

Science Lesson Design Sample Day 2

Planning

Name:	Subject Area: Biology	Lesson Date:
Unit Title: Genetics - Day 2	Lesson Plan Title: Evaluating how traits are passed genetically.	Grade Level: 9th and 10th
Time Required: One 50 minute class period	Materials and Media: (texts, visuals, computer, projector, markers, websites) Computer, Projector, Document Camera, presentation with lesson information -interactive notebooks -cloze notes -Punnett square handouts	
<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 - Writing Standards:</p> <p>CCSS.ELA-LITERACY.W.9-10.2</p> <p>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.</p> <p style="padding-left: 40px;">CCSS.ELA-LITERACY.W.9-10.2.B</p> <p style="padding-left: 40px;">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.</p> <p style="padding-left: 40px;">CCSS.ELA-LITERACY.W.9-10.2.D</p> <p style="padding-left: 40px;">Use precise language and domain-specific vocabulary to manage the complexity of the topic.</p> <p style="padding-left: 40px;">CCSS.ELA-LITERACY.W.9-10.2.E</p> <p style="padding-left: 40px;">Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>		

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 identify Gregor Mendel with 100% accuracy orally and in writing.
2. The students will be able to use Punnett squares to demonstrate how genetic traits are passed with 80% accuracy.
3. The students will be able to discuss the conclusions they were able to draw from their Punnett squares with 80% accuracy.

Criteria (Quantitative):

Students will demonstrate proficiency in the identification of Gregor Mendel with 100% accuracy. Students will demonstrate proficiency for the other 2 objectives with 80% 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, questions & answers, Punnett square completion.

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 as the students are creating the KWL chart. Students will generate a list of the things they think they know about the topic and we will discuss how the study of genetics is a core component of studying biology along with how studying biology can make the world a better place.

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 manipulate the traits using Punnett Squares which will be beneficial for tactile learners.
3. Students who need additional support with note taking will be provided with cloze notes that can be pasted 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 pulled together for small group instruction. Rather than simply writing in the Punnett squares, the teacher will provide manipulatives for the students to place in the appropriate boxes as the teacher walks through multiple examples of traits and how they would be passed on.

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 evaluate the idea of genetic engineering. Students would first develop their own definition of this concept. Then, the students would be provided with 2-3 resources on the topic. After reviewing the resources, the students would make a list of the benefits and disadvantages to genetic engineering. Finally, students would have to present their findings to the class.

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, "Today, we are going to continue our unit on genetics. We are going to learn how specific traits are passed on from parents to their children based on what we learned about DNA yesterday. Think about what you already know about this topic while we watch the following video. Also, think about which of the traits in the video you possess."

The students will watch the following video: <https://www.youtube.com/watch?v=mnSkz8s-b44>

After the video, the teacher will ask the students to view a series of slides that display the traits mentioned in the video. Students will raise their hands based on the traits they possess. The teacher will explain, "As we view the following slides, please raise your hand for the traits you possess. This will give you the opportunity to see how many students in our class possess these dominant and recessive traits."

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

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 create a KWL chart about genetics following the teacher's example. The teacher will model the creation of the chart and give an example of what might be written in the K column.
2. The students will have 3-4 minutes to generate information that they think they know about the topic of genetics.
3. The teacher will stop the students and ask them to share their ideas with a shoulder partner. The students will be told that they can "steal" ideas from their partners to add to their own sheets.
4. The teacher will guide the class in a group discussion about ideas that the students think they know about genetics and she will add those to the class KWL chart.
5. The teacher will ask the students to generate a list of questions that they would like to have answered in the W column of the KWL chart. Students will have 3-4 minutes to complete this task.
6. The teacher will use popsicle sticks to call on students to share their questions. As the students

share, the teacher will add their questions to the W column of the chart.

7. The teacher will use this time to pose the following question: "Why do we even need to study genetics? Would you please list some ways that you think the study of genetics is used to make our world a better place?" Students should come up with things like: curing diseases, preventing birth defects, growing bigger plants, catching criminals, etc.
8. The teacher will explain that the students are going to have the chance to learn the answer to these questions and many more. The teacher will present the slideshow about Gregor Mendel and his work. The teacher will share additional information about how genetic traits are passed and how Punnett squares help us predict/track which traits will be passed to offspring using the same slideshow.
9. The students will take notes using their interactive notebooks. The teacher will ask questions throughout the presentation along with answering any questions the students might have at this time.
10. After taking notes, the students will be provided with the Punnett square handout. The teacher will guide the students through the process for completing the first square for one trait.
11. The teacher will give the students the directions for the next two squares and the students will work with their table groups to complete them. While the students are completing these two squares, the teacher will circulate around the room to provide feedback and answer questions.
12. Students will be assigned the remaining Punnett squares for homework. In addition, students will be assigned to research additional traits that are recessive and dominant. They should have a list of 3 each that we did not cover in class today. The list of traits will be due in two days to allow students time to access a computer.

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

The students will think about their own eye color and the eye color of their siblings and parents. Based on that information, they will reflect on the conclusions they can draw about the dominant and recessive traits their parents have. The teacher will provide the following directions.

The teacher will tell the students, "Take out a piece of paper. On your paper please list two of the members of your family (parents, siblings) along with each person's eye color. Once you have done that, you are going to answer several questions on that same paper. Please look at the slide on the screen and answer each question to the best of your ability."

1. What two traits for eye color do you think each of your parents carries?
2. Defend your answer to question number 1.

Students would have 3-4 minutes to write out their answers. The teacher will then call on several students to share their responses (using the student selector on the Smart Board). All students will turn in their written responses before leaving.