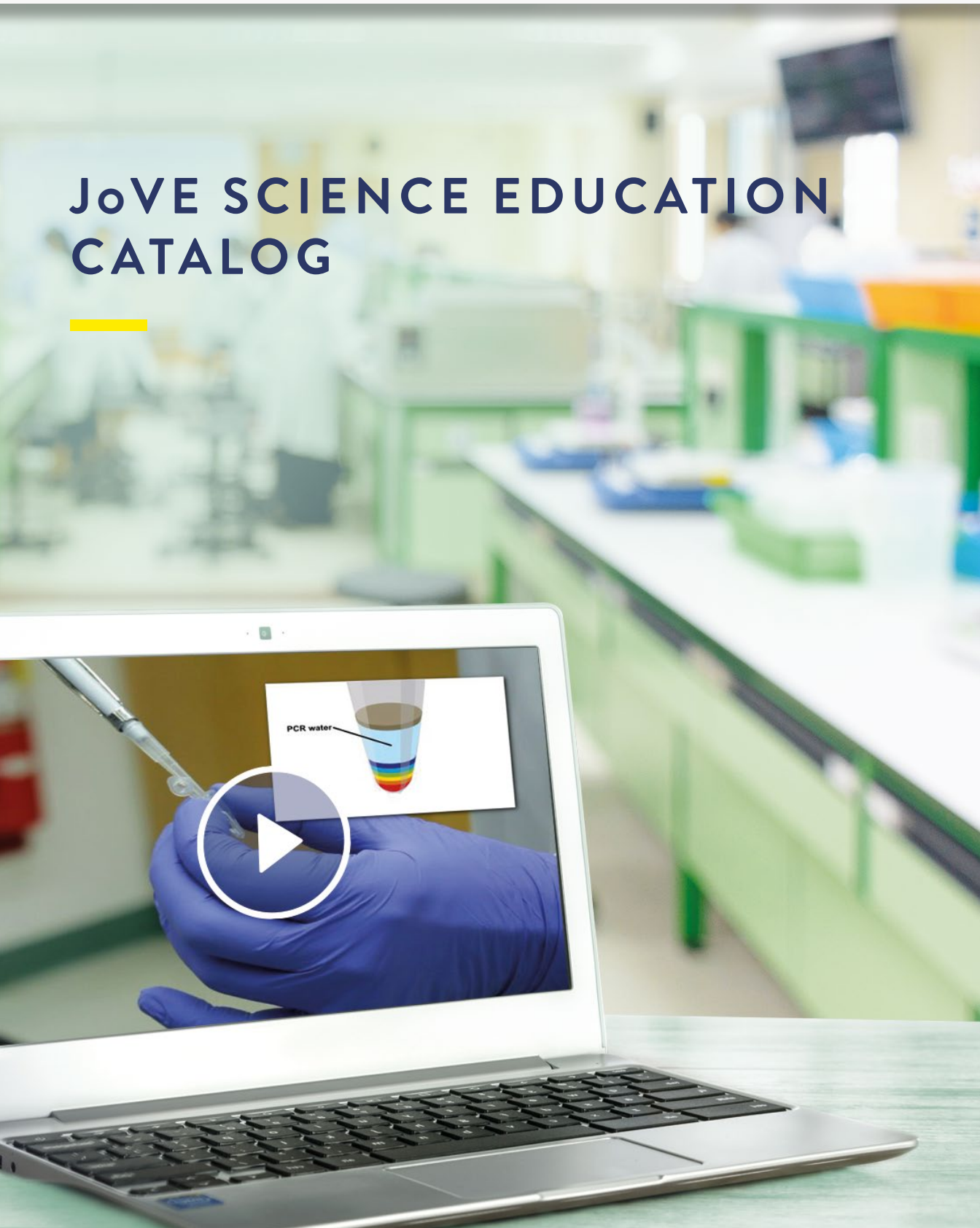
jove

A CATALYST FOR SCIENTIFIC RESEARCH AND EDUCATION

JoVE SCIENCE EDUCATION CATALOG



JoVE SCIENCE EDUCATION

An innovative library of video collections

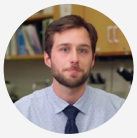
that teach key concepts and fundamental techniques.
These simple, easy-to-understand video demonstrations cover a wide range of subjects in **science, medicine, and engineering.**

- Professionally developed **video demonstrations**
- Clear **animated concepts**
- **Concise lessons** complement classroom & lab instruction
- Detailed accompanying **transcription**
- Produced in collaboration with **top universities**
- New collections **released quarterly**

"Actually seeing the experiment being performed by an experienced researcher will give you the most efficient way of actually performing it."

Dr. Alfredo J. Fernandez
Biological Chemistry and Molecular Pharmacology,
Harvard Medical School

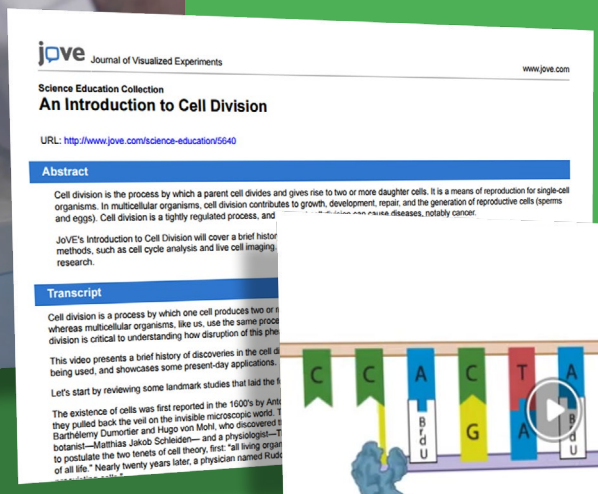
"There is really no learning curve, the videos are easy to use, they teach the materials in depth. They're particularly good for visual learners. It's a nice complement of what we're already doing in the classroom and in the lab."

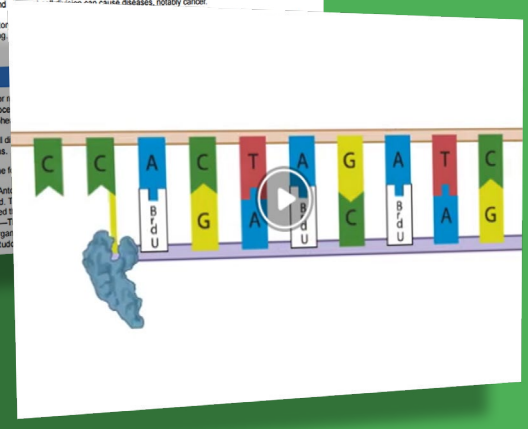


John Siefert
Science Teacher, Conrad Weiser High School

Video demonstrations

Detailed transcriptions


jove Journal of Visualized Experiments
www.jove.com
Science Education Collection
An Introduction to Cell Division
URL: http://www.jove.com/science-education/5640
Abstract
Cell division is the process by which a parent cell divides and gives rise to two or more daughter cells. It is a means of reproduction for single-cell organisms. In multicellular organisms, cell division contributes to growth, development, repair, and the generation of reproductive cells (sperms and eggs). Cell division is a tightly regulated process, and
JoVE's Introduction to Cell Division will cover a brief histor
methods, such as cell cycle analysis and live cell imaging.
research.
Transcript
Cell division is a process by which one cell produces two or
whereas multicellular organisms, like us, use the same proce
division is critical to understanding how disruption of this phe
This video presents a brief history of discoveries in the cell di
being used, and showcases some present-day applications.
Let's start by reviewing some landmark studies that laid the f
The existence of cells was first reported in the 1600's by Ant
botanist—Matthias Jakob Schleiden— and a physiologist—T
to postulate the two tenets of cell theory, first: "all living organ
of all life." Nearly twenty years later, a physician named Rud



Clear animated concepts

SCIENCE EDUCATION BY THE NUMBERS

8 series
38 collections
570 videos

JoVE Science Education Benefits Teaching Faculty and Students:

Teaching Faculty

- Standardizes Teaching of Lab Fundamentals
- Faster, More Consistent Student Learning
- Improves Learning Outcomes in STEM

Students

- Flattens the Learning Curve
- Promotes Greater STEM Interest and Retention
- Supports Visual Learners and Flipped Classrooms

From high school to graduate school, STEM students and their educators can benefit from a Science Education subscription. The Science Education library will include **8 series** by the end of 2017. Each series is **composed of multiple collections of 15 videos.**

- BASIC BIOLOGY *Expanded Content
- ADVANCED BIOLOGY
- CLINICAL SKILLS *Expanded Content
- CHEMISTRY *Expanded Content
- PSYCHOLOGY *Expanded Content
- ENVIRONMENTAL SCIENCES
- PHYSICS *New Series
- ENGINEERING *New Series

BASIC BIOLOGY:

General Laboratory Techniques

This collection exhibits how to use standard pieces of laboratory equipment essential in many experiments.

- Introduction to Working in the Hood
- Measuring Mass in the Laboratory
- Making Solutions in the Laboratory
- Understanding Concentration and Measuring Volumes
- Introduction to the Spectrophotometer
- Introduction to Fluorescence Microscopy
- Introduction to Light Microscopy
- Histological Sample Preparation for Light Microscopy
- Regulating Temperature in the Lab: Preserving Samples Using Cold
- Regulating Temperature in the Lab: Applying Heat
- Introduction to the Centrifuge
- Introduction to the Microplate Reader
- Introduction to the Bunsen Burner
- Introduction to the Micropipettor
- Introduction to Serological Pipettes and Pipettors

Basic Methods in Cellular and Molecular Biology

This collection demonstrates how to execute basic techniques commonly used in cellular and molecular biology.

- Using a Hemacytometer to Count Cells
- Passaging Cells
- PCR: The Polymerase Chain Reaction
- DNA Gel Electrophoresis
- Separating Protein with SDS-PAGE
- Bacterial Transformation: Electroporation
- Bacterial Transformation: The Heat Shock Method
- The ELISA Method
- Plasmid Purification
- Gel Purification
- The Western Blot
- Introduction to Transfection
- DNA Ligation Reactions
- Restriction Enzyme Digests
- Molecular Cloning

Essentials of Biology I: Yeast, Drosophila and C. Elegans

This unique collection features three model organisms commonly used in life sciences research; also covering methodology to maintain them in the laboratory.

S. cerevisiae (Baker's Yeast)
- Introduction
- Maintenance
- Reproduction
- Isolating Nucleic Acids
- Transformation and Cloning

D. melanogaster (Fruit Fly)
- Introduction
- Maintenance and Care
- Development and Reproduction
- Larval Immunohistochemistry
- Embryo and Larva Harvesting and Preparation

C. elegans (Nematode Roundworm)
- Introduction
- Maintenance
- Development and Reproduction
- RNAi in C. *elegans*
- Chemotaxis Assay

Essentials of Biology II: Mouse, Zebrafish and Chick

This collection features three vertebrate species commonly used in life sciences research; also covering methodology on how they are maintained in the laboratory.

M. musculus (Laboratory Mouse)
- Introduction
- Care and Maintenance
- Reproduction and Development
- Mouse Genotyping
- Introducing Experimental Agents Into the Mouse

G. g. domesticus (Chick)
- Introduction
- Care and Maintenance
- Development
- *In ovo* Electroporation
- Chick *ex ovo* Culture

D. rerio (Zebrafish)
- Introduction
- Maintenance and Husbandry
- Reproduction and Development
- Breeding and Embryo Handling
- Microinjection Techniques

Essentials of Lab Animal Research *New

This collection is a comprehensive video guide for appropriate lab animal care and use. Since a majority of biomedical research is focused on studies involving rodents, it is critical that every scientist learns the essential procedures demonstrated in these videos.

- Handling and Restraint Techniques
- Basic Care Procedures
- Fundamentals of Breeding and Weaning
- Rodent Identification I
- Rodent Identification II
- Compound Administration I
- Compound Administration II
- Compound Administration II
- Compound Administration IV
- Blood Withdrawal I
- Blood Withdrawal II
- Anesthesia Induction and Maintenance
- Considerations for Rodent Surgery
- Diagnostic Necropsy
- Sterile Tissue Harvest

Essentials of Lab Safety *New

This collection provides safety guidelines to be followed when working with hazardous materials and equipment. It covers universal topics such as PPE, electrical safety, and general emergency guidelines, as well as some specific safety procedures for chemistry and biology laboratories.

- Personal Protective Equipment
- Eyewash and Shower
- Electrical Safety
- Emergency Guidelines
- SDS & Chemical Storage
- Chemical Spills
- Handling Mineral Acids
- Fume Hoods
- Waste Disposal
- Glove Box
- Schlenk Line
- Vacuum Techniques
- Extreme Temperatures
- Centrifuges
- Autoclave
- High-Pressure Reactor
- Radiation Safety
- Decontamination

ADVANCED BIOLOGY:

Essentials of Neuroscience

This collection provides an introduction to the field of neuroscience, exploring five major branches of study: neurophysiology; neuroanatomy; cell and molecular neuroscience; behavioral neuroscience; and developmental neuroscience.

- Introduction to Neurophysiology
- Patch Clamp Electrophysiology
- Calcium Imaging in Neurons
- Introduction to Neuroanatomy
- Rodent Stereotaxis Surgery
- Histological Staining of Neural Tissue
- Introduction to Neurobiology
- Murine *In Utero* Electroporation
- Explant Cultures of Neural Tissue
- Introduction to Behavioral Neuroscience
- Morris Water Maze
- fMRI: Functional Magnetic Resonance Imaging
- Introduction to Cellular and Molecular Neuroscience
- Primary Neuronal Cultures
- Neural Transfection Methods

Essentials of Developmental Biology

This collection introduces the field of developmental biology and cover five areas: developmental genetics; molecular developmental biology; stem cell biology; organogenesis; and aging and regeneration.

- An Introduction to Developmental Genetics
- Gene Silencing with Morpholinos
- Genetic Engineering of Model Organisms
- An Introduction to Molecular Developmental Biology
- Explant Culture for Developmental Studies
- Whole-mount *In situ* Hybridization
- An Introduction to Stem Cell Biology
- Embryonic Stem Cell Culture and Differentiation
- Induced Pluripotency
- An Introduction to Organogenesis
- Fate Mapping
- Transplantation Studies
- An Introduction to Aging and Regeneration
- Invertebrate Lifespan Quantification
- Tissue Regeneration with Somatic Stem Cell

Essentials of Genetics

This collection focuses on genetics and incorporates five broad subdisciplines: the genetics of individuals and populations, genetics and disease, gene expression, epigenetics, and genetic engineering.

- An Overview of Genetics Analysis
- Genetic Crosses
- Genetic Screens
- An Overview of Genetics and Disease
- SNP Genotyping
- Cytogenetics
- An Overview of Gene Expression
- Expression Profiling with Microarrays
- RNA-Seq
- An Overview of Epigenetics
- DNA Methylation Analysis
- Chromatin Immunoprecipitation
- An Overview of Genetic Engineering
- Recombineering and Gene Targeting
- Genome Editing

Essentials of Cell Biology

This collection provides a glimpse into the field of cell biology and profiles five important cellular phenomena: cell division, motility, endocytosis and exocytosis, metabolism, and cell death.

- An Introduction to Cell Division
- Cell Cycle Analysis
- Live Cell Imaging of Mitosis
- An Introduction to Cell Motility and Migration
- The Transwell Migration Assay
- Invasion Assay Using 3D Matrices
- An Introduction to Endocytosis and Exocytosis
- Cell-surface Biotinylation Assay
- FM Dyes in Vesicle Recycling
- An Introduction to Cell Death
- Annexin V and Propidium Iodide Labeling
- The TUNEL Assay
- An Introduction to Cell Metabolism
- The ATP Bioluminescence Assay
- Detecting Reactive Oxygen Species

CLINICAL SKILLS:

Essentials of Physical Examination I

This collection provides a foundation for performing physical exams; with techniques ranging from measuring blood pressure or vital signs, to key pulmonary and cardiovascular physical examinations.

- General Approach to the Physical Exam
- Observation and Inspection
- Palpation
- Percussion
- Auscultation
- Proper Adjustment of Patient Attire during the Physical Exam
- Blood Pressure Measurement
- Measuring Vital Signs
- Respiratory Exam I
- Respiratory Exam II
- Cardiac Exam I
- Cardiac Exam II
- Cardiac Exam III
- Peripheral Vascular Exam
- Peripheral Vascular Exam Using a Continuous Wave Doppler

Essentials of Physical Examination II

This collection is a specialized edition featuring methodologies and procedures associated with more sensitive and comprehensive physical exams such as HEENT exams, abdominal exams, and pelvic exams.

- Eye Exam
- Ophthalmoscopic Examination
- Ear Exam
- Nose, Sinuses, Oral Cavity and Pharynx Exam
- Thyroid Exam
- Lymph Node Exam
- Abdominal Exam I
- Abdominal Exam II
- Abdominal Exam III
- Abdominal Exam IV
- Male Rectal Exam
- Breast Exam
- Pelvic Exam I
- Pelvic Exam II
- Pelvic Exam III

Essentials of Physical Examination III *New

This collection covers physical examination of two major systems in our body: neurological and musculoskeletal, with videos explaining relevant anatomy, the rationale behind the steps, and the interpretation of the exam findings.

- Cranial Nerve Exam I
- Cranial Nerve Exam II
- Motor Exam I
- Motor Exam II
- Sensory Exam
- Neck Exam
- Shoulder Exam I
- Shoulder Exam II
- Elbow Exam
- Hand and Wrist Exam
- Lower Back Exam
- Hip Exam
- Knee Exam
- Ankle Exam
- Foot Exam

Essentials of Emergency Medicine and Critical Care *New

This collection delves into a wide range of procedures employed in emergency and intensive care settings, ranging from basic life support methods such as CPR and rescue breathing to other common procedures performed during emergency situations.

- Basic Life Support I
- Basic Life Support II
- Pericardiocentesis
- Lateral Canthotomy and Inferior Cantholysis
- Percutaneous Cricothyrotomy
- Open Cricothyrotomy
- Needle Thoracostomy
- Tube Thoracostomy
- Intra-articular Shoulder Injection
- Arterial Line Placement
- Intraosseous Needle Placement
- Peripheral Venous Cannulation
- Internal Jugular CVC
- Femoral CVC
- Subclavian CVC

Essentials of Nursing Skills *New

This collection demonstrates medication preparation and administration, with videos highlighting important safety checks, considerations, dosage calculations, and common mistakes associated with improper medication administration.

- Safety Checks
- Oral Medications
- Topical Medications
- Inhaled Medications
- Subcutaneous Injections
- Intramuscular Injections
- Enteric Tube Medications
- IV Catheter Insertion
- Assessing and Flushing IV Line
- Initiating Maintenance IVFluids
- IV Push Medications
- Primary Intermittent IV Medications
- Secondary Intermittent
- IV Medications
- Discontinuing IV Fluids
- CVAD Dressing Change

CHEMISTRY:

Essentials of General Chemistry

This collection helps provide a solid foundation in general chemistry by showcasing basic lab techniques, demonstrating commonly used equipment, and exploring the theory behind fundamental methodology in chemistry.

- Common Glassware
- Solutions and Concentration
- Density
- Empirical Formula
- Mass Percent
- Freezing Point Depression
- Coordination Chemistry
- pH Meter
- Titration
- Equilibrium Constant
- Le Châtelier's Principle
- Ideal Gas Law
- Enthalpy
- Rate Laws
- Solubility Rules

Essentials of Organic Chemistry

This collection features techniques routinely used in the organic chemistry lab, focussing on regulating temperature and atmosphere during chemical reactions and post-reaction refinement.

- Catalysis
- Reflux
- Reactions below Room Temperature
- Degassing Solvents
- The Schlenk Line
- Anhydrous Reagents
- X-ray Crystallography
- Recrystallization
- Separation via Precipitation
- Rotary Evaporation
- Solid-Liquid Extraction
- Fractional Distillation
- Thin Layer Chromatography
- Nuclear Magnetic Resonance Spectroscopy
- Column Chromatography

Essentials of Analytical Chemistry

This collection takes a broad look at quantitative analysis and instrumentation including electrochemistry, spectroscopy, chromatography, and mass spectrometry.

- Sample Preparation
- Internal Standards
- Standard Additions
- Calibration Curves
- UV-Vis Spectroscopy
- Raman Spectroscopy
- X-ray Fluorescence
- Gas Chromatography
- High Performance Liquid Chromatography
- Ion-Exchange Chromatography
- Capillary Electrophoresis
- Mass Spectrometry
- Scanning Electron Microscopy
- Potentiometry
- Cyclic Voltammetry

Essentials of Organic Chemistry II *New

This collection covers the theory and reactions necessary to carry out syntheses on a more advanced level. In addition, a few videos introduce methods commonly used to analyze the reaction products such as infrared spectroscopy and polarimetry.

- Cleaning Glassware
- Nucleophilic Substitution
- Reducing Agents
- Grignard Reaction
- n-BuLi
- Dean-Stark Trap
- Ozonolysis
- Organocatalysis
- Cross-Coupling Reaction
- Solid Phase Synthesis
- Hydrogenation
- Polymerization
- Melting Point
- IR Spectroscopy
- Polarimetry

Essentials of Inorganic Chemistry *New

This collection covers a range of inorganic chemistry protocols and concepts including air-free techniques, syntheses of transition metal based compounds, core inorganic chemistry concepts like Lewis Acid and Bases, and advanced analysis techniques including EPR spectroscopy.

- Glove Box and Impurity Sensors
- Sublimation of Ferrocene
- Ti(III)–Metallocene
- Lewis Acids & Bases
- Ferrocene
- Dye-Sensitized Solar Cells
- Oxygen-Carrying Co(salen)
- Quadruply M-M Bonded Paddlewheels
- M(dppf)Cl2 and MO Theory
- Group Theory in IR
- Radical Polymerization
- Evans Method
- Powder XRD
- Mössbauer Spectroscopy
- EPR Spectroscopy

Essentials of Biochemistry *New

This collection presents commonly used purification methods, such as affinity chromatography, as well as analytical methods, like MALDI-TOF. In addition, the videos showcase methods for assessing biomolecule interaction and function, such as co-immunoprecipitation and metabolic labeling.

- Dialysis: Diffusion Based Separation
- Enzyme Assays and Kinetics
- MALDI-TOF Mass Spectrometry
- Tandem Mass Spectrometry
- Protein Crystallization
- Chromatography of Biomolecules
- Two-Dimensional Gel Electrophoresis
- Metabolic Labeling
- Electrophoretic Mobility Shift Assay
- Photometric Protein Determination
- Density Gradient Ultracentrifugation
- Co-IP and Pull-Down Assays
- Reconstitution of Membrane Proteins
- Förster Resonance Energy Transfer
- Surface Plasmon Resonance

PSYCHOLOGY:

Essentials of Behavioral Science

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

- An Introduction to Learning and Memory
- Fear Conditioning
- Spatial Memory Testing Using Mazes
- An Introduction to Cognition
- Electroencephalography (EEG)
- Eye Tracking in Cognitive Experiments
- An Introduction to Motor Control
- Balance and Coordination Testing
- Assessing Dexterity with Reaching Tasks
- An Introduction to Reward and Addiction
- Positive Reinforcement Studies
- Self-administration Studies
- An Introduction to Modeling Behavioral Disorders and Stress
- Modeling Social Stress
- Anxiety Testing

Essentials of Experimental Psychology

This collection provides a framework for observing how psychological experiments are embedded in the actual research process, starting from the initial research design to arriving at conclusions in a study.

- Creativity in Designing Experiments
- Ethics in Psychology Research
- Perspectives on Experimental Psychology
- Realism in Research
- Pilot Testing
- Observational Research
- The Two-group Experiment
- The Multi-group Experiment
- Within-subjects Repeated-measures Design
- The Factorial Experiment
- Self-report vs. Behavioral Measures
- Reliability in Psychology Experiments
- Placebos in Research
- Embodiment
- Confederates in Research

Essentials of Cognitive Psychology

This collection describes a number of influential paradigms used to study complex mental processes underlying attention, perception, learning and memory.

- Dichotic Listening
- Method of Subtraction
- Perspectives on Cognitive Psychology
- Visual Search
- Binocular Rivalry
- Multiple Object Tracking
- Approximate Number Sense Test
- Mental Rotation
- Prospect Theory
- Verbal Working Memory Span
- Delayed Estimation
- Verbal Priming
- Incidental Encoding
- Visual Statistical Learning
- Mirror Drawing

Essentials of Developmental Psychology

This collections explores the experimental domains of attention and perception, reasoning, social learning and memory processes - highlighting the dynamic changes that emerge throughout infancy and childhood.

- Habituation
- Rational Imitation
- Self-awareness
- Numerical Cognition
- Mutual Exclusivity
- Casual Reasoning
- Metacognition
- Excecutive Function
- Categories and Inductive Inferences
- Natural Pedagogy
- Influence of Task Demands
- Reliance on Intentions
- Measuring Trust
- Influence of Praise on Motivation
- False Memories

Essentials of Neuropsychology *New

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

- The Split Brain
- Motor Maps
- Perspectives on Neuropsychology
- Iowa Gambling Task
- Executive Function
- Anterograde Amnesia
- Physiological Correlates
- ERPs and the Oddball Task
- The N400 in Semantic Incongruity
- Remember-Know Task
- Voxel-based Morphometry
- Multi-voxel Pattern Analysis
- Object-based Attentional Control
- Diffusion Tensor Imaging
- Transcranial Magnetic Stimulation

Essentials of Sensation and Perception *New

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.

- Color Afterimages
- Blind Spots
- Perspectives on Sensation and Perception
- Motion-induced Blindness
- Rubber Hand Illusion
- Ames Room
- Inattentional Blindness
- Spatial Cueing
- Attentional Blink
- Visual Crowding
- Inverted-face Effect
- McGurk Effect
- Just-noticeable Differences
- Staircase Procedure
- Object Substitution Masking

Essentials of Social Psychology *New

This collection features classical methods used to investigate how social contexts influence people's actions, thoughts, and attitudes and provides a transparent look into social experiments.

- Helping Behavior
- Moral Judgments (fMRI)
- Marginal Dishonesty (Adding to 10 Task)
- Inducing Emotions
- Snap Judgments
- Minimal Groups
- Elaboration Likelihood Model of Persuasion
- Power of Conformity
- Self-control and Construal Level Theory
- Misattribution of Arousal and Cognitive Dissonance
- Introspection Illusion
- Nonconscious Mimicry
- Ostracism & Cyberball Task
- Implicit Association Test
- Interview

ENVIRONMENTAL SCIENCES:

Essentials of Environmental Sciences

This collection utilizes an interdisciplinary approach to explore and evaluate environmental systems with topics ranging from soil and water contaminants, invasive species, alternative energy and forestry.

- Tree Identification
- Forest Survey
- Urban Forestry
- Fuel Cell Assembly
- Biofuel Production
- Testing for GM foods
- Turbidity and Total Solids
- Measuring Dissolved Oxygen
- Nutrients in Aquatic Ecosystems
- Tropospheric Ozone
- Determination of NOx
- Lead Analysis of Soil
- Elemental Analysis of Soil
- Soil Nutrient Analysis
- Analysis of Earthworm Populations

Essentials of Environmental Microbiology

This collection provides an introduction to microbial communities in the environment and their roles in ecosystems; and also explores common methods used to study environmental microbiology.

- Moisture in Soil
- Aseptic Technique
- Gram Staining
- Soil Microorganism
- Filamentous Fungi
- DNA Extraction from Soil
- Environmental PCR
- Reverse Transcription - PCR
- Quantitative PCR
- Water Quality Analysis
- Indicator Organisms by Filtration
- Bacteriophages
- Bacterial Enumeration
- Growth Curves
- Algae Enumeration

Essentials of Earth Sciences

This collection features topics ranging from geology to geochemistry with a variety of demonstrations including physical and chemical properties of minerals and the analysis of rock formations.

- Brunton Compass
- Topographic Profiles
- Geologic Cross-Sections
- Properties of Minerals I
- Properties of Minerals II
- Igneous Volcanic Rocks
- Igneous Intrusive Rocks
- MBT/CBT Paleothermometry
- Uk'37 Paleothermometry
- Sonication Biomarker Extraction
- Soxhlet Biomarker Extration
- Saponification of FAMEs
- Column Chromatography for Paleoclimatology
- Urea Adduction for Paleoclimatology

PHYSICS:

Essentials of Physics I *New

This collection covers classical mechanics and thermodynamics discussing relevant laws and equations every topic is presented with experiments validating theoretical hypothesis, and real world contextual examples.

- Newton's Laws of Motion
- Force
- Vectors in Multiple Directions
- Kinematics and Projectile Motion
- Law of Universal Gravitation
- Conservation of Momentum
- Friction
- Hooke's Law and SHM
- Equilibrium and Free-Body Diagrams
- Torque
- Rotational Inertia
- Angular Momentum
- Energy and Work
- Enthalpy
- Entropy

Essentials of Physics II *New

This collection explores topics including electrostatics, magnetism, optics, wave-based oscillations, and electrical circuits; explaining underlying principles behind physical phenomena that have changed our world.

- Electric Potential
- Electric Fields
- Magnetic Fields
- Electric Charge in a Magnetic Field
- Ohm's Law
- Series and Parallel Resistors
- Capacitance
- Inductance
- RLC Circuit
- Semiconductors
- Photoelectric Effect
- Reflection and Refraction
- Interference and Diffraction
- Standing Waves
- Sound Waves

ENGINEERING:

Essentials of Chemical Engineering *New

This collection explains fundamental concepts in chemical engineering using an experimental approach and it presents necessary operating procedures of various apparatuses such as tray dryer and viscometer.

- Heat Exchanger
- Tray Dryer
- Spin and Chill
- Viscosity
- Porosity
- Extrusion
- Gas Absorber
- Vapor-Liquid Equilibrium
- Tray Distillation
- Liquid-Liquid Extraction
- Liquid-Phase Reactor: Sucrose Inversion
- Crystallization of Salicylic Acid
- Flow in Packed Beds
- PDMS Polymerization
- Catalytic Reactor: Hydrogenation

Essential of Electrical Engineering *New

This collection starts with an electrical safety video that introduces the best practices for commonly used equipment in an electrical laboratory. Subsequent videos introduce elements such as inductors, transformers, convertors, rectifiers, and inverters.

- Electrical Safety
- Characterization of Magnetic Components
- HiRel Board
- DC Boost Converters
- DC Buck Converters
- Flyback Converter
- Single Phase Transformers
- Single Phase Rectifier
- Thyristor Rectifier
- Single Phase Inverter
- Characterization of DC Motors
- AC Induction Motor
- VFD-fed AC Induction Motor
- AC Synchronous Motor
- AC Synchronous Generator

Essentials of Structural Engineering *New

This collection introduces students to fundamental concepts and protocols for material characterization, with specific emphasis on common construction materials such as steel, wood, and concrete.

- Material Constants
- Stress-Strain Characteristics of Aluminum
- Stress-Strain Characteristics of Steels
- Charpy Impact Test
- Rockwell Hardness Test
- Buckling of Steel Beams
- Fatigue of Metals
- Aggregate Characterization for Concrete and Asphaltic Mixes
- Testing Fresh Concrete with the Trial Batch Method
- Compression Tests on Hardened Concrete
- Compression Tests on Hardened Concrete in Tension
- Characterization of Wood
- Tension Tests of Polymers
- Tension Tests of FRP Materials
- Dynamics of Structures

Essentials of Mechanical Engineering *New

This collection introduces a range of concepts that is essential for understanding and designing mechanical systems. Each video examines a specific topic and describes fundamental analytical methods commonly employed to understand the physical behavior.

- Buoyancy and Drag
- Stability of Floating Vessels
- Propulsion and Thrust
- Piping Networks
- Quenching
- Hydraulic Jumps
- Heat Exchangers
- Refrigeration
- Hot Wire Anemometry
- Turbulent Flow
- Flow Visualization
- Impinging Jets
- Conservation of Energy Analysis
- Conservation of Mass
- Conservation of Linear Momentum

Essentials of Bioengineering *New

This collection covers core bioengineering concepts, which includes production of biomaterials, histotypic and whole organ tissue cultures, bioprocessing techniques, and complex system-level fields of bioMEMs and biosensing.

- Biomaterials
- Collagen Hydrogel
- Silk Electro-spinning
- Tissue Engineering
- Histotypic Culture
- Whole Organ Tissue Culture
- Bioprocessing
- Synthetic Biology
- Bioreactors
- BioMEMS
- Photolithography
- Soft Lithography
- Introduction to Biosensing
- Electrochemical Biosensing
- Optical Biosensing

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The University of Melbourne

"My enthusiasm for JoVE is because of the high-level product, the accuracy of the information, the care and concern taken in the shooting of the experiments, and the participation of the laboratory community to make it a visually positive and inspiring method of communicating science."

Julia M. Gelfand
Applied Sciences, Engineering & Public Health Librarian,
University of California Irvine

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