

Extracting DNA

Summary

Students will learn to extract DNA from different cells and see what it looks like. Students will understand that genetic information coded in DNA is passed from parents to offspring by sexual and asexual reproduction.

Time Frame

1 class periods of 60 minutes each

Group Size

Small Groups

Materials

- [student worksheet](#)

(attached)

food sources:

raw or dried green peas-do NOT use cooked or frozen

raw onions

raw chicken or cow liver)

coffee filters

strainer

shell vials

wooden splints

toothpicks

liquid detergent

meat tenderizer

alcohol

100 ml beakers

juicer or blender

salt

water

goggles

Background for Teachers

Students will understand that genetic information coded in DNA is passed from parents to offspring by sexual and asexual reproduction. The basic structure of DNA is the same in all living things. Changes in DNA may alter genetic expression.

Safety Issues: When the students work with the raw meat they should be careful to wash their hands and their work-stations, so as to not spread harmful bacteria.

Student Prior Knowledge

Students should understand polarity, macromolecule structure and function, cell organelles and enzyme function.

Instructional Procedures

Obtain supplies (all should be easily located at the local grocery store). Remember all food must be raw or dried so as to not damage the DNA.

Using a juicer or blender add about 500 ml of split peas (about 2 ½ cups).

Add about 2x the amount of cold water. (1000 ml)

Add a ½ teaspoon of salt and blend well. You are blending to separate the pea cells from each other. The mixture should have a runny consistency but not be clear.

Repeat procedure for onions and liver. You will need slightly less water for the liver.

Pass out lab to students.

Allow students time to read over the lab. Let them make their predictions.

Let the lab groups choose which type of DNA they would like to extract. You may allow students to try more than one as time permits.

It is probably best for you to try this lab beforehand so you know what you are doing and how to help the students. It also is nice to have a couple correctly extracted vials on hand for students whose lab does not work properly. The longer the mixture sits the easier the DNA will be to see.

The DNA should be long and stringy and have somewhat of a gelatinous texture.

If students are having trouble check the following things: Look very closely at the alcohol layer for tiny bubbles. The clumps of DNA may attach to the bubbles. If none of your students are getting DNA you may have added too much water, you might want to make another batch.

Finally make sure each step is given sufficient time.

Assessment Plan

Scoring Guide:

Predictions.....	2 points
Data.....	4 points
Analysis Questions.....	2 points each
Conclusions.....	4 points
<i>Total:</i>	30 points

Correct Data Drawing:

Answers to Analysis Questions:

1. *DNA is long and stringy. It feels kind of gooey or sticky.*
2. *No all DNA looked the same. DNA is the same in all living things.*
3. *The detergent broke down the cell membranes. First the outer membrane and then the nuclear membrane. This is important because DNA stays inside the nucleus and we have to get it out to look at it.*
4. *The meat tenderizer will soften the meat because it is mostly muscle which is mainly made up of proteins. The enzymes will break up those proteins.*
5. *The meat tenderizer breaks up proteins. Proteins hold DNA wound up. We need it unwound.*
6. *All parts of the cell.*
7. *Polar. Nonpolar*
8. *DNA is not alive. It can stick around for thousands of years. The smallest unit that can be alive is a cell, and DNA is a macromolecule which makes up that cell.*
9. *Cell*
10. *All cells contain DNA originally. (Some cells like RBC end up without a nucleus.)*

Answers to Conclusions:

Answers will vary but should be thoughtful and complete.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)