**Biotechnology Guided Learning**

**Directions:** open the Chromebook tab on my website; open on **Biotech Ppt.**

* Answer all questions **on a separate sheet of paper**

1. Define Biotechnology and provide examples of its use.
2. How long have humans been using biotechnology?
   1. Research 3 more examples of Biotech use by humans over the last few thousand years
3. Describe selective breeding and give examples of why we would want to do it.
4. What are the differences you see in the chickens from 60 years ago to the chickens of today?
5. Why might we want to breed the chickens so that they look like this?
6. What potential problems do you foresee from this method of breeding?
7. Why would we want to change the corn in such a drastic manner? How does it make it more beneficial?
8. Draw the Chicken and Corn diagrams
9. Write the steps for Selective breeding.
10. Go to the following link: <http://biologyselectivebreeding.weebly.com/>
    1. List and describe the 3 techniques we use for selective breeding

* Click on the **[Benefits and Risks!]** tab
  1. make a T-Chart outlining the benefits and risks of selective breeding
* Click on the **[Impacts on Evolution Risks!]** tab
  1. Describe how selective breeding impacts our evolution

1. Define cloning.
2. Explain the two ways that cloning can happen in nature
3. Watch the following video **(6:02)**: <https://www.youtube.com/watch?v=q0B9Bn1WW_4>
   1. Who is Dolly the sheep?
   2. What are the types of cells that the first clones of Frogs were made from?
   3. How did scientists solve the problem of using a differentiated cell to create a clone?
   4. List the steps for how scientists made Dolly the sheep.
   5. Why did the baby sheep have a white face and the “mother” had a black face?
4. Go to the following link: <http://healthresearchfunding.org/pros-cons-human-cloning/>

* Watch the 1st video **(2:52)** then read and analyze the information
  1. Describe how stem cells can be used to help humans.
  2. Describe how scientists made an embryonic clone from a skin cell?
  3. When do scientists harvest the stem cells? Why do you think they wait until then?
  4. What was the key ingredient that made the cells divide like they were supposed to?
  5. How do you feel about using embryonic stem cells made from a skin cell?
     1. Do you think it should be done?
     2. What would be the implications if one of these clones were developed into a human?
     3. Do we keep harvesting cells or do we let it develop?
  6. **Summary:** create a detailed T-Chart of the pros and cons to cloning and its human applications

**GMOs, Transgenic Organisms, Recombinant DNA**

1. Define transgenic organism.
2. Why would we integrate DNA from one organism into another?
3. What is a GMO?
4. What is recombinant DNA and how is it used to make a transgenic organism?
5. List the steps for how it works.
6. Draw the image describing how a transgenic organism is made.

**Transgenic Manipulation Activity:** [**http://www.pbs.org/wgbh/harvest/engineer/transgen.html**](http://www.pbs.org/wgbh/harvest/engineer/transgen.html)

1. What genes are we incorporating into the tomato plant?
2. Why are we doing this?
3. What is step one to this process?
4. What is a vector?
5. What is the second step to this process?
6. Why did we transfer the genes to a new bacterium?
7. After integrating the new DNA, what did we need to allow the bacteria to do?
8. Why did we add pieces of the plant to the growing medium?
9. Why did we have to move the plan parts to another growth medium?
10. Why did we sprayed herbicide on the plant cells?
    1. Why do we want plant cells to be resistant to herbicide?
11. Where do the plant cells go after the herbicide treatment?
12. How do we know the process worked?
13. What advantages does this plant have for farmers who grow them on a large scale?

**Transgenic Bacterial Video (1:12)**

[**https://www.dnalc.org/view/15476-Mechanism-of-Recombination-3D-animation-with-with-basic-narration.html**](https://www.dnalc.org/view/15476-Mechanism-of-Recombination-3D-animation-with-with-basic-narration.html)

1. How is the bacterial DNA cleaved and put back together?
2. What are the cleaved ends of the DNA called?

**Papaya Case Study (5:32):** [**https://www.youtube.com/watch?v=2G-yUuiqIZ0**](https://www.youtube.com/watch?v=2G-yUuiqIZ0)

1. What are the reasons for developing GMOs?
2. What was the virus called attacking the papaya?
3. How did they try to stop the virus before using genetic modification?
4. What was the genetic trait needed to solve the papaya problem?
5. Describe cell transformation.
6. How did they get the DNA into the seed?
7. How did integration of the viral DNA make the plant resistant to the virus?
8. How long did it take to get the genetically modified papaya to produce commercially?

**Advantages and disadvantages of GMOs:** [**http://occupytheory.org/advantages-and-disadvantages-of-gmos/**](http://occupytheory.org/advantages-and-disadvantages-of-gmos/)

**Directions:** Watch the video and make a T-Chart highlighting the pros and cons of GMOs