

Laboratory Activities

Activity	Summary	Objectives	Time
In Your Kitchen	An activity to facilitate learning about cells and the structures inside of them. Students extract and visualize DNA from different types of fruit.	<ul style="list-style-type: none"> Formulate a hypothesis Perform a DNA extraction Use positive and negative controls during an experiment Interpret the results of the experiment 	45 - 60 minutes
Mystery of the Crooked Cell	Students use gel electrophoresis to distinguish between normal and sickle cell hemoglobin protein.	<ul style="list-style-type: none"> Use gel electrophoresis to distinguish normal hemoglobin from sickle cell hemoglobin Interpret the results of gel electrophoresis Demonstrate the concept and process of gel electrophoresis 	45 - 60 minutes
Caffeine Critters	Students observe daphnia and the effects alcohol and caffeine have on the organism and its heart rate.	<ul style="list-style-type: none"> Understand some of the effects of alcohol and caffeine on heart rate Learn how to operate a microscope Understand the heart better through their observations Formulate a hypothesis and carry it through an experiment 	45 - 60 minutes
ELISA	Students model the spread of disease in a population by the sharing of simulated body fluids. After spread of the disease students assay their shared samples using ELISA (enzyme-linked immunosorbent assay).	<ul style="list-style-type: none"> Model the spread of disease in a population Model the process of using ELISA to test for an antigen Use positive and negative controls, as well as performing in triplicate, during an assay 	60 - 90 minutes
Airborne	Students model the spread of disease in a population by the sharing of simulated body fluids. NOTE: This activity is a shorter alternative to ELISA.	<ul style="list-style-type: none"> Model the spread of disease in a population Use positive and negative controls during an assay 	30 - 45 minutes
A Love Letter	Students use paper chromatography to determine which pen was used to write a letter from a secret admirer.	<ul style="list-style-type: none"> Perform paper chromatography to distinguish how compounds can be separated using chromatography Interpret the results of paper chromatography Demonstrate the concept and process of paper chromatography 	30 - 45 minutes
Case of the Bloody Statuette	Students put their skills to work for a private investigation firm investigating a local mystery using DNA profiling. NOTE: This activity requires an overnight incubation.	<ul style="list-style-type: none"> Model restriction enzyme analysis of DNA Separate DNA fragments of various length using gel electrophoresis Interpret the results of gel electrophoresis Demonstrate the concept and process of gel electrophoresis 	45 - 90 minutes
The Crucial Concentration	Students use the Lowry Assay to determine which of three sports drinks has the highest concentration of protein.	<ul style="list-style-type: none"> Apply the general concept of quantification to a Lowry Assay Collect data using a spectrophotometer Use data to produce a standard curve Use a graph to find the concentration of an unknown 	45 - 60 minutes

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Peas in a Pod	Students determine the mode of inheritance of a genetic condition by analyzing DNA samples (can use either hemophilia or sickle cell disease).	<ul style="list-style-type: none">• Understand classical Mendelian inheritance• Separate DNA fragments of various lengths using gel electrophoresis• Model the process of genetic screening (testing)	45 - 60 minutes
Acid Rain	Students test the pH of common household products and examine the effects of acid rain on the environment. NOTE: This activity requires an overnight incubation.	<ul style="list-style-type: none">• Demonstrate how to measure the pH of a solution• Develop an understanding of acids, bases, and the pH scale• Develop an understanding of the effects of pollution• Explain why a small change in the pH of a lake is a serious problem	45 - 60 minutes
Cleaning Up Oil Spills	Students examine the effects of oil on birds and develop ways to clean up water contaminated with oil using detergent and oil-eating microbes. NOTE: This activity requires an overnight incubation.	<ul style="list-style-type: none">• Develop an understanding of the effects of oil on the ecosystem• Explore different ways to clean up oil spills• Model oil spill clean up using detergents and oil-eating microbes	45 - 60 minutes
Cow's Eye Dissection	Students will dissect and examine a preserved cow eye.	<ul style="list-style-type: none">• Understand the structure and function of the parts of the eye• Explain similarities of a human and cow eye• Perform dissection on a cow eye	35 - 60 minutes