

## Introduction to Genetics: “He/She gets that from you”

**Homework/Eval:** Quiz on Chapter 9 Day 5  
Read Chapter 9 Section 1 and answer reading questions at end of section

**Author:** Chris Resch

**Date(s) for Plan:** Day 1

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

<b>NJCCCS</b>	Standards	<u><b>NJCCCS for Science</b></u> <b>STANDARD 5.2:B</b> <b>STANDARD 5.3: A and C</b> <b>STANDARD 5.5: C</b> <b>STANDARD 5.10: A</b>	<u><b>NJCCCS for Language Arts</b></u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT determine similar phenotypes that appear to occur other in members of the same family. SWBAT discuss the importance of studying genetics.	
<b>Materials</b>	Family photos which the students have brought in		
<b>Lesson Development</b>	Content	Genetics: Introduction	
	Questions to cover	Why do some families share many of the same characteristics-physical and behavioral. Why is that? What features in your family do you share in common? How do these resemblances come about? Why is it that some things look like your mother instead of your father or vice versa?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will first introduce the lesson by discussing/asking students why families can share so many of the same characteristics.</b></li> <li>• <b>I will then develop the lesson by having students look for and make a list of features that show the strongest resemblance among the members of their family. These lists will be compared within groups and discussed as a whole class. This will prompt a discussion about heredity.</b></li> <li>• <b>This will introduce the idea that not only humans but plants, other animals, and bacteria also pass on traits to their offspring. I will also briefly introduce Gregor Mendel and describe how he studied heredity.</b></li> <li>• <b>The class will then wrap up with why study heredity and a brief recap of what was discussed as well as remind them of the quiz and homework.</b></li> </ul>	

Class Lesson Endpoint  
Period

Evaluation, Comments, and Questions To Research

## Introduction to Genetics: Mendel, Father of Genetics

**Homework/Eval:** Reminder Quiz on Friday  
Read Chapter 9 Section 2 and answer reading questions

**Author:** Chris Resch

**Date(s) for Plan:** Day 2

**Course/Grade:** CP Biology? 10<sup>th</sup> Grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.2:B</b> <b>STANDARD 5.3: A and C</b> <b>STANDARD 5.5: C</b> <b>STANDARD 5.10: A</b>	<u>NJCCCS for Language Arts</u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT explain Mendel's pea plant experiments, including the 7 traits and his observations SWBAT compare and contrast phenotype and genotype	
<b>Materials</b>	<ol style="list-style-type: none"> <li>1. Props of pea plants with the various traits Mendel studied</li> <li>2. Transparency of Mendel's Laws</li> <li>3. Picture of 7 traits of pea plant studied</li> <li>4. Giant Punnett square for chalk board</li> </ol>		
<b>Lesson Development</b>	Content	Genetics: Introduction to classical genetics	
	Questions to cover	What is the difference between a phenotype and a genotype? How are genotype and phenotype related? What were some of the phenotypes that you have in common with your parents?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will first activate students prior knowledge by briefly discussion with them what we discussed about Mendel from Day1. At this point I will show them the pea plant examples.</b></li> <li>• <b>This will lead into a lecture/discussion on the following topics:</b> <ul style="list-style-type: none"> <li>○ Mendel's pea plant experiments</li> <li>○ The definitions of pure-bred (in that the offspring only show one trait for every generation)</li> <li>○ Definitions of genotype, phenotype, heterozygous and homozygous</li> <li>○ Dominant and recessive traits and examples</li> <li>○ What Mendel's factors are (genes) and alleles</li> <li>○ Mendel's laws including: Law of Segregation, Law of Independent Assortment, and Laws of Dominance, Codominance, and Independent Assortment.</li> </ul> </li> <li>• <b>I will then conclude by having the students practice making genotypes of the pea plants and determining the phenotype as well as if the genotype is heterozygous or homozygous, perform a brief review, and answer any questions. They will also practice Punnett square problems after a demonstration using the Punnett square chalk board model.</b></li> </ul>	

Class Lesson Endpoint  
Period

Evaluation, Comments, and Questions To Research

## Introduction to Genetics: Probability

**Homework/Eval:** Answer vocabulary review sections in Chapter 9 Section 3 and answer reading review questions QUIZ DAY 5!

**Author:** Chris Resch

**Date(s) for Plan:** Day 3

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> STANDARD 5.1: B STANDARD 5.2: B STANDARD 5.3: A, C, and D STANDARD 5.5: C	<u>NJCCCS for Language Arts</u> STANDARD 3.1: G STANDARD 3.2: C STANDARD 3.3: A
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT determine the probability of an event. SWBAT perform a monohybrid cross using the Punnett Square. SWBAT state several examples of traits that follow other rules outside of Law of Dominance	
<b>Materials</b>	Penny/Nickel (one per group) Cardboard boxes (one for each group) Probability worksheets Transparency of other patterns of inheritance		
<b>Lesson Development</b>	Content	Genetics: Probability	
	Questions to cover	What is probability? Where/who are some places/people that talk about probability? How is probability related to genetics? What do you notice as you increase the number of tosses?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• I will first begin the class with a discussion of certain places the students have heard of probability before: ex. weather, gambling, genes, sports. This will then lead us into our definition of what probability is –likelihood of something to occur/a prediction</li> <li>• Students will then begin their activity by determining the probability of a coin landing on heads or tails with each flip of the coin</li> <li>• A formula will be used - # of events of choice/# of possible events (one coin-1/2)</li> <li>• In groups of four students will, in turn, each flip a penny and a nickel into the box simultaneously and record the outcomes – 10X each.</li> <li>• After flipping students will have to determine what the probability of the penny and nickel landing on heads/tails is. Students will be asked to observe what happens as the number of tosses increases.</li> <li>• This will then lead into an introduction as to how probability is related to genetics and how Punnett Squares can be used to predict genetic probability.</li> <li>• The lesson will then wrap up with a reminder of homework and the quiz on Friday (Day 5)</li> </ul>	

## Introduction to Genetics: Chromosomes and Linked Genes

**Homework/Eval:** Study for Quiz tomorrow!

**Author:** Chris Resch

**Date(s) for Plan:** Day 4

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.2:B</b> <b>STANDARD 5.3: A and C</b> <b>STANDARD 5.5: C</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT perform a mono- and dihybrid crosses. SWBAT demonstrate crossing over of genes and explain how this can lead to variation in phenotypes.	
<b>Materials</b>	Sponge Bob Genetics worksheets Various colored paperclips Dihybrid problems template		
<b>Lesson Development</b>	Content	Genetics: Monohybrid and dihybrid crosses	
	Questions to cover	How does a Punnett square represent Mendel’s Law of independent assortment? Segregation? How is it that sometimes we don’t look exactly like our parents or we look completely different?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• I will begin the day with a review with a review of monohybrid crosses and Punnett Squares briefly.</li> <li>• I will then hand out a worksheet that is to be completed individually.</li> <li>• After this has have completed this I will then introduce what genes and chromosomes are as well as the chromosomal theory of inheritance.</li> <li>• This will then lead into a discussion of what linked genes, crossing over, and genetic recombination are.</li> <li>• After the discussion has progressed for about 10-15 minutes, I will perform a crossing over demonstration using the colored paperclips</li> <li>• <b>Demonstration-</b> The purpose of this demonstration is to introduce genetic recombination. Hook together several paper clips of the same color; make two chains (2 colors). Visibly locate 2 genes on each chain for the class to see. Each chain = chromosome with genes located somewhere on it. Move and exchange pieces of chain to demonstrate crossing over and the recombinant chromosome</li> <li>• I will then review with the students the information that they need to know for the quiz and answer any questions.</li> </ul>	

## Introduction to Genetics: Chromosomes and Linked Genes

**Homework/Eval:** NO HOMEWORK for the weekend!

**Author:** Chris Resch

**Date(s) for Plan:** Day 5

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 2 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: A, B, AND C</b> <b>STANDARD 5.4: B</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT anesthetize fruit flies without killing them SWBAT create crosses of fruit flies and predict the outcome	
<b>Materials</b>	Quiz Cultures of Drosophila melanogaster (wild type, yellow body, crossveinless wings, vermilion eyes, forked bristles) Flynap White index cards Paintbrushes Anesthetizeer Stereomicroscopes (one per group)		
<b>Lesson Development</b>	Content	Genetics: Monohybrid and dihybrid crosses	
	Questions to cover	Why are fruit flies such a good way to investigate genetics? What does the work "anesthetize" mean? (hint: anesthesia)	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• This lesson will begin with the quiz on information presented over the last few days (see attached)</li> <li>• I will then introduce the fruit flies in terms of what they are, they number of chromosomes they have, why they are used in genetic studies, and the different phenotypes that we will be observing.</li> <li>• This will then lead into a demonstration of how to anesthetize a fruit fly:               <ul style="list-style-type: none"> <li>○ Place 3 drops of Flynap in a cotton ball and replace cap.</li> <li>○ Gently tap culture vial on table to knock down the flies.</li> <li>○ Quickly remove the foam plug and invert the vial onto the anesthetizer and gently tap the anesthetizer on the table.</li> <li>○ Hold this position until the flies stop moving and are collected in the bottom cap of the anesthetizer</li> <li>○ Place the anesthetizer flies on the white index card for viewing under the stereomicroscope</li> </ul> </li> <li>• I will then hand out to each group a lab sheet and students will practice anesthetizing under my supervision. This will be done in lab groups.</li> <li>• Then after the students are finished with the fruit flies, they will then go to the website <a href="http://powayusd.sdcoe.k12.ca.us/-teachers/kjain/Gallery/Zoos/David%20Kreutzer%20Online%20Zoo/home.html">http://powayusd.sdcoe.k12.ca.us/-teachers/kjain/Gallery/Zoos/David%20Kreutzer%20Online%20Zoo/home.html</a></li> <li>• At this site, students will fill out a worksheet that will further enhance their understanding of genetics and traits.</li> <li>• To wrap up the class I will remind the students that in ten days they will view the flies again</li> <li>• Clean up room</li> </ul>	

## Introduction to Genetics: Chromosomes and Linked Genes

**Homework/Eval:** Read Chapter 10 Section 1 and answer the review questions at the end of the section  
Quiz on Day 10

**Author:** Chris Resch

**Date(s) for Plan:** Day 6

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

<b>NJCCCS</b>	Standards	<u><b>NJCCCS for Science</b></u> <b>STANDARD 5.2: A and B</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u><b>NJCCS for Language Arts</b></u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT describe the structure of DNA SWBAT draw how chromosomes are made up of DNA SWBAT identify Watson and Crick, and Rosalind Franklin, and describe how they discovered DNA's structure	
<b>Materials</b>	Chromosome to DNA transparency KNEX model that I had built		
<b>Lesson Development</b>	Content	Genetics: Structure of DNA	
	Questions to cover	What does DNA look like? What does it do? How does DNA "store" information?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will first activate the student's prior knowledge as to how genes can ultimately lead to our phenotype. I will then ask them were the information stored in the chromosome? In the proteins or the nucleic acids.</b></li> <li>• <b>This will prompt a discussion/lecture on Griffith, Avery, Franklin, and Watson and Crick and the importance of their work in proving that genetic information is stored on DNA and not Proteins</b></li> <li>• <b>I will then using the KNEX model, show the students the shape of DNA and ask them to identify the sugar phosphate group and nitrogen bases. This will lead into a discussion of Chargaff's rule.</b></li> <li>• <b>As a wrap up I will then ask the students how they think information stored on DNA gets to, what they should know now, as a phenotype. Students will be asked to think about this question tonight.</b></li> </ul>	

## Introduction to Genetics: Chromosomes and Linked Genes

**Homework/Eval:** Read and answer review questions Chapt 10 section 2

**Author:** Chris Resch

**Date(s) for Plan:** Day 7

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

<b>NJCCCS</b>	Standards	<u><b>NJCCCS for Science</b></u> STANDARD 5.1: B STANDARD 5.2: A and B STANDARD 5.5: A and C STANDARD 5.10: A	<u><b>NJCCS for Language Arts</b></u> STANDARD 3.1: G STANDARD 3.2: C STANDARD 3.3: A
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT describe the process of transcription SWBAT identify the proteins that are involved in the process of transcription SWBAT list the three types of RNA involved in animal cell transcription and translation	
<b>Materials</b>	Transcription Transparency, chalk board model		
<b>Lesson Development</b>	Content	Genetics: Transcription	
	Questions to cover	How is it that information stored on DNA is “shown” or “expressed” as a phenotype?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will begin to activate the student’s prior knowledge by review the information that we had discussed on day 6. I will review with them the different parts of a nucleotide as well as the overall structure and bonds associated with DNA</b></li> <li>• <b>After activating the student’s prior knowledge I will then introduce, compare, and contrast the three different types of RNA molecules that are involved in transcription and translation. I will also not that there are many other types of RNA molecules but we will be focusing on these three.</b></li> <li>• <b>I will then introduce the concept of RNA from DNA (transcription) as well as the protein (RNA polymerase) that is responsible for produced through the use of a demonstration via chalk board model (model set that sticks to the board via magnets).</b></li> <li>• <b>After I have demonstrated how transcription works, I will have the students write and draw the steps in groups. This will help those who are more visually oriented.</b></li> </ul>	

## Introduction to Genetics: Chromosomes and Linked Genes

**Homework/Eval:** Read Chapter 10 Section 3 and answer the review questions at the end of the section  
Quiz on Day 10

**Author:** Chris Resch

**Date(s) for Plan:** Day 8

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

<b>NJCCCS</b>	Standards	<u><b>NJCCCS for Science</b></u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.2: A and B</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u><b>NJCCS for Language Arts</b></u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT describe how DNA becomes RNA through transcription. SWBAT compare and contrast the differences between DNA and mRNA	
<b>Materials</b>	Translation Transparency, transcription hats, chalk board model		
<b>Lesson Development</b>	Content	Genetics: Translation	
	Questions to cover	How is it that information stored on DNA is “shown” or “expressed” as a phenotype? How does a cell make a protein? Why are proteins important?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will begin to activate the student’s prior knowledge by reviewing the information that we had discussed on day 7. This will include the process of transcription and the protein that is associated with it.</b></li> <li>• <b>I will then introduce the concept of protein from RNA (transcription) as well as the proteins (ribosomes) and other types of RNA (rRNA and tRNA) that are involved in this process. This will be demonstrated via chalk board model (model set that sticks to the board via magnets).</b></li> <li>• <b>After I have demonstrated how translation works, I will have the students write and draw the steps in groups. This will help those who are more visually oriented.</b></li> </ul>	

## Introduction to Genetics: Central Dogma

**Homework/Eval:** Study for Quiz on chapter 10

**Author:** Chris Resch

**Date(s) for Plan:** Day 9

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.2: A and B</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.3: A</b> <u>NJCCCS for Health and Physical Education</u>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT describe how DNA becomes RNA through transcription. SWBAT compare and contrast the differences between DNA and mRNA	
<b>Materials</b>	Index cards with DNA sequences Index cards with anticodons Activity handout		
<b>Lesson Development</b>	Content	Genetics: Transcription and Translation	
	Questions to cover	How is it that information stored on DNA is “shown” or “expressed” as a phenotype? How does a cell make a protein? Why are proteins important?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• Today will be involved in a transcription and translation activity. The class will be broken into groups of four with each person in the group being assigned a job (jobs include 2 ribosomes , tRNA, and mRNA) . Students will take the time to “transcribe and translate” 20 sentences. This activity will serve as a reinforcer for the processes of transcription and translation especially for those students who are more kinesthetic learners.</li> <li>• See attached for instructions.</li> </ul>	

## Introduction to Genetics: DNA extraction from a Strawberry

**Homework/Eval:** No Homework for the Weekend

**Author:** Chris Resch

**Date(s) for Plan:** Day 10

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 2 50 minute class periods  
(lab)

NJCCCS	Standards	<u>NJCCCS for Science</u> STANDARD 5.1: A-C STANDARD 5.3: B, D STANDARD 5.5: A, C	<u>NJCCS for Language Arts</u> STANDARD 3.3: A
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT extract DNA from a strawberry SWBAT compare the microscopic structure of DNA to the macroscopic view	
<b>Materials</b>	Handouts (attached), strawberries, cheesecloth, ethanol, detergent, beakers, mortar and pestle, graduated cylinder		
<b>Lesson Development</b>	Content	Genetics: Structure of DNA	
	Questions to cover	What does DNA “really look like” to the naked eye? How do we get at the DNA in a strawberry? What are the purposes of the various solutions? So why is it that when we eat a strawberry we don’t turn into one?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• I will first start the class by giving the kids their quizzes</li> <li>• Students will then be extracting DNA from a strawberry so they can actually see what DNA looks like to the unaided eye.</li> <li>• Before beginning this class I will first ask the class, how we are going to get the DNA out of the strawberries. I will then ask them how we are going to isolate the DNA from all the other stuff. I will use the board and draw a cell while I am asking them these questions.</li> <li>• Protocol for this lab is on the attached sheet and answer questions.</li> </ul>	

## Introduction to Genetics: Genetic Mutation

**Homework/Eval:** Read Chapter 11-3 and answer review questions

**Author:** Chris Resch

**Date(s) for Plan:** Day 11

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u>NJCCCS for Language Arts</u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b> <u>NJCCCS for Health and Physical Education</u> <b>STANDARD 2.1: A, C, AND D</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT identify possible sources of mutation SWBAT compare and contrast between chromosome mutations and gene mutations	
<b>Materials</b>	POWER POINT/LECTURE NOTES/chromosome overhead		
<b>Lesson Development</b>	Content	Genetics: Introduction to genetic mutation	
	Questions to cover	What happens if there is a glitch in the process of transcription and translation? How could the cell be affected by this “glitch?”	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>Today will be an introduction to genetic mutation. I will begin the class by asking students to think about what a “mutation” is. This will lead into a discussion as to how chromosomes and genes can mutate. I will ask the students, what they think will happen to the proteins if the gene mutates. This will aid in the activation of students prior memory of the steps for transcription and translation as well as the activity.</b></li> <li>• <b>I will then explain to the students that different kinds of mutations exist. Some are considered gene mutations, and sometimes whole chromosomes can be altered (which are called chromosomal mutations). Examples such as Down syndrome and sickle cell anemia will be given to illustrate the differences</b></li> </ul>	

## Introduction to Genetics: Genetic Mutation

**Homework/Eval:** Read Chapter 12 Section 2 and answer review questions at end of section

**Author:** Chris Resch

**Date(s) for Plan:** Day 12

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b> <u>NJCCCS for Health and Physical Education</u> <b>STANDARD 2.1: A, C, AND D</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT identify different forms gene mutation SWBAT give some examples of different types genetic disorders caused by gene mutations	
<b>Materials</b>	POWER POINT/LECTURE NOTES		
<b>Lesson Development</b>	Content	Genetics: Genetic Mutations	
	Questions to cover	How are gene mutations differ from chromosome mutations? What kind of diseases are caused by gene mutations? How are genetic mutations examples of evolution? What are some examples of chromosomal mutations?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will begin the class by activating the student’s prior knowledge. I will remind them of the things that we had discussed yesterday including various sources of gene mutation and the idea that gene mutation can occur on the gene or chromosome level. At this point we will focus in on various types of gene mutations including point mutation, point mutations, substitutions, and frame shift mutations. This will also be the point at which I will have a discussion with the students to see if they think that all genetic mutations are bad? How does a genetic mutation contribute to evolution? Sickle cell anemia will be used as an example.</b></li> <li>• <b>We will also discuss the different types of chromosome mutations including: deletion, inversion, and translocation.</b></li> </ul>	

## Introduction to Genetics: Pedigree Analysis

**Homework/Eval:** Practice Pedigree questions

**Author:** Chris Resch

**Date(s) for Plan:** Day 13

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b> <u>NJCCCS for Health and Physical Education</u> <b>STANDARD 2.1: A, C, AND D</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT give examples of traits or disorders transmitted by autosomal dominant, autosomal recessive, polygenic, and X-linked recessive inheritance SWBAT show how pedigree analysis can be used to illustrate the inheritance of traits	
<b>Materials</b>	POWER POINT/LECTURE NOTES		
<b>Lesson Development</b>	Content	Genetics: Genetic Mutations	
	Questions to cover	How can nondisjunction change chromosome number? Why is colorblindness rare among females? What does it mean to say that a gene is X-linked?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will begin this class via a discussion that biologists have studied many different organisms in their search to discover different principles of genetics. The same is true about human genetics. Scientists study human genetic patterns in order to find out more about human genetics.</b></li> <li>• <b>This will lead into a discussion on what pedigrees are, and how they are used. I will explain what the symbols mean (squares and circles that are shaded, half shaded, and non-shaded shapes represent. I will also show the students how you can tell if it is an X-linked, or autosomal gene that is involved through analysis of the pedigree chart. Definitions of X-linked, polygenic, and autosomal dominant/recessive will be defined at this time.</b></li> <li>• <b>At this point I will also discuss the definition of non-disjunction and how it can lead to monosomy or trisomy.</b></li> <li>• <b>I will conclude the class by asking them if there is anything that can be done to the to combat genetic disorders. I will ask them to think about this question and come up with some answers for tomorrow's class.</b></li> </ul>	

## Introduction to Genetics: Introduction to DNA Technology

**Homework/Eval:** Read Chapter 13 Section 1 and answer review questions at end of section

**Author:** Chris Resch

**Date(s) for Plan:** Day 14

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.4: A-C</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b> <u>NJCCS for Technology Literacy</u> <b>STANDARD 8.1: B</b> <b>STANDARD 8.2: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT define genetic engineering SWBAT describe how restriction enzymes can be used to make recombinant DNA SWBAT list the steps in a gene-transfer experiment	
<b>Materials</b>	POWER POINT/LECTURE NOTES		
<b>Lesson Development</b>	Content	Genetics: DNA technology	
	Questions to cover	What is DNA technology? Why study DNA technology? How could genetic engineering be used to improve the lives of humans?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will first begin this class by recapping by reiterating the question, what can be done about genetic disease? How can we combat this problem? I will facilitate a class discussion with students responding the question that I had proposed. I will then introduce the idea of DNA technology, and the concepts of genetic engineering. I will discuss how scientists can manipulate genes. Topics and vocabulary things to talk about include: cloning, vectors, plasmids, recombinant DNA, transgenic organisms, and karyotyping.</b></li> <li>• <b>I will use the idea of how bacteria that have been impregnated with the gene that is responsible for producing the insulin, are used to produce insulin for diabetic patients. This will demonstrate the power of genetic technology. I will then explain how scientists now are trying to produce a vector that will transport a new gene to replace one that is defective in humans.</b></li> </ul>	

## Introduction to Genetics: Introduction to DNA Fingerprinting

**Homework/Eval:** DNA fingerprinting review packet

**Author:** Chris Resch

**Date(s) for Plan:** Day 15

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

<b>NJCCCS</b>	Standards	<u><b>NJCCCS for Science</b></u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.4: A-C</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u><b>NJCCS for Language Arts</b></u> <b>STANDARD 3.2: C</b> <b>STANDARD 3.3: A</b> <u><b>NJCCS for Technology Literacy</b></u> <b>STANDARD 8.1: B</b> <b>STANDARD 8.2: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT describe how DNA technology is used in society SWBAT list the steps involved in DNA fingerprinting	
<b>Materials</b>	POWER POINT/LECTURE NOTES		
<b>Lesson Development</b>	Content	Genetics: DNA technology	
	Questions to cover	How many of you have seen the television show CSI? How do the investigators determine a hair fiber of particle of blood is a match to a suspect or victim? In what kinds of situations would you use DNA fingerprinting for?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will begin this class asking the students if anyone have seen CSI, or Law and Order, or any other crime scene show. I will them ask them “why do the investigators look for hair or blood? What do they usually do with that hair or blood? How do they know that the blood that they found is actually the suspects? How does the whole process work?</b></li> <li>• <b>This question will then lead into a description of the process of DNA fingerprinting. For this will discuss how enzymes are added to that cut the DNA strands into fragments. I will then show them that the fragments are then placed into an electrophoresis gel and separated based on size and appear as bands on the gel. I will show the students how multiple samples can be inserted to the gel and it is the samples that have the same banding patterns that are identical because they were cut in the same places. This means that the DNA in those samples are identical.</b></li> <li>• <b>I will then give the students an activity that tests their knowledge of DNA fingerprinting. (see attached).</b></li> </ul>	

## Introduction to Genetics: DNA Fingerprinting Lab

**Homework/Eval:** DNA fingerprinting review packet  
Announcement Test on Day 20!!

**Author:** Chris Resch

**Date(s) for Plan:** Days 16-18

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 2 50 minute class periods  
(day 17) and one 50 minute

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: A-C</b> <b>STANDARD 5.4: A-C</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.3: A</b> <u>NJCCS for Technology Literacy</u> <b>STANDARD 8.1: B</b> <b>STANDARD 8.2: A</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT perform a DNA fingerprinting procedure SWBAT describe what each step in the DNA fingerprinting lab is doing DNA	
<b>Materials</b>	Agarose gel, Electrophoresis equipment (with reagents), DNA fingerprinting lab manuals, rulers		
<b>Lesson Development</b>	Content	Genetics: DNA technology	
	Questions to cover	What's going on to the DNA in each step?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>I will begin this class by activating the student's memory via a recap of the process of DNA fingerprinting. I will then read through the lab with them and demonstrate, quickly exactly what will be taking place. For instructions on the lab please see attached.</b></li> </ul>	

## Introduction to Genetics: Review

**Homework/Eval:** Study for test  
Test on Day 20!!

**Author:** Chris Resch

**Date(s) for Plan:** Day 19

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

NJCCCS	Standards	<u>NJCCCS for Science</u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.2: A-B</b> <b>STANDARD 5.3: A and D</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u>NJCCS for Language Arts</u> <b>STANDARD 3.3: A</b> <u>NJCCS for Technology Literacy</u> <b>STANDARD 8.1: B</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT recall information from this prior unit SWBAT describe the evolution of genetics, including a number of important discoveries as well as important descriptions of DNA and RNA.	
<b>Materials</b>	Paper/ Jeopardy Power point		
<b>Lesson Development</b>	Content	Genetics: DNA technology	
	Questions to cover	Are there any questions about the material?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• <b>This class will be devoted for review for the unit test. In order to review the class will be split up into groups and Jeopardy will be played. This Jeopardy is through a power point presentation version of jeopardy that I have created. At this point I will also ask students if they have any questions in preparation for tomorrow's unit exam.</b></li> </ul>	

## Introduction to Genetics: Unit Exam

**Homework/Eval:** No Homework!

**Author:** Chris Resch

**Date(s) for Plan:** Day 20

**Course/Grade:** CP Biology/10<sup>th</sup> grade

**Duration (min.):** 50 minute class period

<b>NJCCCS</b>	Standards	<u><b>NJCCCS for Science</b></u> <b>STANDARD 5.1: B</b> <b>STANDARD 5.2: A-B</b> <b>STANDARD 5.3: A and D</b> <b>STANDARD 5.5: A and C</b> <b>STANDARD 5.10: A</b>	<u><b>NJCCS for Language Arts</b></u> <b>STANDARD 3.1: G</b> <b>STANDARD 3.2: C</b>
<b>Goals and Objectives</b>	Long Term	Swbat discuss the importance DNA and genes plays in the construction and functioning of organisms	
	Short Term	SWBAT recall information from past unit exams SWBAT achieve a 70% or better on the genetics unit exam.	
<b>Materials</b>	Paper		
<b>Lesson Development</b>	Content	Genetics: DNA technology	
	Questions to cover	Are there any last minute questions?	
<b>Lesson Procedure</b>	<b>Time=50 (min)</b>	<b>Lesson Component</b>	
		<b>Welcome/Attendance/Do Now/Review Homework</b>	
		<ul style="list-style-type: none"> <li>• Today the unit exam will be administered and take the whole period. I will answer as many last minute questions as possible and then administer the test. Exam attached.</li> </ul>	