

### Lesson Plan Template

<b>Grade:</b> 10	<b>Subject:</b> Biology
<b>Materials:</b> Scientific Articles, white boards, markers	<b>Technology:</b> N/A
<b>Instructional Strategies:</b> <input type="checkbox"/> <b>Direct instruction</b> <input type="checkbox"/> Guided practice <input type="checkbox"/> Socratic Seminar <input type="checkbox"/> Learning Centers <input type="checkbox"/> Lecture <input type="checkbox"/> Technology integration <input type="checkbox"/> Other (list)	<b>Guided Practices and Concrete Application:</b> <input type="checkbox"/> <b>Large group activity</b> <input type="checkbox"/> Independent activity <input type="checkbox"/> <b>Pairing/collaboration</b> <input type="checkbox"/> Simulations/Scenarios <input type="checkbox"/> Other (list) Explain:
<b>Standard(s)-</b>  Performance Standard HS-LS3-1 Construct an explanation to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.  LS1.A: Structure and Function: All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins.  ^^The previous standards we have covered over the past 3 weeks.  <b>LS3.A: Inheritance of Traits: DNA make up genes that are sections on chromosomes which are the instructions for forming individual characteristics (traits). All cells of an organism have the same genetic content. Gene expression is regulated in different ways.</b>	<b>Differentiation</b>  <b>Below Proficiency:</b>  Students below proficiency may not make complete connection between how DNA works and DNA technology, but still be capable forming opinions on DNA technology and will find answers in the text with the help of their peers during peer collaboration.  <b>Above Proficiency:</b>  Students above proficiency will make complete connections between how DNA works and DNA technology and will be capable of forming opinions on the use of DNA technology, leading their peer groups and can do more research on a DNA technology that interests them during their reflection.  <b>Approaching/Emerging Proficiency:</b>  Students as/emerging proficiency will make sufficient connections between how DNA works and DNA technology and will be capable of forming opinions on DNA technology and will work with their peers to collaborate on ideas (both helping others and being helped themselves).
<b>Objective(s)</b>  By the end of class students will have connected their prior knowledge of the function of DNA/ genetic material in an organism to current scientific technologies (use of Genetically Modified Organisms) by using evidence from scientific text to support answers and form opinions they have on the use of GMO technology.  <b>Bloom's Taxonomy Cognitive Level:</b> Analyze and Evaluate	<b>Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)</b>  Participation is the biggest expectation in this lesson. Students know to be on task when they are in the classroom. In general cell phones are allowed provided they do not become a distraction.
<b>Classroom Management- (grouping(s), movement/transitions, etc.)</b>  Traditional seating for beaker question and attendance Lab seating for reading activity Choice seating for independent work	(This cell is merged into the Behavior Expectations cell above)
<b>Minutes</b> 5	<b>Procedures</b> <b>Set-up/Prep:</b> Print off articles, place white boards, dry erase markers, and writing utensils around the lab tables

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15	<p><b>Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)</b></p> <p>We will begin class with a beaker question. Then we will move to the lab tables in the back and students may only bring a highlighter/pen. Every lab table must have 4 people. Students will be able to choose their seats, but I will move them if there are less than four per table. When everyone is seated, I will introduce the activity: <i>“We’ve been learning a lot about our genetic material. We even started learning a little about DNA Technology in lab on Tuesday and in Large Group. The goal of today is to learn some more about DNA Technology and really think about what it means that we can change someone/somethings DNA. Has anyone heard of GMOs?”</i> Then, I will ask students to write down everything they know about GMO’s on the group’s white board. After a minute we will regroup discuss and then I will introduce the two articles we will be reading that give more information on GMO’s.</p>	
5	<p><b>Explain: (concepts, procedures, vocabulary, etc.)</b></p> <p>Students will be creating questions about GMO’s and finding the answers through reading two separate articles (Linked: <a href="https://newsela.com/read/china-tinypigs/id/12641/">https://newsela.com/read/china-tinypigs/id/12641/</a> and <a href="https://newsela.com/read/gmo-salmon/id/13185/">https://newsela.com/read/gmo-salmon/id/13185/</a> first pages attached below) that will provide different perspectives to its use.</p> <p>After learning what the students already know, they will then collaborate with their group to create questions asking what they want to know to know about GMO’s and what they think the articles we are going to read will answer. We will pick one question from each group to write on the large white board for everyone to see.</p>	
20	<p><b>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)</b></p> <p>Students will take about 7 minutes (more or less time based on what I observe) to read their assigned article. Students will not be allowed to discuss until each student finishes reading. While reading, students should annotate their text specifically underlining/highlighting/mark the evidence that supports answers to the large group questions.</p> <p>After everyone is finished reading students will discuss in their small group what answers they found and write their answers down on their small group’s white board. I will assign each group one of the large group questions to answer.</p>	
20 (rest of the class period)	<p><b>Review (wrap up and transition to next activity):</b></p> <p>Each group will have a spokesperson to share out what they concluded as a group. We will discuss, as a large group, the answers the students found in the articles. What was the most surprising thing you learned? Have you formed more of an opinion on GMO’s? Do you think scientists should use this technology?</p> <p>Lastly, students will write a short reflection on DNA Technology (See attached document) and work on finishing their Gel Electrophoresis Lab. Students may choose where they want to sit and work.</p>	
<p><b>Formative Assessment: (linked to objectives)</b>  <b>Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc.</b></p> <p>The first “formative assessment” will be having the students write everything they already know about GMO’s on their white board.          Throughout the lesson, I will be walking around to monitor student reading and discussion. Additionally, I will be leading the general conversation by asking probing questions to get students to think about the topic and check for understanding.</p>	<p><b>Summative Assessment (linked back to objectives)</b></p> <p>The summative assessment will be the reflection activity after the lesson.</p> <p style="text-align: center;"><b>If applicable- overall unit, chapter, concept, etc.:</b>          N/A</p>	
<p><b>Reflection (What went well? What did the students learn? How do you know? What changes would you make?):</b></p>		

# Chinese company edits pig DNA, develops piglets that will stay pet-sized

By Los Angeles Times, adapted by Newsela staff on 10.30.15

Word Count **823**

Level **1020L**



A BGI gene-edited micro pig (left) stands next to some Bama mini pigs that are conventionally used for scientific research. Courtesy of Alison Van Eenennaam

BEIJING, China — Have you been longing for a “teacup” pig but worried that your pet might grow as big as your bathtub?

A Chinese company says it now has the answer: a swine that would weigh no more than about 33 pounds fully grown. The company, called BGI, created the pigs by changing their DNA, which contains the instructions for how each cell in the body works. DNA is passed on from parents to children.

## **Pint-Sized Porkers**

BGI recently announced that it intends to start selling the miniature pigs for \$1,600. The company originally created them to study human diseases.

The pigs made a splash late last month when BGI showed them at the Shenzhen International Biotech Leaders Summit in China. The pint-size porkers were created through a process known as

# FDA says OK to salmon with genes modified to make it grow faster

By Associated Press, adapted by Newsela staff on 12.09.15

Word Count **815**

Level **1040L**



Frankie Ragusa, general manager of Seattle distribution for Ocean Beauty Seafoods, carries a 40-pound Copper River salmon after its arrival at the Sea-Tac Airport outside Seattle, Washington, May 17, 2013. It was part of the first shipment of the season of Copper River salmon from Cordova, Alaska. AP/Ted S. Warren, File

WASHINGTON, D.C. — Before too long there may be a very odd thing on Americans' dinner plates. It looks exactly like salmon, and it is, but it is salmon that has been genetically modified. The salmon is the first altered animal cleared for humans to eat in the United States.

Scientists are altering the genes of salmon to make them grow faster. Genes are passed down by parents. Genes decide what someone looks like and how their body works. They make a person have wavy or straight hair, or blue or brown eyes, or even smile a certain way. Plants, animals and people all have genes. With new genes, now the salmon can grow faster.

Critics call it "Frankenfish," after the Frankenstein monster, but the Food and Drug Administration (FDA) granted its approval on Thursday, saying the faster-growing salmon is safe to eat. It could be available in grocery stores in a couple of years.

# DNA Technology Research & Reflection



The term DNA technology refers to many different techniques that scientists use to manipulate DNA to make advancements in scientific technology. There can be both benefits and disadvantages to using DNA technology along with many ethical considerations and debates. On Tuesday we began watching “Human Nature” a documentary on the CRISPR gene and on Thursday we read about DNA technology and its impact on human lives. Your task is to write about your personal opinion on these DNA technologies. You may choose one of the technologies we discuss in class- or a new technology you want to research below- and answer **(in complete sentences)** the reflection questions. Get curious!

## Branches of DNA Technology

<b>DNA Fingerprinting</b>	<b>CRISPR</b>	<b>Gene Therapy</b>
<b>GMO's</b>	<b>Cloning</b>	<b>Phage Therapy</b>

1. What DNA technology did you choose?
2. Briefly describe what this technology is. What is it used for?
3. What is one benefit of using this technology?
4. What is a potential disadvantage (or ethical consideration) of this technology?
5. Do you think scientists should use this technology? Why or why not?