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Perna Bhanushali, PhD

Manager-Customer Success, JoVE

perna.bhanushali@jove.com

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in 2006 at Princeton
University

As a young researcher,
Moshe was unable to
complete a crucial
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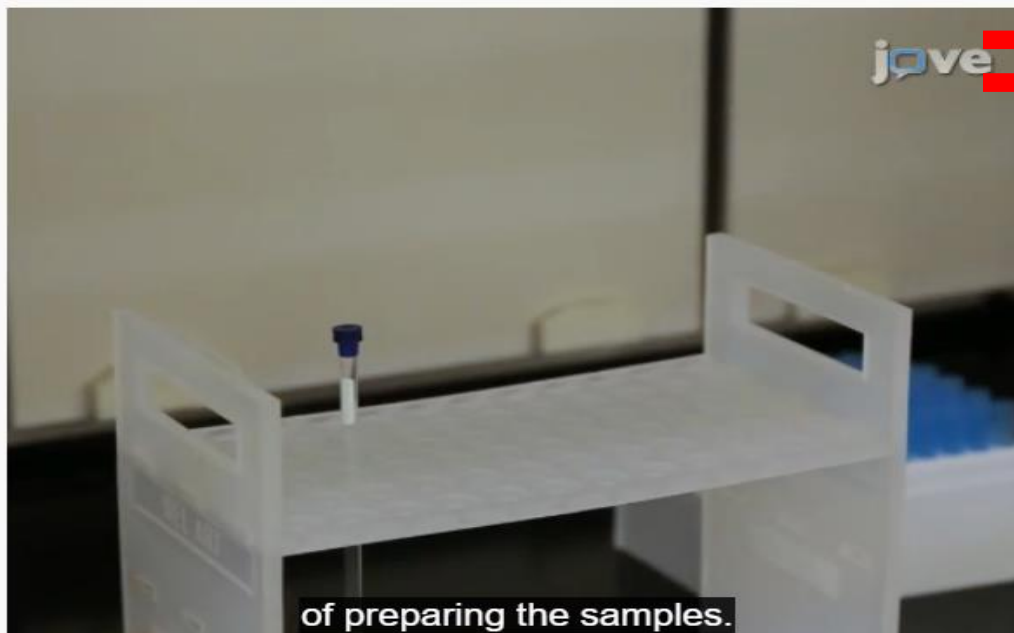
A Time-Efficient Fluorescence Spectroscopy-Based Assay for Evaluating Actin Polymerization Status in Rodent and Human Brain Tissues

[👤 Authors](#) | [📄 Journal \(Neuroscience\)](#) | [📁 Methods Collections](#)



Analysis of Cerebral Vasospasm in a Murine Model of Subarachnoid Hemorrhage with High Frequency Transcranial Duplex Ultrasound

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Lineage Tracing and Clonal Analysis in Developing Cerebral Cortex Using Mosaic...



Basophil Activation Test for Allergy Diagnosis

NMR Spectroscopy as a Robust Tool for the Rapid Evaluation of the Lipid Profile of Fish Oil Supplements

DOI: [10.3791/55547](https://doi.org/10.3791/55547)Kathryn Williamson¹, Emmanuel Hatzakis^{1,2}¹Department of Food Science and Technology, The Ohio State University, ²Foods for Health Discovery Theme, The Ohio State University

Chapters

- 0:05 Title
- 0:38 [NMR Sample and Instrument Preparation](#)
- 3:33 Acquisition of the NMR Data
- 4:46 Processing and Analysis of the NMR Data
- 7:14 Results: Lipid Profile of Fish Oil Supplements
- 7:58 Conclusion

Summary

Automatic Translation

May 1st, 2017

Here, high-resolution ^1H and ^{13}C Nuclear Magnetic Resonance (NMR) spectroscopy was used as a rapid and reliable tool for

[Abstract](#) [Introduction](#) [Protocol](#) [Results](#) [Discussion](#) [Materials](#) [References](#)

Automatic Translation ▾

Chemistry

NMR Spectroscopy as a Robust Tool for the Rapid Evaluation of the Lipid Profile of Fish Oil Supplements

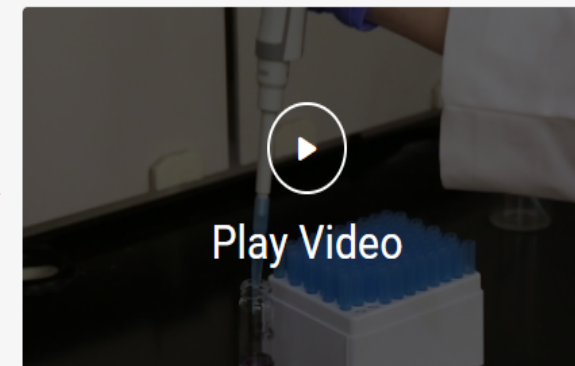
doi: [10.3791/55547](https://doi.org/10.3791/55547) Published: May 1, 2017Kathryn Williamson¹, Emmanuel Hatzakis^{1,2}¹Department of Food Science and Technology, **The Ohio State University**, ²Foods for Health Discovery Theme, **The Ohio State University**

Summary

Here, high-resolution ¹H and ¹³C Nuclear Magnetic Resonance (NMR) spectroscopy was used as a rapid and reliable tool for quantitative and qualitative analysis of encapsulated fish oil supplements.

Abstract

The western diet is poor in *n*-3 fatty acids, therefore the consumption of fish oil supplements is recommended to increase the intake of these essential nutrients. The objective of this work is to demonstrate the qualitative and quantitative analysis of encapsulated fish oil supplements using high-resolution ¹H and ¹³C NMR spectroscopy utilizing two different NMR instruments; a 500 MHz and an 850 MHz



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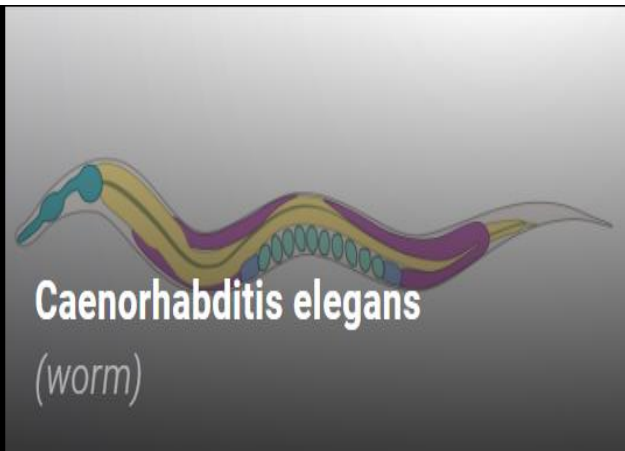
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Encyclopedia of Experiments

Drosophila melanogaster (fruit fly)

This collection features research methods using the model organism *Drosophila melanogaster* at each stage of its life cycle to explore a wide range of physiological and behavioral questions.

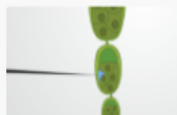
Embryo

Larva

Pupa

Adult

Embryo



Microinjection of *Drosophila* Nurse Cells

A Method of Intracellular Delivery



Drosophila Egg Collection and Dechoriation

A Method to Remove the Outermost Egg Layer



Preparation of Fixed *Drosophila* Oocytes for Immunostaining

A High-Throughput Method to Fix and Remove the Outer Membrane



Chorion and Vitelline Membrane Mechanical Removal

A Method to Prepare *Drosophila* Oocytes for Direct Observation



Microinjection of Live *Drosophila* Embryos

Early Delivery of Reagents to the Developing Embryo

Larva



Drosophila Burrowing and Tunneling Assay

A Method to Assess Tissue Hypoxia in Fly Larvae



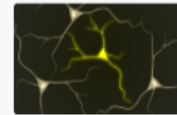
Drosophila Larva Imaginal Disc Dissection

A Method to Observe Developing Epithelia



Drosophila Neuromuscular Junction (NMJ) Quantification

A Method to Assess Synaptic Morphology and Function



Two-Photon Laser-Induced Neural Injury

A Method to Observe Axon Degeneration and Regeneration in *Drosophila* Larvae



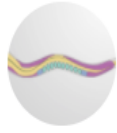
Larval Fillet Preparation

A Method to Visualize Intact Sensory Neurons and Associated Epidermal Cells



Cuticle Disruption

A Method to Collect Hemolymph from *Drosophila* Larvae



Encyclopedia of Experiments

Caenorhabditis elegans (worm)

This collection features research techniques for the metazoan *Caenorhabditis elegans*. This nematode worm is a powerful model system due to its transparent body, defined developmental plan, robust genetic tools, and neuro-behavioral paradigms.

Basic Methods

Microscopy

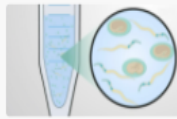
Behavior

Anatomy and Physiology

Cell Biology

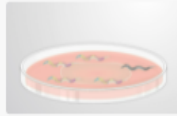
Genetics

Basic Methods



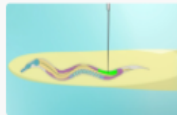
Nematode Synchronization

A Method to Obtain Populations of Worms in Identical Stages of Development



Lifespan Analysis

Measuring *C. elegans* Longevity



Gonad Microinjection

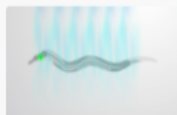
A Method of Compound Delivery Directly into the Germline of *C. elegans*

Microscopy



Freeze-Cracking of Nematodes

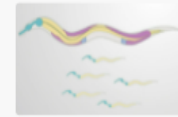
A Method to Expose Interior Worm Tissues for Staining



Calcium Imaging

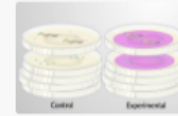
A Method to Visualize Neural Activity in Live *C. elegans*

Behavior



Single Worm PCR

A Method to Extract and Amplify Genomic DNA



Egg Laying Assay

A Method to Quantify the Egg-Laying Behavior of *C. elegans*



Nematode Slide Preparation

A Method to Mount Animals on an Agar Pad



Encyclopedia of Experiments

Danio rerio (zebrafish)

This collection features research methods using the model organism *Danio rerio* in its embryo, larva, and adult stages to explore physiological and behavioral questions and create disease models for screening various chemicals.

Embryo

Larva

Adult

Embryo



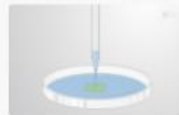
Embryo-Based Chemical Toxicity Screen

Assessing Effects on Developing Zebrafish Embryos



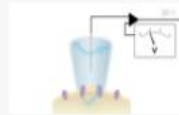
Light Sheet Microscopy Sample Preparation

Mounting Live Zebrafish Embryos for Long-Term Imaging



Agar Mounting

A Basic Method of Mounting Live Zebrafish Embryos for Long-Term Imaging



Whole-Cell Patch Clamp Electrophysiology

A Method to Study Electrical Properties of Neurons

Larva



Photomotor Response Assay

A Method to Measure the Behavioral Response of Larval Zebrafish to a Sudden Change in Lighting Condition



Escape Response Assay



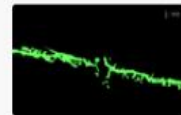
Mating and Egg Staging

A Method to Generate Embryos and Sort Them by Developmental Stage



Layered Agar Mounting

Preparing Live Zebrafish Embryos for Long-Term Imaging with an Inverted Microscope



Two-Photon Laser Axotomy

A Method to Injure Axons in Zebrafish Embryos and Observe Axonal Recovery



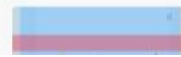
Embryo Microinjection

A Technique to Deliver a Compound into the Zebrafish Yolk



Prey Capture Assay

A Method to Study the Prey Capture Behavior of Zebrafish Larva



Zebrafish Avoidance and Thigmotaxis Assay

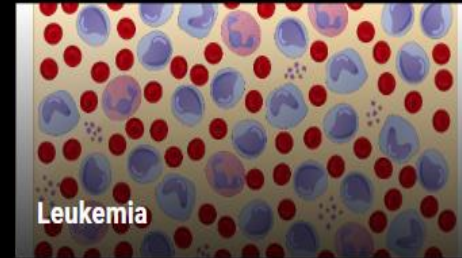
Cancer Research



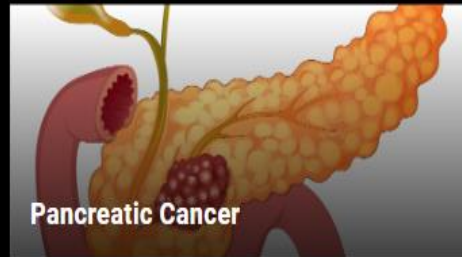
Breast Cancer



Lung Cancer



Leukemia



Pancreatic Cancer



Colorectal Cancer



Skin Cancer



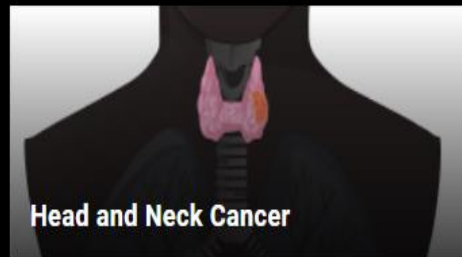
Gynecologic Cancer



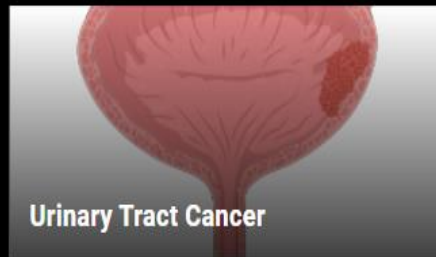
Prostate Cancer



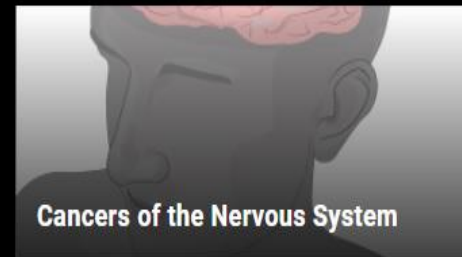
Gastrointestinal Cancer



Head and Neck Cancer



Urinary Tract Cancer



Cancers of the Nervous System



Encyclopedia of Experiments

Breast Cancer

This collection features biomedical research methods employed in research laboratories to advance breast cancer prevention, detection, and treatment.

Procedures and techniques

In vitro studies

Procedures and techniques



Orthotopic Injection into the Mammary Fat Pad

Establishing Breast Cancer in Mice



Orthotopic Injection

Implanting Tissue Specific Cancer Cells into an Adult Mouse



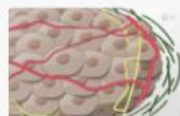
Intraductal Injection

Delivering Injection Mix into the Ducts of the Mouse Mammary Gland



Portal Vein Injection

A Method to Study Cancer Metastasis to the Liver



Spatial Measurement of Tumor Interstitial Fluid Pressure

A Method to Measure the Interstitial Fluid Pressure



Mechanical Dissociation

A Method to Obtain Viable Cells from a Tissue



Lymphedema Ultrasonography

A Technique to Measure the Change in Thickness of an Affected Tissue



Radical Mastectomy

Surgical Removal of the Entire Mammary Gland from a Mouse to Study Cancer Progression



zPDX-Analysis of Invasiveness

Investigating Invasive Behavior of Metastatic Cancer Cells in Zebrafish Embryo Xenografts



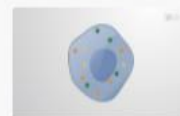
India Ink Inflation

A Staining Method to Visualize Tumor Nodules



Rabbit Intraductal Injection

Localized Delivery of Solution of Interest into the Rabbit Mammary Gland



Sample Preparation for Metabolomics

A Method to Prepare Cell Samples for Metabolite Profiling

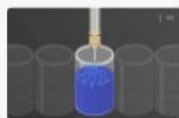




Encyclopedia of Experiments

Lung Cancer

This collection highlights some of the latest protocols in lung cancer research. The collection covers techniques relating to the generation of lung cancer animal models, cancer cell characterization, treatment and detection strategies, in vitro culture studies, assays and isolation techniques that facilitate lung cancer research.

[In vitro study](#)[In vivo study](#)[Ex vivo study](#)**In vitro study**

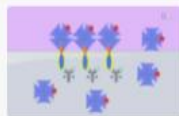
In Vitro Phototoxicity Assay

A PDT-based Method to Evaluate the Phototoxic Potential of a Photosensitizer in Lung Cancer Cells



Cell Cycle Analysis

An Approach to Study Cell Cycle Regulation of miRNA-transfected Lung Cancer Cells



Antibody Microarray

A Technique to Study the Protein Expression of miRNA Treated Lung Cancer Cells



3-Dimensional Culture of Lung Carcinoma Cells

A Method To Study Cell-Matrix Interactions



RNA Extraction Assay

A Method to Extract RNA from miRNA Transfected Lung Cancer Cells



miRNA Extraction

A Method to Extract miRNA from Plasma Sample



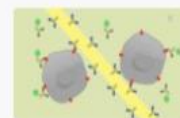
Exosome Isolation

A Technique to Separate Exosomes from the Plasma of Non-small Cell Lung Cancer Patients



3D Co-culture of Lung Cancer Cells with CAFs

An In Vitro Model System to Study Tumor Progression



Immunofluorescence Assay

A Method to Identify Tumor Cells Captured on a Medical Wire



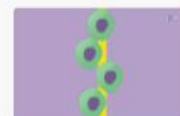
Dose Escalation

A Method for Developing Drug Resistance in Cancer Cells



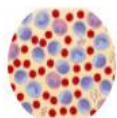
Colony Formation Assay

Assessing the Efficacy of Anticancer Agents on Colony-Forming Lung Cancer Cells



3D DNA FISH

A Technique to Locate a Specific Gene on a Chromosome



Encyclopedia of Experiments

Leukemia

Leukemia reflects cancer primarily resulting from an elevated number of white blood cells in the body. This collection features a set of in vitro assay techniques to analyze leukemic cell growth and metabolism, cell isolation and culture methods, approaches to characterize and study cellular morphology, and genetic manipulation procedures.

Cell isolation & characterization

In vitro techniques & assays

Cell isolation & characterization



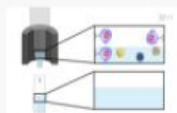
May-Grunwald Giemsa Staining

A Method to Stain Bone Marrow Cells



T-Cell Enrichment

A Technique to Isolate T-Cells from Mixed Cell Population by Magnetic Separation



Magnetic-Activated Cell Sorting

A Method to Isolate c-Kit Positive Cells



BrdU Immunofluorescence Staining

A Technique to Identify Cells in Different Phases of Cell Cycle



Density Gradient Centrifugation

A Method to Isolate CLL Cells from Peripheral Blood



Negative Immunomagnetic Selection

A Method to Purify B-cells from Peripheral Blood Mononuclear Cells



Leukemic Subpopulation Harvest

A Method for Spatial Separation of Leukemic Cell Subpopulations from 2D Co-culture



G-10 Column Based Leukemia Cell Sorting

A Method to Purify Acute Lymphoblastic Leukemia Cells from Bone Marrow Stromal Cells



Retro-Orbital Blood Sampling

A Method for Isolating Mononuclear Cells from the Retro-Orbital Sinus of a Mouse



Bone Marrow Aspiration

A Method to Obtain Bone Marrow to Examine Cell Morphology



Bone Marrow Harvest from Mouse Hind Limb



Bone Marrow-Derived Dendritic Cells Generation

A Method to Generate Dendritic Cells from Mouse Bone Marrow



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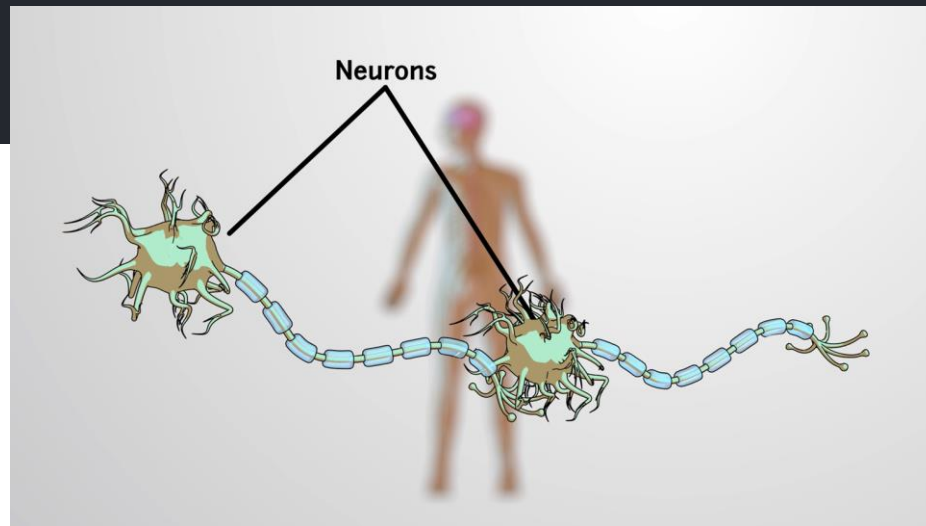
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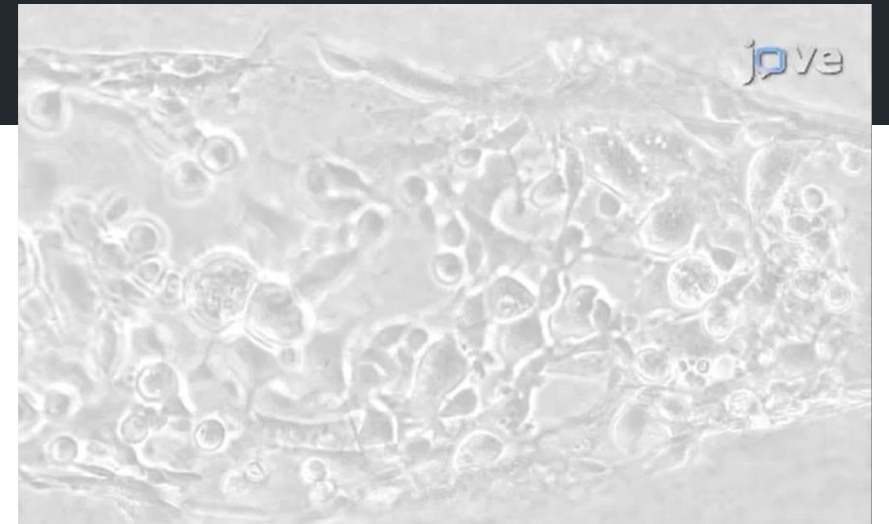
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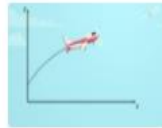
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Chapter 1
Units, Dimensions, and
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Chapter 4
Motion in Two or Three Dimensions



Chapter 7
Work and Kinetic Energy



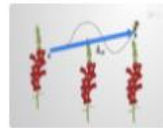
Chapter 10
Rotation and Rigid Bodies



Chapter 13
Fluid Mechanics



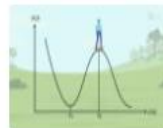
Chapter 16
Waves



Chapter 2
Vectors and Scalars



Chapter 5
Newton's Laws of Motion



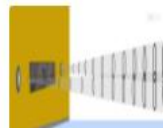
Chapter 8
Potential Energy and Energy
Conservation



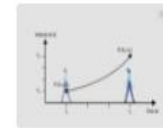
Chapter 11
Dynamics of Rotational Motions



Chapter 14
Gravitation



Chapter 17
Sound



Chapter 3
Motion Along a Straight Line



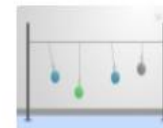
Chapter 6
Application of Newton's Laws of
Motion



Chapter 9
Linear Momentum, Impulse and
Collisions



Chapter 12
Equilibrium and Elasticity

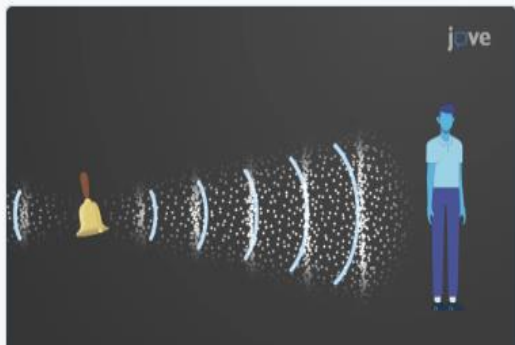


Chapter 15
Oscillations

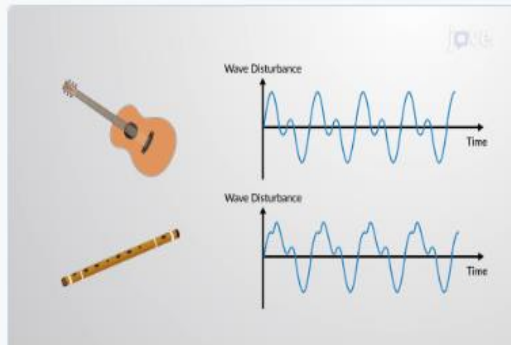
CHAPTER 17

Sound

KEY TERMS AND CONCEPTS

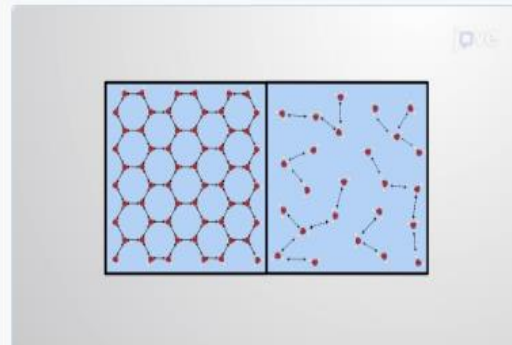
**Sound Waves**

Sound waves can be thought of as fluctuations in the pressure of a medium through which they propagate. Since the pressure also makes the...

**Perception of Sound Waves**

The human ear is not equally sensitive to all frequencies in the audible range. It may perceive sound waves with the same pressure but different...

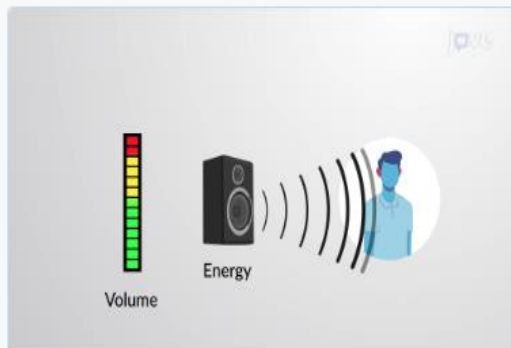
SCIENTISTS IN ACTION

**Speed of Sound in Solids and Liquids**

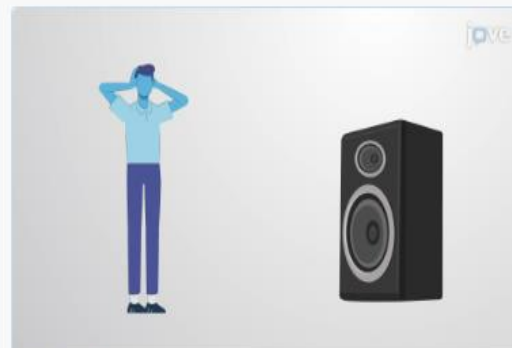
Most solids and liquids are incompressible—their densities remain constant throughout. In the presence of an external force, the molecules tend...

**Speed of Sound in Gases**

The speed of sound in a gaseous medium depends on various factors. Since gases constitute molecules that are free to move, they are highly...

**Sound Intensity**

The loudness of a sound source is related to how energetically the source is vibrating, consequently making the molecules of the propagation medium...

**Sound Intensity Level**

Humans perceive sound by hearing. The human ear helps sound waves reach the brain, which then interprets the waves and creates the perception of...

Enzyme Activity

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PROCEDURE

Baseline Peroxidase Enzyme Experiment

Investigating the Effect of pH on Peroxidase Activity

Investigating the Effect of Temperature on Peroxidase Activity

Results

PROCEDURE ▲

☰ PRINT PROCEDURE STEPS

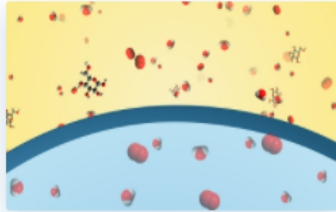
1. Baseline Peroxidase Enzyme Experiment

1. To begin, the baseline for the peroxidase enzyme reaction must be determined. Make the substrate by adding 7 mL of distilled water to a clean test tube and then add 0.2 mL of guaiacol. Note: Guaiacol is a color-changing indicator that becomes more yellow-orange as the enzyme reaction progresses.
2. Next, add 0.3 mL of 0.1% H₂O₂.
3. Using a marker, label the test tube substrate and then cover the tube with a piece of sealing film.
4. Holding the cover in place, invert the tube four times to mix the tube contents.

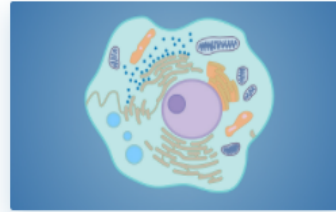
Fundamentals



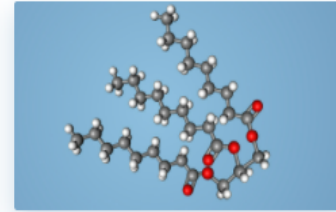
Scientific Method



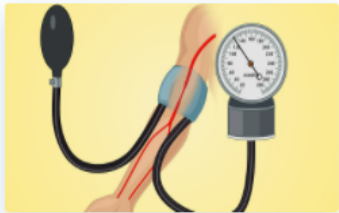
Diffusion and Osmosis



Cell Structure

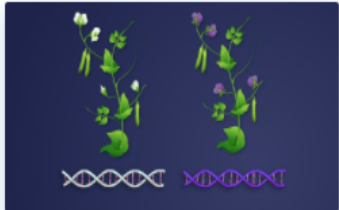


Macromolecules



Physiology of the Circulatory System

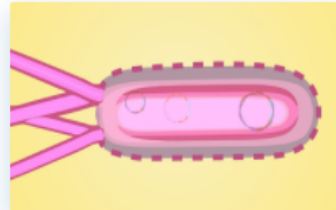
Genetics



Genetics of Organisms

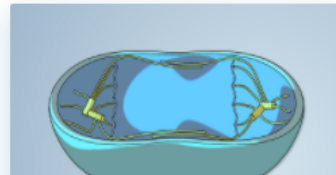
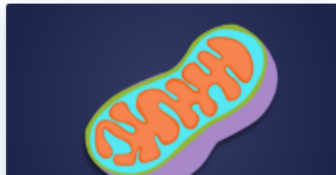


DNA Isolation and Restriction Enzyme Analysis



Bacterial Transformation

Cellular Processes

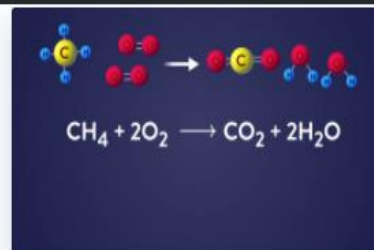




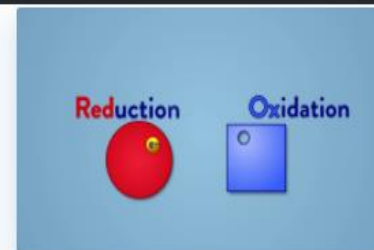
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Scientific Measurement and Lab Skills



Stoichiometry, Product Yield, and Limiting Reactants



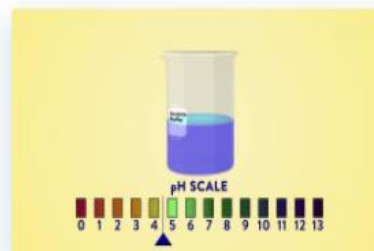
Redox Reactions



Ideal Gas Law



Acid and Base Concentrations



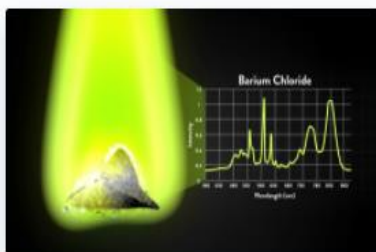
Buffers



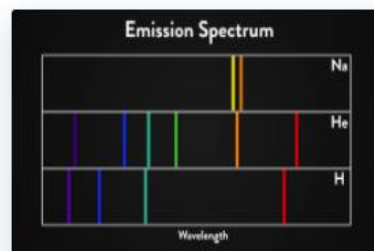
Enthalpy of Reaction



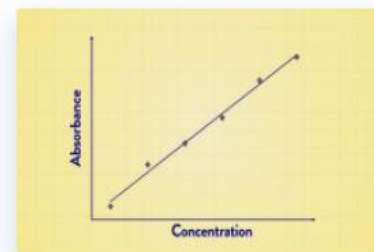
Solubility



Metal Flame Emission



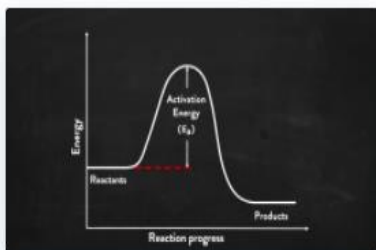
Balmer Series



Beer's Law



Concentration Dependence



Temperature Dependence



Galvanic Cells



Electrolytic Cells

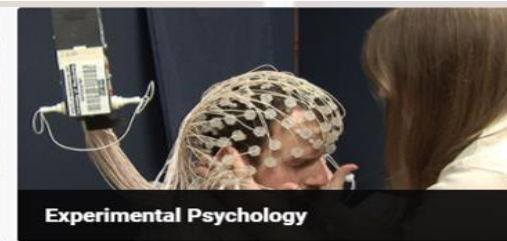
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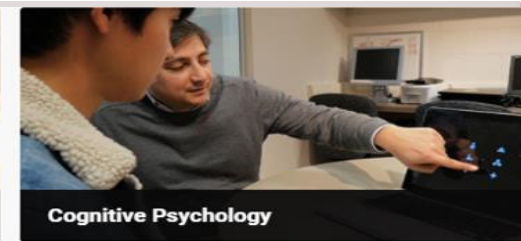
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This collection presents the fundamentals of behavior neuroscience and focuses on the concepts of learning, memory, cognition, movement, addiction and behavioral disorders.



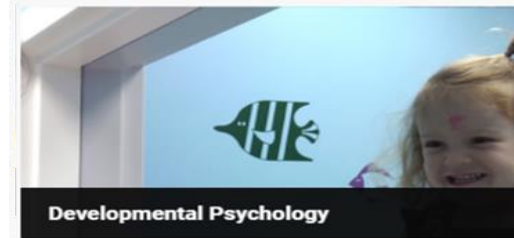
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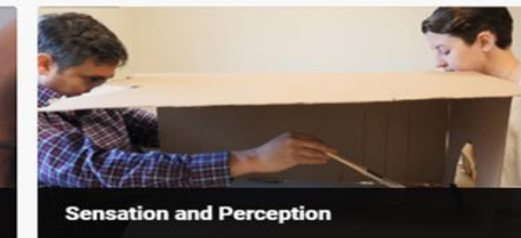
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Neuropsychology

This collection presents multidisciplinary techniques in behavior, neurophysiology, anatomy, and functional imaging to help diagnose brain damage and mental disorders.



Sensation and Perception

This collection delves into a variety of procedures to study how the brain processes our complex sensory world and solves problems confronting conscious awareness and visual, tactile, and auditory perception.

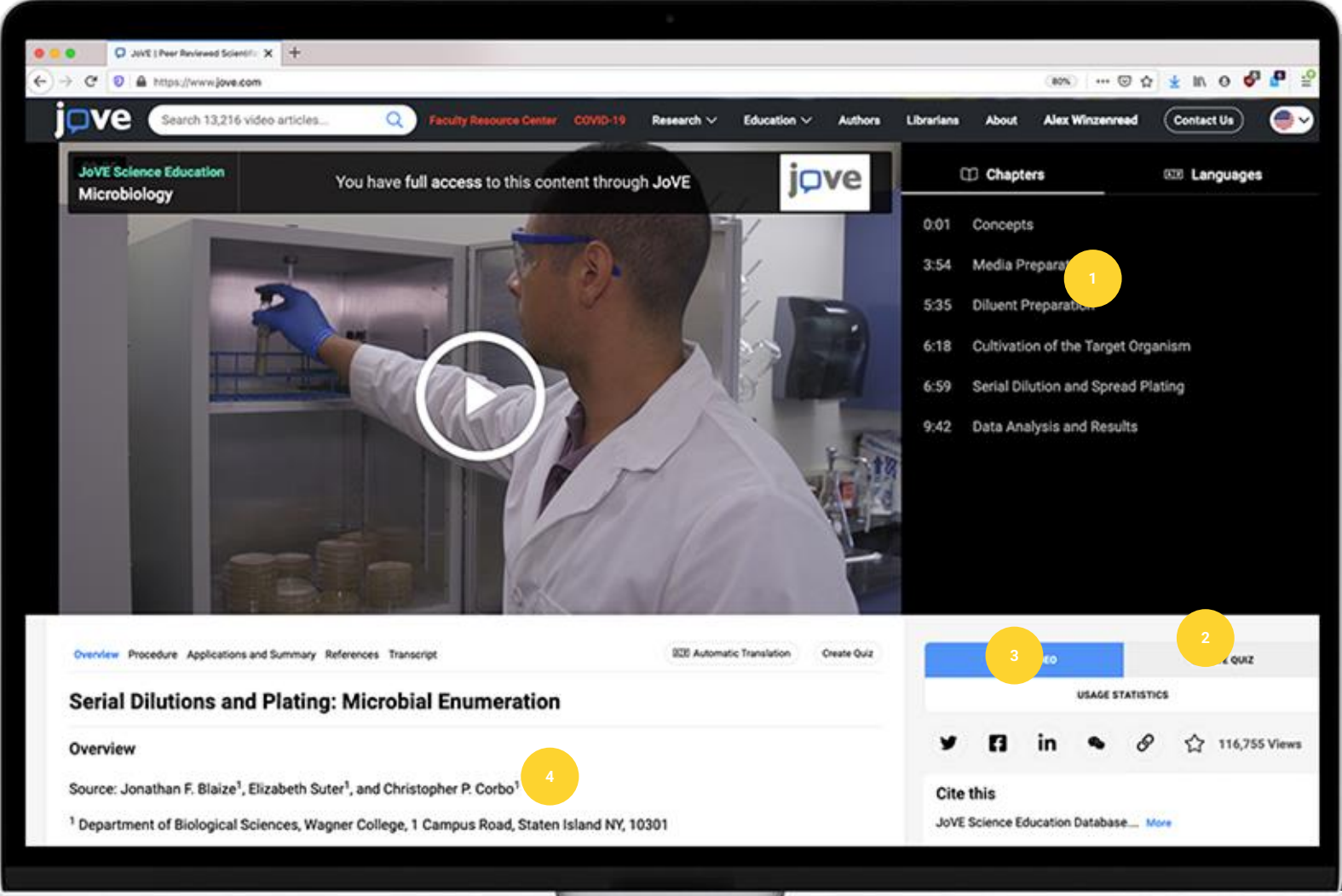


Social Psychology

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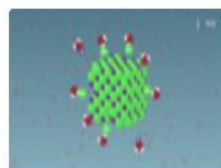
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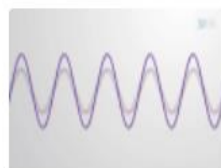
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Chemical Quantities and Aqueous Reactions



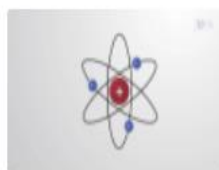
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Electronic Structure of Atoms



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Chemical Bonding: Molecular Geometry and Bonding Theories



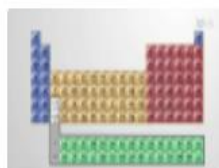
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Atoms and Elements



Chapter 5

Gases



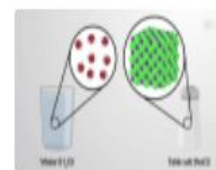
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Chapter 11

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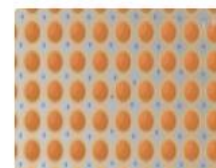
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Molecules, Compounds, and Chemical Equations



Chapter 6

Thermochemistry



Chapter 9

Chemical Bonding - Basic Concepts



Chapter 12

Solutions and Colloids

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Chapter 3

Molecules, Compounds, and Chemical Equations

3.1 MOLECULES AND COMPOUNDS

3.2 CHEMICAL FORMULAS

3.3 MOLECULAR MODELS

3.4 CLASSIFICATION OF ELEMENTS AND COMPOUNDS

3.5 IONIC COMPOUNDS: FORMULAS AND NOMENCLATURE

3.6 MOLECULAR COMPOUNDS: FORMULAS AND NOMENCLATURE

3.7 ORGANIC COMPOUNDS

3.8 FORMULA MASS AND MOLE CONCEPTS OF COMPOUNDS

3.1 Molecules and Compounds



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More than 100 different elements are known to humanity, of which about 94 elements occur naturally on the earth, and the remainder have been created in laboratories. Different elements combine to form different substances. Just as combinations of only ten digits (0 to 9) allow for the formation of infinite numbers, each with its own specific identity, combinations of the elements allow for an almost

3.8 FORMULA MASS AND MOLE CONCEPTS OF COMPOUNDS

3.9 EXPERIMENTAL DETERMINATION OF CHEMICAL FORMULA

3.10 CHEMICAL EQUATIONS

SCIENTISTS IN ACTION

KEY TERMS

KEY RELATIONSHIPS & EQUATIONS

CHAPTER EXERCISES

APPENDICES

More than 100 different elements are known to humanity, of which about 94 elements occur naturally on the earth, and the remainder have been created in laboratories. Different elements combine to form different substances. Just as combinations of only ten digits (0 to 9) allow for the formation of infinite numbers, each with its own specific identity, combinations of the elements allow for an almost unlimited number of compounds, each with its own specific properties. The ability of elements to form compounds creates a great diversity of substances in nature. But how do these elements combine? What rules govern how elements combine? How do atoms of one element differ from those of another? This chapter provides the tools to answer these questions by examining the basic structure of atoms and discussing the formation of molecules and ions.

Beyond the basic structure, it is also essential to ascertain how much of an element is contained within a given compound. For example, proper maintenance of swimming pools requires regular additions of various chemical compounds in carefully measured amounts to prevent the growth of harmful bacteria and algae. Since the relative amount of calcium ion, Ca^{2+} , in the water should be maintained within certain limits to prevent eye irritation and avoid damaging the pool bed and plumbing, calcium cations are added to the water to maintain proper calcium levels. Therefore, it is necessary to know both the relative amount of Ca^{2+} in the compound and the volume of water in the pool to achieve the required calcium level. Quantitative aspects of the elemental composition of substances (such as the calcium-containing compound) and mixtures (such as the pool water) are also the subject of this chapter.

Atoms and Molecules

Everything in the universe is made up of matter. Above a subatomic scale, that matter is composed of a combination of elements. An atom is the smallest unit of an element that retains all properties of the element. For example, a silver coin is made up of silver atoms, and each silver atom retains the unique properties of the element silver.

Elements are pure substances consisting of identical atoms that cannot be broken down into simpler substances by chemical changes. Atomic elements contain single atoms as their basic unit. Carbon is composed of carbon atoms, and sodium is composed of sodium atoms. Most elements are atomic elements. There are, however, a few elements that exist as a combination of two or more of the same type of atoms, and are never found in nature as single atoms. These are called molecular elements. Molecular elements exist as molecules with two or more atoms bonded together. For example, most of the pure hydrogen, oxygen, and nitrogen in the air occur in molecules containing two atoms each, called diatomic molecules, which are written as H_2 , O_2 , and N_2 , respectively. As we shall later discuss, the subscript tells us the number of atoms present in each molecule. Other elements commonly found as diatomic molecules are fluorine (F_2), chlorine (Cl_2), bromine (Br_2), and iodine (I_2). Molecular elements can also be polyatomic, like sulfur (S_8) and phosphorus (P_4). The

Chemistry

Chapter 3

Molecules, Compounds, and Chemical Equations

3.1 MOLECULES AND COMPOUNDS

3.2 CHEMICAL FORMULAS

3.3 MOLECULAR MODELS

3.4 CLASSIFICATION OF ELEMENTS AND COMPOUNDS

3.5 IONIC COMPOUNDS: FORMULAS AND NOMENCLATURE

3.6 MOLECULAR COMPOUNDS: FORMULAS AND NOMENCLATURE

3.7 ORGANIC COMPOUNDS

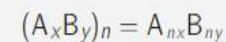
3.8 FORMULA MASS AND MOLE CONCEPTS OF COMPOUNDS

3.9 EXPERIMENTAL DETERMINATION OF

Key Relationships & Equations

$$\% X = \frac{\text{mass X}}{\text{mass X-containing compound}} \times 100\%$$

$$\frac{\text{molecular or molar mass (amu or g mol}^{-1}\text{)}}{\text{empirical formula mass (amu or g mol}^{-1}\text{)}} = \frac{n \text{ formula units}}{\text{molecule}}$$



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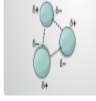
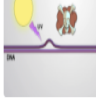

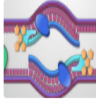
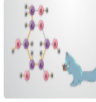
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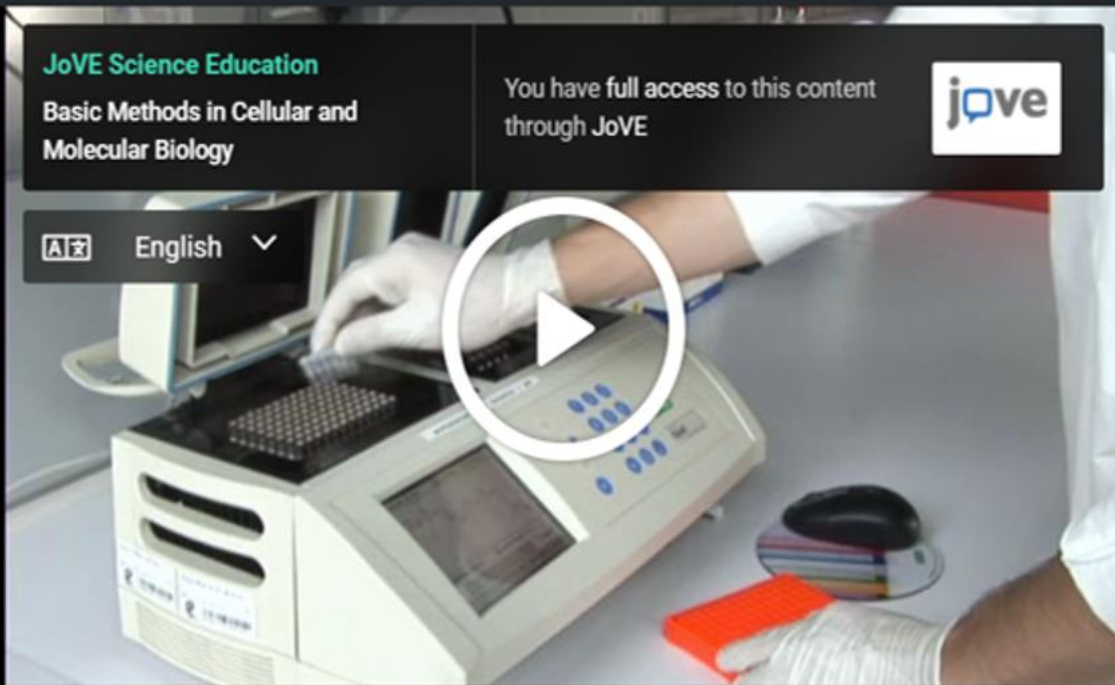
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- 4:46 Reaction Components
- 7:10 Setting up the Reaction
- 9:54 Helpful Hints
- 11:23 Applications
- 12:56 Summary

Overview Procedure

Automatic Translation

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PCR: The Polymerase Chain Reaction

Overview

The polymerase chain reaction, or PCR, is a technique used to amplify DNA through thermocycling – cycles of temperature changes at fixed time intervals. Using a thermostable DNA polymerase, PCR can create numerous copies of DNA from DNA building blocks called dNTPs. There are three steps in PCR: denaturation, annealing, and extension. Denaturation is the first step in the cycle and involves the DNA template being heated to separate the

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Through auscultation, the clinician is able "to eavesdrop on the workings of the body" to gain important diagnostic information.¹ Historically, the term "auscultation" was synonymous with "immediate auscultation," in which...

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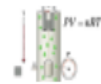
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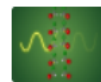
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Synthesis of Luminol- Concept



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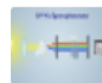
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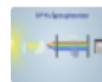
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Education: Lab: Chemistry

UV-Vis Spectroscopy of Dyes- Concept



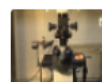
Education: Lab: Chemistry

UV-Vis Spectroscopy of Dyes - Student Protocol



Education: Analytical Chemistry

Ultraviolet-Visible (UV-Vis) Spectroscopy



Education: General Laboratory Techniques

Introduction to Fluorescence Microscopy



Education: Analytical Chemistry

X-ray Fluorescence (XRF)

Applications - fluorophores, photobleaching, quenching



Education: Immunology

Immunofluorescence Microscopy: Immunofluorescence Staining of Paraffin-Embedded Tissue Sections



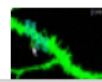
Education: Immunology

Confocal Fluorescence Microscopy: A Technique to Determine the Localization of Proteins in Mouse Fibroblasts



Education: Cell Biology

FM Dyes in Vesicle Recycling



Research: Neuroscience

Lateral Diffusion and Exocytosis of Membrane Proteins in Cultured Neurons Assessed using Fluorescence Recovery and Fluorescence-

[Playlists](#) · Chemistry

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Synthesis of cobalt-bis(dimethylglyoxime)Cl₂ complex



Research: Chemistry

Preparation of SNS Cobalt(II) Pincer Model Complexes of Liver Alcohol Dehydrogenase



Research: Chemistry

Developing Photosensitizer-Cobaloxime Hybrids for Solar-Driven H₂ Production in Aqueous Aerobic Conditions



Research: Chemistry

Facile Preparation of (2Z,4E)-Dienamides by the Olefination of Electron-deficient Alkenes with Allyl Acetate



Research: Chemistry

Synthesis of High Purity Nonsymmetric Dialkylphosphinic Acid Extractants

Determination of Aluminium (III) and Iron (III) after separation by chloride extraction



Research: Chemistry

Facile Preparation of Ultrafine Aluminum Hydroxide Particles with or without Mesoporous MCM-41 in Ambient Environments



Research: Bioengineering

Fabrication of a Dipole-assisted Solid Phase Extraction Microchip for Trace Metal Analysis in Water Samples



Research: Chemistry

Investigations on the Ga(III) Complex of EOB-DTPA and Its ⁶⁸Ga Radiolabeled Analogue

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Research Skills

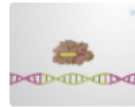
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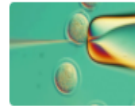


CRISPR-cas



Education: Core: Molecular Biology

CRISPR and crRNAs



Education: Genetics

Genome Editing



Research: Genetics

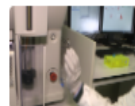
CRISPR/Cas9 Ribonucleoprotein-mediated Precise Gene Editing by Tube Electroporation

Flow Cytometry



Education: Immunology

Flow Cytometry and Fluorescence-Activated Cell Sorting (FACS): Isolation of Splenic B Lymphocytes



Education: Immunology

Cell Cycle Analysis: Assessing CD4 and CD8 T Cell Proliferation After Stimulation Using CFSE Staining and Flow Cytometry



Education: Immunology

Adoptive Cell Transfer: Introducing Donor Mouse Splenocytes to a Host Mouse and Assessing Success via FACS

mRNA Translation

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Advanced Lab Techniques

· Advanced Lab Techniques

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Instrumentation



Education: General Laboratory Techniques

An Introduction to Working in the Hood



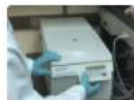
Education: General Laboratory Techniques

An Introduction to the Micropipettor



Education: General Laboratory Techniques

Introduction to Serological Pipettes and Pipettors



Education: General Laboratory Techniques

An Introduction to the Centrifuge



Education: General Laboratory Techniques

Introduction to Light Microscopy



Education: General Laboratory Techniques

Introduction to the Bunsen Burner



Education: General Laboratory Techniques

Regulating Temperature in the Lab: Preserving Samples Using Cold



Education: General Laboratory Techniques

Regulating Temperature in the Lab: Applying Heat

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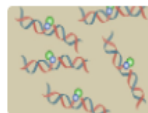
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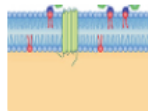
Education: Cell Biology

An Introduction to Cell Death



Education: Cell Biology

The TUNEL Assay



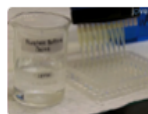
Education: Cell Biology

Annexin V and Propidium Iodide Labeling



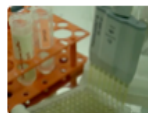
Education: Immunology

Assay for Cell Death: Chromium Release Assay of Cytotoxic Ability



Research: Biology

Viability Assays for Cells in Culture



Research: Biology

Cellular Toxicity of Nanogenomedicine in MCF-7 Cell Line: MTT assay



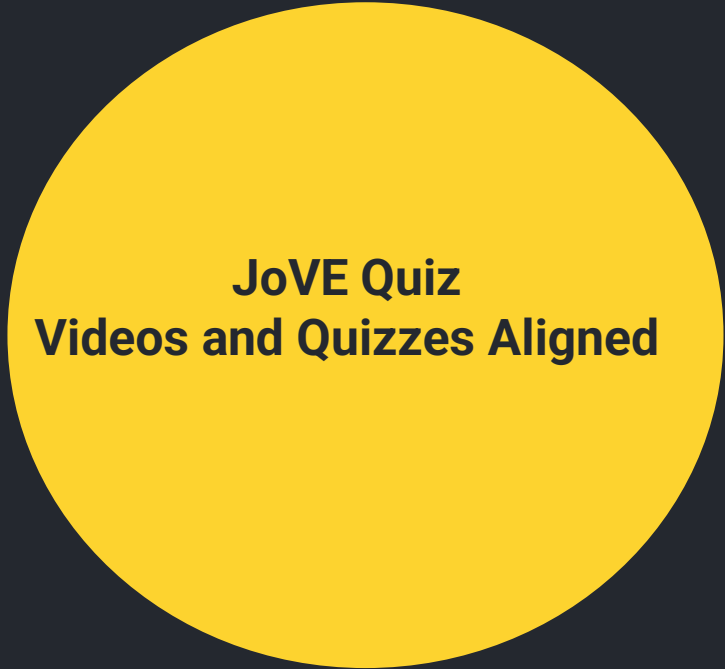
Research: Biochemistry

Mapping Metabolism: Monitoring Lactate Dehydrogenase Activity Directly in Tissue



Research: Chemistry

Anticancer Metal Complexes: Synthesis and Cytotoxicity Evaluation



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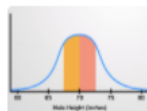
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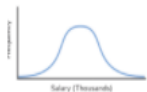
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The calculation and understanding of descriptive statistics of a sample for a continuous or discrete quantitative variable and for a qualitative variable



Education: Core: Psychology

Variation: Normal Distribution, Range, and Standard Deviation

Education: Core: Psychology

Measures of Central Tendency

Education: Core: Psychology

Statistical Significance

The graphic representation of a univariate distribution (histogram)/or a bivariate distribution



Education: Lab Bio

Scientific Method- Concept

Education: Lab: Chemistry

Proper Lab Notebook Keeping- Concept

Education: Lab: Chemistry

Scientific Measurement and Lab Skills- Concept

Not Started

Deadline

10/11/2021 11:59 PM EDT

Activities



Activity 1

The Scientific Method



QUESTION

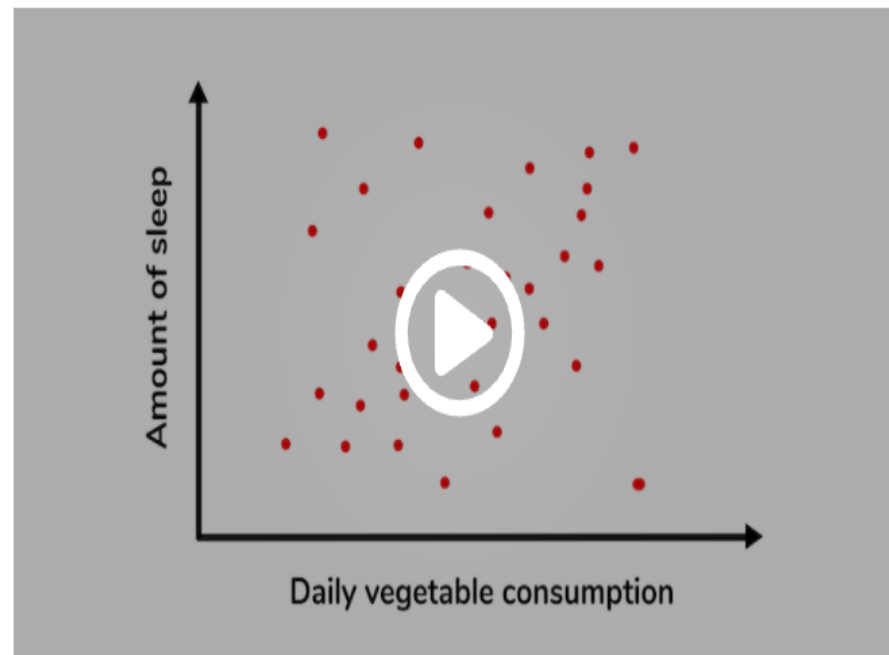
Which of the following terms refer to the item being intentionally manipulated or changed in an experiment?

- Only valid variables
- The independent variable
- Only operative variables
- The dependent variable

QUESTION

The control group is exposed to the same features as the experimental group except for:

Correlations



QUESTION

What does it mean when two variables are correlated?

- Researchers had to manipulate the behaviors to observe the particular outcome.
- A relationship exists between the two variables.
- Negative changes in one variable must cause positive changes in the other variable.
- There is no true relationship between the two variables.

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Biology

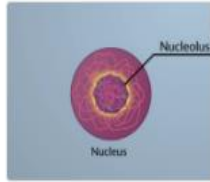
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Introduction to Biology



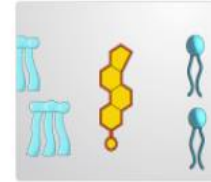
General Biology Lab



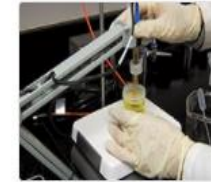
Cell Biology



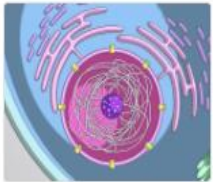
Anatomy and
Physiology



Molecular Biology



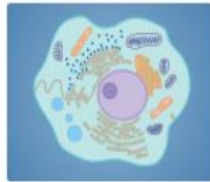
Molecular Biology Lab



Genetics



Microbiology



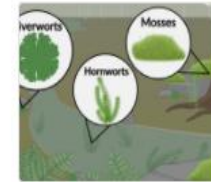
Microbiology Lab



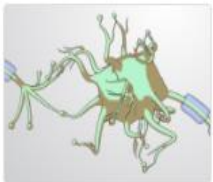
Immunology



Introduction to
Neuroscience



Plant Biology



Neurobiology

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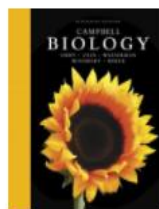
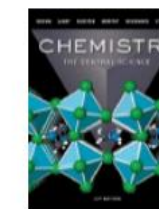
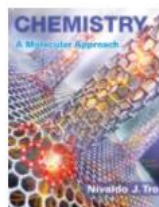
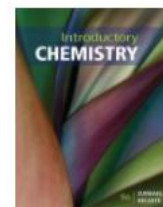
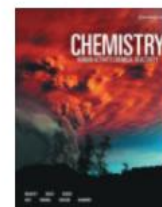
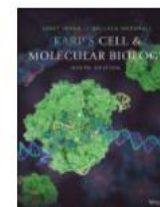
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