GENETIC ENGINEERING WEBQUEST:

**Artificial Selection or Selective Breeding:**

a. Define Artificial Selection. What is another term for it?

b. What are some examples of artificial selection?

**Recombinant DNA:**

a. Which human hormone can be made using genetic engineering processes?

b. Before genetic engineering was used to help diabetics who could not produce or use their own insulin,

what was being used to treat their diabetes?

c. List the seven steps involved in producing insulin using genetic engineering.

**Electrophoresis**

a. Where was the DNA placed inside the gel?

b. How are the DNA strands pushed through the gel?

c. List the 5 steps of the gel electrophoresis technique

d. What are the materials needed for step 1- making the gel?

e. What are the materials necessary for the gel apparatus?

f. How can you see the pattern on the agarose gel?

g. Estimate the size of the 3 bands in the DNA sample.

**Genetically Modified Foods and Organisms:**

a. What are Genetically Modified (GM) Foods?

b. List three benefits and three controversies surrounding this scientific technology.

**Tomato**

a. Click on first picture –Identify and explain how farmers in the past were able to grow desirable crops.

b. Click on second picture – What is genetic modification? How is it used to create tomatoes that can withstand the cold?

c. Click on “Food for Thought” List 2 examples of genetic modification in use and identify 1 benefits and negatives aspect of each.

**Using Genetically Engineered Animals**

a. What is the name of the first drug approved by the FDA that was genetically engineered from an animal? What does it do?

b. How do the scientists make blood thinners from genetically engineered goats?

**Transgenic or Knockout Mice**

a. What is the key question that Capeechi’s work in medicine raised?

b. Describe the 7 steps briefly for making knock out mice:

c. What is the process called when similar genes swap places? What additional gene will be added to this?

d.. What are chimera mice?

e.. What percentage of the mice will have the “knock out gene” after breeding?

**Antibodies**

a. What is an antigen?

b. What are the cells that recognize and respond to antigens?

c. What is a “clonal cell culture line”?

d. What is the most difficult step in making monoclonal antibodies?

**Stem Cells** – watch video on nature of stems cells and unlocking stem cell potential

a. What is the embryo called one week after development?

b. What are the role(s) of the Adult Somatic Stem Cells ?

c. What is regenerative medicine?

d. What are the organs that tissue engineers are working on growing with Embryonic stem cells?

**Gene Therapy**

a. What is gene therapy?

b. What is the most common vector used in gene therapy?

c. Click through the cystic fibrosis case studies 1&2.

d. Go to the space doctor and treat one of the three alien patients: give the name of the patient, the faulty protein and the vector used to treat the patient.

**Micro Arrays**

a. What is DNA Micro Array analysis used for ?

b. How do scientists know if a gene is on or off in a cell?

c. Click on the microarray and investigate the differences between healthy and cancerous cells.

**Reverse Breeding**

a. What is the name of the scientist that is creating birds into more dinosaur like creatures?

b. What two things did Jurassic Park Director Stephen Spielberg not know about T-Rex in 1993?

c. What is the “Dino-Chicken Project”

d. What genetic engineering techniques does he compare his technique to but just quicker?

e. What gene has a Wisconsin lab already identified that birds currently do not display?