opportunity cost: The value of a resource that could be used in another way

Order – Classification level between class and family

Organic: Products grown without the use of synthetic pesticides and conventional fertilizers

Organism: individual animal, plant or single celled life form

Ornamental: plant grown for its attractive appearance, examples include purple leaf plum

OSHA: Occupational Safety and Health Administration, government agency under the United States Department of Labor that helps employers reduce injuries, illnesses, and deaths in the workplace

Osmosis: process by which molecules of solvent tend to pass through a semi permeable membrane from a less concentrated solution into a more concentrated one

Outline Lines - _____

Overgrazing: grassland that has been grazed so heavily that the vegetation is damaged and the ground becomes liable to erosion

Ovule: part of the ovary of seed plants that contains the female germ cell and after fertilization becomes the seed

Oxyacetylene welding: fuel gases and oxygen to weld and cut metals

P

Parasitic: organism living as a parasite, harming its host as it benefits, example includes tape worm

Pasteurization: process of heating food to a specific temperature for a predefined length of time and then immediately cooling it after it is removed from the heat, example food product is milk

Patented: product that has a patent

Perennials: Continuous growth and produces seeds each year, examples include trees and shrubs

Permeability– the ease in which air, water, and roots move through the soil

pH: measure of hydrogen ion concentration, scale of 1 to 14 which 7 being neutral, 1-6 acidic and 8-14 being basic/alkaline

Photosynthesis: Process plants producing their own food using carbon dioxide and water to produce sugar

Phylum – Primary division of kingdom

Pie Chart: type of graph in which a circle is divided into sections that each represents a proportion of the whole

Placement: students volunteer or work for business/organization

Placement – students volunteer or work for business/organization

Plagiarism: practice of taking someone else's work or ideas and passing them off as one's own

Plant Cell: eukaryotic cells with a cell wall and one large vacuole

Plant –eukaryotes who photosynthesize (produce their own food)

Pollution: the presence or introduction of a substance that has harmful or poisonous effects on the environment

Porosity – total pore space in soil, volume in soil that holds air and water

Post-emergent: type of herbicide used to kill weeds after they have germinated

PPE: personal protection equipment, refers to protective clothing or equipment used to protect the wearer's body from harm, examples include helmets and goggles

Prediction: investigator makes a statement about what they believe will happen when the hypothesis is put to the test

Pre-emergent: type of herbicide used to kill weeds as they germinate, applied before weeds are seen

Pricing incentive: incites customers to purchase a product/service

Primer: The material used in PVC plumbing that allows glue to penetrate the pipe for the strongest joint

Producer: organism that obtains its energy from food it produced itself, examples include plants

Profit – income minus costs

Prokaryote – cells without a nucleus

Propagation: produce more on an organism

Proteins: class of nitrogen based organic compounds that are composed of amino acids and are an essential part of living organisms, helps build muscles in an animal's diet

Protist – unicellular eukaryotes

Purebred: organism bred from parents of the same breed or variety

Q

Qualitative data: data that is observed, but not measured, examples include color, texture, taste, appearance

Quantitative data: data that is measured, examples include mass, length, time

Quarantine: a period or place of isolation in which organisms from elsewhere or been exposed to an infectious disease are placed

R

Recessive: heritable characteristics controlled by genes that are expressed in offspring only when inherited from both parents, when not masked by a dominant characteristic inherited from one parent, represented with lower case letters

Renewable resources: any natural resource that can replenish itself naturally over time, examples include wood and solar energy

Replication: process of copying DNA, occurs in the nucleus

Research – students plan and conduct an experiment using the scientific method

Respiration: process in living organisms involving the production of energy, typically with the intake of oxygen and the release of carbon dioxide

RNA: ribonucleic acid, messenger carrying instructions from DNA for producing proteins

Ruler: measurement tool with increments that are in proportion to real life (1 inch = 1 foot)

S

Sale incentive: remuneration offered to a salesperson fro exceeding some predetermined sales goal

Sanitation: the process of keeping places free from dirt, infections, disease …

Scale factor – the ratio of two corresponding lengths in two similar geometric figures.

Selective breeding: the process by which humans breed animals and plants for particular traits

Sharps Container: container that is filled with used needles and other sharp medical objects

Short Term Goal – a goal that will be accomplished within the next 6 months

Small Intestine: part of the digestive system between the stomach and large intestine, absorbs nutrients

Soil – a mixture of broken and weathered fragments of rock and/or decaying organic matter which covers the earth in a thin layer and serves as the medium for plant growth

Species – Smallest level of classification, Level of similar organisms that can exchange genes, Second part of a scientific name

Supervised Agricultural Experience – student planned activities conducted outside class time

Supplement: material that completes or enhances an animals diet

Sustainable: practice that assures the future production of crops

T

Tap Root: straight tapering root growing vertically downward

Texture by Feel Method – a step by step method used to classify the soil texture

Title Block – the section of a drawing reserved for information about the drawing in general

Top soil: upper most layer of soil, usually the top 2-8 inches

Toxicity: degree/amount to which a substance can damage an organism

Tracker – Log of journal or financial actions to be entered online at a later date.

Transcription: process of making RNA from the DNA code, occurs in the nucleus

Transgenetic: An organism that has had a foreign gene introduced

Translation: process of making proteins from the RNA code, occurs in the ribosome

U

Uracil: nitrogen base in RNA, DNA does not have uracil instead it has thymine

Urine: typically yellow fluid stored in the bladder that contains waste to be removed from the body

V

Vaccination: act or practice of vaccinating to prevent disease

Value – refers to the lightness or darkness of the hue

Variable Cost: costs that change as the rate of production changes, examples include soil for petunia production, food for animal production

Vector: disease causing material

Vitamins: group of organic compounds that are essential for normal growth and nutrition

W

Water: colorless, transparent, odorless tasteless liquid

Water Holding Capacity – the amount of water soil can hold

Weaning: A young animal separated from it mother and is no longer nursing

Withholding: Funds taken from an employees paycheck for income tax

X

x-axis: horizontal axis on a graph

Y

y-axis: vertical axis on a graph, dependent variable

Yield: agricultural product