

ALCOSS: 7.1

Describe characteristics common to living things, including growth and development, reproduction, cellular organization, use of energy, exchange of gases, and response to the environment.

Mastered:

Students will be able to describe characteristics common to living things.

Present:

Students will use their knowledge of the characteristics common to living things to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future effects of common characteristics of living things on Earth

Present and Going Forward Vocabulary:

Characteristics, homeostasis, response, structure, function, sexual reproduction, asexual reproduction

Career Connections:

Embryologist, Pharmacologist, Biographer, Marine Biologist, Entomologist, Virologist, Geneticist, Pathologist, Horticulturist, Bacteriologist, Biochemist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of the characteristics common to living things to create products which will advance their present understanding by choosing one activity from one section (Bloom’s, Think Keys, OR Kaplan’s). If time is available, students may do more than one activity. Students may need to plan their product using the organizational tool, Project Planner which can be found in Appendix A.

1. Bloom’s Level of Thinking

- **Synthesis**-Write a poem, song, or rap on the six characteristics of living things, Consider one stanza for each. If poem, rhyme and meter may be specified.
- **Synthesis**-Write an opinion paper about “What would happen if an organism lost the ability to _____?”
- **Evaluation**- Prepare a defense letter of this statement, “The farther one gets away from homeostasis, the sicker one becomes.”

2. Thinker Keys

Prediction	(Predicting how an organism’s behavior impacts the environment) What would happen if one-half of the rain forests on a large island burned? List implications for terrain, streams, estuaries, oceans, and for the food webs of each. After researching the information, use PowerPoint, Prezi, graphic novel, story or report to share this information.
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3. Kaplan’s Depth & Complexity

 ETHICS	VIRUSES – Read <i>The Hot Zone</i> by Richard Preston. Discuss the implications of a CDC-mandated quarantine, both on local and national levels, for an Ebola-like outbreak.	<ul style="list-style-type: none"> • Prepare a debate as to whether the public should be told or not told, defend your stand. • Write an essay anticipating public reactions during either “Tell or Don’t Tell” scenario. • Journal how outcomes might be different if the pathogens involved were bacterial instead of viral.
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Literature Connections/Resources:

- Czerneda, Julie. Great Careers for People Interested in Living Things (Career Connections). Farmington Hills MI: UXL. 1993.
- Preston, Richard. The Hot Zone. NY: Anchor. 1999.
- Rylant, Cynthia. Every Living Thing. NY: Atheneum. 1988.

ALCOSS: 7.2

Identify functions of organelles found in eukaryotic cells, including the nucleus, cell membrane, cell wall, mitochondria, chloroplasts, and vacuoles.

Mastered:

Students will be able to identify functions of organelles found in eukaryotic cells.

Present:

Students will use their knowledge of functions of organelles found in eukaryotic cells to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future effects of the functions of organelles found in eukaryotic cells.

Present and Going Forward Vocabulary:

Cell theory, mitochondria, cellular respiration, prokaryotic cell, eukaryotic cell, mitotic cell cycle, nucleolus, DAN, RNA, mitosis

Career Connections:

Biologist, Medical Doctors, Pharmacologist, Toxicologist, Veterinarian, Zoologist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of the function of organelles found in eukaryotic cells to create products which will advance their present understanding. Choose one or more of the following activities to complete as alternate activities to the general assignments.

1. Kaplan’s Depth & Complexity- Identifying components of the cell theory.

 OVER TIME	Complete a timeline of discoveries leading to development of the modern cell theory, showing sequence of discovery and include a brief biography of each contributor.	Create a Timeline in sequence with brief biography of contributors. You may draw the timeline or use an online timeline Web site.
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2. Identifying cells as prokaryotic or eukaryotic

- **Evaluation** – Do you think it is a good idea to have organisms classified according to whether they have membrane-bound organelles? Defend your position with supporting evidence as an opinion paper.

3. Listing the sequence of the mitotic cell cycle

- **Synthesis** – Compose a song or poem explaining the steps of mitosis or the cell cycle. Use separate verses or stanzas for each step. If poem, rhyme and meter must be specified.

4. RAFT (Student page found in Appendix A)

Students will choose one row. They will write about the TOPIC from the perspective of the ROLE to the AUDIENCE using the FORMAT. You can allow students to choose one item from each of the four columns. Provide an audience for the student to present their product. Students may need to plan their product using the organizational tool, Project Planner.

<u>ROLE</u>	<u>AUDIENCE</u>	<u>FORMAT</u>	<u>TOPIC</u>
Sunlight	Chloroplast	Persuasive Letter	“You Need Me!”
Mitochondria	Cell	Energizer Bunny Commercial	“ATP-Your Power Source”
Organelles	Classroom	Role Play	“Working Together”
Nucleus	Organelles	Flow Chart	“From Nutrition to Waste-What I Expect from Each of You”

Literature Connections/Resources:

- Wallace, Holly. *Cells and Systems*. Mankato, MN. Heinemann Library. 2003.
- Cell Biology: http://www.youtube.com/watch?v=zufaN_aetZI
- Plant and Animal Cell Overview:

<http://www.youtube.com/watch?v=Jn9oJtXZYcU>

ALCOSS: 7.3

Relate major tissues and organs of the skeletal, circulatory, reproductive, muscular, respiratory, nervous, and digestive systems to their function.

Mastered:

Students will be able to relate major tissues and organs of systems to their function.

Present:

Students will use their knowledge relating major tissues and organs of systems to their function to create products which will advance their present understanding.

Going Forward:

Students will be able to predict future effects of tissues and organs related to their functions within systems.

Present and Going Forward Vocabulary:

Cell, tissue, organ, organ system, dermal tissue, nerve tissue, muscle tissue, connective tissue, exoskeleton, homeostasis, form, function

Career Connections:

Lab Technician, Scientist, X-Ray Technician, Radiologist, Physiotherapist, Nutritionists, Doctor, Nurses, Pathologist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of relating major tissues and organs of systems to their function to create products which will advance their present understanding.

Bloom's (Synthesis) – Design an animal with no need for (insert choice) system. Create an ecosystem where this might have evolved or could be possible. Discuss how your design could be used to assist humans with disorders of this system, or how it could become possible without their having the need for prostheses or ongoing medical intervention due to the condition.

Literature Connections/Resources:

- Wallace, Holly. Cells and Systems. Mankato, MN. Heinemann Library. 2003.
- VanCleve, Janice. The Human Body for Every Kid. Hoboken, NJ: Bass. 1995.
- Your Body's Systems-Factmonster.com:
<http://www.factmonster.com/ipka/A0774536.html>

ALCOSS: 7.4

Describe organisms in the six-kingdom classification system by their characteristics.

Mastered:

Students will be able to describe organisms in the six-kingdom classification by their characteristics.

Present:

Students will use their knowledge of the description of organisms in the six-kingdom classification to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future effects of the past, present, and possible classification of organisms by their characteristics.

Present and Going Forward Vocabulary:

Classification, dichotomous key, taxonomy, binomial nomenclature, kingdom, phylum, class, order, family, genus, species, branching diagram, cladogram, derived characteristic, domain, invertebrates, vertebrates

Career Connections:

Taxonomist, Plant Taxonomist, Botanist, Biologist, Physiologist,

Comparative Physiologist, Biochemist, Scientist, Agricultural Scientist, Agronomist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of the description or organisms in the six-kingdom classification to create products which will advance their present understanding. Choose one or more of the following Kaplan’s or Bloom’s activities to complete as alternate activities to the general assignments.

1. Kaplan’s Depth and Complexity

ELEMENT	QUESTIONS/ACTIVITY	PRODUCT(S)
 LANGUAGE OF THE DISCIPLINE	What tools do taxonomists use, and how have they changed with new discoveries?	Create a slide show, an advertisement <u>or</u> a chart displaying your findings.
 OVER TIME	Compare different taxonomy schemes as they have existed over time. Include a time line showing discoveries leading to changes	Time line

2. Bloom’s Activities

- **Analysis** – What are some problems faced by taxonomists with regard to extinct organisms? Microscopic organisms? Write a letter to the Editor with your information.
- **Analysis** – Compare and contrast the classification schemes of Aristotle and Linnaeus using a Venn diagram.
- **Evaluation** – What do you think about the present classification system, and what changes would you recommend? Defend your position with a speech.
- **Synthesis** – Design a seven-kingdom classification system based on characteristics as they are known today. Give it a name and plan a marketing campaign to have it accepted.
- **Synthesis** – Create a “Dial-a-Kingdom” spin dial comparing at least five identifying traits and two examples, with scientific names of the six kingdoms. Name of kingdom should be at the top, followed by traits (pro- or eukaryotic, single or multicellular, cell wall, autotrophy or heterotrophy, etc.) and examples last. Laminate for durability.

Literature Connections/Resources:

- Tachell, Peter. The Usborne Internet-Linked Science Encyclopedia. Atlanta: Usborne Books. 2003
- The Six Kingdoms: http://www.ric.edu/faculty/ptiskus/six_kingdoms/index.html

ALCOSS: 7.5
 Identify major differences between plants and animals, including, internal structures, external structures, methods of locomotion, methods of reproduction, and stages of development.

Mastered:

Students will be able to identify major difference between plant and animals.

Present:

Students will use their knowledge of identifying major difference between plant and animals to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future differences between plant and animals on Earth.

Present and Going Forward Vocabulary:

Nucleus, cell membrane, cell wall, ribosome, endoplasmic reticulum, Golgi apparatus, vesicle, mitochondria, chloroplast, lysosome

Career Connections:

Bioinformatics Specialist, Biotechnologist, Biologist, Botanist, Cell Biologist, Conservationist, Ecologist, Environmentalist, Geneticist, Marine Biologist, Medical Doctors, Pharmacologist, Taxologist, Toxicologist, Veterinarian, Zoologist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of identifying major differences between plant and animals to create products which will advance their present understanding. Students will complete the first Bloom's activity of analysis. Then students may choose one or more of the remaining Bloom's activities to complete.

Bloom's Activities

- **Analysis** – Compare and contrast the following, using Venn diagrams the following:
 - cellular structures of plant and animal cells
 - levels of organization of plants and animals
 - methods of reproduction of plants and animals

THEN, choose one or more of the following activities to complete as alternate activities to the general assignments.

- **Synthesis** – Design and create a dial chart showing the above.
- **Analysis** – Develop a display to show how cyanobacteria are similar to chloroplast.
- **Evaluation** – With a speech defend this statement, “Chloroplasts are descended from assimilated cyanobacteria.”
- **Evaluation** – Research “Primary and Secondary Endosymbiosis.” What do you think about this hypothesis? Why? Write a letter to the Editor stating your opinion and defend it.
- **Synthesis** - Design an experiment to measure rate of photosynthesis by amount of oxygen produced. How could this information be used in designing a space probe searching for photosynthetic life on another planet? Discuss how a similar experiment could be used, searching for carbon dioxide release, to search for organisms using cellular respiration.

Literature Connections/Resources:

- Tachell, Peter. The Usborne Internet-Linked Science Encyclopedia. Atlanta: Usborne Books. 2003
- The Six Kingdoms: http://www.ric.edu/faculty/ptiskus/six_kingdoms/index.html
- Cell Division and Cell Cycle: <http://www.youtube.com/watch?v=Q6ucKWIFmg>

ALCOSS: 7.6

Describe the evidence of species variation due to climate, changing landforms, interspecies interaction, and genetic mutation.

Mastered:

Students will be able to describe the evidence of species variation.

Present:

Students will use their knowledge of the evidence of species variation to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future variations of species due to climate, changing landforms, interspecies interaction, and genetic mutation.

Present and Going Forward Vocabulary:

Variation, adaptation, selection, speciation, embryology, evolution, gradualism, homologous, natural selection, punctuated equilibrium, vestigial structure

Career Connections:

Animal Behavior, Zoo Careers, Scientist, Biologist, Botanist, Ecologist, Entomologist Embryologist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of the evidence of species variation to create products which will advance their present understanding. Choose one or more of the following Bloom's or Think Keys activities to complete as alternate activities to the general assignments.

1. Bloom’s Activities

- **Analysis** – How is the process of species variation caused by climate similar to that caused by changing landforms?
Draw a diagram to illustrate.
- **Evaluation** – In an opinion article, defending this position; “Interspecies interaction inevitably leads to species, 5variation”.

2. Thinker Keys

What If?	<p>What if a genetic mutation had occurred allowing humans to see infrared light? Imagine.....</p> <ul style="list-style-type: none"> • ...if this had happened in North America around 1000 BC., how might that have affected the hunting capabilities of the tribe in which this mutation occurred? What would have been the implications for later European settlers? • ...if the mutation had occurred in Europe during the Middle Ages, what might have happened to the mutation inheritor? Might there have been a difference in acceptance depending on whether the child was male of female? <p>Hold a press conference detailing your opinion.</p>
Variations	<p>How many new variations (mutations) can you think of that would improve or benefit a plant or animal of your choice? What might be a negative effect of one of the mutations on the ecosystem in which it live? Write and illustrate your information in a story.</p>

Literature Connections/Resources:

- Hazen, Walter. Everyday Life in the Middle Ages. Culver City, CA: Good Year Books. 2005.
- Biology: Genetic Mutation: Point Mutation Forms: <http://www.youtube.com/watch?v=kbAuW47BENw>
- Genetic Mutations Revision: <http://www.youtube.com/watch?v=weAp0SpRz68>

ALCOSS: 7.7
Describe biotic and abiotic factors in the environment.

Mastered:

Students will be able to describe biotic and abiotic factors in the environment.

Present:

Students will use their knowledge of biotic and abiotic factors in the environment to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future effects of biotic and abiotic factors in the environment.

Present and Going Forward Vocabulary:

Ecology, ecosystem, biotic factor, abiotic factor, communities, environment, interaction, autotroph, heterotroph, energy flow, food web, food chain, energy pyramid

Career Connections:
Horticulturist, Ecologist, Bioscience, Botany, Veterinary, Wldlife, Animal Behavior, Climatologist, Agriculturalist, Animal Scientist, Biochemist, Marine Biologist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of biotic and abiotic factors in the environment to create products which will advance their present understanding. Choose one or more of the following activities to complete as alternate activities to the general assignments.

Bloom's Activities

- **Analysis** – Write a commercial explaining some problems or misunderstandings encountered when distinguishing between biotic and abiotic factors.
- **Analysis**– Develop a display to compare and contrast autotrophs and heterotrophs. Be sure to include any problems encountered when distinguishing between autotrophs and heterotrophs.
- **Analysis** – List five organisms from each of the following groups that we eat on a regular basis: producers, primary consumers, secondary consumers, tertiary consumers, apex predators. Submit a story to a magazine explaining why this list gets more difficult to complete the higher up the food pyramid we go.
- **Synthesis** – Design a checklist in booklet form to compare with known factors in an environment to determine if those factors are biotic or abiotic.
- **Synthesis** – Write a list of twenty organisms found in an ecosystem. Construct a chart to show the flow of energy from producer to tertiary consumer...
 - in the shortest and simplest route (food chain)
 - using all twenty organisms (food web)
 - showing available energy at each level (food pyramid)

Literature Connections/Resources:

- Tachell, Peter. The Usborne Internet-Linked Science Encyclopedia. Atlanta: Usborne Books. 2003
- Biotic and Abiotic: <http://www.youtube.com/watch?v=woSO0D94VGA>

ALCOSS: 7.8

Describe the function of chromosomes.

Mastered:

Students will be able to describe the function of chromosomes.

Present:

Students will use their knowledge of the function of chromosomes to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future chromosomal changes that could occur.

Present and Going Forward Vocabulary:

Cell, genetic material, organism, DNA, RNA, unicellular, multicellular, cell cycle, mitosis, meiosis, interphase, cytokinesis

Career Connections:

Geneticist, Bioscientist, Medical Doctor/Physician, Agriculturalist, Bioinformatics Scientist, Bench Scientist, Clinical Geneticist, Medical Geneticist, Genetic Counselor, Genetic Lab Researcher

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of the function of chromosomes to create products which will advance their present understanding. Choose one or more of the following activities to complete as alternate activities to the general assignments.

3. Bloom's Activities

- **Analysis**-Create a booklet to compare and contrast DNA found in prokaryotic cells with that found in Eukaryotic cells.
- **Synthesis**-Compose a song with lyrics explaining the dual role of chromosomes: controlling cell processes and determining traits.
- **Synthesis**-Create a **secret** message by filling in the blanks with letters, and using the three-based triplets (codons) to identify the encoded letter. Recognize three bases are needed to code for a letter (amino acid), and the sequence of letters (amino acids) determines the sentence's message (protein). Use chart below to create your message. In the above chart, the names of the amino acids have been

removed. Students will substitute letters for the missing amino acids. Because there are only 20 amino acids, students will have to decide which six letters of the alphabet they will **not** use. There are sixty spaces after the “start” and “stop” codons have been used, so many letters will have multiple codon possibilities, as do the amino acids they represent. All blank spaces must be filled in, and repeating letters should be clustered together, as are amino acids on the chart. Students should work in pairs on this, or they must have access to a completed chart in order to decode the message.

Remind students:

These are tRNA codons, not DNA. Note uracil is present, not thymine.

DNA’s ATG = mRNA’s UAC = tRNA’s AUG = start (methionine), therefore, codons always match DNA, except for the thymine/uracil switch.

Messages must begin with the “start” codon and end with a “stop” codon.

Codon-produced letters represent amino acids, which when placed in a specific sequence results in a sentence and represents a protein.

The number of letters (amino acids) is limited to 20, but with those twenty a vast number of sentences (proteins) is possible.

For variation, have students send message as a DNA code or as a mRNA code, either of which must be “translated” into tRNA first.

- AUG = start. UAA, UGA, or UAG = stop

First Letter	Second Letter				Third Letter
	U	C	A	G	
U					U
					C
			STOP	STOP	A
			STOP		G
C					U
					C
					A
					G
A					U
					C
					A
	START				G
G					U
					C
					A
					G

Literature Connections/Resources:

- Tachell, Peter. *The Usborne Internet-Linked Science Encyclopedia*. Atlanta: Usborne Books. 2003.
- Prokaryotic and Eukaryotic Cells:
<http://www.cod.edu/people/faculty/fancher/prokeuk.htm>

ALCOSS: 7.9

Identify the process of chromosome reduction in the production of sperm and egg cells during meiosis.

Mastered:

Students will be able to identify the process of chromosome reduction in the production of sperm and egg cells during

Present:

Students will use their knowledge of the process of chromosome reduction in the production of sperm and egg

Going Forward:

Students will be able to understand and predict future possible changes that may occur during meiosis.

meiosis. cells during meiosis to create products which will advance their present understanding.

Present and Going Forward Vocabulary:

Cell, genetic material, organism, DNA, RNA, unicellular, multicellular, cell cycle, mitosis, meiosis, interphase, cytokinesis, chromosome, chromatid, chromatin, homologous

Career Connections:
 Geneticist, Bioscientist, Physician, Agriculturalist,
 Bioinformatics Scientist, Bench scientist, Clinical Geneticist,
 Medical Geneticist, Genetic Counselor, Genetic Lab Researcher

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of the process of chromosome reduction in the production of sperm and egg cells during meiosis to create products which will advance their present understanding. Choose one or more of the following Bloom’s or Kaplan’s activities to complete as alternate activities to the general assignments.

1. Bloom’s Activities

- **Analysis** – Make a diagram to compare and contrast mitosis and meiosis in human males with that of human females.
- **Synthesis** – Create a chart explaining why meiosis in males has different outcomes than in females. Explain what would happen if they were the same.
- **Synthesis** – Write a descriptive story about one chromosome’s journey through each stage of meiosis. Include the vocabulary words chromosome, chromatid, chromatin, and homologous.

2. Kaplan’s Depth & Complexity

ETHICS	When meiosis produces too few or too many chromosome in a sex cell, the fertilized egg may die or the embryo may have birth defects. Discuss the implications of: <ul style="list-style-type: none"> • accurate early diagnostic tests resulting in notification of a “problem” • not-so-accurate diagnostic tests resulting in notification of a “problem” • who, if anyone, should have the right to decide to terminate such pregnancy-the mother, father, a panel of doctors, or a government agency? • should such a decision be based on what type of defect or degree of incapacity? 	Write a new Law stating your opinion after researching the above. Be prepared with documentation to defend your Law.
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Literature Connections/Resources:

- Tachell, Peter. The Usborne Internet-Linked Science Encyclopedia. Atlanta: Usborne Books. 2003.
- March of Dimes: http://www.marchofdimes.com/birthdefects_chromosomal.html

ALCOSS: 7.10
 Identify differences between deoxyribonucleic acid (DNA) and ribonucleic acid (RNA).

Mastered:

Students will be able to identify the differences between DNA and RNA.

Present:

Students will use their knowledge of the differences between DNA and RNA to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future effects of differences between DNA and RNA.

Present and Going Forward Vocabulary:

Cell, genetic material, organism, DNA, RNA, unicellular, multicellular, cell cycle, mitosis, meiosis, interphase, cytokinesis

Career Connections:

Geneticist, Bioscientist, Physician, Agriculturalist, Bioinformatics Scientist, Bench scientist, Clinical Geneticist, Medical Geneticist, Genetic Counselor, Genetic Lab Researcher, Developmental Biologist, Biochemist, Epidemiologist

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of the differences between DNA and RNA to create products which will advance their present understanding. Choose one or more of the following activities to complete as alternate activities to the general assignments.

Bloom's Activities

- **Analysis** – Create a diagram comparing the structure of CAN to that of RNA. Be sure to compare how their structures relate to their functions.
- **Synthesis** – Construct a model showing the differences between DNA and RNA.
- **Synthesis** – Write an essay to a scientific journal about what would happen if there were no differences between DNA and RNA.
 - What if the difference were the number of stands?
 - What if both contained thymine?
 - What if DNA was outside of the nucleus?
- **Synthesis** – Write a letter to Drs. Watson and Crick thanking them for their hard work discovering the shape of the DNA molecule. What three questions will you include in the letter and why?

Literature Connections/Resources:

- Tachell, Peter. The Usborne Internet-Linked Science Encyclopedia. Atlanta: Usborne Books. 2003.
- Similarities and Differences Between DNA and RNA:
<http://www.usask.ca/education/coursework/mcvittiej/bio30unit1/overheads/1.23.html>
- Wikipedia-Molecular Structure of Nucleic Acids:
http://en.wikipedia.org/wiki/Molecular_Structure_of_Nucleic_Acids:_A_Structure_for_Deoxyribose_Nucleic_Acid

ALCOSS: 7.11

Identify Mendel's laws of genetics.

Mastered:

Students will be able to identify Mendel's law of genetics.

Present:

Students will use their knowledge of Mendel's law of genetics to create products which will advance their present understanding.

Going Forward:

Students will be able to understand and predict future effects of changes in Mendel's law of genetics.

Present and Going Forward Vocabulary:

Cell, genetic material, organism, DNA, RNA, unicellular, multicellular, cell cycle, mitosis, meiosis, interphase, cytokinesis

Career Connections:

Bioinformatics Scientist, Bench Scientist, Clinical Geneticist, Medical Geneticist, Genetic Counselor, Genetic Lab Researcher

Advanced Understanding & Activity (Alternate activity):

Students will apply their knowledge of Mendel's law of genetics to create products which will advance their present understanding. Choose one or more of the following Bloom's or Kaplan's activities to complete as alternate activities to the general assignments.

1. Bloom’s Activities

- **Analysis**– Compare and contrast Down’s syndrome and sickle cell anemia. Create a presentation of your choice describing your results.
- **Synthesis** – Create a chart summarizing Mendel’s laws of dominance, segregation, and independent assortment. Give examples of phenotypes and genotypes of parent crossings and expected phenotype and genotype outcome ratios of offspring.
- **Synthesis** – Create a presentation using PowerPoint, podcast, or transparencies to show how layering a Punnett square can make predicting genetic outcomes easier to understand.

2. Kaplan’s Depth & Complexity

ETHICS	<p>Research Huntington’s disease. Discuss the implications of early sterilization in an effort to eliminate the gene from the human gene pool. Could this be done with sickle cell anemia? Could it be done with Down’s Syndrome? Should any of the efforts be researched or attempted? If approved, who should have the right to make such a determination?</p>	<p>Write an opinion article stating your views on these questions. Be sure you have full knowledge about the other conditions that you were questioned about and how they affect the human.</p> <p>After presenting your opinion article, take a survey of your classmates to see what their opinions are concerning the early sterilization.</p>
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Literature Connections/Resources:

- Gregor Mendel’s Punnett Square:
<http://www.youtube.com/watch?v=d4izVAkhMPQ>
- Bill Nye “Genetics” Episode Clip:
http://www.youtube.com/watch?v=dPk_V1KkMuU
- Chromosomal Inheritance:
<http://www.youtube.com/watch?v=Q77t8kc4O34&feature=related>