

Biotechnology WebQuest

WEBSITE #1: <http://www.pbs.org/wgbh/nova/sheppard/analyze.html>

1. DNA is unique for everyone with one exception. What would be an example of that exception? identical twins
2. What are DNA Fingerprints used for?
 - A) Determining biological parents
 - B) Solving crimes

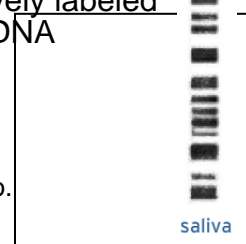
CLICK ON VIEW AND GO THROUGH THE INTERACTIVE

Part I: "It Takes A Lickin'!"

3. What "crime" was committed? NOVA lollipop licked
4. What bodily fluid was removed from the "crime scene" to get the DNA? saliva
5. How many suspects are there in this crime? seven sisters

Part II: "DNA Fingerprinting at the NOVA Lab!"

6. What does a Restriction Enzyme do? Cut DNA in specific locations
7. What is Agarose Gel? Acts as a molecular strainer---Jello consistency
8. What is Electrophoresis? The process of moving molecules using electrical current
9. Smaller fragments of DNA move easier that longer strands.
10. Why do you need to place a nylon membrane over the gel? Because the agarose gel is hard to work with
11. Probes attach themselves to Probes attach to segments of DNA that are radioactively labeled
12. Which chemical in your "Virtual Lab" is radioactive? Only with certain sequences of DNA
13. Sketch your DNA Fingerprint in the box to the right.
14. Based on criminal's DNA Fingerprint... **WHO COMMITTED THE CRIME???** Honey



WEBSITE #2: <http://www.amnh.org/ology/>

Click on the GENETICS tab to the left, then scroll down and Click on the Quest for the Perfect Tomato. Then click Food for Thought.

15. Give **two** examples of genetically modified foods.

Corn-better crops; Banana-vaccinations

WEBSITE #3: <http://www.pbs.org/wgbh/harvest/coming/coming.html>

Click on each of the foods on the table to see what research is being done to bioengineer the foods. List 3 foods and describe how they are being modified.

- 16) Rice-increase nutritional value
- 17) Bananas-vaccinations
- 18) Coffee-altered caffeine content

WEBSITE #4: <http://gslc.genetics.utah.edu/units/cloning/> Open the link and view each of the sections under "Cloning in Focus." For each section, answer the questions.

What is Cloning?

19. Who is Dolly? First cloned sheep
20. When a zygote divides into separate cells, it is called: embryo
21. Somatic cells are also called body cells.
22. In order to clone a gene, a gene is inserted into a plasmid.
23. In order to create an embryo from a somatic cell, the donor egg cell must have its nucleus removed.

Click and Clone.

24. List all the materials needed to clone a mouse.
Mimi, Megdo, Momi, microscope, petri dishes, sharp pipette, blunt pipette, chemical to stimulate cell division
25. Place the following steps in the box to the right in correct order.
26. There are two time gaps in the process of cloning. What are they? For example, what do you have to wait for?
27. What color will the cloned mouse be? brown
What is the name of this mouse? Mini-Mimi

- | | |
|----------|--|
| <u>4</u> | Stimulate cell division |
| <u>6</u> | Deliver baby |
| <u>2</u> | Remove & discard nucleus from egg cell |
| <u>1</u> | Isolate donor cells from egg donor & germ cell donor |
| <u>3</u> | Transfer somatic cell nucleus into egg cell |
| <u>5</u> | Implant embryo into surrogate mother |

Why Clone?

28. Why is cloning extinct animals problematic?

What if cloned creatures were smarter and fiercer

29. What are some reasons a person might want to clone a human?

Infertility problems, genetic control of offspring, organ farming

30. Briefly describe in your own words, why CC the cat was not identical in color to Rainbow, even though she was a clone.

Environmental conditions can affect coat color

Cloning Myths

31. What is "nature vs. nurture"?

Nature = genetics, nurture = environmental factors

Is it Cloning or Not?

32. For each of the following scenarios, indicate YES (it is cloning) or NOT (it is not cloning).

- no 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.
- yes 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 sheet to develop to maturity.
- no 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.
- no In vitro fertilization
- yes Cell nuclei from an extinct woolly mammoth are placed into enucleated cow cells.

Website #5: <http://learn.genetics.utah.edu/content/cloning/cloningrisks/>

What are the risks of cloning?

33. What is one reason why cloning animals has such a high failure rate?

Most embryos fail to develop or pregnancies miscarry

34. What is a telomere and how does it affect cloned animals?

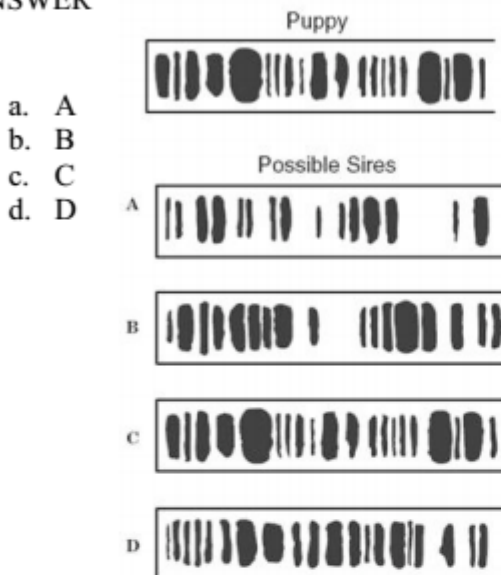
DNA sequences at the ends of chromosomes---they shrink in length every time DNA is replicated and is a natural part of aging

Google Search: What are some ethical issues in cloning?

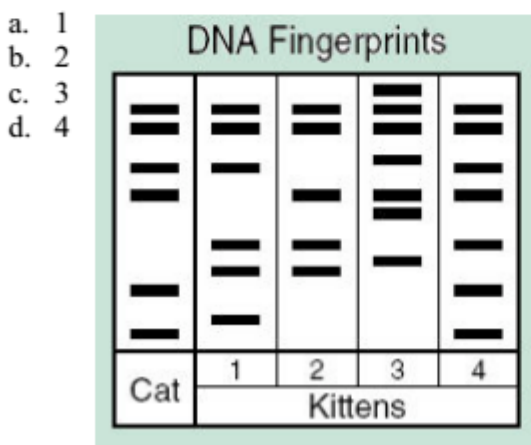
35. Write a paragraph below on your thoughts and opinions about the ethical issues of cloning.

DNA FINGERPRINTING PRACTICE

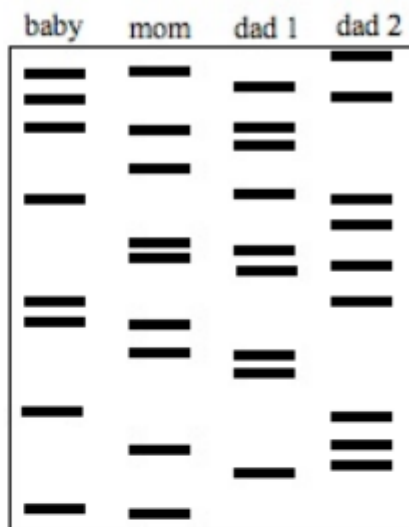
1. The DNA fingerprints were made from blood samples taken from a puppy and four possible sires of this puppy in an effort to determine the puppy's pedigree. According to this information, which sire was probably the father of this puppy? **CIRCLE YOUR ANSWER**



2. The picture shows a segment of DNA from a cat. Which of these is most likely the kitten of this cat? **CIRCLE YOUR ANSWER.**



3. Mrs. Smith has a baby named Tyra. She believes one of two men can be the father of her child. A paternity test is done and the results are shown above. Which of the 2 men are baby Tyra's father? _____



4. Lt. Russ is investigating a murder scene. The felon was scratched by his victim & some of his skin cells were found under the victim's fingernails. A DNA test was performed. Which of the suspects is the murderer? _____

