Oklahoma Key Business Systems

Lesson 4

Bioscience: *Extracting DNA*

Bioscience is any science that deals with living organisms. Bioscience explains the structure, behavior, organization and life processes of living organisms in relation to the natural environment. DNA, deoxyribonucleic acid, is a molecule that contains the genetic instructions for any living organism. Genes are composed of DNA and are considered the functional unit of heredity.

Essential question: How can scientists, doctors, farmers, etc. use genetic information?

Explore >> Materials: fruit (strawberry or banana work well), dish detergent, salt, water, 2 plastic cups, coffee filter, cold rubbing alcohol (90% works best), wooden stick, meat tenderizer (pineapple juice or contact lens solution could also be used)

Procedure:

1. Place fruit into a re-sealable container and completely mash the fruit.
2. In a plastic cup add ½ cup of water, 2 tsp. of detergent, and 1 tsp. of salt.
3. Add the mixture from the plastic cup to the re-sealable container holding the mashed up fruit.
4. Let the mixture sit for 5-10 minutes. You will want to gently massage the mixture occasionally during this time.
5. Place the filter inside an empty cup and pour your mixture through the filter into the cup. Add a pinch of meat tenderizer to the mixture.
6. Stir gently
7. Pour cold alcohol into the container using the side of the glass (you do not want splashing) until you have a layer of alcohol equal in volume to the fruit/enzyme mixture.
8. You will see white stringy stuff rise to the alcohol layer from the fruit/enzyme mixture – this is the DNA!
9. Collect some DNA by using a wooden stick to pick it up out of the alcohol.

Explain: What roles do the detergent and meat tenderizer serve in this activity? How is DNA protected in the cell?

Expand: What are some benefits of being able to extract DNA?

Application: A genetically modified organism is called a GMO. Organisms may be genetically modified to increase resilience to disease or benefit the organism in other ways. The use and production of GMO's is controversial. Can you think of at least 2 pros and 2 cons associated with genetic modification?

Evaluate: Show your parents the extracted DNA and explain what is contained in that DNA and why it is important.

Revisit and answer the essential question.

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