

Science Lesson Design Sample Day 1

Planning

Name:	Subject Area: Biology	Lesson Date:
Unit Title: Genetics - Day 1	Lesson Plan Title: Introduction to DNA	Grade Level: 9th and 10th
Time Required: One 50 minute class period	<p>Materials and Media: (texts, visuals, computer, projector, markers, websites)</p> <ul style="list-style-type: none"> -Computer, Projector, Document Camera, presentation with lesson information, -interactive notebooks -Genetics Find Someone Who: https://docs.google.com/a/apps.maricopa.edu/document/d/1sJkg52-PXwqPlthjCIEEVNkhwRDqcDjYPjp8ao6tWO0/edit?usp=sharing -Group presentation located in Google Classroom -Blueprint to You Reading: http://www.genome.gov/12511466 *copies of the reading will be printed and marked for the Jigsaw activity ahead of time -Blueprint to You Questions: http://www.ret-erau.com/Modules/2012/Meeks/Module2/Lesson2StudentHandoutFromBlueprintToYouQuestions.pdf 	
<p>Aligned Standards: (Common Core/Content Area Standards)</p> <p>Arizona Science Standards: Concept 2: Molecular Basis of Heredity Understand the molecular basis of heredity and resulting genetic diversity. PO 1. Analyze the relationships among nucleic acids (DNA, RNA), genes, and chromosomes. PO 2. Describe the molecular basis of heredity, in viruses and living things, including DNA replication and protein synthesis. PO 3. Explain how genotypic variation occurs and results in phenotypic diversity. PO 4. Describe how meiosis and fertilization maintain genetic variation.</p> <p>Common Core English Language Arts - Reading Standards:</p> <p>CCSS.ELA-LITERACY.RI.9-10.1</p> <p>Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.</p> <p>CCSS.ELA-LITERACY.RI.9-10.2</p> <p>Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.</p>		

Common Core English Language Arts - Writing Standards:

CCSS.ELA-LITERACY.W.9-10.2

Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

CCSS.ELA-LITERACY.W.9-10.2.B

Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

CCSS.ELA-LITERACY.W.9-10.2.D

Use precise language and domain-specific vocabulary to manage the complexity of the topic.

CCSS.ELA-LITERACY.W.9-10.2.E

Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

CCSS.ELA-LITERACY.W.9-10.2.F

Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

Measurable Objectives: *Ensure that learning is focused clearly enough that both students and teacher know the intended result of instruction.*

1. The students will be able to define DNA with 90% accuracy orally and in writing.
2. The students will be able to define the following terms with 80% accuracy on a written quiz: allele, dominant trait, recessive trait, genotype, phenotype, homozygous, heterozygous and locus.
3. The students will be able to identify 5 main ideas from the reading "Blueprint to You" in writing with 100% accuracy.

Criteria (Quantitative):

Students will demonstrate proficiency in defining DNA with 90% accuracy.

Students will demonstrate proficiency in defining the other lesson terms with 80% accuracy.

Students will demonstrate proficiency in identifying the 5 main ideas with 100% accuracy.

Assessment Tool: The summative assessment for this lesson will be a lesson quiz with multiple choice, short answer and essay response questions. A variety of informal assessments will be used throughout the period including teacher observation, completion of the reading handout, information included in

the students' interactive notebooks, list of 5 main ideas from the reading.

Purpose & Application: *Access prior knowledge and building background, making connections of what they know to what they'll learn. Include examples of how people use this information in the real world.*

The purpose and application for this lesson will be covered during the first part of the instruction right after the students read the lesson objectives. The teacher will guide the students to recognize that studying DNA is a core component of studying biology and it is a critical element of understanding genetics, which impact all of us through the traits we carry and pass on to our children.

Differentiation: *How will you meet the needs of all your students (variables could include readiness, rate of learning, interest, learning styles, flexible groups, products demonstrating mastery).*

1. Course content will be presented visually and verbally to meet the needs of both visual and auditory learners.
2. Students will have the chance to respond to the content presented (vocabulary and content) in their interactive notebooks.
3. Students who need additional support with note taking will be provided with cloze notes that they can paste into their interactive notebooks.

Remediation: *Re-teaching of the content using a multi-sensory approach or different method. Adapting and modifying instructional practices to deliver appropriate, responsive instruction for students.*

Students who are struggling with the concepts will be provided extra support as the teacher is circulating around the room. If some students need additional support, the teacher will pull those students together for small group instruction while the other students are working. During this time, the teacher could help the students locate information for their vocabulary slides if that is what they need help with. The teacher could provide highlighters and guide the students to identify key facts in the reading passage during the jigsaw activity.

Extensions: *Enhancement of the content (Bloom's Taxonomy/Webb's Depth of Knowledge) that will go above and beyond the measurable goals.*

Students who quickly grasp the concepts and need an additional challenge will be provided the opportunity to decide which of the reasons for studying DNA is the most important. Once they have selected a reason, they will need to create a 2 minute persuasive speech about why their use of DNA is more important than the others. They must include scientific facts to support their position. Finally, students would have to present their findings to the class. This could be done in real time or submitted as a video.

Delivery

Anticipatory Set: *More than just words and discussion with your students. You can also engage in a brief activity or question-and-answer session to start the lesson plan off in a participatory and active manner which encourages engagement. (Lead-in *written in Narrative Form):*

The teacher will tell the students, "Please look at the pictures on the Smart Board (all of the images will be pictures of strands of DNA). On your warm up paper, please tell me what you think these pictures are of and what they represent." Students will be given a couple of minutes to respond and then the teacher will ask the students to share their ideas with their shoulder partners. After calling on a couple of students, the teacher will tell the students, "Today, we are going to begin our unit on genetics. We are going to learn what DNA is and it's role in genetics. We are also going to study some key vocabulary words that we will be using throughout this unit. Now that you have identified the pictures on the board, think about what you already know about DNA. Take a minute and write down your own definition of DNA on your warm up paper."

"We are going to take a few minutes to look at some basic genetic traits that are represented in our classroom. Each of you is going to receive a copy of the Genetics Find Someone Who handout. You will have 3-4 minutes to try and find a student who can answer yes for each item on the handout. You are the only person who can write on your paper and you can only use a student's name once." The teacher will have the students stand and give them 4-5 minutes to find matches for their handouts. Music will be playing in the background during this time. When the timer goes off, the teacher will direct the students to have a seat.

Once students are seated, the teacher will debrief the activity with the students by guiding the students to observe how many students in the class possessed each trait on the handout. The teacher will ask the students to note their observations in their Interactive Notebooks.

The teacher will call on 3 students to read the lesson objectives using the class set of popsicle sticks.

Instructional Sequence: *Numbered steps which detail teacher facilitated instruction with evidence of modeling, guided practice, active engagement strategies and checking for understanding (throughout the lesson) and differentiation of instruction.*

1. Following the Anticipatory Set, the students will be divided into 8 groups of 3 -4. Each group will be assigned one of the vocabulary words for today's lesson: allele, dominant trait, recessive trait, genotype, phenotype, homozygous, heterozygous and locus.
2. The students will have 8-10 minutes to create an informational slide related to their vocabulary word. Each student will have a laptop computer and they will be working the presentation that the teacher already loaded into the Google Classroom. Each group will work on the slide for their vocabulary word and add the following information: definition, picture of the word, synonyms for the word, and use the word in a sentence. The teacher will check the students' progress while they are working by circulating around the room and providing feedback.
3. When the students have completed their slides, the teacher will guide the class through the slideshow and the students will add these terms to their interactive notebooks.
4. The teacher will provide each student with a copy of the Blueprint to You reading handout. Each handout will have a colored star on the top of the handout (blue, green, red or gold). The students will get together in groups (of approximately 6) based on the color of the star on the handout.
5. Once the students are grouped by the color of their stars, the teacher will tell the students which portion of the handout their group will be responsible for. The teacher will explain that the students will become an expert on their section of the handout and that they need to be prepared to teach another group of students about their content in a few minutes.
6. The students will have 8 - 10 minutes to read their portion of the handout and discuss the main

ideas with their groups. The students should make notes, highlight, etc. on their handouts.

7. Next, students will form groups of 4, but this time, they will need one member of the group that has each color of star on his/her handout. So the groups will consist of one each: blue star, green star, red star and gold star.
8. In the new groups, the students will have 8-10 minutes for each group member to share the information from his/her portion of the reading. As one student is sharing, the other students should make notes on their handouts.
9. When the students have had time to finish sharing, they will be given 5 minutes to add their handouts to their interactive notebooks along with any additional comments they would like to include.
10. The students will receive a copy of the Blueprint to You Questions. Students will begin working on their own to answer the questions based on the reading and discussion that they have participated in.
11. The teacher will circulate around the room and provide feedback while the students are working.
12. The students will be assigned the remainder of the handout for homework. complete the handout at home if they don't have time to complete it in class. In addition, the students will need to write a paragraph summarizing the 5 most important ideas from the reading passage as part of their homework.

Closure: *Revisit/reflect on Anticipatory set and help students organize the information into a meaningful context in their minds. (*written in Narrative Form)*

The teacher will tell the students, "Go to the document titled 'DNA Information' in the Google Classroom. On the shared document, please list two items that you learned from today's lesson. After you list the fact you learned, add another sentence explaining why you think this information is important. Remember to add your initials in parenthesis at the end of each of your sentences."

Students would have 4-5 minutes to add their answers to the shared document. The teacher will then display the shared document on the Smart Board and call on several students to read some of the answers listed.