

Name: \_\_\_\_\_

Packet Due Date: \_\_\_\_\_

**Life Science**  
**Wednesday Unit - Quarter 3**

# Hawaii Science Now

05 JAN 2018

**Lessons & Objectives**

**Lesson 1: Introduction to Genetic Engineering**

- **I can...** analyze the core concepts of genetics.

**Lesson 2:**

- **I can...** explain modern scientific technique used to modify genes.

**Lesson 3: Case Study Research**

- **I can...** research specific cases in genetic engineering and synthesize the information for an argumentative presentation.

**Lesson 4: Case Study Research**

- **I can...** research specific cases in genetic engineering and synthesize the information for an argumentative presentation.

**Lesson 5: Presentation of Findings to National Science Foundation**

- **I can...** accurately demonstrate information gained through research and assert an individual claim.

## National Science Foundation Providing Funding for Research Project!

By ALBERT EINSTEIN

For the first time in the history of the National Science Foundation will be awarding a 10 million dollar grant! This grant will fund one lucky group of sciences to help advance in their field of genetic engineering. Each scientific team will conduct research in their field of genetic engineering over the course of this next work quarter. These teams will then have the chance to present their research to the panel of judges explaining why their project should be funded. The judges will be making the final decision on which team deserves the funding!



## Performance Expectations

**Packet Completion:** \_\_\_\_\_/4

<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
Nothing is missing. Responses consistently meets ALL the criteria for high quality work. Evidence of exemplary effort is evident.	Work is 75-100% complete and accurate. Work/effort misses the criterion for high quality consistently.	Work is 50-75% complete and accurate. Work has evidence of quality but not consistently.	More than 50% of the work is incomplete or incorrect. Work does not meet the expected level of quality.	No work completed.

**Speech:** \_\_\_\_\_/4

<i><b>Content and Presentation</b></i>	<b>1</b> Fair	<b>2</b> Good	<b>3</b> Excellent	<b>4</b> Superior	<b>Total Points:</b>
Strong Opening and Statement of the Research Topic at Hand.	1	2	3	4	
Strong Explanation of Findings to Judging Panel	1	2	3	4	
Memorable and Interesting Language: Rhetoric	1	2	3	4	
Voice: Clear, Interesting, Expressive	1	2	3	4	
Delivery: Poise, Gestures, Eye Contact	1	2	3	4	
<b>Subtotals</b>					

## LESSON 1: INTRODUCTION TO GENETIC ENGINEERING

### KWL

What do you <b><u>K</u></b> now?	What do you <b><u>W</u></b> ant to know?	What have you <b><u>L</u></b> earned?

### Key Terms

#### Biotechnology

**Biotechnology** is the use of technology to \_\_\_\_\_ or \_\_\_\_\_ living organisms.

Through the use of biotechnology, scientists alter or manipulate organisms with the hope of changing the way living things function or the materials they produce.

**Examples (List at least 2):**

\_\_\_\_\_

\_\_\_\_\_

#### Breeding

**Breeding** is the mating and production of \_\_\_\_\_ by animals.

#### Selective Breeding

**Selective breeding** (also called \_\_\_\_\_) is the process by which humans breed organisms with specific traits to produce offspring with desired characteristics.

**Examples (List at least 2):**

\_\_\_\_\_

\_\_\_\_\_

## Genetic Engineering

**Genetic Engineering** is the deliberate modification of the \_\_\_\_\_ (DNA) of an organism to modify its \_\_\_\_\_.

**Examples (List at least 2):**

\_\_\_\_\_  
\_\_\_\_\_

## Genetically Modified Organisms (GMOs)

A **Genetically Modified Organism (GMO)** is an organism whose \_\_\_\_\_ (all their genes) has been altered through genetic engineering so that its DNA contains one or more genes not normally found there.

**Examples (List at least 2):**

\_\_\_\_\_  
\_\_\_\_\_

## Credible or Not?

As each group presents, please fill in three key facts and explain why or not the poster is credible

Poster Topic	Key Facts	Credible or Not? Why?
1	- - -	
2	- - -	
3	- - -	

## LESSON 2: MODERN SCIENTIFIC TECHNIQUES

### Do Now

Please answer the following questions using full sentences:

1) What are some problems that modern science can solve through genetic engineering?

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2) Remembering what you learned about Genetics and Heredity, predict how Scientists are able to modify genes?

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### How Genetic Engineering Works?

All living organisms are made of tiny building-blocks called \_\_\_\_\_

Inside each cell are \_\_\_\_\_ that contain the full set of blueprints or \_\_\_\_\_

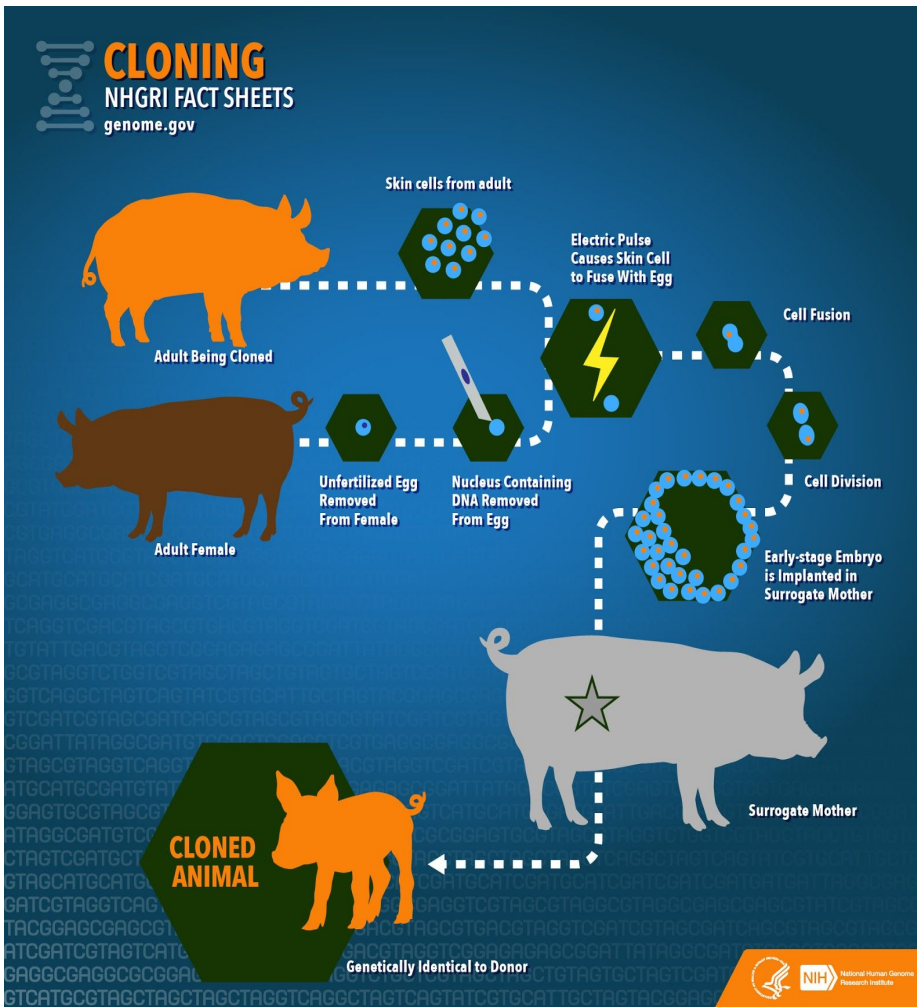
DNA is called the blueprint of life because

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Genetic Engineering works by modifying the \_\_\_\_\_ in order to change the characteristics of a organism.

# A Closer Look at Cloning

## Steps to Cloning



**Step 1.** Skin Cells from Animal and a \_\_\_\_\_ Egg collected.

**Step 2.** Nucleus containing \_\_\_\_\_ removed from Egg

**Step 3.** Electrical Pulse causes Skin \_\_\_\_\_ to fuse with Egg

**Step 4.** Cell Fusion & Division: Where cells with a single nuclei fuse together and then split into cells with same genetic material

**Step 5.** Early Stage Embryo implanted back into surrogate mother

**Step 6.** Surrogate Mother gives birth to cloned animal.

### Case Study: Dolly the Sheep

What were some of the hopes related to the cloning of Dolly the Sheep?

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What were some of the fears related to the cloning of Dolly the Sheep?

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## A Closer Look at Genetic Engineering and Diseases

**Predict:** How do you think that Genetic Engineering can help with prevention of diseases?

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**Predict:** What could be some of the risks of using genetic engineering to prevent diseases?

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### Case Study about Malaria:

Why does Malaria poses such a problem to humans?

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How would genetic engineering go about stopping the spread of Malaria?

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What are some other diseases that could be prevented through this technology?

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What are some of the risks associated with using Genetic Engineering to combat diseases?

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**Conclusion:** Do you believe that the threat that Malaria poses justifies the use of Genetic Engineering to combat it?

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### LESSONS 3 AND 4: CASE STUDY RESEARCH

**OBJECTIVE:** I can research specific cases in genetic engineering and synthesize the information for an argumentative presentation.

#### **Do Now!**

Please answer the following questions using full sentences:

1) What is the most interesting thing that you've learned about genetic engineering so far?

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2) What issues are possible to solve with genetic engineering?

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#### **Goal: National Science Foundation (NSF) Funding**

The National Science Foundation (NSF) just announced the proposal finalists for one fully funded grant, with the goal of furthering genetic engineering research.

The six finalists are:

1. Modifying embryos
2. Eternal youth
3. Accessible biohacking





4. Eliminating cancers and disease
5. Preparing for space exploration
6. Modifying food to withstand climate change

You and your team's goal is to present why your research should be funded above the others!  
 Good luck, scientists. :)

**Case Study Team Assignment**

**Your Case:** \_\_\_\_\_

**Your Role:** \_\_\_\_\_

Group Member Name	Role

**Task 1. Pre-research questions**

**What questions do you have related to your topic and role? Please write at least three questions, as well as record additional thoughts.**

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

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**Task 2a. Background Questions**

1. How can your topic be furthered with genetic engineering?

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<b>Evidence</b>	<b>Source</b>
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2. What are the genetic engineering techniques specific to your case?

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Evidence	Source

3. What do you think the **benefits** of this technology are?

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Evidence	Source

4. What do you think the **risks** of this technology are?

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Evidence	Source

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**Task 2b. Annotated Notes**

<b>Notes</b>	<b>Source</b>

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**Task 3. Planning for the proposal meeting**

While preparing your argument, please keep the following questions in mind (please use an extra piece of paper if you'd like more space):

1. How would this research benefit the specific role you've been assigned in this case?

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2. Why do you think this research should be funded over the other 5 case proposals?

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**GRAPHIC ORGANIZER**

**Introduction (state your position):**

Topic:  
\_\_\_\_\_

Position:  
\_\_\_\_\_

**Evidence (why your proposal should be funded over the other 5):**

<b>Reason 1</b>	<b>Reason 2</b>	<b>Reason 3</b>
Reason:  	Reason:  	Reason:  
Evidence:  	Evidence:  	Evidence:  

**Conclusion (restate position and importance of this research):**

Restate Position:  
\_\_\_\_\_

Importance/Ending Thoughts:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Task 4. Write out your speech (verbatim) and practice with your group**

Using your graphic organizer, write out a speech with the evidence you've gathered. Aim to have your speech be **no more than 2 minutes** in length. Practice with your group after you've finished.

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**LESSON 5: PRESENTATION OF FINDINGS TO NATIONAL SCIENCE FOUNDATION**

**OBJECTIVE:** I can accurately demonstrate information gained through research and assert an individual claim.

<b>Content and Presentation</b>	<b>1 Fair</b>	<b>2 Good</b>	<b>3 Excellent</b>	<b>4 Superior</b>	
Strong Opening and Statement of the Research Topic at Hand.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Strong Explanation of Findings to Judging Panel	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Memorable and Interesting Language: Rhetoric	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	

Voice: Clear, Interesting, Expressive	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>Total Points:</b>
Delivery: Poise, Gestures, Eye Contact	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
<b>Subtotals</b>					

**Presentation Notes:**