

POWERHOUSE SCIENCE CENTER

3615 Auburn Blvd., Sacramento 95821 (916) 674-5000

Topics

Life Sciences

Grades

6-8

Duration

60 minutes

Vocabulary

biochemistry, DNA (deoxyribonucleic acid), organism, cell, nucleus, gene, organelle, chromosome, double helix, pipette, test-tube

Next Generation Science Standards

Practices

Developing & Using Models

Planning & Carrying Out Investigations

Core Ideas

LS1.A: Structure and Function.

All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).

DNA: Up Close And Personal

Overview

Have you every wondered about where all the information to make you came from?

In this introduction to biochemistry, students begin by discussing the basics of cell biology. They focus on the organelle that has the instructions, the blue print to make them. They are introduced to terms like chromosome, gene, DNA and double helix. Students learn about the basic structure of a DNA.

Students are guided through the lab procedure to extract their cheek cells and follow a series of steps involving the addition of chemicals at different temperatures to extract their DNA. They store their DNA in a micro test tube and have a one of a kind souvenir to remember their lab experience.

Objectives

- Students identify the organelle responsible for carrying the blueprint of life.
- Students visualize the structure of a DNA molecule with the help of a model.
- Students follow steps in the DNA extraction procedure.
- Students learn how to measure chemicals using a pipette.
- Students observe their precipitated DNA in solution.

Teacher Preparation

- Please arrive at Powerhouse with enough time to allow students and chaperones to use the restroom before the program begins.
- If program starts late, content will be altered to fit available time.
- The teacher is required to remain in the lab throughout the presentation.

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Next Generation

Science Standards

Core Ideas:

ETS – Links Among
Engineering, Technology,
Science and Society

Crosscutting Concepts

Cause and Effect

Scale, Proportion, and
Quantity

Structure and Function

Performance Expectations

MS-LS1-1- From Molecules
to Organisms: Structures and
Function

Vocabulary:

Biochemistry: the study of
the chemical reactions
that take place inside
organisms

DNA: deoxyribonucleic
acid is a biological
molecule that carries
hereditary information in
many organisms

Organism: an individual
animal, plant, or single
celled life form

DNA: Up Close And Personal

Teacher Preparation Continued:

- Students will be working with chemicals. They should wear appropriate clothing.
- Students will work in pairs. Be sure to assign pairs who will work well together.
- Students will be writing in a lab journal. If this presents a challenge to any of your students, please be sure to inform Powerhouse in advance.

Extended Learning Activity

1. Make a DNA model

Origami:

<https://www.yourgenome.org/activities/origami-dna>

Edible DNA:

<https://www.genomebc.ca/wp-content/uploads/2017/10/6.3.3.11-Edible-DNA.pdf>

2. Write a report on the discovery of DNA and the exclusion of Rosalind Franklin from the credits.

TED ED: Rosalind Franklin: DNA's unsung hero

<https://www.youtube.com/watch?v=BIP0IYrdirl>

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Vocabulary Continued:

Organelle: specialized structures within a cell that performs a specific function

Nucleus: large membrane bound organelle that contains genetic material

Gene: a unit of hereditary that is transferred from parent to offspring

Chromosome: threadlike structures containing DNA

Double helix: three-dimensional structure of double-stranded DNA

Pipette: a laboratory tool used to transport a measured volume of liquid

Test-tube: a glass or plastic tube closed at one end, used to hold small amounts of material for use in a laboratory

Quotes:

“ DNA is like a computer program but far, far more advanced than any software ever created.”

- Bill Gates

DNA: Up Close And Personal

Resources

-Gene Ed Genetics, Education and Discovery

https://geneed.nlm.nih.gov/topic_subtopic.php?tid=1

-University of Utah, Genetic Science Learning Center

<https://teach.genetics.utah.edu/>