Deer Valley Unified School District

Science Curriculum

Biology

CONTENT STANDARDS: **The following performance objectives from S1 C3 PO5, S2 C1 PO1-4, S2 C2 PO1-4, S3 C2 PO2-3 must be taught by end of academic year but are intended to be embedded throughout the academic year, therefore, have not been designated to be introduced in any particular semester. The intent of assigning the other Strand 1 and 3 performance objectives to a semester is based on science content; however, this does not mean the selected performance objectives relate only to that semester.**

READING FOR SCIENCE AND TECHNICAL SUBJECTS STANDARDS, GRADES 9-10 (RST.9-10): **The following RST.9-10.2, 4, 5 and 10 must be taught by end of academic year but are intended to be embedded throughout the academic year, therefore, have not been designated to be introduced in any particular semester. The intent of assigning the other RSTs to a semester is based on science content; however, this does not mean the selected standards relate only to that semester.**

WRITING FOR SCIENCE AND TECHNICAL SUBJECTS STANDARDS, GRADES 9-10 (WST.9-10): **The following WST.9-10. 4, 5, 6 and 10 must be taught by end of academic year but are intended to be embedded throughout the academic year, therefore, have not been designated to be introduced in any particular semester. The intent of assigning the other WSTs to a semester is based on science content; however, this does not mean the selected standards relate only to that semester.**

***RST.9-10.10 and WST.9-10.10 should be addressed when creating a cumulative performance assessment with each unit, end of semester and/or academic year.**

Resources

Supporting resources linked to suggested instructional strategies/student activities/lessons can be found on http://dvusdbiology.wikispaces.com/ within appropriate content area.

1st Semester

CHANGE OVER TIME **Content: Cells** **Topic: Scientific Process**			**Semester: 1**
Essential Question(s): 1. How do you solve problems? **2. How do scientists carry out valid investigations?** **3. How does the scientific process apply to real-world scenarios?**			
Content Objective(s)	**Standards**	**ELA Standards** **Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated***	**ELA Standards** **Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Construct and conduct a valid experiment from observation to conclusion. - Create and publish findings in lab report format. - Self-reflect on own lab reports and peer review other student reports for content and validity. - Read, evaluate and critic scientific publications.	S1, C1, - PO 1. Evaluate scientific information for relevance to a given problem. - PO 2. Develop questions from observations that transition into testable hypotheses. - PO 3. Formulate a testable hypothesis. - PO 4. Predict the outcome of an investigation based on prior evidence, probability, and/or modeling (not guessing or inferring). S1, C2, - PO 1. Demonstrate safe and ethical procedures (e.g., use and care of technology, materials, organisms) and behavior in all science inquiry. - PO 2. Identify the resources needed to conduct an investigation. - PO 3. Design an appropriate protocol (written plan of action) for testing a hypothesis: o Identify dependent and independent variables in a controlled investigation. o Determine an appropriate method for data collection (e.g., using balances, thermometers, microscopes, spectrophotometer, using qualitative changes). o Determine an appropriate method for recording data (e.g., notes, sketches, photographs, videos, journals (logs), charts, computers/calculators). - PO 4. Conduct a scientific investigation that is based on a research design. - PO 5. Record observations, notes, sketches, questions, and ideas using tools such as journals, charts, graphs, and computers. S1, C3, - PO 1. Interpret data that show a variety of possible relationships between variables, including: o positive relationship o negative relationship	2 - Read sample abstracts, allowing students to draw conclusions and formulate a summary. 3 - Follow a set of scientific procedures to conduct an investigation. 4 – Provide sample tables/graphs and scientific articles/journals and have students determine meaning. 6 – Provide sample labs and have students evaluate and critique lab as a whole or parts of, in terms of validity and accuracy. 7 – Provide scenario based quantitative data and have students create data tables and/or graphs.	1 – Have students write a summary based upon opposing scientific evidence/claims and discuss/debate their opinion including evidence to support their point of view. - Have students write an experimental summary based upon original or provided findings. 2- Write a formal lab report or parts of based upon personal findings or sample data using proper scientific style.

	o no relationship - PO 2. Evaluate whether investigational data support or do not support the proposed hypothesis. - PO 3. Critique reports of scientific studies (e.g., published papers, student reports) - PO 4. Evaluate the design of an investigation to identify possible sources of procedural error, including: o sample size o trials o controls o analyses - PO 6. Use descriptive statistics to analyze data, including: o mean o frequency o range - PO 7. Propose further investigations based on the findings of a conducted investigation. S1,C4, - PO 1. For a specific investigation, choose an appropriate method for communicating the results. - PO 2. Produce graphs that communicate data. - PO 3. Communicate results clearly and logically. - PO 4. Support conclusions with logical scientific arguments.	- Have students analyze and discuss results based upon sample graphs and tables.	

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Control	Negative/positive relationship	Trials	Qualitative
Variables (DV, IV)	Evidence	Sample size	Evaluate
Constant	Analysis	Theory	Critique
Experimental Group	Mean/mode/median	Law	Scientific writing
Hypothesis	Conclusion	Validity	Pure/applied science
	Bias	Quantitative	

*Number indicates which RST.9-10 standard is addressed.

CHANGE OVER TIME			**Semester: 1**
Content: Cells			
Topic: Chemistry			
Essential Question(s): 1. Why is Chemistry important to Biology? **2. Why are organic and inorganic molecules important to the cell?**			
Content Objective(s)	**Standards**	**ELA Standards** **Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated***	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Identify the roles organic and inorganic chemicals (e.g., carbohydrates, proteins, lipids, nucleic acids, water, ATP) play in cells. - Explain the function of macromolecules, ATP and water to cell processes. - Describe the levels of organization of living things from cells, tissues, organs, organ systems, organisms, populations, communities, to ecosystems.	S4, C5, - PO 2. Describe the role of organic and inorganic chemicals (e.g., carbohydrates, proteins, lipids, nucleic acids, water, ATP) important to living things. - PO 5. Describe the levels of organization of living things from cells, through tissues, organs, organ systems, organisms, populations, and communities to ecosystems.	4 – Interpreting periodic table symbols and chemical formulas	

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Atomic structure/element/compound	Macro/micro molecules	Enzymes/catalysts
Monomer/polymer	Types of bonds	pH
Organic/inorganic	Proteins/lipids/nucleic acids/carbohydrates	Dehydration synthesis

*Number indicates which RST.9-10 standard is addressed.

CHANGE OVER TIME			**Semester: 1**
Content: Cells			
Topic: Structures			
Essential Question(s): 1. What is life? **2. How do we know cells exist?** **2. How do cell organelles interact to maintain life?**			
Content Objective(s)	**Standards**	**ELA Standards**	
		Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Distinguish living and non-living based upon characteristics of life - The students will compare the form and function of prokaryotic and eukaryotic cells - Compare and contrast cellular components	S4, C1, - PO 2. Compare the form and function of prokaryotic and eukaryotic cells and their cellular components.	8 & 9 – Ask students "Are viruses living or non-living?" and allow students time for independent investigation 9 – Give students different types of cells (bacterial, blood, nerve, tissue, stem, root, etc) and have students research form and function of their specific cell.	1, 7 & 8– Take side on the virus debate, have students create a formal/informal product to support their claim (debate, paper, presentation) 2a & 7 – Have students present findings of cell research project, being sure to properly cite/reference resources.

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Nucleus (nucleolus/nuclear pores/DNA)	Cell wall	Centromere	Vesicles
Prokaryotic/eukaryotic cell	Golgi body/apparatus	Centrioles	Cytoplasm (cytosol/cytoskeleton)
Cell membrane	ER (smooth/rough)	Mitochondria	Vacuoles
Ribosome	Lysosomes	Chloroplast	Plant/animal cell

*Number indicates which RST.9-10 standard is addressed.

CHANGE OVER TIME			**Semester: 1**
Content: Cells			
Topic: Transport			
Essential Question(s): 1. Why do materials move in and out of cell? **2. How does cell transport help maintain homeostasis?**			
Content Objective(s)	**Standards**	**ELA Standards**	
		Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Explain how cells transport materials across its membrane. - Explain the importance of water to cells. - Explain how energy is used in cellular growth development and repair.	S4, C1, - PO 4. Analyze mechanisms of transport of materials (e.g., water, ions, macromolecules) into and out of cells: o passive transport o active transport - PO 3. Explain the importance of water to cells. - PO 1. Describe the role of energy in cellular growth, development, and repair.	2 – Have student read a real-world text relating to heat stroke/dehydration (ex: Can You Stand the Heat?) and discuss cause and effect.	1 – Dialysis tubing and/or Egg-mosis lab report

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Hypo/hyper/isotonic (osmotic)	Osmotic pressure	Phospholipid bi-layer/ fluid mosaic	Pino/Phagocytosis
Concentration gradient	Turgor pressure	Semi-permeable	Diffusion (types of)
Active/passive transport	Hydrophilic/hydrophobic	Endo/exocytosis	Channel proteins
Crenate/cytolysis	Cohesion/adhesion		

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CHANGE OVER TIME			**Semester: 1**
Content: Cells			
Topic: Energetics			
Essential Question(s): 1. How do cells acquire energy? **2. Why is the relationship between plant and animal essential to life?**			
Content Objective(s)	**Standards**	**ELA Standards**	
		Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Compare the processes of photosynthesis and cellular respiration in terms of energy flow, reactants, and products. - Explain how energy is used in cellular growth development and repair.	S4, C5, - PO 1. Compare the processes of photosynthesis and cellular respiration in terms of energy flow, reactants, and products. S4, C1, - PO 1. Describe the role of energy in cellular growth, development, and repair.	4 – Compare and contrast products and reactants of both cellular respiration and photosynthesis.	2 & 6 – Have students create a product (pamphlet, presentation, video) that persuades the audience to "buy stock" in plants and/or animals based upon the importance to energy flow in the biosphere.

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Reactants/products/catalysts	Fermentation	Glycolysis	Citric acid cycle
Aerobic/anaerobic respiration	ADP/ATP/AMP	Mitochondria (cristae/matrix)	Calvin cycle
Cellular respiration	Energy	Chloroplast (granas/thylakoids/stoma/stroma)	Light-dependent/independent
Photosynthesis	ETC	Electron carriers	Photosystem I & II

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CHANGE OVER TIME **Content: Cells** **Topic: Cellular Division (Mitosis and Meiosis)**			**Semester: 1**
Essential Question(s): 1. How are cell division and reproduction related? **2. Why is it necessary that the cell cycle be regulated?**			
Content Objective(s)	**Standards**	**ELA Standards** **Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated***	**ELA Standards** **Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Explain why and how cellular reproduction occurs - Explain how energy is used in cellular growth development and repair. - Explain the process of meiosis. - Explain how meiosis and fertilization can give rise to genetic variation.	S4, C1, - PO 5. Describe the purposes and processes of cellular reproduction. S4, C1, - PO 1. Describe the role of energy in cellular growth, development, and repair. S4, C2, - PO4 Describe how meiosis and fertilization maintain genetic variation.	2 & 4 – Have students evaluate student selected or teacher provided articles regarding current cell cycle regulation (cancer), research and technologies.	2 & 7 – Conduct a study/research regarding: a) Irregular cell growth b) Checkpoints within cell cycle c) And/or current practices to fight cancer

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Interphase (G_1, G_2, G0, S, M)	Daughter cells	Haploid/diploid
Checkpoints	DNA replication (chromosomes, chromatin, chromatid, histones)	Mutations
PMAT+C (mitosis/meiosis)	Cell pole/equator	Somatic/germ cells
Interkinesis	DNA helicase/polymerase/ligase	Crossing over
Spindle fibers		Tetrads

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2nd Semester

CHANGE OVER TIME			**Semester: 2**
Content: Genetics, Evolution, and Ecology			
Topic: Scientific Process			
Essential Question(s): 1. How do you solve problems? **2. How do scientists carry out valid investigations?** **3. How does the scientific process apply to real-world scenarios?**			
Content Objective(s)	**Standards**	**ELA Standards**	
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	S1, C3, - PO 1. Interpret data that show a variety of possible relationships between variables, including: o positive relationship o negative relationship o no relationship - PO 2. Evaluate whether investigational data support or do not support the proposed hypothesis. - PO 3. Critique reports of scientific studies (e.g., published papers, student reports) - PO 4. Evaluate the design of an investigation to identify possible sources of procedural error, including: o sample size o trials o controls o analyses - PO 6. Use descriptive statistics to analyze data, including: o mean o frequency o range - PO 7. Propose further investigations based on the findings of a conducted investigation. S1,C4, - PO 1. For a specific investigation, choose an appropriate method for communicating the results. - PO 2. Produce graphs that communicate data. - PO 3. Communicate results clearly and logically. - PO 4. Support conclusions with logical scientific arguments.		

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

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Hypothesis	Conclusion	Validity	Pure/applied science
	Bias	Quantitative	

*Number indicates which RST.9-10 standard is addressed.

CHANGE OVER TIME **Content: Genetics** **Topic: Molecular Basis of Heredity**			**Semester 2**
Essential Question(s): Why don't you look exactly like your parents? **How are traits passed to the next generation?** **How do DNA and RNA control the structure and function of cells and of entire organisms?**			
Objectives	Standards	**ELA standards**	
		Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Explain how DNA and RNA including the processes of replication and protein synthesis are the basis of heredity and result in genetic diversity.	S4, C2, - PO 2. Describe the molecular basis of heredity, in viruses and living things, including DNA replication and protein synthesis. - PO 3. Explain how genotypic variation occurs and results in phenotypic diversity.	9. Student will research different sources of information to assess whether a virus is living or not and form an opinion that is supported by research evidence. 9. Read articles about patenting genes and form an opinion whether it serves or hinders the research community supported by evidence from articles. 7. Using teacher or student generated Punnett squares students will be able to describe genotypic and phenotypic ratios. Using Punnett square information students will perform f2 generation crosses and explain how the results can affect genetic variation.	7 & 8. Conduct research about a genetic condition. 7 & 8 Conduct research about the effects of limited genetic variation on population. (cheetah and Nene (Hawaiian geese)

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Heterozygous	Homozygous	Geno/Phenotype	Punnett Squares
Allele	Variation	Mutation	A-T G-C
Dominate/recessive	Mendel's laws	Non-Mendelian genetics	Genes
P_1, F_1	Autosomal	Gametic	Mapping/ karyotypes/ pedigrees/cytological
Heredity			

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CHANGE OVER TIME			**Semester 2**
Content: Evolution			
Topic: Mechanisms			
Essential Question(s): How has the earth changed? **Why are there so many different types of organisms on the planet?**			
Objectives	**Standards**	**ELA standards**	
		Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - explain how favorable environmental conditions mutation and recombination of genes, genetic variability, finite supply of resources required for life and differential fitness rates can lead to speciation .	S4, C4 - PO1: Identify the components that can lead to speciation o Genetic variation o Finite resources o Environmental selection - PO 2: Explain how genotypic and phenotypic variation can result in adaptations - PO 3: Describe how the continuing operation of natural selection underlies a population's ability to adapt to changes - PO4: Predict how a change in an environmental factor can affect the number and diversity of species in an ecosyste	8 & 9 - Present student with opposing theories of mechanisms of evolution and have them discuss whether the author's conclusions are valid.	2 - produce a time line of biological and geological events that leads to the development of the theory of evolution. 2 - Using multiple sources explain how the mechanisms of evolution can lead to speciation.

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Natural selection	Fitness	Gene flow/immigration/emigration	Genetic drift
Mutations	Artificial selection	Variation	Adaptation
Differential reproduction	Sex/ sexual selection/sexual dimorphism	Crossing-over	Polymorphism
Bottle neck	Founder effect	Speciation	Allopatric
Sympatric	Parapatric	Adaptive radiation	Allele frequency
Hardy-Weinberg	Geno/phenotype	Biodiversity	

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<table>
<tr><td colspan="3">CHANGE OVER TIME</td><td rowspan="3">Semester 2</td></tr>
<tr><td colspan="3">Content: Evolution</td></tr>
<tr><td colspan="3">Topic: Evidence</td></tr>
<tr><td colspan="3">Essential Question(s): Why do living things change over time?</td><td></td></tr>
<tr><td rowspan="2">Content objectives</td><td rowspan="2">Standards</td><td colspan="2">ELA standards</td></tr>
<tr><td>Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*</td><td>Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated*</td></tr>
<tr><td>Students will be able to:

- Explain how scientific evidence from various science disciplines supports the theory of evolution.

- Explain relatedness of organisms.</td><td>S4, C4,
- PO 5. Analyze how patterns in the fossil record, nuclear chemistry, geology, molecular biology, and geographical distribution give support to the theory of organic evolution through natural selection over billions of years and the resulting present day biodiversity.

- PO 6. Analyze, using a biological classification system (i.e., cladistics, phylogeny, morphology, DNA analysis), the degree of relatedness among various species.</td><td>9 - Analyze if different sources of scientific evidence supports the theory of evolution.
7 - Using information presented in a text has students construct a cladogram. Present students with a phylogenic tree or DNA information and have them analyze the relationship among organisms.</td><td>9 & 10 - Using various reference sources explain how the fossil record, molecular biology, etc. support the theory of evolution.
9& 10 - Using various reference sources analyze, evaluate and explain the relatedness between organisms.</td></tr>
<tr><td colspan="4">Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Homologous/ analogous
Fossil record
Phylogeny
Vestigial
Radiometric dating
Cladistics
Bio-molecular
Bio-geographical
Artificial selection
Embryology
Hardy –Weinberg</td></tr>
</table>

*Number indicates which RST.9-10 standard is addressed.

CHANGE OVER TIME			**Semester: 2**
Content: Ecology			
Topic: Energy Flow			
Essential Question(s): 1. How would an ecosystem be affected if a level of organisms was removed? 2. How do nutrients cycle through the environment?			
Content Objective(s)	**Standards**	**ELA Standards**	
		Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Diagram and create models of the water cycle, carbon cycle, and nitrogen cycle. - Construct a food chain to represent energy transfer through an ecosystem. - Construct a food web that shows the interdependence of organisms within an ecosystem.	S1, C3, - PO 5. Design models (conceptual or physical) of the following to represent "real world" scenarios: o carbon cycle o water cycle o nitrogen S4, C5, - PO 3. Diagram the following biogeochemical cycles in an ecosystem: o water o carbon o nitrogen - PO 4. Diagram the energy flow in an ecosystem through a food chain.	5 - Provide a diagram of a food chain and have students describe and calculate the amount of energy that is transferred between trophic levels. 7 - Provide diagrams of nutrient cycles and have students summarize/explain the steps involved in each cycle.	4 – Have students write an explanation of each step of the nutrient cycles.
Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction: Types of pyramids Biotic/abiotic Ecology Habitat Food web Types of relationships (symbiotic/predation) Ecosystem Heterotroph/Autotroph Levels of organization Interdependence Producer/Consumer (types of) Biogeochemical cycles (N, C, H_2O) Niche			

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CHANGE OVER TIME **Content: Ecology** **Topic: Populations**			**Semester: 2**
Essential Question(s): 1. How do environmental factors affect human populations? **2. How do organisms interact with one another in an ecosystem?**			
Content Objective(s)	**Standards**	**ELA Standards** **Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated***	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Distinguish between biotic and abiotic factors and predict their impact on human populations. - Describe the relationship between levels of organization within an ecosystem.	S3, C3, - PO 1. Analyze social factors that limit the growth of a human population, including: o affluence o education o access to health care o cultural influences - PO 2. Describe biotic (living) and abiotic (nonliving) factors that affect human populations. - PO 3. Predict the effect of a change in a specific factor on a human population. S4, C3, - PO 1. Identify the relationships among organisms within populations, communities, ecosystems, and biomes. - PO 2. Describe how organisms are influenced by a particular combination of biotic (living) and abiotic (nonliving) factors in an environment. - PO 3. Assess how the size and the rate of growth of a population are determined by birth rate, death rate, immigration, emigration, and carrying capacity of the environment.	5 - Have students read scientific publications and identify/analyze relationships and interactions between organisms. 7 – Provide a population growth graph and have students describe factors that affect population levels.	2 - Have students construct a working ecosystem, introduce environmental factors, and observe changes in the ecosystem. Write a formal lab report. 7 - Have students research an environmental factor and predict the impact on human populations.
Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction: Carrying capacity Population density Competition (inter/intraspecific) Growth rate (exponential/logistic) Population dispersion Immigration/emigration Dependent Birth/death rate Limiting factors (density /independent)			

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CHANGE OVER TIME			**Semester: 2**
Content: Ecology			
Topic: Environmental Science			
Essential Question(s): 1. How do we know if an ecosystem is "stable" or "healthy"? 2. What are some ways that you can conserve resources?			
Content Objective(s)	**Standards**	**ELA Standards**	
		Suggested Instructional Strategies/ Student Activities/ Lessons with RST.9-10. Incorporated*	**Suggested Instructional Strategies/ Student Activities/ Lessons with WST.9-10. Incorporated***
Students will be able to: - Describe how human activities affect the environment. - Describe how natural disasters affect the environment. - Suggest methods for managing resources.	S3, C1, - PO 1. Evaluate how the processes of natural ecosystems affect, and are affected by, humans - PO 2. Describe the environmental effects of natural and/or human-caused hazards: (e.g., flooding, drought, earthquakes, fires, pollution, extreme weather) - PO 3. Assess how human activities (e.g., clear cutting, water management, tree thinning) can affect the potential for hazards. - PO 4. Evaluate factors that affect the quality of the environment: (e.g., urban development, smoke, volcanic dust) - PO 5. Evaluate the effectiveness of conservation practices and preservation techniques on environmental quality and biodiversity. S3, C2, - PO 1. Analyze the costs, benefits, and risks of various ways of dealing with the following needs or problems: (i.e., various forms of alternative energy, storage of nuclear waste, abandoned mines, greenhouse gases, hazardous wastes) - PO 2. Recognize the importance of basing arguments on a thorough understanding of the core concepts and principles of science and technology.	6 - Have students read and analyze articles about recent natural disasters and/or human-caused hazards. 8 – Have students read and evaluate conservation plans from government or private organizations. 9 – Provide articles with differing viewpoints on environmental issues and have students compare and contrast.	1 – Have students research and form a debate regarding the cause and effect of natural and human-caused disasters. - Have students research and form a debate regarding the effectiveness of conservation techniques.

	- PO 3. Support a position on a science or technology issue. - PO 4. Analyze the use of renewable and nonrenewable resources in Arizona: (i.e., water, land, soil, mineral, air) - PO 5. Evaluate methods used to manage natural resources (e.g., reintroduction of wildlife, fire ecology).		

Vocabulary (RST.9-10.4 and RST.9-10.5) to be addressed during instruction:

Conservation practices	Renewable/nonrenewable resources	Biodegradable/nonbiodegradable	Pollution
Enhanced greenhouse effect	Greenhouse gases	Acid rain	Invasive species
Alternative energy	Extinction	Deforestation/clear cutting/desertificatio	
Interdependence	Sustainability	Legislation	

*Number indicates which RST.9-10 standard is addressed.