Richmond Public Schools
Department of Curriculum and Instruction
Curriculum Pacing And Resource Guide

Course Title/ Course #: Biology II -Genetics/4350

Start day: 1

Meetings: 180 days

Course Description

Students will gain a broad understanding of genetics through hands-on laboratory work, expert speakers, and group projects. They will talk with local physicians and scientists about the latest research and clinical applications in genetics, and follow fictional families through the process from clinical diagnosis of genetic condition to receiving testing results. Students will study the most up to date topics in genetics including the application of genetics and biotechnology to industry, agriculture, research, forensics, evolution and disease. This class has a considerable laboratory component. Students will develop a research project for entry into the Metro Richmond STEM Fair and RPS STEM Fair Prerequisite: Biology I

Pacing Resources Assessments MP1

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
2 Weeks and On-going	GEN. 1 a-m	Scientific Inquiry: Experimental Design (Ongoing) - Select Science Fair Topic	**Virginia Department of Education of Enhanced Scope and Sequence Lessons:** • VDOE- Scientific Process and Experimental Design: • VDOE- Safety and the Material Safety Data Sheet: • VDOE- Current Applications in	· SOL Pass · **Journal entry** - have students write a summary of what they learned. · Students should take the quiz at the end of each **GIZMO simulation** and they should complete accompanying worksheet. · **3-2-1** – Students write down on a note card 3 things they learned from today's lesson, 2 questions they have about the topic and 1

			Science: **Biology Corner** ● Lab Safety ● Lab Safety Guidelines ● Identify the Controls and Variables **Other Web Resources** ● A Scientific Cleanup ● Chesapeake Bay Program. www.chesapeakebay.net ● Helena Easter- Livebinder ● Scientific Method Lesson Plans ● Explore Biology **Experience Science with Explore Learning:** ● Graphs and Statistic-Reaction Time 1 ● Graphs and Statistics-Reaction Time 2	thing [they] want the teacher to know from today's lesson. · Oswego City School District Regents Exam Prep Center Living Environment - Laboratory Skills · **Discussion questions**: -Explain how a scientific investigation can involve both a laboratory observation and a field observation. -Explain how a hypothesis and a theory are related.
Introduction to Genetics				
1Week	GEN 2, a	Mendel's Principles	**Virginia Department of Education of Enhanced Scope and Sequence Lessons:** ● Mendelian Genetics **GIZMO** ● Chicken Genetics **Other Web Resources** ● The Biology Corner - Biology lesson plans, worksheets, tutorials and resources for teachers and students	• Completion of GIZMO simulation, worksheet, and online quiz. • You are a comic strip writer. Create a new comic strip about a lead character that has a genetic mutation that has given him or her special super powers. It can be a real mutation or a fictitious mutation. (Teacher should create a scoring guide). • You are a relative of a family member with a genetic mutation. Create a brochure to raise money for

			• A Mendel Seminar • An Inventory of My Traits	the awareness of this mutation. It can be a real mutation or a fictitious mutation. (Teacher should create a scoring guide). • Write a short article for the newspaper about one of the four scientists and his/her contributions to the discovery of DNA. (VDOE) • Write the lyrics of a song about one of the four scientists and his/her contributions to the discovery of DNA. (VDOE) • Response letter to your new boss - You are Mr. Dinson, a newly hired employee at Globex, Inc. Before your first day at work, you receive the above letter from the president of the company. Write a response letter to Ms. Wish, saying whether you agree to the company having access to your medical records and whether you agree to a genetic screening before you go to work for them. Explain your reasoning as it applies to both the company and your job description, and be sure to let Ms. Wish know whether you will be coming to work for the company or not.(VDOE) • Have students write a research paper or create a computer-generated presentation on a genetic disorder, allowing them to choose disorders that interest them.(VDOE) • Students will watch Discovery Streaming videos and will answer discussion questions regarding the video. **Discussion Questions** • Discuss Mendel's methodology. What were
1Week	GEN 2, b	The Chromosome	**Discovery Streaming**: • Biologix: Chromosomal Basis of Inheritance The Biology Corner - Biology lesson plans, worksheets, tutorials and resources for teachers and students • Modeling Chromosomal Inheritance– use pipe cleaners to show how genes are inherited; independent assortment, segregation, sex-linkage • Linkage Group Simulation – uses pipe cleaners and beads, students construct chromosomes with alleles and perform crosses, predicting outcomes (advanced) **Other Web Resources** • Chromosome Analysis ○ Chromosome Analysis: Creating Karyotypes • Facts About the X Chromosome • Facts About the Y Chromosome • chromosome review worksheet.pdf • Chromosome Notes.ppt • CHROMOSOME FUSION • Comparison of Human and Chimpanzee Chromosomes	

			○ Student Handout Packet, Version 1 ○ Student Handout Packet, Version 2 ○ Teacher Key to Questions, Resources, Chrom. 16 Diagram ○ Hominoid Chromosome Comparisons: Addendum :Read these useful and important suggestions and comments. ● Pairing Up Chromosomes	some of the careful considerations that Mendel made? Do you think his methodology was good? Why or why not? ● Describe the results of Mendel's pea experiment. Describe how recessive and dominant traits behave from generation to generation. Also discuss new traits. ● Describe how Mendel's breeding of peas demonstrated natural selection. ● How does this in turn support biological evolution? ● How did he control the species that he experimented with? How might these traits affect the survival of these species in the wild? What do new traits have to do with survival? ● The scene: Janet Cooper, a genetic engineer, arrives home very excited. She has managed to transfer some cattle growth hormone genes into a chicken. She tells her husband and teenage children (Bob 15 and Lisa 17) that now chickens will grow even faster. They can be slaughtered sooner and therefore farmers will kill more chickens per year and make more money. She is going to patent her invention and hopes to make a lot of money from it. Husband John likes foreign holidays and fast cars. Lisa is a vegetarian and belongs to a local animal rights group. Bob is an active member of his local church and has strong views on "man playing God". Imagine how each family member reacts to Janet's news - and how she reacts to them!
1Week	GEN 2, c	Theory of Inheritance: Genetic variation – mutations, alleles, phenotypes	**Virginia Department of Education of Enhanced Scope and Sequence Lessons:** ● · Genetic Variation and Mutations **Other Web Resources** ● Human Genetic Variation ● The Genetics of Parenthood ● **NOVA "Life's Greatest Miracle" video** ○ Video Worksheet ● Order the free DVD, "The Meaning of Sex: Genes and Gender" from the *Howard Hughes Medical Institute* and try any of the numerous activities in this "Biointeractive" site.	

			• Genetics, DNA, and Heredity: The Basics	Write a piece of dialogue (or enact a role-play) beginning: Janet: I can't wait to tell you all what happened today! Listen to this ..... • People who are against genetic engineering are often told they are "Luddites". Find out who the Luddites were (clue: early 19th century British history) and how the expression is used today. Tell us in 300 words why you are: a) a Luddite about genetic engineering of animals, or b) definitely not a Luddite about genetic engineering of animals, or c) against genetic engineering of animals but don't believe you are a Luddite.
1Week	GEN 2, d	Theory of Inheritance: Structure and function of DNA and RNA	**Virginia Department of Education of Enhanced Scope and Sequence Lessons:** • DNA Structure, Nucleic Acids, and Proteins **GIZMO** • Building DNA • Inheritance **Discovery Streaming**: • DNA Structure and Function • 1962: Nobel Prize awarded for discovery of DNA structure • DNA Composition and Structure • Ribosomes and Protein Synthesis **Other Web Resources** • Double Helix Game • Blackett Family DNA Activity 2 • From Gene to Protein - Transcription and Translation ○ **Download Student Handout:** PDF format or Word format ○ **Download Teacher Preparation Notes:** PDF format	
1Week	GEN 2,e	Theory of Inheritance: Recombinant	**Discovery Streaming**: • The Role of DNA in Genetic	

		DNA, clones, genomes, and genomics	Variation Between and Among Species **Other Web Resources** ● Genomics and Human Identity ● Dragon Genetics – Independent Assortment and Gene Linkage ○ **Download Student Handout:** PDF format or Word format ○ **Download Teacher Preparation Notes:** PDF format or Word format ● Dragon Genetics -- Understanding Inheritance ○ **Download Student Handout:** PDF format or Word format ○ **Download Teacher Preparation Notes:** PDF format or Word format ● Recombinant DNA Paper Lab ● Genome Project Teacher Guide ● You've Come A Long Way Dolly! ● Cloning Around	
1Week	GEN 2,f	Theory of Inheritance: Human genome project	**Discovery Streaming**: ● Human Genome **Other Web Resources** ● Bioinformatics and the Human Genome Project ● Genetic Mind Reader ● PBS Leeson	
1Week	GEN 1 - 2	Review and Assessment	**Genetics Review Packets:** ● Genetics Tutorial	● New York Regents

			○ Genetics Tutorial.ppt ● DNA Notes.ppt ● DNA and RNA review worksheet.pdf ● DNA internet lesson.pdf ● DNA and Transcription Tutorial.ppt ● DNA and Transcription Tutorial worksheet.pdf ● DNA Challenge _first half_.ppt ● Meiosis internet lesson.pdf ● Meiosis Notes.ppt ● Meiosis animation.ppt ● Chromosome challenge.ppt ● Online Human Genome Project Worksheet	● Bubbabrain - Play the games to review ● important concepts and terms for many courses. ● Quizlet flashcards, tests, and study games make learning fun and engaging for students of all ages. ● *Texas STAAR Review & Practice* gives your students the tools they need to succeed on the State of Texas Assessments of Academic Readiness exam.

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Pacing Resources Assessments MP2

Time Frame	Standards of Learning	Units/ Topics/ Concepts	Resources	Assessments
Linking Mitosis and Meiosis				
1 Week	GEN. 3, a -b	Diploid vs. haploid & Somatic cells vs. gametes	• Haploid vs Diploid Cells: How to Know the Difference • Quizlet Flash Card • Videos • Lesson Plans	• · Have students observe and document the appearance of cells in all phases of the cell cycle, using either prepared slides or freshly made ones. Have them draw and label the parts of the cell. • · Have students calculate the time a dividing cell spends in each phase of the cell cycle. Direct them to observe a total of 100 cells, using either prepared or freshly made slides, and record which phase each cell is in. • · Have students locate information on diseases that result from defects in the process of mitosis.
1 Week	GEN.3, c- e	Mitosis Meiosis Cancer	**Virginia Department of Education Enhanced Scope and Sequence Lessons:** • The Cell Cycle and Mitosis • Meiosis • The Cell Cycle, Mitosis, and Meiosis Worksheets • The Cell Cycle and Cellular Division **GIZMO** • Cell Division **SMART Exchange:** • Cell division • Meiotic Cell Division • Mitosis Phases **Discovery Streaming**: • Increasing the Genetic Variability in Species: Crossing Over in Meiosis • Introduction: Cell Cycle, Mitosis and Cytoplasmic Division • Life Cycle of a Cell and Cell Division	

			Other Web Resources ● The Official Site of the Nobel Prize – Control of the Cell Cycle ● Cell Biology and Cancer ● Cells Alive ● Boxer vs Briefs Meiosis Activity ● Review PPT ● Mitosis - How Each New Cell Gets a Complete Set of Genes ○ **Download Student Handout:** PDF format or Word format ○ **Download Teacher Preparation Notes:** PDF format ● Meiosis and Fertilization – Understanding How Genes Are Inherited ○ **Download Student Handout:** PDF format or Word format ○ **Download Teacher Preparation Notes:** PDF format ● Mutation Notes.ppt ● Translation Tutorial worksheet.pdf ● Translation Notes.ppt ● translation practice warmup.ppt	Students should report their finding to the class and write letters to an organization that does research on that disease. Students may also advocate for funding and additional research on their disease. ● Have students locate information on environmental factors that alter the process of mitosis or its rate. Have students research what products may contain these agents and in what part of the world they are primarily used. ● · Have students compare the process of mitosis in animal and plant cells. ● · Have students create a "look book" on the cell cycle. ● · Research the causes and effects of Down syndrome (trisomy 21), Klinefelter syndrome (XXY), and Turner syndrome (X).
1 Week	GEN.3, f	Karyotypes	**Biology Corner** ● Karyotyping Online – use a website simulator to learn how to pair chromosomes and diagnose abnormalities ● Karyotyping Online II – another simulation on how to construct a karyotype ● Chromosome Study – cut out chromosomes	

			and tape them in pairs to construct a "paper" karyotype **Web Resources** ● Karyotype Drag and Drop ● Human Karyotype Lab ● Adventures In Karyotyping ● Karyotype lab analysis.pdf ● Karyotype analysis worksheet.pdf ● Mitosis Notes.ppt ● Patient A Karyotype.pdf ● THE CHROMOSOME SHUFFLE ● Make a Karyotype **Cytogenetics** This lesson plan will enable students to learn karyotyping as part of cytogenetics and all the information that can be supplied by karyotyping. ● Lesson Plan (DOC - 82 kb) ● Chromosomal Karyotypes (PPT - 108 kb) ● Chromosomal Variations (PPT - 89 kb)	● · Students will watch Discovery Streaming videos and will answer discussion questions regarding the video.
Mendelian Genetics				
1 Week	GEN. 4 a	Mendel's Principles	**Other Web Resources** ● Mendelian Genetics ○ **Download Student Handout:** PDF format or Word format	• Have students create a story about two types of genetic

			○ **Download Genetics Supplement:** PDF format or Word format ○ **Download Teacher Preparation Notes:** PDF format or Word form ● Gummy Bear Genetics ● Chi Square Modeling Using Candy – count the number of each color in a bag to determine if they occur in equal proportions ● Hardy-Weinberg Problem Set – statistical analysis, using HW equation and some dragons ● Hardy Weinberg Simulation – track an allele in population by simulating how parents pass alleles to offspring ● Corn Genetics and Chi Square – statistical analysis, using preserved corn and counting kernels ● phenotype-babies	mutations that organisms may encounter. • Create a graphic organizer about different types of genetic mutations • You are a medical doctor. One of your patients just had a baby whom you have just diagnosed as having a genetic mutation. You need to prepare the family with the details of what it will entail to raise a child with this disorder. Explain the genetic basis for this disorder (causes, symptoms, and treatment). Write the dialogue between you and the mother. Include the items from the scoring guide in your dialogue. • You are a teacher. You will be tutoring a child with a genetic mutation. Write a report about the genetic mutation to demonstrate that you understand the mutation and will make the necessary accommodations for the child. Include the items from the scoring guide in your report. • You are a _____. Construct your own scenario in which you focus on the concepts involved with a genetic mutation. Include
1 Week	GEN. 4 b	One/two trait crosses	**GIZMO** ● Mouse Genetics (One Trait) ● Mouse Genetics (Two Traits) ● Hardy Weinberg Equilibrium ● All Inheritance Patterns Worksheet ● Autosomal punnett square homework.pdf ● Autosomal dominance worksheet.pdf ● Autosomal recessive inheritance worksheet.pdf	
1 Week	GEN. 4 c	Nature vs. nurture	**Web Resources** ● Genes, Environment, and Human Behavior	

				the items from the scoring guide in your product. • Present students with this scenario: “You are a talented scientist in genetic biology. You are trying to get money from a large corporation to fund your research in the field of stem cell technology.” Have students write proposals to this corporation, describing how important stem cell research is, the different types of research, and the benefits of stem cells. Direct them to research this topic in various resources before writing their proposals. (VDOE)
1 Week	GEN. 4 d	Pedigrees	**Web Resources** ● Read about "The Blue People of Troublesome Creek," check out the "Blue People" Pedigree, show the "Blue People of Troublesome Creek"*PowerPoint* Presentation , and do this associated laboratory activity. ● Your Family Health History ● Traits and Generations ● Pedigree Notes.ppt ● Pedigree Worksheet 1	● Family Pedigree Project Instructions ● Family Pedigree Project
1Weeks	GEN 1 - 4	Review and Assessment	**The Biology Corner** ● Mendel & Inheritance – powerpoint presentation covering basics of genetics ● Heredity Simulation – use popsicle sticks to show how alleles are inherited	● New York Regents ● Bubbabrain - Play the games to review ● important concepts and terms for many

			• Penny Genetics – flip a coin to compare actual outcomes versus predicted outcomes from a punnett square • Simple Genetics Practice – using mendelian genetics and punnett squares • Genetic Crosses with two traits – basic crosses, uses Punnett squares • Genetic Crosses with two traits II – basic crosses, uses Punnett squares • Dihybrid Crosses in Guinea Pigs (pdf) – step through on how to do a 4×4 punnett square • Codominance & Incomplete Dominance – basic crosses involving codominance • Genetics Practice Problems – includes codominance, multiple allele traits, polygenic traits, for AP Biology • Genetics Practice Problems II – for advanced biology students, includes both single allele and dihybrid crosses, intended for practice after students have learned multiplicative properties of statistics and mathematical analysis of genetic crosses **Other Web Resources** • **DNA Day Jeopardy!** • **Genetic Timeline** • **Genetics History Notes.ppt** • DNA review packet.pdf • Biochemical evidence for evolution.pdf • DNA Chalkboard Challenge 2.ppt	courses. • Quizlet's flashcards, tests, and study games make learning fun and engaging for students of all ages. • *Texas STAAR Review & Practice* gives your students the tools they need to succeed on the State of Texas Assessments of Academic Readiness exam.

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Pacing Resources Assessments MP3				
Sex Determination				
1 week	GEN. 5 a- b	Sexual differentiation & X and Y chromosomes	• Sex Linked Worksheets • X-Linked Traits – practice crosses that involve sex-linkage, mainly in fruit flies • X Linked Genetics in Calico Cats – more practice with sex-linked traits • Gender and Sex Determination – NOVA explores how sex is determined, and social issues of gender • Boy or Girl, How Genetics determine your baby's gender • " Y" You're a Guy— Genetics and Sex Determination Worksheet •	• You are a comic strip writer. Create a new comic strip about a lead character that has a genetic mutation that has given him or her special super powers. It can be a real mutation or a fictitious mutation. (Teacher should create a scoring guide). • You are a relative of a family member with a genetic mutation. Create a brochure to raise money for the awareness of this mutation. It can be a real mutation or a fictitious mutation. (Teacher should create a scoring guide). • Have students create a story about two types of gender based genetic mutations that organisms may encounter. • Create a graphic organizer
1 week	GEN. 5 c	Ratio of males to females in humans	• X-Linked Inheritance • Mars vs. Venus: The gender gap in health	

1 week	GEN. 5 d	Temperature variation	• Variation, Selection, and Time • Exploring Mutant Organisms • Evolution Begins With The Inheritance of Gene Variations • High School Teacher's Guide - RACE - Are We So Different? • Understanding Evolution • Classroom Activities: Battling Beetles • Classroom Activities: Gene Switches • Classroom Activities: Variations in the Clam Species Clamys sweetus	about different types of genetic gender mutations • You are a medical doctor. One of your patients just had a baby whom you have just diagnosed as having a genetic gender mutation. You need to prepare the family with the details of what it will entail to raise a child with this disorder. Explain the genetic basis for this disorder (causes, symptoms, and treatment). Write the dialogue between you and the mother. Include the items from the scoring guide in your dialogue. • You are a teacher. You will be tutoring a child with a genetic gender mutation. Write a report about the genetic mutation to demonstrate that you understand the mutation and will make the necessary accommodations for the child. Include the items from the scoring guide in your report. • **Basic Probability and Chi-Squared Tests**

Diseases, Disorders, and Mutations Linking Mitosis and Meiosis				
1 week	GEN. 6 a	Autosomal dominant and recessive	• Online Research for a Genetic Disorder	• GENETICS DISORDER RESEARCH PROJECT • **Writing Prompt-** Individually, students will respond to the following question: Do you think that the ability to view a person's karyotype is an effective technique that could be used to cure genetic disorders? Based on your previous knowledge of genetic engineering, explain techniques scientists can use to possibly cure these disorders, and the moral and ethical dilemma of when these techniques should be used. The response must be written as a two-paragraph essay.
1 week	GEN. 6 b	Sex-linked	• Sex Chromosome Abnormalities • Turner syndrome • XXX Females • Klinefelter Syndrome • XYY Males	
1 week	GEN. 6 c	Polygenic/ multifactorial	• Polygenic/multifactorial PPT • Polygenic Traits: Definition & Examples - Video & Lesson Transcript • Polygenic traits with pennies • Multifactorial Inheritance and Complex Disease - Articles & Resources •	
1 week	GEN. 6 d	Chromosomal	**Center for Disease Control Lessons:** **Am I a Carrier of Cystic Fibrosis?** • Lesson Plan • Cystic Fibrosis Fact Sheet	

			Chromosomal Abnormality Investigation? • Lesson Plan • Tay-Sachs Example Presentation **Genetic Screening: Who Should Be Tested?** • Lesson Plan • Genetic Disorders (Step 2).ppt • Genetic screening and testing (step3).PPT **Making Connections between Genes and Diseases** • Lesson Plan • Chromosome Template (step 1) • Class Chromosome Chart2 (Step 3) • Genome Project Intro2 (Step 1) • Sample Genome Slides2 (Step 1).ppt **Sex-Linked Chromosomal Disorders** • Lesson Plan	
1 week	GEN. 6 e	Enzyme pathway disorders	• Looking Through My Father's Eyes • Using Case Studies to Teach Science • Lesson 5: Using a Rare Disease to Learn about Molecular Biology	

1Weeks	GEN 1 - 6	Review and Assessment	**Review Packets:** ● Genetics ● Biology Keystone Review Packet Module 2 with Answers	● New York Regents ● Bubbabrain - Play the games to review ● important concepts and terms for many courses. ● Quizlet's flashcards, tests, and study games make learning fun and engaging for students of all ages. ● *Texas STAAR Review & Practice* gives your students the tools they need to succeed on the State of Texas Assessments of Academic Readiness exam.

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Pacing Resources Assessments MP4				
Time Frame	**Standards of Learning**	**Units/ Topics/ Concepts**	**Resources**	**Assessments**
Blood Genetics				

2 Week	GEN. 7 a	ABO, Rh(D), MN groups	• Were the babies switched? – The genetics of Blood Types
			  ○ **Download Student Handout:** PDF format or Word format
			  ○ **Download Teacher Preparation Notes:** PDF format or Word format
			• Blood Typing Game
			• Using Blood Tests to Identify Babies and Criminals
			  ○ Teacher notes
			• Making Babies: Blood Types Lab
			• Blood Typing Worksheet
			• The Genetics of Blood Disorders – a worksheet with genetics problems that relate to specific disorders: sickle cell anemia, hemophilia, and Von Willebrand disease.
				• Genetics Unit Codominance worksheet
				• Genetics Worksheet
				• Genetics Worksheet #9 Blood Types

1 Week	GEN. 7 b	Immune system (HLA groups)	• Reference • Operation Antibody Lesson Plan	
1 Week	GEN. 7 c	Transfusions	• Are You My Type? A Lesson on Blood Transfusions **I Want Your Blood: Blood Transfusions Unit** • "Hey, What's Your Type?" • Why Opposites Attract: Blood Agglutination • Part 1: Born of Blood: Craft Stick Chromosomes	

			○ Part 2: Born of Blood: Chromosome Chronicles ○ Part 3: Born of Blood: Fun Punns ○ Part 4: Born of Blood: Inheritance of Blood Types ● Pre-Hardy-Weinberg ● "Where in the World is Your Blood Type?" ● B.O.A. Responder: Safe and Unsafe Transfusions Activity Suggestion ● Safety of the Blood Supply Activity Suggestion	
1 Week	GEN. 7 d	Transplants	● Organ Donation-It's Gotta Match! Activity Suggestion ● Life is A Gift Unit Plans ● The Gift of a Lifetime Unit Plans	
Bioethics				
1 Week	GEN. 7 a	Continuum of opinion	● Genetic Engineering and Farm Animals	**Case Studies in Bioethics** ● Who May See the Results of DNA Testing? ● When is Cloning an Option? ● My Genes Made Me Do It! ● Who Benefits from Genetic Screening? ● The Source of Transplants ● Pumping Up with Drugs? ● Decisions in Gene Therapy ● Genetically Modified
1 Week	GEN. 7 b	Bioethics issues	**Virginia Department of Education of Enhanced Scope and Sequence Lessons:** · Biotechnological Issues and Bioethics **Biology Corner** ● Genetic Science Ethics – survey as a group ethical questions involved genetics (cloning, gene therapy..) ● Your Genes Your Choices – this is a more involved group assignment where groups read scenarios about genetic testing and ethics involved. ● Genetic Engineering Concept Map – Complete this graphic organizer on various techniques used in genetics, such as selective breeding and manipulating DNA **Discovery Streaming**:	

			• DNA Technologies	Agricultural Products • Dealing with Infertility
2 Weeks	GEN 1 - 8	Review and Assessment	• Multiple Allele Traits – practice with blood type crosses and other ABO type alleles • Multiple Allele Traits in Chickens – shows how combs are inherited (rrpp x RRpp) • Inheritance and Eye Color – uses a simulation to show how multiple alleles can influence a single trait (eye color) • Oompa Loompa Genetics(pdf) – basic crosses and problem sets, using oompa loompas • Norn Genetics – online simulation showing basic single allele traits, multiple allele traits and codominance • Human Genetics Survey – class takes a survey of human traits, such as ear points • Human Genetics Bingo – grid with traits, powerpoint presentation discusses traits • Human Genetics Presentation – discusses ABO blood types, albinism, cystic fibrosis and other traits unique to humans • Design-a-Species – using the rules of inheritance (mendel), create an organism; dominance & recessiveness, multiple allele traits, codominance • Variations on a Human Face – toss a penny to determine the features of a face, such as freckles, dimples; then draw that face. • Paper Pets – another simulation using paper models with traits for eyes, nose, mouth, and hair. • Corn Genetics – grow corn, 3:1 albino ratio, lab report analyzes F1, F2 crosses • Fruit Fly Genetics – virtual lab where you cross different flies, gather data and statistically analyze the results	Genetics Project Ideas

			• Fruit Fly (Drosophila) Virtual Lab – more extensive virtual lab through a program created by Virtual Courseware, requires set up by teacher. • Drosophilab – this virtual lab requires you to download a program to your computer, students can choose traits to cross and run chi square analysis on outcomes, while this is more basic than the Virtual Courseware lab, it appears to have less bugs. • Dragon Genetics Word Problems (ppt) – displays genetics problems on projector for students to solve	