1. What is in a vaccine that makes it effective?
2. What is an allergic reaction?
3. What are the molecules that trigger immune responses?
4. What happens to an onion cell in salt water?
5. What is the function of a gene?
6. Where does protein synthesis occur?
7. If the amino acid sequence is changed, how will it affect the final protein product?
8. Cheerios claims that eating 1 bowl of cheerios a day can help to reduce cholesterol. The whole grains have been said to lower LDL counts in patients with high cholesterol. Design a controlled experiment to test of the effects of whole grains on cholesterol levels.
   1. Hypothesis
   2. Independent variable
   3. Experimental group
   4. Data to be collected
   5. Data to support the claim

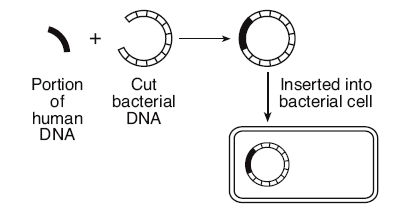
**Gene:**

* A segment of **\_\_\_\_\_\_\_\_\_\_\_**that codes for a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **\_\_\_\_\_\_\_\_\_\_\_** 🡪 **\_\_\_\_\_\_\_\_\_\_\_\_\_** 🡪 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** 🡪 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Selective Breeding:**

* **Selective Breeding-** Controlled reproduction. Choosing **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to reproduce.
  + Cross breeding corn to get desired traits such as size, sweetness, health
  + Cross breeding wolves to get all modern day dog breeds
  + Cross breeding strongest cows to make a “SUPER COW”
* Selective breeding has happened for **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of years!!!!!

**Modern Science:**

* RECENTLY (Last 25 years)…
* Scientists manipulate, or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of organisms to make new characteristics
* This is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Scientists use **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to the cut a gene out of one organism, and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** into another organism.
* ****DNA is a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, so the new organism will **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the gene to make the desired protein trait.

**Insulin Production by Bacteria:**

* The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for insulin was cut from a human using an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* The human gene for insulin was **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**into a bacteria using an enzyme
* The bacteria\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the human gene and produce insulin.
* The insulin is collected and given to patients with **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Benefits of Genetic Engineering?:**

* Create new **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Create better **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of medicine / food

**Mutations:**

* ANY change in the DNA- whether by mutation or by genetic engineering will be **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that develops from that cell.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** OR genetically **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** cell will pass on the changed DNA through **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Mutations are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** events
* Radiation, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** can increase your chances of a mutation.
* A mutation in a body cell will only be passed on to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* A mutation in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** can be passed on to offspring.

**Evolution:**

* Mutations and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** during sexual reproduction lead to new gene combinations and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* Genetic recombination occurs during **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* Some characteristics give organisms an advantage over other organisms.
* Some traits help organisms survive and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* An **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is any trait/characteristics that helps you\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a particular environment.
* The organisms that are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for their environment will naturally survive and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Their genes and traits will be **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to their offspring.
* This is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for the most fit organisms.
* Over time, the population of better adapted organisms will **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** species will decrease over time, because they cannot **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**ANSWER:**

1. What is selective breeding?
2. What is genetic engineering?
3. What is a gene?
4. If a mutation occurs in a body cell, how and where will it be passed on to?
5. What are some factors that increase the chance of mutation?
6. When does genetic recombination occur?
7. What is the only way for “change” to occur in an asexually reproducing organism?
8. What do scientists use to cut and paste DNA?
9. What are some benefits of genetic engineering?
10. What is an adaptation?
11. Give 3 adaptations of a shark that may help it survive.
12. What is the function of the placenta?
13. What is meiosis?
14. What are the building blocks of carbohydrates?
15. What are receptor molecules?
16. Name 3 feedback mechanisms: