

Name _____

BIOTECHNOLOGY WEB LESSON

Site: Genetic Science Learning Center (<http://gslc.genetics.utah.edu/>)

Cloning in Focus

1. Read "What is Cloning" Answer True (T) or False (F) to the following statements
 - a) _____ Clones are exact genetic copies of the original
 - b) _____ All clones must be created in a laboratory.
 - c) _____ To create artificial twins, two embryos are fused together.
 - d) _____ To make Dolly, scientists transferred the nucleus of a somatic cell to an egg cell.
 - e) _____ The nucleus is like the brain of the cell.
 - f) _____ An egg is a type of somatic cell.
 - g) _____ A surrogate mother was needed to create Dolly.

2. Go to "Click and Clone" and place the following steps in the correct order

- _____ Stimulate cell division
- _____ Deliver baby
- _____ Remove and discard the nucleus from the egg cell
- _____ Isolate donor cells from egg donor and germ cell donor
- _____ Transfer the somatic cell nucleus into the egg cell
- _____ Implant embryo into a surrogate mother

What color will the cloned mouse be? _____ What is the name of this mouse? _____

3. Go to "Why Clone". List the four main uses of cloning. Now, rank them in order of which you think is the most beneficial to humans. 1 is most beneficial, 4 is the least beneficial.

Cloning Use	Rank (1-4)

4. Go to "Cloning Myths" at this site (you are still at the Cloning in Focus section at the Genetic Science learning center. Read about CC and Rainbow. Explain in your own words why the cloned cat did not look like the original.

8. Go to "Is It Cloning or Not". For each of the following, indicate YES (it is cloning) or NO (it is not) by circling.
 - a) [Y or N] Sperm taken from a male goat is combined with a female's egg in a petri dish. The resulting embryo is implanted into the female's uterus to develop
 - b) [Y or N] A sheep embryo, composed of 16 cells, is removed from the mother's uterus and separated into individual cells. Each cell is allowed to multiply, creating 16 separate embryos, which are then implanted in different female sheep to develop to maturity.
 - c) [Y or N] A cow with many desirable traits is stimulated with hormones to produce a number of egg cells. Each of these eggs is fertilized and implanted into a surrogate mother.
 - d) [Y or N] In vitro fertilization
 - e) [Y or N] Cell nuclei from an extinct woolly mammoth are placed into enucleated cow cells.

Biotechniques Laboratory → DNA Extraction

1. List three reasons for extracting DNA from a human subject.

2. Describe in detail where DNA is found in the cell: _____

3. In our virtual test subject, where did we get cells from? _____

4. List the 4 steps needed to extract DNA

- 1) _____
- 2) _____
- 3) _____
- 4) _____

5. The lysis solution contains detergent, the detergent will do what to the cell? _____

6. What does the salt do to the cellular mixture? _____

7. The centrifuge causes the debris to do what? _____

8. Isopropyl alcohol causes DNA to do what? _____

Biotechniques Laboratory → Gel Electrophoresis

1. a) Electrophoresis is used to sort DNA by _____

b) What is placed into the holes at the end of the gel? _____

c) By adding electric current, we can make the DNA _____

d) Shorter strands of DNA move [farther / slower] than longer strands.

2. Place the steps in the correct order.

_____ Load DNA sample into the gel.

_____ Stain the gel and analyze results

_____ Make the gel

_____ Hook up the electrical current

_____ Set up gel apparatus

3. In the "Gel Electrophoresis Laboratory" follow the steps to make your own gel, answer the questions as you go.

a) What is agarose made from? _____

b) Melted agarose is poured into a _____

c) Buffer _____ electric current in the electrophoresis box.

d) In real life, loading samples into the gel wells takes _____

e) The black end generates a _____ charge, the red end a _____ charge.

f) The bubbles in the electrophoresis box are _____ that your current is running.

g) Staining the DNA will make it show up under a _____ light.

h) What are your estimates for the number of base pairs in the three bands? _____