

Main Criteria: North Dakota Academic Content Standards

Secondary Criteria: JoVE

Subject: Science

Grade: 9-12

Correlation Options: Show Correlated

Adopted: 2006

CONTENT STANDARD	ND.1.	Unifying Concepts: Students understand the unifying concepts and processes of science.
BENCHMARK	9-10.1.1.	<p>Models: Explain how models can be used to illustrate scientific principles</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Igneous Intrusive Rock • Igneous Volcanic Rock • Making a Geologic Cross Section • Using Topographic Maps to Generate Topographic Profiles
BENCHMARK	9-10.1.2.	<p>Systems: Describe the interaction of components within a system (e.g., interactions between living and nonliving components of an ecosystem, interaction between organelles of a cell)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Behavioral Neuroscience • An Introduction to Cellular and Molecular Neuroscience • An Introduction to Learning and Memory • An Introduction to Motor Control • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • Anterograde Amnesia • Anxiety Testing • Calcium Imaging in Neurons • Decoding Auditory Imagery with Multivoxel Pattern Analysis • Histological Staining of Neural Tissue • Learning and Memory: The Remember-Know Task • Modeling Social Stress • Motor Learning in Mirror Drawing

		<ul style="list-style-type: none"> • Motor Maps • Patch Clamp Electrophysiology • Physiological Correlates of Emotion Recognition • Rodent Stereotaxic Surgery • The Split Brain • fMRI: Functional Magnetic Resonance Imaging
BENCHMARK	9-10.1.3.	<p>Constancy and Change: Explain how a system can be dynamic yet may remain in equilibrium (e.g., water cycle, rock cycle, population)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Abdominal Exam I: Inspection and Auscultation • Abdominal Exam II: Percussion • Abdominal Exam III: Palpation • Abdominal Exam IV: Acute Abdominal Pain <p>Assessment</p> <ul style="list-style-type: none"> • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cognition • An Introduction to Endocytosis and Exocytosis • An Introduction to Learning and Memory • An Introduction to Reward and Addiction • Anesthesia Induction and Maintenance • Ankle Exam • Annexin V and Propidium Iodide Labeling • Arterial Line Placement • Assembly of a Reflux System for Heated Chemical Reactions • Assessing Dexterity with Reaching Tasks • Auscultation • Balance and Coordination Testing • Basic Care Procedures • Basic Life Support Part II: Airway/Breathing and Continued Cardiopulmonary Resuscitation • Basic Life Support: Cardiopulmonary Resuscitation and Defibrillation • Basic Mouse Care and Maintenance • Blood Pressure Measurement • Blood Withdrawal I • Blood Withdrawal II • Cardiac Exam I: Inspection and Palpation • Cardiac Exam II: Auscultation • Cardiac Exam III: Abnormal Heart Sounds • Cell-surface Biotinylation Assay • Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance • Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance • Central Venous Catheter Insertion: Subclavian Vein • Compound Administration I

- **Compound Administration II**
- **Compound Administration III**
- **Compound Administration IV**
- **Comprehensive Breast Exam**
- **Considerations for Rodent Surgery**
- **Cranial Nerves Exam I (I-VI)**
- **Cranial Nerves Exam II (VII-XII)**
- **Detecting Reactive Oxygen Species**
- **Diagnostic Necropsy and Tissue Harvest**
- **Dialysis: Diffusion Based Separation**
- **Ear Exam**
- **Elbow Exam**
- **Emergency Tube Thoracostomy (Chest Tube Placement)**
- **Emergent Lateral Canthotomy and Inferior Catholysis**
- **Eye Exam**
- **FM Dyes in Vesicle Recycling**
- **Fear Conditioning**
- **Foot Exam**
- **General Approach to the Physical Exam**
- **Hand and Wrist Exam**
- **Hip Exam**
- **Intra-articular Shoulder Injection for Reduction Following Anterior Shoulder Dislocation**
- **Intraosseous Needle Placement**
- **Knee Exam**
- **Le Châtelier's Principle**
- **Lower Back Exam**
- **Lymph Node Exam**
- **Male Rectal Exam**
- **Measuring Vital Signs**
- **Motor Exam I**
- **Motor Exam II**
- **Neck Exam**
- **Needle Thoracostomy (needle Decompression) for Temporizing Tension Pneumothorax Treatment**
- **Nose, Sinuses, Oral Cavity and Pharynx Exam**
- **Observation and Inspection**
- **Ophthalmoscopic Examination**
- **Palpation**
- **Pelvic Exam I: Assessment of the External Genitalia**
- **Pelvic Exam II: Speculum Exam**
- **Pelvic Exam III: Bimanual and Rectovaginal Exam**
- **Percussion**
- **Percutaneous Cricothyrotomy (Seldinger Technique)**
- **Pericardiocentesis**
- **Peripheral Vascular Exam**
- **Peripheral Vascular Exam Using a Continuous Wave Doppler**
- **Peripheral Venous Cannulation**
- **Physiological Correlates of Emotion Recognition**

		<ul style="list-style-type: none"> • Proper Adjustment of Patient Attire during the Physical Exam • Reconstitution of Membrane Proteins • Respiratory Exam I: Inspection and Palpation • Respiratory Exam II: Percussion and Auscultation • Self-administration Studies • Sensory Exam • Separation of Mixtures via Precipitation • Shoulder Exam I • Shoulder Exam II • Spatial Memory Testing Using Mazes • Spectrophotometric Determination of an Equilibrium Constant • Sterile Tissue Harvest • Surgical Cricothyrotomy • The ATP Bioluminescence Assay • The TUNEL Assay • Thyroid Exam • Using a pH Meter • Zebrafish Maintenance and Husbandry
BENCHMARK	9-10.1.4.	<p>Form and Function: Describe the relationship between form and function (e.g., solids, liquids, gases, cell specialization, simple machines, and plate tectonics)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Abdominal Exam I: Inspection and Auscultation • Abdominal Exam II: Percussion • Abdominal Exam III: Palpation • Abdominal Exam IV: Acute Abdominal Pain Assessment • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Division • An Introduction to Cell Motility and Migration • An Introduction to Cellular and Molecular Neuroscience • An Introduction to Cognition • An Introduction to Developmental Genetics • An Introduction to Developmental Neurobiology • An Introduction to Drosophila melanogaster • An Introduction to Learning and Memory • An Introduction to Modeling Behavioral Disorders and Stress • An Introduction to Molecular Developmental Biology • An Introduction to Motor Control • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • An Introduction to Organogenesis • An Introduction to Reward and Addiction • An Introduction to Saccharomyces cerevisiae • An Introduction to Stem Cell Biology

- An Introduction to the Chick: Gallus gallus domesticus
- An Introduction to the Laboratory Mouse: Mus musculus
- An Introduction to the Zebrafish: Danio rerio
- An Overview of Epigenetics
- An Overview of Gene Expression
- Anesthesia Induction and Maintenance
- Ankle Exam
- Anterograde Amnesia
- Anxiety Testing
- Approximate Number Sense Test
- Arterial Line Placement
- Assessing Dexterity with Reaching Tasks
- Auscultation
- Balance and Coordination Testing
- Basic Chick Care and Maintenance
- Basic Life Support Part II: Airway/Breathing and Continued Cardiopulmonary Resuscitation
- Basic Life Support: Cardiopulmonary Resuscitation and Defibrillation
- Basic Mouse Care and Maintenance
- Binocular Rivalry
- Blood Pressure Measurement
- Blood Withdrawal I
- Blood Withdrawal II
- C. elegans Chemotaxis Assay
- C. elegans Development and Reproduction
- C. elegans Maintenance
- Calcium Imaging in Neurons
- Cardiac Exam I: Inspection and Palpation
- Cardiac Exam II: Auscultation
- Cardiac Exam III: Abnormal Heart Sounds
- Cell Cycle Analysis
- Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance
- Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance
- Central Venous Catheter Insertion: Subclavian Vein
- Chick ex ovo Culture
- Co-Immunoprecipitation and Pull-Down Assays
- Color Afterimages
- Compound Administration I
- Compound Administration II
- Compound Administration III
- Compound Administration IV
- Comprehensive Breast Exam
- Considerations for Rodent Surgery
- Cranial Nerves Exam I (I-VI)
- Cranial Nerves Exam II (VII-XII)
- Crowding
- Cytogenetics

- DNA Methylation Analysis
- Decision-making and the Iowa Gambling Task
- Decoding Auditory Imagery with Multivoxel Pattern Analysis
- Determining Spatial Orientation of Rock Layers with the Brunton Compass
- Development and Reproduction of the Laboratory Mouse
- Development of the Chick
- Diagnostic Necropsy and Tissue Harvest
- Dichotic Listening
- Drosophila Development and Reproduction
- Drosophila Larval IHC
- Drosophila Maintenance
- Drosophila melanogaster Embryo and Larva Harvesting and Preparation
- Ear Exam
- Elbow Exam
- Electro-encephalography (EEG)
- Embryonic Stem Cell Culture and Differentiation
- Emergency Tube Thoracostomy (Chest Tube Placement)
- Emergent Lateral Canthotomy and Inferior Catholysis
- Event-related Potentials and the Oddball Task
- Executive Function and the Dimensional Change Card Sort Task
- Executive Function in Autism Spectrum Disorder
- Explant Culture for Developmental Studies
- Explant Culture of Neural Tissue
- Expression Profiling with Microarrays
- Eye Exam
- Eye Tracking in Cognitive Experiments
- Fate Mapping
- Fear Conditioning
- Finding Your Blind Spot and Perceptual Filling-in
- Foot Exam
- Fundamentals of Breeding and Weaning
- Gene Silencing with Morpholinos
- General Approach to the Physical Exam
- Genetic Engineering of Model Organisms
- Habituation: Studying Infants Before They Can Talk
- Hand and Wrist Exam
- Hip Exam
- Histological Staining of Neural Tissue
- Igneous Intrusive Rock
- Igneous Volcanic Rock
- In ovo Electroporation of Chicken Embryos
- Inattentive Blindness
- Incidental Encoding
- Induced Pluripotency
- Intra-articular Shoulder Injection for Reduction

Following Anterior Shoulder Dislocation

- **Intraosseous Needle Placement**
- **Introducing Experimental Agents into the Mouse**
- **Invasion Assay Using 3D Matrices**
- **Invertebrate Lifespan Quantification**
- **Isolating Nucleic Acids from Yeast**
- **Just-noticeable Differences**
- **Knee Exam**
- **Language: The N400 in Semantic Incongruity**
- **Learning and Memory: The Remember-Know Task**
- **Live Cell Imaging of Mitosis**
- **Lower Back Exam**
- **Lymph Node Exam**
- **Making a Geologic Cross Section**
- **Male Rectal Exam**
- **Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain**
- **Measuring Reaction Time and Donders' Method of Subtraction**
- **Measuring Verbal Working Memory Span**
- **Measuring Vital Signs**
- **Mental Rotation**
- **Metabolic Labeling**
- **Modeling Social Stress**
- **Motion-induced Blindness**
- **Motor Exam I**
- **Motor Exam II**
- **Motor Learning in Mirror Drawing**
- **Motor Maps**
- **Mouse Genotyping**
- **Multiple Object Tracking**
- **Murine In Utero Electroporation**
- **Mutual Exclusivity: How Children Learn the Meanings of Words**
- **Neck Exam**
- **Needle Thoracostomy (needle Decompression) for Temporizing Tension Pneumothorax Treatment**
- **Neuronal Transfection Methods**
- **Nose, Sinuses, Oral Cavity and Pharynx Exam**
- **Object Substitution Masking**
- **Observation and Inspection**
- **Ophthalmoscopic Examination**
- **Palpation**
- **Passaging Cells**
- **Patch Clamp Electrophysiology**
- **Pelvic Exam I: Assessment of the External Genitalia**
- **Pelvic Exam II: Speculum Exam**
- **Pelvic Exam III: Bimanual and Rectovaginal Exam**
- **Percussion**
- **Percutaneous Cricothyrotomy (Seldinger Technique)**
- **Pericardiocentesis**

- Peripheral Vascular Exam
- Peripheral Vascular Exam Using a Continuous Wave Doppler
- Peripheral Venous Cannulation
- Physiological Correlates of Emotion Recognition
- Primary Neuronal Cultures
- Proper Adjustment of Patient Attire during the Physical Exam
- Prospect Theory
- RNA-Seq
- RNAi in *C. elegans*
- Respiratory Exam I: Inspection and Palpation
- Respiratory Exam II: Percussion and Auscultation
- Rodent Handling and Restraint Techniques
- Rodent Identification I
- Rodent Identification II
- Rodent Stereotaxic Surgery
- Self-administration Studies
- Sensory Exam
- Shoulder Exam I
- Shoulder Exam II
- Spatial Cueing
- Spatial Memory Testing Using Mazes
- Sterile Tissue Harvest
- Surgical Cricothyrotomy
- The Ames Room
- The Attentional Blink
- The Inverted-face Effect
- The McGurk Effect
- The Morris Water Maze
- The Precision of Visual Working Memory with Delayed Estimation
- The Rubber Hand Illusion
- The Split Brain
- The Staircase Procedure for Finding a Perceptual Threshold
- The Transwell Migration Assay
- Thyroid Exam
- Tissue Regeneration with Somatic Stem Cells
- Transplantation Studies
- Tree Identification: How To Use a Dichotomous Key
- Tree Survey: Point-Centered Quarter Sampling Method
- Using Diffusion Tensor Imaging in Traumatic Brain Injury
- Using GIS to Investigate Urban Forestry
- Using TMS to Measure Motor Excitability During Action Observation
- Using Topographic Maps to Generate Topographic Profiles
- Verbal Priming
- Visual Attention: fMRI Investigation of Object-based

		<p>Attentional Control</p> <ul style="list-style-type: none"> • Visual Search for Features and Conjunctions • Visual Statistical Learning • Whole-Mount In Situ Hybridization • Within-subjects Repeated-measures Design • Yeast Maintenance • Yeast Reproduction • Yeast Transformation and Cloning • Zebrafish Breeding and Embryo Handling • Zebrafish Maintenance and Husbandry • Zebrafish Microinjection Techniques • Zebrafish Reproduction and Development • fMRI: Functional Magnetic Resonance Imaging
BENCHMARK	9-10.1.5.	<p>Form and Function: Explain how classification can be based on the relationship between form and function (e.g., elements and compounds, biological classifications, types of clouds)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Caenorhabditis elegans • An Introduction to Drosophila melanogaster • An Introduction to Saccharomyces cerevisiae • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Laboratory Mouse: Mus musculus • An Introduction to the Zebrafish: Danio rerio • Bacterial Transformation: Electroporation • Bacterial Transformation: The Heat Shock Method • Basic Chick Care and Maintenance • Basic Mouse Care and Maintenance • C. elegans Chemotaxis Assay • C. elegans Development and Reproduction • C. elegans Maintenance • Categories and Inductive Inferences • Chick ex ovo Culture • Culturing and Enumerating Bacteria from Soil Samples • DNA Gel Electrophoresis • Detection of Bacteriophages in Environmental Samples • Development and Reproduction of the Laboratory Mouse • Development of the Chick • Drosophila Development and Reproduction • Drosophila Larval IHC • Drosophila Maintenance • Drosophila melanogaster Embryo and Larva Harvesting and Preparation • Filamentous Fungi • Gel Purification • In ovo Electroporation of Chicken Embryos • Introducing Experimental Agents into the Mouse • Isolating Nucleic Acids from Yeast

		<ul style="list-style-type: none"> • Mouse Genotyping • Plasmid Purification • RNAi in <i>C. elegans</i> • Separating Protein with SDS-PAGE • The ELISA Method • The Western Blot • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Using GIS to Investigate Urban Forestry • Yeast Maintenance • Yeast Reproduction • Yeast Transformation and Cloning • Zebrafish Breeding and Embryo Handling • Zebrafish Maintenance and Husbandry • Zebrafish Microinjection Techniques • Zebrafish Reproduction and Development
BENCHMARK	9-10.1.6.	<p>Evolution and Equilibrium: Identify principles governing evolution and equilibrium within systems (e.g., cause and effect, positive and negative feedback)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Behavioral Neuroscience • An Introduction to <i>Caenorhabditis elegans</i> • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cellular and Molecular Neuroscience • An Introduction to Developmental Neurobiology • An Introduction to <i>Drosophila melanogaster</i> • An Introduction to Endocytosis and Exocytosis • An Introduction to Learning and Memory • An Introduction to Modeling Behavioral Disorders and Stress • An Introduction to Molecular Developmental Biology • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • An Introduction to Reward and Addiction • An Introduction to <i>Saccharomyces cerevisiae</i> • An Introduction to Stem Cell Biology • An Introduction to Transfection • Anesthesia Induction and Maintenance • Annexin V and Propidium Iodide Labeling • Anterograde Amnesia • Anxiety Testing • Approximate Number Sense Test • Are You Smart or Hardworking? How Praise Influences Children's Motivation • Assembly of a Reflux System for Heated Chemical Reactions • Bacterial Transformation: Electroporation • Bacterial Transformation: The Heat Shock Method

- Basic Care Procedures
- Basic Chick Care and Maintenance
- Basic Mouse Care and Maintenance
- C. elegans Chemotaxis Assay
- C. elegans Development and Reproduction
- C. elegans Maintenance
- Calcium Imaging in Neurons
- Calibration Curves
- Capillary Electrophoresis (CE)
- Cell Cycle Analysis
- Cell-surface Biotinylation Assay
- Chick ex ovo Culture
- Chromatography-Based Biomolecule Purification Methods
- Co-Immunoprecipitation and Pull-Down Assays
- Color Afterimages
- Column Chromatography
- Conducting Reactions Below Room Temperature
- Considerations for Rodent Surgery
- Coordination Chemistry Complexes
- Crowding
- Cyclic Voltammetry (CV)
- DNA Gel Electrophoresis
- DNA Ligation Reactions
- Decision-making and the Iowa Gambling Task
- Decoding Auditory Imagery with Multivoxel Pattern Analysis
- Degassing Liquids with Freeze-Pump-Thaw Cycling
- Density Gradient Ultracentrifugation
- Detecting Reactive Oxygen Species
- Determining Rate Laws and the Order of Reaction
- Determining the Density of a Solid and Liquid
- Determining the Empirical Formula
- Determining the Mass Percent Composition in an Aqueous Solution
- Determining the Solubility Rules of Ionic Compounds
- Development and Reproduction of the Laboratory Mouse
- Development of the Chick
- Diagnostic Necropsy and Tissue Harvest
- Dialysis: Diffusion Based Separation
- Drosophila Development and Reproduction
- Drosophila Larval IHC
- Drosophila Maintenance
- Drosophila melanogaster Embryo and Larva Harvesting and Preparation
- Electro-encephalography (EEG)
- Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat
- Electrophoretic Mobility Shift Assay (EMSA)
- Embryonic Stem Cell Culture and Differentiation

- Enzyme Assays and Kinetics
- Event-related Potentials and the Oddball Task
- Executive Function and the Dimensional Change Card Sort Task
- Executive Function in Autism Spectrum Disorder
- Explant Culture of Neural Tissue
- Eye Tracking in Cognitive Experiments
- FM Dyes in Vesicle Recycling
- Fear Conditioning
- Finding Your Blind Spot and Perceptual Filling-in
- Fractional Distillation
- Freezing-Point Depression to Determine an Unknown Compound
- Fundamentals of Breeding and Weaning
- Förster Resonance Energy Transfer (FRET)
- Gas Chromatography (GC) with Flame-Ionization Detection
- Gel Purification
- Growing Crystals for X-ray Diffraction Analysis
- Habituation: Studying Infants Before They Can Talk
- High-Performance Liquid Chromatography (HPLC)
- Histological Staining of Neural Tissue
- How Children Solve Problems Using Causal Reasoning
- In ovo Electroporation of Chicken Embryos
- Inattentive Blindness
- Incidental Encoding
- Induced Pluripotency
- Internal Standards
- Introduction to Catalysis
- Introduction to Mass Spectrometry
- Introduction to Titration
- Invertebrate Lifespan Quantification
- Ion-Exchange Chromatography
- Isolating Nucleic Acids from Yeast
- Just-noticeable Differences
- Language: The N400 in Semantic Incongruity
- Le Châtelier's Principle
- Learning and Memory: The Remember-Know Task
- Live Cell Imaging of Mitosis
- MALDI-TOF Mass Spectrometry
- Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain
- Measuring Reaction Time and Donders' Method of Subtraction
- Measuring Verbal Working Memory Span
- Mental Rotation
- Metabolic Labeling
- Method of Standard Addition
- Modeling Social Stress
- Molecular Cloning
- Motion-induced Blindness

- **Motor Learning in Mirror Drawing**
- **Mouse Genotyping**
- **Multiple Object Tracking**
- **Murine In Utero Electroporation**
- **Neuronal Transfection Methods**
- **Nuclear Magnetic Resonance (NMR) Spectroscopy**
- **Object Substitution Masking**
- **PCR: The Polymerase Chain Reaction**
- **Passaging Cells**
- **Patch Clamp Electrophysiology**
- **Performing 1D Thin Layer Chromatography**
- **Photometric Protein Determination**
- **Physiological Correlates of Emotion Recognition**
- **Plasmid Purification**
- **Positive Reinforcement Studies**
- **Preparing Anhydrous Reagents and Equipment**
- **Primary Neuronal Cultures**
- **Prospect Theory**
- **Protein Crystallization**
- **Purifying Compounds by Recrystallization**
- **RNAi in *C. elegans***
- **Raman Spectroscopy for Chemical Analysis**
- **Reconstitution of Membrane Proteins**
- **Restriction Enzyme Digests**
- **Rodent Handling and Restraint Techniques**
- **Rodent Stereotaxic Surgery**
- **Rotary Evaporation to Remove Solvent**
- **Sample Preparation for Analytical Preparation**
- **Scanning Electron Microscopy (SEM)**
- **Schlenk Lines Transfer of Solvents**
- **Self-administration Studies**
- **Separating Protein with SDS-PAGE**
- **Separation of Mixtures via Precipitation**
- **Solid-Liquid Extraction**
- **Solutions and Concentrations**
- **Spatial Cueing**
- **Spatial Memory Testing Using Mazes**
- **Spectrophotometric Determination of an Equilibrium Constant**
- **Sterile Tissue Harvest**
- **Surface Plasmon Resonance (SPR)**
- **Tandem Mass Spectrometry**
- **The ATP Bioluminescence Assay**
- **The Ames Room**
- **The Attentional Blink**
- **The Inverted-face Effect**
- **The McGurk Effect**
- **The Morris Water Maze**
- **The Multi-group Experiment**
- **The Precision of Visual Working Memory with Delayed Estimation**

		<ul style="list-style-type: none"> • The Rubber Hand Illusion • The Simple Experiment: Two-group Design • The Staircase Procedure for Finding a Perceptual Threshold • The TUNEL Assay • The Western Blot • Tissue Regeneration with Somatic Stem Cells • Tree Identification: How To Use a Dichotomous Key • Two-Dimensional Gel Electrophoresis • Ultraviolet-Visible (UV-Vis) Spectroscopy • Using Differential Scanning Calorimetry to Measure Changes in Enthalpy • Using Diffusion Tensor Imaging in Traumatic Brain Injury • Using TMS to Measure Motor Excitability During Action Observation • Using Your Head: Measuring Infants' Rational Imitation of Actions • Using a pH Meter • Verbal Priming • Visual Attention: fMRI Investigation of Object-based Attentional Control • Visual Search for Features and Conjunctions • Visual Statistical Learning • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF) • Yeast Maintenance • Yeast Reproduction • Yeast Transformation and Cloning • Zebrafish Breeding and Embryo Handling • Zebrafish Maintenance and Husbandry • Zebrafish Reproduction and Development • fMRI: Functional Magnetic Resonance Imaging
CONTENT STANDARD	ND.2.	Science Inquiry: Students use the process of science inquiry.
BENCHMARK	9-10.2.1.	<p>Understandings About Scientific Inquiry: Explain how scientific investigations can result in new ideas</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Abdominal Exam II: Percussion • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cell Motility and Migration • An Introduction to Developmental Genetics • An Introduction to Developmental Neurobiology • An Introduction to Drosophila melanogaster • An Introduction to Endocytosis and Exocytosis

		<ul style="list-style-type: none"> • An Introduction to Learning and Memory • An Introduction to Molecular Developmental Biology • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • An Introduction to Organogenesis • An Introduction to Saccharomyces cerevisiae • An Introduction to Stem Cell Biology • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Laboratory Mouse: Mus musculus • An Introduction to the Zebrafish: Danio rerio • An Overview of Epigenetics • An Overview of Gene Expression • An Overview of Genetic Analysis • An Overview of Genetic Engineering • An Overview of Genetics and Disease • Anterograde Amnesia • Auscultation • C. elegans Maintenance • Cell Cycle Analysis • Color Afterimages • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Development of the Chick • Drosophila Maintenance • General Approach to the Physical Exam • Genetic Crosses • Inattentional Blindness • Le Châtelier's Principle • Making a Geologic Cross Section • Measuring Reaction Time and Donders' Method of Subtraction • Motion-induced Blindness • Object Substitution Masking • Percussion • Piaget's Conservation Task and the Influence of Task Demands • Rotary Evaporation to Remove Solvent • Spatial Cueing • The Attentional Blink • The Rubber Hand Illusion • The Split Brain • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Yeast Transformation and Cloning
BENCHMARK	9-10.2.2.	<p>Abilities Necessary To Do Scientific Inquiry: Use appropriate safety equipment and precautions during investigations (e.g., goggles, apron, eye wash station)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Working in the Hood

		<ul style="list-style-type: none"> • An Introduction to the Centrifuge • An Introduction to the Micropipettor • Aseptic Technique in Environmental Science • Common Lab Glassware and Uses • Conducting Reactions Below Room Temperature • Histological Sample Preparation for Light Microscopy • Introducing Experimental Agents into the Mouse • Introduction to Fluorescence Microscopy • Introduction to Light Microscopy • Introduction to Serological Pipettes and Pipettors • Introduction to the Bunsen Burner • Introduction to the Microplate Reader • Introduction to the Spectrophotometer • Making Solutions in the Laboratory • Measuring Mass in the Laboratory • Regulating Temperature in the Lab: Applying Heat • Regulating Temperature in the Lab: Preserving Samples Using Cold • Understanding Concentration and Measuring Volumes
BENCHMARK	9-10.2.3.	<p>Abilities Necessary To Do Scientific Inquiry: Identify questions and concepts that guide scientific investigations</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Manipulating an Independent Variable through Embodiment • Observational Research • Pilot Testing • Placebos in Research • Realism in Experimentation • Reliability in Psychology Experiments • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Within-subjects Repeated-measures Design
BENCHMARK	9-10.2.4.	<p>Abilities Necessary To Do Scientific Inquiry: Formulate a testable hypothesis for a simple investigation</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design
BENCHMARK	9-10.2.5.	<p>Abilities Necessary To Do Scientific Inquiry: Identify the independent and dependent variables, the control, and the constants when conducting an experiment</p> <p><u>JoVE</u></p>

		<ul style="list-style-type: none"> • Calibration Curves • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Manipulating an Independent Variable through Embodiment • Observational Research • Pilot Testing • Placebos in Research • Realism in Experimentation • Reliability in Psychology Experiments • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Within-subjects Repeated-measures Design
BENCHMARK	9-10.2.6.	<p>Abilities Necessary To Do Scientific Inquiry: Design and conduct a guided investigation</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Manipulating an Independent Variable through Embodiment • Observational Research • Pilot Testing • Placebos in Research • Realism in Experimentation • Reliability in Psychology Experiments • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Within-subjects Repeated-measures Design
CONTENT STANDARD	ND.3.	Physical Science: Students understand the basic concepts and principles of physical science.
BENCHMARK	9-10.3.1.	<p>Properties of Matter: Classify elements according to similar properties. (e.g., metal, nonmetal, solids, liquids, gases)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Chromatography-Based Biomolecule Purification Methods • Column Chromatography • Coordination Chemistry Complexes • Determining Rate Laws and the Order of Reaction • Determining the Solubility Rules of Ionic Compounds • Introduction to Mass Spectrometry • Lead Analysis of Soil Using Atomic Absorption

		<p>Spectroscopy</p> <ul style="list-style-type: none"> • Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium • X-ray Fluorescence (XRF)
BENCHMARK	9-10.3.2.	<p>Properties of Matter: Classify changes in matter as physical or chemical</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Cell Metabolism • Cyclic Voltammetry (CV) • Detecting Reactive Oxygen Species • Enzyme Assays and Kinetics • Freezing-Point Depression to Determine an Unknown Compound • Introduction to Titration • Proton Exchange Membrane Fuel Cells • The ATP Bioluminescence Assay • The ELISA Method
BENCHMARK	9-10.3.3.	<p>Properties of Matter: Identify the Law of Conservation of Matter in physical and chemical changes</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Determining the Empirical Formula
BENCHMARK	9-10.3.4.	<p>Atoms and Molecules: Construct a model of an atom (e.g., protons, neutrons, electrons, nucleus, electron cloud)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Determining the Empirical Formula
BENCHMARK	9-10.3.5.	<p>Chemical Reactions: Identify the reactants and products in a chemical reaction</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Assembly of a Reflux System for Heated Chemical Reactions • Conducting Reactions Below Room Temperature • Coordination Chemistry Complexes • Determining Rate Laws and the Order of Reaction • Determining the Empirical Formula • Determining the Solubility Rules of Ionic Compounds • Introduction to Catalysis • Introduction to Titration • Le Châtelier's Principle • Preparing Anhydrous Reagents and Equipment • Proton Exchange Membrane Fuel Cells • Solutions and Concentrations • Spectrophotometric Determination of an Equilibrium Constant • Using Differential Scanning Calorimetry to Measure Changes in Enthalpy

BENCHMARK	9-10.3.6.	<p>Chemical Reactions: Distinguish between balanced and unbalanced chemical equations</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Assembly of a Reflux System for Heated Chemical Reactions • Calibration Curves • Conducting Reactions Below Room Temperature • Coordination Chemistry Complexes • Determining Rate Laws and the Order of Reaction • Determining the Empirical Formula • Determining the Mass Percent Composition in an Aqueous Solution • Determining the Solubility Rules of Ionic Compounds • Introduction to Catalysis • Introduction to Titration • Method of Standard Addition • Preparing Anhydrous Reagents and Equipment • Proton Exchange Membrane Fuel Cells • Solutions and Concentrations • Spectrophotometric Determination of an Equilibrium Constant • Using Differential Scanning Calorimetry to Measure Changes in Enthalpy
BENCHMARK	9-10.3.8.	<p>Energy Transfer and Transformation: Describe the relationships between kinetic and potential energy in basic transformations (e.g., physical and chemical changes)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Conducting Reactions Below Room Temperature • Determining Rate Laws and the Order of Reaction • Fractional Distillation • Ideal Gas Law • Introduction to Catalysis • The Ideal Gas Law
BENCHMARK	9-10.3.9.	<p>Vibrations and Waves: Compare and contrast electromagnetic and mechanical waves (i.e. energy, energy transfer, medium)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Nuclear Magnetic Resonance (NMR) Spectroscopy • Raman Spectroscopy for Chemical Analysis
CONTENT STANDARD	ND.4.	Life Science: Students understand the basic concepts and principles of life science.
BENCHMARK	9-10.4.1.	<p>Structure and Function: Relate cell function to cell structure (i.e., cell wall, cell membrane, nucleus, mitochondria, chloroplast)</p> <p><u>JoVE</u></p>

- **An Introduction to Aging and Regeneration**
- **An Introduction to Cell Death**
- **An Introduction to Cell Division**
- **An Introduction to Cell Metabolism**
- **An Introduction to Cell Motility and Migration**
- **An Introduction to Cellular and Molecular Neuroscience**
- **An Introduction to Developmental Neurobiology**
- **An Introduction to Endocytosis and Exocytosis**
- **An Introduction to Molecular Developmental Biology**
- **An Introduction to Neurophysiology**
- **An Introduction to Saccharomyces cerevisiae**
- **An Introduction to Stem Cell Biology**
- **An Introduction to Transfection**
- **Annexin V and Propidium Iodide Labeling**
- **Bacterial Transformation: Electroporation**
- **Bacterial Transformation: The Heat Shock Method**
- **Balance and Coordination Testing**
- **C. elegans Development and Reproduction**
- **Calcium Imaging in Neurons**
- **Cell Cycle Analysis**
- **Cell-surface Biotinylation Assay**
- **Cytogenetics**
- **DNA Ligation Reactions**
- **Density Gradient Ultracentrifugation**
- **Detecting Reactive Oxygen Species**
- **Electro-encephalography (EEG)**
- **Embryonic Stem Cell Culture and Differentiation**
- **Enzyme Assays and Kinetics**
- **Explant Culture of Neural Tissue**
- **FM Dyes in Vesicle Recycling**
- **Förster Resonance Energy Transfer (FRET)**
- **Gene Silencing with Morpholinos**
- **Genetic Crosses**
- **Histological Staining of Neural Tissue**
- **In ovo Electroporation of Chicken Embryos**
- **Induced Pluripotency**
- **Invasion Assay Using 3D Matrices**
- **Isolating Nucleic Acids from Yeast**
- **Live Cell Imaging of Mitosis**
- **Metabolic Labeling**
- **Molecular Cloning**
- **Murine In Utero Electroporation**
- **Neuronal Transfection Methods**
- **Passaging Cells**
- **Patch Clamp Electrophysiology**
- **Plasmid Purification**
- **Primary Neuronal Cultures**
- **Protein Crystallization**
- **Recombineering and Gene Targeting**
- **Reconstitution of Membrane Proteins**
- **Restriction Enzyme Digests**
- **Surface Plasmon Resonance (SPR)**

		<ul style="list-style-type: none"> • The ATP Bioluminescence Assay • The TUNEL Assay • The Transwell Migration Assay • The Western Blot • Tissue Regeneration with Somatic Stem Cells • Whole-Mount In Situ Hybridization • Yeast Maintenance • Yeast Reproduction • Yeast Transformation and Cloning
<p>BENCHMARK</p>	<p>9-10.4.2.</p>	<p>Structure and Function: Relate the functions of cells in multi-cellular organisms to their cell type (e.g., nerve cells, blood cells, guard cells)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Motility and Migration • An Introduction to Cellular and Molecular Neuroscience • An Introduction to Cognition • An Introduction to Developmental Genetics • An Introduction to Developmental Neurobiology • An Introduction to Endocytosis and Exocytosis • An Introduction to Modeling Behavioral Disorders and Stress • An Introduction to Molecular Developmental Biology • An Introduction to Motor Control • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • An Introduction to Organogenesis • An Introduction to Reward and Addiction • An Introduction to Stem Cell Biology • An Overview of Epigenetics • An Overview of Gene Expression • Ankle Exam • Anterograde Amnesia • Balance and Coordination Testing • C. elegans Development and Reproduction • Calcium Imaging in Neurons • Color Afterimages • Cranial Nerves Exam I (I-VI) • Cranial Nerves Exam II (VII-XII) • Crowding • DNA Methylation Analysis • Detecting Reactive Oxygen Species • Development and Reproduction of the Laboratory Mouse • Development of the Chick • Drosophila Larval IHC • Ear Exam • Elbow Exam

- **Electro-encephalography (EEG)**
- **Embryonic Stem Cell Culture and Differentiation**
- **Emergent Lateral Canthotomy and Inferior Catholysis**
- **Event-related Potentials and the Oddball Task**
- **Explant Culture for Developmental Studies**
- **Explant Culture of Neural Tissue**
- **Expression Profiling with Microarrays**
- **Eye Exam**
- **FM Dyes in Vesicle Recycling**
- **Fate Mapping**
- **Finding Your Blind Spot and Perceptual Filling-in**
- **Foot Exam**
- **Gene Silencing with Morpholinos**
- **Genetic Engineering of Model Organisms**
- **Hand and Wrist Exam**
- **Hip Exam**
- **Histological Staining of Neural Tissue**
- **Inattentional Blindness**
- **Induced Pluripotency**
- **Just-noticeable Differences**
- **Knee Exam**
- **Lower Back Exam**
- **MALDI-TOF Mass Spectrometry**
- **Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain**
- **Motion-induced Blindness**
- **Motor Exam I**
- **Motor Exam II**
- **Murine In Utero Electroporation**
- **Neck Exam**
- **Neuronal Transfection Methods**
- **Object Substitution Masking**
- **Ophthalmoscopic Examination**
- **Passaging Cells**
- **Patch Clamp Electrophysiology**
- **Physiological Correlates of Emotion Recognition**
- **Primary Neuronal Cultures**
- **RNA-Seq**
- **Rodent Stereotaxic Surgery**
- **Self-administration Studies**
- **Sensory Exam**
- **Shoulder Exam I**
- **Shoulder Exam II**
- **Spatial Cueing**
- **The Ames Room**
- **The Attentional Blink**
- **The ELISA Method**
- **The Inverted-face Effect**
- **The McGurk Effect**
- **The Rubber Hand Illusion**
- **The Split Brain**

		<ul style="list-style-type: none"> • The Staircase Procedure for Finding a Perceptual Threshold • The TUNEL Assay • Tissue Regeneration with Somatic Stem Cells • Transplantation Studies • Using Diffusion Tensor Imaging in Traumatic Brain Injury • Using TMS to Measure Motor Excitability During Action Observation • Whole-Mount In Situ Hybridization • Zebrafish Breeding and Embryo Handling • Zebrafish Reproduction and Development • fMRI: Functional Magnetic Resonance Imaging
BENCHMARK	9-10.4.3.	<p>Structure and Function: Explain the relationship between protein structure and function</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Cell Death • An Introduction to Cell Motility and Migration • An Introduction to Saccharomyces cerevisiae • An Overview of Epigenetics • An Overview of Gene Expression • Biofuels: Producing Ethanol from Cellulosic Material • Cell-surface Biotinylation Assay • Chromatin Immunoprecipitation • Co-Immunoprecipitation and Pull-Down Assays • DNA Ligation Reactions • Density Gradient Ultracentrifugation • Dialysis: Diffusion Based Separation • Drosophila Larval IHC • Electrophoretic Mobility Shift Assay (EMSA) • Enzyme Assays and Kinetics • FM Dyes in Vesicle Recycling • Förster Resonance Energy Transfer (FRET) • Genetic Engineering of Model Organisms • Introduction to Catalysis • Introduction to Mass Spectrometry • Invasion Assay Using 3D Matrices • Ion-Exchange Chromatography • Live Cell Imaging of Mitosis • MALDI-TOF Mass Spectrometry • Metabolic Labeling • Molecular Cloning • PCR: The Polymerase Chain Reaction • Photometric Protein Determination • Protein Crystallization • Reconstitution of Membrane Proteins • Restriction Enzyme Digests • Separating Protein with SDS-PAGE • Separation of Mixtures via Precipitation • Surface Plasmon Resonance (SPR)

		<ul style="list-style-type: none"> • Tandem Mass Spectrometry • The ELISA Method • The TUNEL Assay • The Transwell Migration Assay • The Western Blot • Two-Dimensional Gel Electrophoresis • Yeast Transformation and Cloning
<p>BENCHMARK</p>	<p>9-10.4.4.</p>	<p>Genetics and Reproduction: Relate DNA, genes, and chromosomes</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Aging and Regeneration • An Introduction to Caenorhabditis elegans • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cellular and Molecular Neuroscience • An Introduction to Developmental Genetics • An Introduction to Drosophila melanogaster • An Introduction to Molecular Developmental Biology • An Introduction to Organogenesis • An Introduction to Saccharomyces cerevisiae • An Introduction to Stem Cell Biology • An Introduction to Transfection • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Zebrafish: Danio rerio • An Overview of Epigenetics • An Overview of Gene Expression • An Overview of Genetic Analysis • An Overview of Genetic Engineering • An Overview of Genetics and Disease • Annexin V and Propidium Iodide Labeling • Bacterial Transformation: Electroporation • Bacterial Transformation: The Heat Shock Method • C. elegans Development and Reproduction • C. elegans Maintenance • Cell Cycle Analysis • Chick ex ovo Culture • Chromatin Immunoprecipitation • Community DNA Extraction from Bacterial Colonies • Cytogenetics • DNA Gel Electrophoresis • DNA Ligation Reactions • DNA Methylation Analysis • Density Gradient Ultracentrifugation • Detecting Environmental Microorganisms with the Polymerase Chain Reaction and Gel Electrophoresis • Development and Reproduction of the Laboratory Mouse • Drosophila melanogaster Embryo and Larva Harvesting and Preparation • Electrophoretic Mobility Shift Assay (EMSA)

		<ul style="list-style-type: none"> • Embryonic Stem Cell Culture and Differentiation • Enzyme Assays and Kinetics • Explant Culture for Developmental Studies • Expression Profiling with Microarrays • Fate Mapping • Förster Resonance Energy Transfer (FRET) • Gel Purification • Gene Silencing with Morpholinos • Genetic Crosses • Genetic Engineering of Model Organisms • Genetic Screens • Genome Editing • In ovo Electroporation of Chicken Embryos • Induced Pluripotency • Isolating Nucleic Acids from Yeast • Live Cell Imaging of Mitosis • Molecular Cloning • Mouse Genotyping • Neuronal Transfection Methods • PCR: The Polymerase Chain Reaction • Photometric Protein Determination • Plasmid Purification • Primary Neuronal Cultures • Protein Crystallization • Quantifying Environmental Microorganisms and Viruses Using qPCR • RNA Analysis of Environmental Samples Using RT-PCR • RNA-Seq • RNAi in <i>C. elegans</i> • Recombineering and Gene Targeting • Restriction Enzyme Digests • SNP Genotyping • Testing For Genetically Modified Foods • The TUNEL Assay • Tissue Regeneration with Somatic Stem Cells • Transplantation Studies • Two-Dimensional Gel Electrophoresis • Whole-Mount In Situ Hybridization • Yeast Maintenance • Yeast Transformation and Cloning • Zebrafish Breeding and Embryo Handling • Zebrafish Microinjection Techniques • Zebrafish Reproduction and Development
BENCHMARK	9-10.4.5.	<p>Genetics and Reproduction: Explain the relationship between spontaneous changes in DNA and a source of genetic variation</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Aging and Regeneration • An Introduction to <i>Caenorhabditis elegans</i> • An Introduction to Cell Death

		<ul style="list-style-type: none"> • An Introduction to Cell Division • An Introduction to Developmental Genetics • An Introduction to Drosophila melanogaster • An Introduction to Modeling Behavioral Disorders and Stress • An Introduction to Saccharomyces cerevisiae • An Introduction to Transfection • An Introduction to the Zebrafish: Danio rerio • An Overview of Epigenetics • An Overview of Gene Expression • An Overview of Genetic Analysis • An Overview of Genetics and Disease • C. elegans Development and Reproduction • Genetic Engineering of Model Organisms • Genetic Screens • Isolating Nucleic Acids from Yeast • Passaging Cells • SNP Genotyping • The TUNEL Assay • Yeast Reproduction • Zebrafish Maintenance and Husbandry
BENCHMARK	9-10.4.6.	<p>Genetics and Reproduction: Compare and contrast the results of mitosis and meiosis (i.e., mitosis involves a nuclear division that results in two daughter nuclei that are identical to the parent nucleus; meiosis involves two nuclear divisions that result in gametes cells containing half the number of chromosomes)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Cell Division • An Introduction to Saccharomyces cerevisiae • Cell Cycle Analysis • Genetic Crosses • Live Cell Imaging of Mitosis • Recombineering and Gene Targeting • Yeast Reproduction • Yeast Transformation and Cloning
BENCHMARK	9-10.4.7.	<p>Genetics and Reproduction: Apply the basic concepts of genetics to predict inherited traits (i.e., segregation, independent assortment, dominant and recessive traits)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Caenorhabditis elegans • An Introduction to Developmental Genetics • An Introduction to Drosophila melanogaster • An Overview of Epigenetics • An Overview of Genetic Analysis • An Overview of Genetics and Disease • C. elegans Development and Reproduction • DNA Methylation Analysis • Drosophila Development and Reproduction

		<ul style="list-style-type: none"> • Genetic Crosses • Genetic Screens • Mouse Genotyping
BENCHMARK	9-10.4.8.	<p>Natural Selection and Biological Evolution: Relate the concept of natural selection to its evolutionary consequences</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Overview of Genetic Analysis
BENCHMARK	9-10.4.9.	<p>Natural Selection and Biological Evolution: Identify evidence for evolution (e.g., fossil records, vestigial structures, similarities between organisms, and DNA)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Caenorhabditis elegans • An Introduction to Drosophila melanogaster • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Laboratory Mouse: Mus musculus • An Introduction to the Zebrafish: Danio rerio • An Overview of Genetic Analysis • Drosophila Development and Reproduction • Drosophila melanogaster Embryo and Larva Harvesting and Preparation • High-Performance Liquid Chromatography (HPLC)
BENCHMARK	9-10.4.11.	<p>Matter and Energy in Living Systems: Explain how matter and energy flow through living and nonliving components in an ecosystem (e.g., carbon cycle, water cycle, nitrogen cycle)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • An Overview of Alkenone Biomarker Analysis for Paleothermometry • An Overview of bGDGT Biomarker Analysis for Paleoclimatology • Analysis of Earthworm Populations in Soil • Bacterial Growth Curve Analysis and its Environmental Applications • Carbon and Nitrogen Analysis of Environmental Samples • Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry • Culturing and Enumerating Bacteria from Soil Samples • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction • Filamentous Fungi

		<ul style="list-style-type: none"> • Fundamentals of Breeding and Weaning • Metabolic Labeling • Nutrients in Aquatic Ecosystems • Purification of a Total Lipid Extract with Column Chromatography • Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry • Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium • Sonication Extraction of Lipid Biomarkers from Sediment • Soxhlet Extraction of Lipid Biomarkers from Sediment • Using GIS to Investigate Urban Forestry
BENCHMARK	9-10.4.12.	<p>Matter and Energy in Living Systems: Compare and contrast photosynthesis and cellular respiration</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Cell Metabolism • Biofuels: Producing Ethanol from Cellulosic Material • Detecting Reactive Oxygen Species • The ATP Bioluminescence Assay
CONTENT STANDARD	ND.5.	Earth and Space Science: Students understand the basic concepts and principles of earth and space science.
BENCHMARK	9-10.5.2.	<p>Earth's History: Relate the changes in the Earth's atmosphere to the evolution of photosynthetic life forms</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Overview of Alkenone Biomarker Analysis for Paleothermometry • An Overview of bGDGT Biomarker Analysis for Paleoclimatology • Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry • Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction • Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry • Sonication Extraction of Lipid Biomarkers from Sediment • Soxhlet Extraction of Lipid Biomarkers from Sediment
BENCHMARK	9-10.5.4.	<p>Geologic Processes, Human Activities, and the Environment: Identify the short-term and long-term effects of physical processes (e.g., plate tectonics, extreme weather phenomenon) on the environment and society</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Igneous Intrusive Rock • Igneous Volcanic Rock • Making a Geologic Cross Section

		<ul style="list-style-type: none"> • Turbidity and Total Solids in Surface Water • Using Topographic Maps to Generate Topographic Profiles
BENCHMARK	9-10.5.5.	<p>Geologic Processes, Human Activities, and the Environment: Analyze how evidence of past natural hazards and geologic events has predicted subsequent hazards and events (e.g. Gap time method to predict earthquakes and tsunamis)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Igneous Volcanic Rock
BENCHMARK	9-10.5.6.	<p>Geologic Processes, Human Activities, and the Environment: Explain the effects of human activities (e.g., dams, levees, farming practices, deforestation, land-use practices, land-management strategies) on the environment</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Introduction to Mass Spectrometry • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Making a Geologic Cross Section • Measuring Tropospheric Ozone • Nutrients in Aquatic Ecosystems • Proton Exchange Membrane Fuel Cells • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Turbidity and Total Solids in Surface Water • Water Quality Analysis via Indicator Organisms
CONTENT STANDARD	ND.6.	Science and Technology: Students understand relations between science and technology.
BENCHMARK	9-10.6.1.	<p>Technological Design: Use appropriate technologies and techniques to solve a problem (e.g., computer-assisted tools, Internet, research skills)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Working in the Hood • An Introduction to the Centrifuge • An Introduction to the Micropipettor • Common Lab Glassware and Uses • Freezing-Point Depression to Determine an Unknown Compound • Histological Sample Preparation for Light Microscopy • Introduction to Fluorescence Microscopy • Introduction to Light Microscopy • Introduction to Serological Pipettes and Pipettors

		<ul style="list-style-type: none"> • Introduction to the Bunsen Burner • Introduction to the Microplate Reader • Introduction to the Spectrophotometer • Making Solutions in the Laboratory • Measuring Mass in the Laboratory • Regulating Temperature in the Lab: Applying Heat • Regulating Temperature in the Lab: Preserving Samples Using Cold • Understanding Concentration and Measuring Volumes
<p>BENCHMARK</p>	<p>9-10.6.2.</p>	<p>Technological Design: Explain how scientific principles have been used to create common technologies (e.g., household appliances, automotive parts, agricultural equipment, textiles, fabrics, computers, Internet resources, CD-ROMs)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Abdominal Exam I: Inspection and Auscultation • Abdominal Exam IV: Acute Abdominal Pain Assessment • Algae Enumeration via Culturable Methodology • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cell Motility and Migration • An Introduction to Cognition • An Introduction to Developmental Neurobiology • An Introduction to Drosophila melanogaster • An Introduction to Endocytosis and Exocytosis • An Introduction to Learning and Memory • An Introduction to Motor Control • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • An Introduction to Organogenesis • An Introduction to Reward and Addiction • An Introduction to Saccharomyces cerevisiae • An Introduction to Stem Cell Biology • An Introduction to Transfection • An Introduction to the Centrifuge • An Introduction to the Laboratory Mouse: Mus musculus • An Introduction to the Micropipettor • An Overview of Alkenone Biomarker Analysis for Paleothermometry • An Overview of Epigenetics • An Overview of Genetic Analysis • An Overview of Genetic Engineering • An Overview of Genetics and Disease • An Overview of bGDGT Biomarker Analysis for Paleoclimatology

- Anesthesia Induction and Maintenance
- Annexin V and Propidium Iodide Labeling
- Arterial Line Placement
- Assembly of a Reflux System for Heated Chemical Reactions
- Auscultation
- Bacterial Growth Curve Analysis and its Environmental Applications
- Bacterial Transformation: Electroporation
- Bacterial Transformation: The Heat Shock Method
- Basic Life Support: Cardiopulmonary Resuscitation and Defibrillation
- Biofuels: Producing Ethanol from Cellulosic Material
- Blood Pressure Measurement
- Blood Withdrawal I
- Blood Withdrawal II
- Calcium Imaging in Neurons
- Calibration Curves
- Capillary Electrophoresis (CE)
- Carbon and Nitrogen Analysis of Environmental Samples
- Cardiac Exam II: Auscultation
- Cardiac Exam III: Abnormal Heart Sounds
- Cell Cycle Analysis
- Cell-surface Biotinylation Assay
- Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance
- Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance
- Central Venous Catheter Insertion: Subclavian Vein
- Chromatin Immunoprecipitation
- Chromatography-Based Biomolecule Purification Methods
- Co-Immunoprecipitation and Pull-Down Assays
- Color Afterimages
- Column Chromatography
- Common Lab Glassware and Uses
- Community DNA Extraction from Bacterial Colonies
- Compound Administration I
- Compound Administration II
- Compound Administration III
- Compound Administration IV
- Conducting Reactions Below Room Temperature
- Considerations for Rodent Surgery
- Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry
- Coordination Chemistry Complexes
- Cranial Nerves Exam I (I-VI)
- Cranial Nerves Exam II (VII-XII)
- Crowding
- Culturing and Enumerating Bacteria from Soil Samples

- Cyclic Voltammetry (CV)
- Cytogenetics
- DNA Gel Electrophoresis
- DNA Ligation Reactions
- DNA Methylation Analysis
- Decision-making and the Iowa Gambling Task
- Decoding Auditory Imagery with Multivoxel Pattern Analysis
- Degassing Liquids with Freeze-Pump-Thaw Cycling
- Density Gradient Ultracentrifugation
- Detecting Environmental Microorganisms with the Polymerase Chain Reaction and Gel Electrophoresis
- Detecting Reactive Oxygen Species
- Detection of Bacteriophages in Environmental Samples
- Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy
- Determining Rate Laws and the Order of Reaction
- Determining Spatial Orientation of Rock Layers with the Brunton Compass
- Determining the Density of a Solid and Liquid
- Determining the Empirical Formula
- Determining the Mass Percent Composition in an Aqueous Solution
- Determining the Solubility Rules of Ionic Compounds
- Diagnostic Necropsy and Tissue Harvest
- Dialysis: Diffusion Based Separation
- Dissolved Oxygen in Surface Water
- Ear Exam
- Electro-encephalography (EEG)
- Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat
- Electrophoretic Mobility Shift Assay (EMSA)
- Embryonic Stem Cell Culture and Differentiation
- Emergency Tube Thoracostomy (Chest Tube Placement)
- Emergent Lateral Canthotomy and Inferior Catholysis
- Enzyme Assays and Kinetics
- Event-related Potentials and the Oddball Task
- Explant Culture of Neural Tissue
- Expression Profiling with Microarrays
- Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction
- Eye Exam
- Eye Tracking in Cognitive Experiments
- FM Dyes in Vesicle Recycling
- Fate Mapping
- Fear Conditioning
- Finding Your Blind Spot and Perceptual Filling-in
- Fractional Distillation
- Freezing-Point Depression to Determine an Unknown Compound

- Förster Resonance Energy Transfer (FRET)
- Gas Chromatography (GC) with Flame-Ionization Detection
- Gel Purification
- General Approach to the Physical Exam
- Genetic Crosses
- Genetic Engineering of Model Organisms
- Genetic Screens
- Genome Editing
- Gram Staining of Bacteria from Environmental Sources
- Growing Crystals for X-ray Diffraction Analysis
- High-Performance Liquid Chromatography (HPLC)
- Histological Sample Preparation for Light Microscopy
- Histological Staining of Neural Tissue
- Ideal Gas Law
- Induced Pluripotency
- Internal Standards
- Intra-articular Shoulder Injection for Reduction Following Anterior Shoulder Dislocation
- Intraosseous Needle Placement
- Introduction to Catalysis
- Introduction to Fluorescence Microscopy
- Introduction to Light Microscopy
- Introduction to Mass Spectrometry
- Introduction to Serological Pipettes and Pipettors
- Introduction to Titration
- Introduction to the Spectrophotometer
- Invasion Assay Using 3D Matrices
- Ion-Exchange Chromatography
- Isolation of Fecal Bacteria from Water Samples by Filtration
- Language: The N400 in Semantic Incongruity
- Le Châtelier's Principle
- Lead Analysis of Soil Using Atomic Absorption Spectroscopy
- Learning and Memory: The Remember-Know Task
- Live Cell Imaging of Mitosis
- MALDI-TOF Mass Spectrometry
- Making Solutions in the Laboratory
- Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain
- Measuring Mass in the Laboratory
- Measuring Tropospheric Ozone
- Measuring Vital Signs
- Metabolic Labeling
- Method of Standard Addition
- Molecular Cloning
- Motion-induced Blindness
- Motor Exam II
- Motor Maps
- Murine In Utero Electroporation

- Needle Thoracostomy (needle Decompression) for Temporizing Tension Pneumothorax Treatment
- Nose, Sinuses, Oral Cavity and Pharynx Exam
- Nuclear Magnetic Resonance (NMR) Spectroscopy
- Nutrients in Aquatic Ecosystems
- Object Substitution Masking
- Ophthalmoscopic Examination
- PCR: The Polymerase Chain Reaction
- Passaging Cells
- Patch Clamp Electrophysiology
- Pelvic Exam II: Speculum Exam
- Pelvic Exam III: Bimanual and Rectovaginal Exam
- Percussion
- Percutaneous Cricothyrotomy (Seldinger Technique)
- Performing 1D Thin Layer Chromatography
- Pericardiocentesis
- Peripheral Vascular Exam
- Peripheral Vascular Exam Using a Continuous Wave Doppler
- Peripheral Venous Cannulation
- Photometric Protein Determination
- Physical Properties Of Minerals I: Crystals and Cleavage
- Physical Properties Of Minerals II: Polymineralic Analysis
- Physiological Correlates of Emotion Recognition
- Plasmid Purification
- Positive Reinforcement Studies
- Preparing Anhydrous Reagents and Equipment
- Protein Crystallization
- Proton Exchange Membrane Fuel Cells
- Purification of a Total Lipid Extract with Column Chromatography
- Purifying Compounds by Recrystallization
- Quantifying Environmental Microorganisms and Viruses Using qPCR
- RNA-Seq
- Raman Spectroscopy for Chemical Analysis
- Recombineering and Gene Targeting
- Reconstitution of Membrane Proteins
- Regulating Temperature in the Lab: Applying Heat
- Regulating Temperature in the Lab: Preserving Samples Using Cold
- Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry
- Respiratory Exam II: Percussion and Auscultation
- Restriction Enzyme Digests
- Rodent Stereotaxic Surgery
- Rotary Evaporation to Remove Solvent
- SNP Genotyping
- Sample Preparation for Analytical Preparation
- Scanning Electron Microscopy (SEM)

		<ul style="list-style-type: none"> • Schlenk Lines Transfer of Solvents • Self-administration Studies • Separating Protein with SDS-PAGE • Separation of Mixtures via Precipitation • Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium • Solid-Liquid Extraction • Solutions and Concentrations • Sonication Extraction of Lipid Biomarkers from Sediment • Soxhlet Extraction of Lipid Biomarkers from Sediment • Spatial Cueing • Spectrophotometric Determination of an Equilibrium Constant • Sterile Tissue Harvest • Surface Plasmon Resonance (SPR) • Surgical Cricothyrotomy • Tandem Mass Spectrometry • Testing For Genetically Modified Foods • The ATP Bioluminescence Assay • The Attentional Blink • The ELISA Method • The Ideal Gas Law • The Rubber Hand Illusion • The TUNEL Assay • The Transwell Migration Assay • The Western Blot • Tissue Regeneration with Somatic Stem Cells • Transplantation Studies • Turbidity and Total Solids in Surface Water • Two-Dimensional Gel Electrophoresis • Ultraviolet-Visible (UV-Vis) Spectroscopy • Understanding Concentration and Measuring Volumes • Using Differential Scanning Calorimetry to Measure Changes in Enthalpy • Using Diffusion Tensor Imaging in Traumatic Brain Injury • Using GIS to Investigate Urban Forestry • Using TMS to Measure Motor Excitability During Action Observation • Using a pH Meter • Visual Attention: fMRI Investigation of Object-based Attentional Control • X-ray Fluorescence (XRF) • Yeast Transformation and Cloning • fMRI: Functional Magnetic Resonance Imaging
BENCHMARK	9-10.6.3.	<p>Technology and Society: Explain how emerging technologies (e.g., genetic manipulation, biofuels, and hydrogen fuels) may impact society and the environment</p> <p><u>JoVE</u></p>

- Abdominal Exam I: Inspection and Auscultation
- Abdominal Exam IV: Acute Abdominal Pain Assessment
- Algae Enumeration via Culturable Methodology
- An Introduction to Aging and Regeneration
- An Introduction to Behavioral Neuroscience
- An Introduction to Cell Death
- An Introduction to Cell Division
- An Introduction to Cell Metabolism
- An Introduction to Cell Motility and Migration
- An Introduction to Cognition
- An Introduction to Developmental Neurobiology
- An Introduction to Drosophila melanogaster
- An Introduction to Endocytosis and Exocytosis
- An Introduction to Learning and Memory
- An Introduction to Motor Control
- An Introduction to Neuroanatomy
- An Introduction to Neurophysiology
- An Introduction to Organogenesis
- An Introduction to Reward and Addiction
- An Introduction to Saccharomyces cerevisiae
- An Introduction to Stem Cell Biology
- An Introduction to Transfection
- An Introduction to the Centrifuge
- An Introduction to the Laboratory Mouse: Mus musculus
- An Introduction to the Micropipettor
- An Overview of Alkenone Biomarker Analysis for Paleothermometry
- An Overview of Epigenetics
- An Overview of Genetic Analysis
- An Overview of Genetic Engineering
- An Overview of Genetics and Disease
- An Overview of bGDGT Biomarker Analysis for Paleoclimatology
- Anesthesia Induction and Maintenance
- Annexin V and Propidium Iodide Labeling
- Arterial Line Placement
- Assembly of a Reflux System for Heated Chemical Reactions
- Auscultation
- Bacterial Growth Curve Analysis and its Environmental Applications
- Bacterial Transformation: Electroporation
- Bacterial Transformation: The Heat Shock Method
- Basic Life Support: Cardiopulmonary Resuscitation and Defibrillation
- Biofuels: Producing Ethanol from Cellulosic Material
- Blood Pressure Measurement
- Blood Withdrawal I
- Blood Withdrawal II

- Calcium Imaging in Neurons
- Calibration Curves
- Capillary Electrophoresis (CE)
- Carbon and Nitrogen Analysis of Environmental Samples
- Cardiac Exam II: Auscultation
- Cardiac Exam III: Abnormal Heart Sounds
- Cell Cycle Analysis
- Cell-surface Biotinylation Assay
- Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance
- Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance
- Central Venous Catheter Insertion: Subclavian Vein
- Chromatin Immunoprecipitation
- Chromatography-Based Biomolecule Purification Methods
- Co-Immunoprecipitation and Pull-Down Assays
- Color Afterimages
- Column Chromatography
- Common Lab Glassware and Uses
- Community DNA Extraction from Bacterial Colonies
- Compound Administration I
- Compound Administration II
- Compound Administration III
- Compound Administration IV
- Conducting Reactions Below Room Temperature
- Considerations for Rodent Surgery
- Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry
- Coordination Chemistry Complexes
- Cranial Nerves Exam I (I-VI)
- Cranial Nerves Exam II (VII-XII)
- Crowding
- Culturing and Enumerating Bacteria from Soil Samples
- Cyclic Voltammetry (CV)
- Cytogenetics
- DNA Gel Electrophoresis
- DNA Ligation Reactions
- DNA Methylation Analysis
- Decision-making and the Iowa Gambling Task
- Decoding Auditory Imagery with Multivoxel Pattern Analysis
- Degassing Liquids with Freeze-Pump-Thaw Cycling
- Density Gradient Ultracentrifugation
- Detecting Environmental Microorganisms with the Polymerase Chain Reaction and Gel Electrophoresis
- Detecting Reactive Oxygen Species
- Detection of Bacteriophages in Environmental Samples
- Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy

- Determining Rate Laws and the Order of Reaction
- Determining Spatial Orientation of Rock Layers with the Brunton Compass
- Determining the Density of a Solid and Liquid
- Determining the Empirical Formula
- Determining the Mass Percent Composition in an Aqueous Solution
- Determining the Solubility Rules of Ionic Compounds
- Diagnostic Necropsy and Tissue Harvest
- Dialysis: Diffusion Based Separation
- Dissolved Oxygen in Surface Water
- Ear Exam
- Electro-encephalography (EEG)
- Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat
- Electrophoretic Mobility Shift Assay (EMSA)
- Embryonic Stem Cell Culture and Differentiation
- Emergency Tube Thoracostomy (Chest Tube Placement)
- Emergent Lateral Canthotomy and Inferior Catholysis
- Enzyme Assays and Kinetics
- Event-related Potentials and the Oddball Task
- Explant Culture of Neural Tissue
- Expression Profiling with Microarrays
- Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction
- Eye Exam
- Eye Tracking in Cognitive Experiments
- FM Dyes in Vesicle Recycling
- Fate Mapping
- Fear Conditioning
- Finding Your Blind Spot and Perceptual Filling-in
- Fractional Distillation
- Freezing-Point Depression to Determine an Unknown Compound
- Förster Resonance Energy Transfer (FRET)
- Gas Chromatography (GC) with Flame-Ionization Detection
- Gel Purification
- General Approach to the Physical Exam
- Genetic Crosses
- Genetic Engineering of Model Organisms
- Genetic Screens
- Genome Editing
- Gram Staining of Bacteria from Environmental Sources
- Growing Crystals for X-ray Diffraction Analysis
- High-Performance Liquid Chromatography (HPLC)
- Histological Sample Preparation for Light Microscopy
- Histological Staining of Neural Tissue
- Ideal Gas Law
- Induced Pluripotency

- Internal Standards
- Intra-articular Shoulder Injection for Reduction Following Anterior Shoulder Dislocation
- Intraosseous Needle Placement
- Introduction to Catalysis
- Introduction to Fluorescence Microscopy
- Introduction to Light Microscopy
- Introduction to Mass Spectrometry
- Introduction to Serological Pipettes and Pipettors
- Introduction to Titration
- Introduction to the Spectrophotometer
- Invasion Assay Using 3D Matrices
- Ion-Exchange Chromatography
- Isolation of Fecal Bacteria from Water Samples by Filtration
- Language: The N400 in Semantic Incongruity
- Le Châtelier's Principle
- Lead Analysis of Soil Using Atomic Absorption Spectroscopy
- Learning and Memory: The Remember-Know Task
- Live Cell Imaging of Mitosis
- MALDI-TOF Mass Spectrometry
- Making Solutions in the Laboratory
- Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain
- Measuring Mass in the Laboratory
- Measuring Tropospheric Ozone
- Measuring Vital Signs
- Metabolic Labeling
- Method of Standard Addition
- Molecular Cloning
- Motion-induced Blindness
- Motor Exam II
- Motor Maps
- Murine In Utero Electroporation
- Needle Thoracostomy (needle Decompression) for Temporizing Tension Pneumothorax Treatment
- Nose, Sinuses, Oral Cavity and Pharynx Exam
- Nuclear Magnetic Resonance (NMR) Spectroscopy
- Nutrients in Aquatic Ecosystems
- Object Substitution Masking
- Ophthalmoscopic Examination
- PCR: The Polymerase Chain Reaction
- Passaging Cells
- Patch Clamp Electrophysiology
- Pelvic Exam II: Speculum Exam
- Pelvic Exam III: Bimanual and Rectovaginal Exam
- Percussion
- Percutaneous Cricothyrotomy (Seldinger Technique)
- Performing 1D Thin Layer Chromatography
- Pericardiocentesis

- Peripheral Vascular Exam
- Peripheral Vascular Exam Using a Continuous Wave Doppler
- Peripheral Venous Cannulation
- Photometric Protein Determination
- Physical Properties Of Minerals I: Crystals and Cleavage
- Physical Properties Of Minerals II: Polymineralic Analysis
- Physiological Correlates of Emotion Recognition
- Plasmid Purification
- Positive Reinforcement Studies
- Preparing Anhydrous Reagents and Equipment
- Protein Crystallization
- Proton Exchange Membrane Fuel Cells
- Purification of a Total Lipid Extract with Column Chromatography
- Purifying Compounds by Recrystallization
- Quantifying Environmental Microorganisms and Viruses Using qPCR
- RNA-Seq
- Raman Spectroscopy for Chemical Analysis
- Recombineering and Gene Targeting
- Reconstitution of Membrane Proteins
- Regulating Temperature in the Lab: Applying Heat
- Regulating Temperature in the Lab: Preserving Samples Using Cold
- Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry
- Respiratory Exam II: Percussion and Auscultation
- Restriction Enzyme Digests
- Rodent Stereotaxic Surgery
- Rotary Evaporation to Remove Solvent
- SNP Genotyping
- Sample Preparation for Analytical Preparation
- Scanning Electron Microscopy (SEM)
- Schlenk Lines Transfer of Solvents
- Self-administration Studies
- Separating Protein with SDS-PAGE
- Separation of Mixtures via Precipitation
- Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium
- Solid-Liquid Extraction
- Solutions and Concentrations
- Sonication Extraction of Lipid Biomarkers from Sediment
- Soxhlet Extraction of Lipid Biomarkers from Sediment
- Spatial Cueing
- Spectrophotometric Determination of an Equilibrium Constant
- Sterile Tissue Harvest
- Surface Plasmon Resonance (SPR)

		<ul style="list-style-type: none"> • Surgical Cricothyrotomy • Tandem Mass Spectrometry • Testing For Genetically Modified Foods • The ATP Bioluminescence Assay • The Attentional Blink • The ELISA Method • The Ideal Gas Law • The Rubber Hand Illusion • The TUNEL Assay • The Transwell Migration Assay • The Western Blot • Tissue Regeneration with Somatic Stem Cells • Transplantation Studies • Turbidity and Total Solids in Surface Water • Two-Dimensional Gel Electrophoresis • Ultraviolet-Visible (UV-Vis) Spectroscopy • Understanding Concentration and Measuring Volumes • Using Differential Scanning Calorimetry to Measure Changes in Enthalpy • Using Diffusion Tensor Imaging in Traumatic Brain Injury • Using GIS to Investigate Urban Forestry • Using TMS to Measure Motor Excitability During Action Observation • Using a pH Meter • Visual Attention: fMRI Investigation of Object-based Attentional Control • X-ray Fluorescence (XRF) • Yeast Transformation and Cloning • fMRI: Functional Magnetic Resonance Imaging
CONTENT STANDARD	ND.7.	Science and Other Areas: Students understand relations between science and personal, social, and environmental issues.
BENCHMARK	9-10.7.1.	<p>Science and Personal Health: Explain how personal health is related to fitness, substance abuse, sexual activity, and nutrition</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Abdominal Exam I: Inspection and Auscultation • Abdominal Exam II: Percussion • Abdominal Exam III: Palpation • Abdominal Exam IV: Acute Abdominal Pain Assessment • An Introduction to Reward and Addiction • Ankle Exam • Arterial Line Placement • Auscultation • Basic Life Support Part II: Airway/Breathing and Continued Cardiopulmonary Resuscitation • Basic Life Support: Cardiopulmonary Resuscitation and Defibrillation

- **Blood Pressure Measurement**
- **Cardiac Exam I: Inspection and Palpation**
- **Cardiac Exam II: Auscultation**
- **Cardiac Exam III: Abnormal Heart Sounds**
- **Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance**
- **Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance**
- **Central Venous Catheter Insertion: Subclavian Vein**
- **Comprehensive Breast Exam**
- **Cranial Nerves Exam I (I-VI)**
- **Cranial Nerves Exam II (VII-XII)**
- **Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy**
- **Ear Exam**
- **Elbow Exam**
- **Emergency Tube Thoracostomy (Chest Tube Placement)**
- **Emergent Lateral Canthotomy and Inferior Catholysis**
- **Eye Exam**
- **Foot Exam**
- **General Approach to the Physical Exam**
- **Hand and Wrist Exam**
- **Hip Exam**
- **Intra-articular Shoulder Injection for Reduction Following Anterior Shoulder Dislocation**
- **Intraosseous Needle Placement**
- **Knee Exam**
- **Lead Analysis of Soil Using Atomic Absorption Spectroscopy**
- **Lower Back Exam**
- **Lymph Node Exam**
- **Male Rectal Exam**
- **Measuring Tropospheric Ozone**
- **Measuring Vital Signs**
- **Motor Exam I**
- **Motor Exam II**
- **Neck Exam**
- **Needle Thoracostomy (needle Decompression) for Temporizing Tension Pneumothorax Treatment**
- **Nose, Sinuses, Oral Cavity and Pharynx Exam**
- **Observation and Inspection**
- **Ophthalmoscopic Examination**
- **Palpation**
- **Pelvic Exam I: Assessment of the External Genitalia**
- **Pelvic Exam II: Speculum Exam**
- **Pelvic Exam III: Bimanual and Rectovaginal Exam**
- **Percussion**
- **Percutaneous Cricothyrotomy (Seldinger Technique)**
- **Pericardiocentesis**
- **Peripheral Vascular Exam**
- **Peripheral Vascular Exam Using a Continuous Wave**

		<p>Doppler</p> <ul style="list-style-type: none"> • Peripheral Venous Cannulation • Proper Adjustment of Patient Attire during the Physical Exam • Respiratory Exam I: Inspection and Palpation • Respiratory Exam II: Percussion and Auscultation • Self-administration Studies • Sensory Exam • Shoulder Exam I • Shoulder Exam II • Surgical Cricothyrotomy • Thyroid Exam • Verbal Priming • Whole-Mount In Situ Hybridization
BENCHMARK	9-10.7.2.	<p>Science and Environmental Issues: Identify factors that affect populations (e.g., food webs, carrying capacity, overpopulation, disease, food supply, algal blooms, resources, conservation practices)</p> <p>JoVE</p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Laboratory Mouse: Mus musculus • An Introduction to the Zebrafish: Danio rerio • Analysis of Earthworm Populations in Soil • Aseptic Technique in Environmental Science • Bacterial Growth Curve Analysis and its Environmental Applications • Bacterial Transformation: Electroporation • Bacterial Transformation: The Heat Shock Method • Basic Mouse Care and Maintenance • C. elegans Maintenance • Culturing and Enumerating Bacteria from Soil Samples • Detection of Bacteriophages in Environmental Samples • Dissolved Oxygen in Surface Water • Drosophila Maintenance • Drosophila melanogaster Embryo and Larva Harvesting and Preparation • Filamentous Fungi • Isolation of Fecal Bacteria from Water Samples by Filtration • Nutrients in Aquatic Ecosystems • Passaging Cells • Plasmid Purification • Quantifying Environmental Microorganisms and Viruses Using qPCR • Self-report vs. Behavioral Measures of Recycling • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Using GIS to Investigate Urban Forestry

		<ul style="list-style-type: none"> • Yeast Maintenance • Yeast Reproduction
CONTENT STANDARD	ND.8.	History and Nature of Science: Students understand the history and nature of science.
BENCHMARK	9-10.8.3.	<p>People in Science: Explain how individuals and groups, from different disciplines in and outside of science, contribute to science at different levels of complexity</p> <p>JoVE</p> <ul style="list-style-type: none"> • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cell Motility and Migration • An Introduction to Developmental Genetics • An Introduction to Developmental Neurobiology • An Introduction to Drosophila melanogaster • An Introduction to Endocytosis and Exocytosis • An Introduction to Molecular Developmental Biology • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • An Introduction to Organogenesis • An Introduction to Saccharomyces cerevisiae • An Introduction to Stem Cell Biology • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Laboratory Mouse: Mus musculus • An Introduction to the Zebrafish: Danio rerio • An Overview of Epigenetics • An Overview of Gene Expression • An Overview of Genetic Analysis • An Overview of Genetic Engineering • An Overview of Genetics and Disease • Anterograde Amnesia • Genetic Crosses • Ideal Gas Law • Invasion Assay Using 3D Matrices • Le Châtelier's Principle • Measuring Reaction Time and Donders' Method of Subtraction • Perspectives on Experimental Psychology • Perspectives on Neuropsychology • Perspectives on Sensation and Perception • Piaget's Conservation Task and the Influence of Task Demands • Rotary Evaporation to Remove Solvent • The Ideal Gas Law • The Split Brain • The Transwell Migration Assay

		<ul style="list-style-type: none"> • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy
BENCHMARK	9-10.8.4.	<p>Scientific Knowledge: Identify theories that have changed over time (e.g., alchemy, atomic structure, model of the solar system)</p> <p>JoVE</p> <ul style="list-style-type: none"> • Abdominal Exam II: Percussion • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cell Motility and Migration • An Introduction to Developmental Genetics • An Introduction to Developmental Neurobiology • An Introduction to Drosophila melanogaster • An Introduction to Endocytosis and Exocytosis • An Introduction to Learning and Memory • An Introduction to Molecular Developmental Biology • An Introduction to Neuroanatomy • An Introduction to Neurophysiology • An Introduction to Organogenesis • An Introduction to Saccharomyces cerevisiae • An Introduction to Stem Cell Biology • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Laboratory Mouse: Mus musculus • An Introduction to the Zebrafish: Danio rerio • An Overview of Epigenetics • An Overview of Gene Expression • An Overview of Genetic Analysis • An Overview of Genetic Engineering • An Overview of Genetics and Disease • Anterograde Amnesia • Auscultation • C. elegans Maintenance • Cell Cycle Analysis • Color Afterimages • Degassing Liquids with Freeze-Pump-Thaw Cycling • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Development of the Chick • Drosophila Maintenance • General Approach to the Physical Exam • Genetic Crosses • Ideal Gas Law • Inattentional Blindness • Le Châtelier's Principle • Making a Geologic Cross Section

		<ul style="list-style-type: none"> • Measuring Reaction Time and Donders' Method of Subtraction • Motion-induced Blindness • Object Substitution Masking • Passaging Cells • Percussion • Piaget's Conservation Task and the Influence of Task Demands • Rotary Evaporation to Remove Solvent • Schlenk Lines Transfer of Solvents • Spatial Cueing • The Attentional Blink • The Ideal Gas Law • The Rubber Hand Illusion • The Split Brain • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Yeast Transformation and Cloning
BENCHMARK	9-10.8.5.	<p>Science and Society: Explain how views and attitudes have influenced the development of science (e.g., religion, previous knowledge, cultural tradition, superstition, folklore, legends)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Introduction to Cell Death • An Introduction to Endocytosis and Exocytosis • An Overview of Genetic Analysis

Grade: 9 - Adopted: 2011

CONTENT STANDARD	ND.CC.9-10.RST.	Reading Standards for Information Literacy in Science and Technical Subjects
BENCHMARK		Craft and Structure
GRADE LEVEL EXPECTATION	9-10.RST.4.	<p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Abdominal Exam I: Inspection and Auscultation • Abdominal Exam II: Percussion • Abdominal Exam III: Palpation • Abdominal Exam IV: Acute Abdominal Pain Assessment • Algae Enumeration via Culturable Methodology • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cell Motility and Migration

- **An Introduction to Cellular and Molecular Neuroscience**
- **An Introduction to Cognition**
- **An Introduction to Developmental Genetics**
- **An Introduction to Developmental Neurobiology**
- **An Introduction to Drosophila melanogaster**
- **An Introduction to Endocytosis and Exocytosis**
- **An Introduction to Learning and Memory**
- **An Introduction to Modeling Behavioral Disorders and Stress**
- **An Introduction to Molecular Developmental Biology**
- **An Introduction to Motor Control**
- **An Introduction to Neuroanatomy**
- **An Introduction to Neurophysiology**
- **An Introduction to Organogenesis**
- **An Introduction to Reward and Addiction**
- **An Introduction to Saccharomyces cerevisiae**
- **An Introduction to Stem Cell Biology**
- **An Introduction to Transfection**
- **An Introduction to Working in the Hood**
- **An Introduction to the Centrifuge**
- **An Introduction to the Chick: Gallus gallus domesticus**
- **An Introduction to the Laboratory Mouse: Mus musculus**
- **An Introduction to the Micropipettor**
- **An Introduction to the Zebrafish: Danio rerio**
- **An Overview of Alkenone Biomarker Analysis for Paleothermometry**
- **An Overview of Epigenetics**
- **An Overview of Gene Expression**
- **An Overview of Genetic Analysis**
- **An Overview of Genetic Engineering**
- **An Overview of Genetics and Disease**
- **An Overview of bGDGT Biomarker Analysis for Paleoclimatology**
- **Analysis of Earthworm Populations in Soil**
- **Anesthesia Induction and Maintenance**
- **Ankle Exam**
- **Annexin V and Propidium Iodide Labeling**
- **Anterograde Amnesia**
- **Anxiety Testing**
- **Approximate Number Sense Test**
- **Are You Smart or Hardworking? How Praise Influences Children's Motivation**
- **Arterial Line Placement**
- **Aseptic Technique in Environmental Science**
- **Assembly of a Reflux System for Heated Chemical Reactions**
- **Assessing Dexterity with Reaching Tasks**
- **Auscultation**
- **Bacterial Growth Curve Analysis and its Environmental Applications**
- **Bacterial Transformation: Electroporation**

- **Bacterial Transformation: The Heat Shock Method**
- **Balance and Coordination Testing**
- **Basic Care Procedures**
- **Basic Chick Care and Maintenance**
- **Basic Life Support Part II: Airway/Breathing and Continued Cardiopulmonary Resuscitation**
- **Basic Life Support: Cardiopulmonary Resuscitation and Defibrillation**
- **Basic Mouse Care and Maintenance**
- **Binocular Rivalry**
- **Biofuels: Producing Ethanol from Cellulosic Material**
- **Blood Pressure Measurement**
- **Blood Withdrawal I**
- **Blood Withdrawal II**
- **C. elegans Chemotaxis Assay**
- **C. elegans Development and Reproduction**
- **C. elegans Maintenance**
- **Calcium Imaging in Neurons**
- **Calibration Curves**
- **Capillary Electrophoresis (CE)**
- **Carbon and Nitrogen Analysis of Environmental Samples**
- **Cardiac Exam I: Inspection and Palpation**
- **Cardiac Exam II: Auscultation**
- **Cardiac Exam III: Abnormal Heart Sounds**
- **Categories and Inductive Inferences**
- **Cell Cycle Analysis**
- **Cell-surface Biotinylation Assay**
- **Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance**
- **Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance**
- **Central Venous Catheter Insertion: Subclavian Vein**
- **Chick ex ovo Culture**
- **Children's Reliance on Artist Intentions When Identifying Pictures**
- **Chromatin Immunoprecipitation**
- **Chromatography-Based Biomolecule Purification Methods**
- **Co-Immunoprecipitation and Pull-Down Assays**
- **Color Afterimages**
- **Column Chromatography**
- **Common Lab Glassware and Uses**
- **Community DNA Extraction from Bacterial Colonies**
- **Compound Administration I**
- **Compound Administration II**
- **Compound Administration III**
- **Compound Administration IV**
- **Comprehensive Breast Exam**
- **Conducting Reactions Below Room Temperature**
- **Considerations for Rodent Surgery**
- **Conversion of Fatty Acid Methyl Esters by**

Saponification for Uk'37 Paleothermometry

- Coordination Chemistry Complexes
- Cranial Nerves Exam I (I-VI)
- Cranial Nerves Exam II (VII-XII)
- Crowding
- Culturing and Enumerating Bacteria from Soil Samples
- Cyclic Voltammetry (CV)
- Cytogenetics
- DNA Gel Electrophoresis
- DNA Ligation Reactions
- DNA Methylation Analysis
- Decision-making and the Iowa Gambling Task
- Decoding Auditory Imagery with Multivoxel Pattern Analysis
- Degassing Liquids with Freeze-Pump-Thaw Cycling
- Density Gradient Ultracentrifugation
- Detecting Environmental Microorganisms with the Polymerase Chain Reaction and Gel Electrophoresis
- Detecting Reactive Oxygen Species
- Detection of Bacteriophages in Environmental Samples
- Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy
- Determination of Moisture Content in Soil
- Determining Rate Laws and the Order of Reaction
- Determining Spatial Orientation of Rock Layers with the Brunton Compass
- Determining the Density of a Solid and Liquid
- Determining the Empirical Formula
- Determining the Mass Percent Composition in an Aqueous Solution
- Determining the Solubility Rules of Ionic Compounds
- Development and Reproduction of the Laboratory Mouse
- Development of the Chick
- Diagnostic Necropsy and Tissue Harvest
- Dialysis: Diffusion Based Separation
- Dichotic Listening
- Dissolved Oxygen in Surface Water
- Drosophila Development and Reproduction
- Drosophila Larval IHC
- Drosophila Maintenance
- Drosophila melanogaster Embryo and Larva Harvesting and Preparation
- Ear Exam
- Elbow Exam
- Electro-encephalography (EEG)
- Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat
- Electrophoretic Mobility Shift Assay (EMSA)
- Embryonic Stem Cell Culture and Differentiation
- Emergency Tube Thoracostomy (Chest Tube Placement)

- Emergent Lateral Canthotomy and Inferior Catholysis
- Enzyme Assays and Kinetics
- Ethics in Psychology Research
- Event-related Potentials and the Oddball Task
- Executive Function and the Dimensional Change Card Sort Task
- Executive Function in Autism Spectrum Disorder
- Experimentation using a Confederate
- Explant Culture for Developmental Studies
- Explant Culture of Neural Tissue
- Expression Profiling with Microarrays
- Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction
- Eye Exam
- Eye Tracking in Cognitive Experiments
- FM Dyes in Vesicle Recycling
- Fate Mapping
- Fear Conditioning
- Filamentous Fungi
- Finding Your Blind Spot and Perceptual Filling-in
- Foot Exam
- Fractional Distillation
- Freezing-Point Depression to Determine an Unknown Compound
- From Theory to Design: The Role of Creativity in Designing Experiments
- Fundamentals of Breeding and Weaning
- Förster Resonance Energy Transfer (FRET)
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- **Numerical Cognition: More or Less**
- **Nutrients in Aquatic Ecosystems**
- **Object Substitution Masking**
- **Observation and Inspection**
- **Observational Research**
- **Ophthalmoscopic Examination**
- **PCR: The Polymerase Chain Reaction**
- **Palpation**
- **Passaging Cells**
- **Patch Clamp Electrophysiology**
- **Pelvic Exam I: Assessment of the External Genitalia**
- **Pelvic Exam II: Speculum Exam**
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- **Percussion**
- **Percutaneous Cricothyrotomy (Seldinger Technique)**
- **Performing 1D Thin Layer Chromatography**
- **Pericardiocentesis**
- **Peripheral Vascular Exam**
- **Peripheral Vascular Exam Using a Continuous Wave Doppler**
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- **Perspectives on Sensation and Perception**
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- **An Introduction to Stem Cell Biology**
- **An Introduction to Transfection**
- **An Introduction to Working in the Hood**
- **An Introduction to the Centrifuge**
- **An Introduction to the Chick: *Gallus gallus domesticus***
- **An Introduction to the Laboratory Mouse: *Mus musculus***
- **An Introduction to the Micropipettor**
- **An Introduction to the Zebrafish: *Danio rerio***
- **An Overview of Alkenone Biomarker Analysis for Paleothermometry**
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- **Bacterial Transformation: Electroporation**
- **Bacterial Transformation: The Heat Shock Method**
- **Balance and Coordination Testing**
- **Basic Care Procedures**
- **Basic Chick Care and Maintenance**
- **Basic Life Support Part II: Airway/Breathing and Continued Cardiopulmonary Resuscitation**
- **Basic Life Support: Cardiopulmonary Resuscitation and Defibrillation**
- **Basic Mouse Care and Maintenance**
- **Binocular Rivalry**
- **Biofuels: Producing Ethanol from Cellulosic Material**
- **Blood Pressure Measurement**
- **Blood Withdrawal I**
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- **C. elegans Chemotaxis Assay**
- **C. elegans Development and Reproduction**
- **C. elegans Maintenance**
- **Calcium Imaging in Neurons**
- **Calibration Curves**
- **Capillary Electrophoresis (CE)**
- **Carbon and Nitrogen Analysis of Environmental Samples**
- **Cardiac Exam I: Inspection and Palpation**
- **Cardiac Exam II: Auscultation**
- **Cardiac Exam III: Abnormal Heart Sounds**
- **Categories and Inductive Inferences**
- **Cell Cycle Analysis**
- **Cell-surface Biotinylation Assay**
- **Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance**
- **Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance**
- **Central Venous Catheter Insertion: Subclavian Vein**
- **Chick ex ovo Culture**
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- **Common Lab Glassware and Uses**
- **Community DNA Extraction from Bacterial Colonies**
- **Compound Administration I**
- **Compound Administration II**
- **Compound Administration III**
- **Compound Administration IV**
- **Comprehensive Breast Exam**
- **Conducting Reactions Below Room Temperature**
- **Considerations for Rodent Surgery**
- **Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry**
- **Coordination Chemistry Complexes**
- **Cranial Nerves Exam I (I-VI)**
- **Cranial Nerves Exam II (VII-XII)**
- **Crowding**
- **Culturing and Enumerating Bacteria from Soil Samples**
- **Cyclic Voltammetry (CV)**
- **Cytogenetics**
- **DNA Gel Electrophoresis**
- **DNA Ligation Reactions**
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Analysis

- **Degassing Liquids with Freeze-Pump-Thaw Cycling**
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- **Dissolved Oxygen in Surface Water**
- **Drosophila Development and Reproduction**
- **Drosophila Larval IHC**
- **Drosophila Maintenance**
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- **Elbow Exam**
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- **Extraction of Biomarkers from Sediments - Accelerated**

Solvent Extraction

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BENCHMARK		Integration of Knowledge and Ideas
GRADE LEVEL EXPECTATION	9-10.RST.7.	<p>Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cognition • An Introduction to Developmental Neurobiology • An Introduction to Drosophila melanogaster • An Introduction to Endocytosis and Exocytosis • An Introduction to Learning and Memory • An Introduction to Modeling Behavioral Disorders and Stress • An Introduction to Motor Control • An Introduction to Neurophysiology • An Introduction to Reward and Addiction • An Overview of Alkenone Biomarker Analysis for Paleothermometry • An Overview of Genetic Analysis • An Overview of Genetics and Disease • An Overview of bGDGT Biomarker Analysis for Paleoclimatology • Analysis of Earthworm Populations in Soil • Annexin V and Propidium Iodide Labeling • Anterograde Amnesia • Anxiety Testing • Approximate Number Sense Test • Are You Smart or Hardworking? How Praise Influences Children's Motivation • Assembly of a Reflux System for Heated Chemical Reactions

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- **Gas Chromatography (GC) with Flame-Ionization Detection**
- **Gene Silencing with Morpholinos**
- **Genetic Crosses**
- **Genetic Screens**
- **Growing Crystals for X-ray Diffraction Analysis**
- **Habituation: Studying Infants Before They Can Talk**
- **High-Performance Liquid Chromatography (HPLC)**
- **How Children Solve Problems Using Causal Reasoning**
- **Ideal Gas Law**
- **Igneous Intrusive Rock**
- **Igneous Volcanic Rock**
- **Inattentive Blindness**
- **Incidental Encoding**
- **Internal Standards**
- **Introducing Experimental Agents into the Mouse**
- **Introduction to Catalysis**
- **Introduction to Mass Spectrometry**
- **Introduction to Titration**
- **Introduction to the Microplate Reader**
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- **Invasion Assay Using 3D Matrices**

- Invertebrate Lifespan Quantification
- Ion-Exchange Chromatography
- Isolating Nucleic Acids from Yeast
- Just-noticeable Differences
- Language: The N400 in Semantic Incongruity
- Le Châtelier's Principle
- Lead Analysis of Soil Using Atomic Absorption Spectroscopy
- Learning and Memory: The Remember-Know Task
- MALDI-TOF Mass Spectrometry
- Making Solutions in the Laboratory
- Making a Geologic Cross Section
- Manipulating an Independent Variable through Embodiment
- Measuring Children's Trust in Testimony
- Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain
- Measuring Reaction Time and Donders' Method of Subtraction
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- PCR: The Polymerase Chain Reaction
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- Performing 1D Thin Layer Chromatography
- Pericardiocentesis
- Peripheral Vascular Exam Using a Continuous Wave Doppler
- Perspectives on Cognitive Psychology
- Perspectives on Neuropsychology
- Photometric Protein Determination
- Physical Properties Of Minerals I: Crystals and Cleavage
- Physical Properties Of Minerals II: Polymineralic

Analysis

- **Physiological Correlates of Emotion Recognition**
- **Piaget's Conservation Task and the Influence of Task Demands**
- **Pilot Testing**
- **Placebos in Research**
- **Plasmid Purification**
- **Positive Reinforcement Studies**
- **Preparing Anhydrous Reagents and Equipment**
- **Prospect Theory**
- **Protein Crystallization**
- **Proton Exchange Membrane Fuel Cells**
- **Purification of a Total Lipid Extract with Column Chromatography**
- **Purifying Compounds by Recrystallization**
- **Quantifying Environmental Microorganisms and Viruses Using qPCR**
- **RNA Analysis of Environmental Samples Using RT-PCR**
- **RNA-Seq**
- **RNAi in *C. elegans***
- **Raman Spectroscopy for Chemical Analysis**
- **Realism in Experimentation**
- **Reconstitution of Membrane Proteins**
- **Reliability in Psychology Experiments**
- **Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry**
- **Rotary Evaporation to Remove Solvent**
- **SNP Genotyping**
- **Sample Preparation for Analytical Preparation**
- **Scanning Electron Microscopy (SEM)**
- **Schlenk Lines Transfer of Solvents**
- **Self-administration Studies**
- **Self-report vs. Behavioral Measures of Recycling**
- **Separation of Mixtures via Precipitation**
- **Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium**
- **Solid-Liquid Extraction**
- **Solutions and Concentrations**
- **Sonication Extraction of Lipid Biomarkers from Sediment**
- **Soxhlet Extraction of Lipid Biomarkers from Sediment**
- **Spatial Cueing**
- **Spatial Memory Testing Using Mazes**
- **Spectrophotometric Determination of an Equilibrium Constant**
- **Surface Plasmon Resonance (SPR)**
- **Tandem Mass Spectrometry**
- **Testing For Genetically Modified Foods**
- **The ATP Bioluminescence Assay**
- **The Attentional Blink**
- **The Costs and Benefits of Natural Pedagogy**
- **The ELISA Method**

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CONTENT STANDARD	ND.CC.9-10.WHST.	Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects
BENCHMARK		Text Types and Purposes
GRADE LEVEL EXPECTATION	9-10.WHST.1.	Write arguments focused on discipline-specific content.

INDICATOR	9-10.WHST.1.a.	<p>Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design
CONTENT STANDARD	ND.CC.9-10.WHST.	Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects
BENCHMARK		Text Types and Purposes
GRADE LEVEL EXPECTATION	9-10.WHST.2.	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
INDICATOR	9-10.WHST.2.a.	<p>Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design
INDICATOR	9-10.WHST.2.d.	<p>Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Abdominal Exam I: Inspection and Auscultation • Abdominal Exam II: Percussion • Abdominal Exam III: Palpation • Abdominal Exam IV: Acute Abdominal Pain Assessment • Algae Enumeration via Culturable Methodology • An Introduction to Aging and Regeneration • An Introduction to Behavioral Neuroscience • An Introduction to Caenorhabditis elegans • An Introduction to Cell Death • An Introduction to Cell Division • An Introduction to Cell Metabolism • An Introduction to Cell Motility and Migration • An Introduction to Cellular and Molecular Neuroscience • An Introduction to Cognition • An Introduction to Developmental Genetics • An Introduction to Developmental Neurobiology • An Introduction to Drosophila melanogaster • An Introduction to Endocytosis and Exocytosis • An Introduction to Learning and Memory • An Introduction to Modeling Behavioral Disorders and

Stress

- An Introduction to Molecular Developmental Biology
- An Introduction to Motor Control
- An Introduction to Neuroanatomy
- An Introduction to Neurophysiology
- An Introduction to Organogenesis
- An Introduction to Reward and Addiction
- An Introduction to *Saccharomyces cerevisiae*
- An Introduction to Stem Cell Biology
- An Introduction to Transfection
- An Introduction to Working in the Hood
- An Introduction to the Centrifuge
- An Introduction to the Chick: *Gallus gallus domesticus*
- An Introduction to the Laboratory Mouse: *Mus musculus*
- An Introduction to the Micropipettor
- An Introduction to the Zebrafish: *Danio rerio*
- An Overview of Alkenone Biomarker Analysis for Paleothermometry
- An Overview of Epigenetics
- An Overview of Gene Expression
- An Overview of Genetic Analysis
- An Overview of Genetic Engineering
- An Overview of Genetics and Disease
- An Overview of bGDGT Biomarker Analysis for Paleoclimatology
- Analysis of Earthworm Populations in Soil
- Anesthesia Induction and Maintenance
- Ankle Exam
- Annexin V and Propidium Iodide Labeling
- Anterograde Amnesia
- Anxiety Testing
- Approximate Number Sense Test
- Are You Smart or Hardworking? How Praise Influences Children's Motivation
- Arterial Line Placement
- Aseptic Technique in Environmental Science
- Assembly of a Reflux System for Heated Chemical Reactions
- Assessing Dexterity with Reaching Tasks
- Auscultation
- Bacterial Growth Curve Analysis and its Environmental Applications
- Bacterial Transformation: Electroporation
- Bacterial Transformation: The Heat Shock Method
- Balance and Coordination Testing
- Basic Care Procedures
- Basic Chick Care and Maintenance
- Basic Life Support Part II: Airway/Breathing and Continued Cardiopulmonary Resuscitation
- Basic Life Support: Cardiopulmonary Resuscitation and

Defibrillation

- Basic Mouse Care and Maintenance
- Binocular Rivalry
- Biofuels: Producing Ethanol from Cellulosic Material
- Blood Pressure Measurement
- Blood Withdrawal I
- Blood Withdrawal II
- C. elegans Chemotaxis Assay
- C. elegans Development and Reproduction
- C. elegans Maintenance
- Calcium Imaging in Neurons
- Calibration Curves
- Capillary Electrophoresis (CE)
- Carbon and Nitrogen Analysis of Environmental Samples
- Cardiac Exam I: Inspection and Palpation
- Cardiac Exam II: Auscultation
- Cardiac Exam III: Abnormal Heart Sounds
- Categories and Inductive Inferences
- Cell Cycle Analysis
- Cell-surface Biotinylation Assay
- Central Venous Catheter Insertion: Femoral Vein with Ultrasound Guidance
- Central Venous Catheter Insertion: Internal Jugular with Ultrasound Guidance
- Central Venous Catheter Insertion: Subclavian Vein
- Chick ex ovo Culture
- Children's Reliance on Artist Intentions When Identifying Pictures
- Chromatin Immunoprecipitation
- Chromatography-Based Biomolecule Purification Methods
- Co-Immunoprecipitation and Pull-Down Assays
- Color Afterimages
- Column Chromatography
- Common Lab Glassware and Uses
- Community DNA Extraction from Bacterial Colonies
- Compound Administration I
- Compound Administration II
- Compound Administration III
- Compound Administration IV
- Comprehensive Breast Exam
- Conducting Reactions Below Room Temperature
- Considerations for Rodent Surgery
- Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry
- Coordination Chemistry Complexes
- Cranial Nerves Exam I (I-VI)
- Cranial Nerves Exam II (VII-XII)
- Crowding
- Culturing and Enumerating Bacteria from Soil Samples

- Cyclic Voltammetry (CV)
- Cytogenetics
- DNA Gel Electrophoresis
- DNA Ligation Reactions
- DNA Methylation Analysis
- Decision-making and the Iowa Gambling Task
- Decoding Auditory Imagery with Multivoxel Pattern Analysis
- Degassing Liquids with Freeze-Pump-Thaw Cycling
- Density Gradient Ultracentrifugation
- Detecting Environmental Microorganisms with the Polymerase Chain Reaction and Gel Electrophoresis
- Detecting Reactive Oxygen Species
- Detection of Bacteriophages in Environmental Samples
- Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy
- Determination of Moisture Content in Soil
- Determining Rate Laws and the Order of Reaction
- Determining Spatial Orientation of Rock Layers with the Brunton Compass
- Determining the Density of a Solid and Liquid
- Determining the Empirical Formula
- Determining the Mass Percent Composition in an Aqueous Solution
- Determining the Solubility Rules of Ionic Compounds
- Development and Reproduction of the Laboratory Mouse
- Development of the Chick
- Diagnostic Necropsy and Tissue Harvest
- Dialysis: Diffusion Based Separation
- Dichotic Listening
- Dissolved Oxygen in Surface Water
- Drosophila Development and Reproduction
- Drosophila Larval IHC
- Drosophila Maintenance
- Drosophila melanogaster Embryo and Larva Harvesting and Preparation
- Ear Exam
- Elbow Exam
- Electro-encephalography (EEG)
- Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat
- Electrophoretic Mobility Shift Assay (EMSA)
- Embryonic Stem Cell Culture and Differentiation
- Emergency Tube Thoracostomy (Chest Tube Placement)
- Emergent Lateral Canthotomy and Inferior Catholysis
- Enzyme Assays and Kinetics
- Ethics in Psychology Research
- Event-related Potentials and the Oddball Task
- Executive Function and the Dimensional Change Card

Sort Task

- Executive Function in Autism Spectrum Disorder
- Experimentation using a Confederate
- Explant Culture for Developmental Studies
- Explant Culture of Neural Tissue
- Expression Profiling with Microarrays
- Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction
- Eye Exam
- Eye Tracking in Cognitive Experiments
- FM Dyes in Vesicle Recycling
- Fate Mapping
- Fear Conditioning
- Filamentous Fungi
- Finding Your Blind Spot and Perceptual Filling-in
- Foot Exam
- Fractional Distillation
- Freezing-Point Depression to Determine an Unknown Compound
- From Theory to Design: The Role of Creativity in Designing Experiments
- Fundamentals of Breeding and Weaning
- Förster Resonance Energy Transfer (FRET)
- Gas Chromatography (GC) with Flame-Ionization Detection
- Gel Purification
- Gene Silencing with Morpholinos
- General Approach to the Physical Exam
- Genetic Crosses
- Genetic Engineering of Model Organisms
- Genetic Screens
- Genome Editing
- Gram Staining of Bacteria from Environmental Sources
- Growing Crystals for X-ray Diffraction Analysis
- Habituation: Studying Infants Before They Can Talk
- Hand and Wrist Exam
- High-Performance Liquid Chromatography (HPLC)
- Hip Exam
- Histological Sample Preparation for Light Microscopy
- Histological Staining of Neural Tissue
- How Children Solve Problems Using Causal Reasoning
- Ideal Gas Law
- Igneous Intrusive Rock
- Igneous Volcanic Rock
- In ovo Electroporation of Chicken Embryos
- Inattentive Blindness
- Incidental Encoding
- Induced Pluripotency
- Internal Standards
- Intra-articular Shoulder Injection for Reduction Following Anterior Shoulder Dislocation

- **Intraosseous Needle Placement**
- **Introducing Experimental Agents into the Mouse**
- **Introduction to Catalysis**
- **Introduction to Fluorescence Microscopy**
- **Introduction to Light Microscopy**
- **Introduction to Mass Spectrometry**
- **Introduction to Serological Pipettes and Pipettors**
- **Introduction to Titration**
- **Introduction to the Bunsen Burner**
- **Introduction to the Microplate Reader**
- **Introduction to the Spectrophotometer**
- **Invasion Assay Using 3D Matrices**
- **Invertebrate Lifespan Quantification**
- **Ion-Exchange Chromatography**
- **Isolating Nucleic Acids from Yeast**
- **Isolation of Fecal Bacteria from Water Samples by Filtration**
- **Just-noticeable Differences**
- **Knee Exam**
- **Language: The N400 in Semantic Incongruity**
- **Le Châtelier's Principle**
- **Lead Analysis of Soil Using Atomic Absorption Spectroscopy**
- **Learning and Memory: The Remember-Know Task**
- **Live Cell Imaging of Mitosis**
- **Lower Back Exam**
- **Lymph Node Exam**
- **MALDI-TOF Mass Spectrometry**
- **Making Solutions in the Laboratory**
- **Making a Geologic Cross Section**
- **Male Rectal Exam**
- **Manipulating an Independent Variable through Embodiment**
- **Measuring Children's Trust in Testimony**
- **Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain**
- **Measuring Mass in the Laboratory**
- **Measuring Reaction Time and Donders' Method of Subtraction**
- **Measuring Tropospheric Ozone**
- **Measuring Verbal Working Memory Span**
- **Measuring Vital Signs**
- **Memory Development: Demonstrating How Repeated Questioning Leads to False Memories**
- **Mental Rotation**
- **Metabolic Labeling**
- **Metacognitive Development: How Children Estimate Their Memory**
- **Method of Standard Addition**
- **Modeling Social Stress**
- **Molecular Cloning**

- **Motion-induced Blindness**
- **Motor Exam I**
- **Motor Exam II**
- **Motor Learning in Mirror Drawing**
- **Motor Maps**
- **Mouse Genotyping**
- **Multiple Object Tracking**
- **Murine In Utero Electroporation**
- **Mutual Exclusivity: How Children Learn the Meanings of Words**
- **Neck Exam**
- **Needle Thoracostomy (needle Decompression) for Temporizing Tension Pneumothorax Treatment**
- **Neuronal Transfection Methods**
- **Nose, Sinuses, Oral Cavity and Pharynx Exam**
- **Nuclear Magnetic Resonance (NMR) Spectroscopy**
- **Numerical Cognition: More or Less**
- **Nutrients in Aquatic Ecosystems**
- **Object Substitution Masking**
- **Observation and Inspection**
- **Observational Research**
- **Ophthalmoscopic Examination**
- **PCR: The Polymerase Chain Reaction**
- **Palpation**
- **Passaging Cells**
- **Patch Clamp Electrophysiology**
- **Pelvic Exam I: Assessment of the External Genitalia**
- **Pelvic Exam II: Speculum Exam**
- **Pelvic Exam III: Bimanual and Rectovaginal Exam**
- **Percussion**
- **Percutaneous Cricothyrotomy (Seldinger Technique)**
- **Performing 1D Thin Layer Chromatography**
- **Pericardiocentesis**
- **Peripheral Vascular Exam**
- **Peripheral Vascular Exam Using a Continuous Wave Doppler**
- **Peripheral Venous Cannulation**
- **Perspectives on Sensation and Perception**
- **Photometric Protein Determination**
- **Physical Properties Of Minerals I: Crystals and Cleavage**
- **Physical Properties Of Minerals II: Polymineralic Analysis**
- **Physiological Correlates of Emotion Recognition**
- **Piaget's Conservation Task and the Influence of Task Demands**
- **Pilot Testing**
- **Placebos in Research**
- **Plasmid Purification**
- **Positive Reinforcement Studies**
- **Preparing Anhydrous Reagents and Equipment**
- **Primary Neuronal Cultures**

- Proper Adjustment of Patient Attire during the Physical Exam
- Prospect Theory
- Protein Crystallization
- Proton Exchange Membrane Fuel Cells
- Purification of a Total Lipid Extract with Column Chromatography
- Purifying Compounds by Recrystallization
- Quantifying Environmental Microorganisms and Viruses Using qPCR
- RNA Analysis of Environmental Samples Using RT-PCR
- RNA-Seq
- RNAi in *C. elegans*
- Raman Spectroscopy for Chemical Analysis
- Realism in Experimentation
- Recombineering and Gene Targeting
- Reconstitution of Membrane Proteins
- Regulating Temperature in the Lab: Applying Heat
- Regulating Temperature in the Lab: Preserving Samples Using Cold
- Reliability in Psychology Experiments
- Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry
- Respiratory Exam I: Inspection and Palpation
- Respiratory Exam II: Percussion and Auscultation
- Restriction Enzyme Digests
- Rodent Handling and Restraint Techniques
- Rodent Identification I
- Rodent Identification II
- Rodent Stereotaxic Surgery
- Rotary Evaporation to Remove Solvent
- SNP Genotyping
- Sample Preparation for Analytical Preparation
- Scanning Electron Microscopy (SEM)
- Schlenk Lines Transfer of Solvents
- Self-administration Studies
- Self-report vs. Behavioral Measures of Recycling
- Sensory Exam
- Separating Protein with SDS-PAGE
- Separation of Mixtures via Precipitation
- Shoulder Exam I
- Shoulder Exam II
- Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium
- Solid-Liquid Extraction
- Solutions and Concentrations
- Sonication Extraction of Lipid Biomarkers from Sediment
- Soxhlet Extraction of Lipid Biomarkers from Sediment
- Spatial Cueing
- Spatial Memory Testing Using Mazes

- Spectrophotometric Determination of an Equilibrium Constant
- Sterile Tissue Harvest
- Surface Plasmon Resonance (SPR)
- Surgical Cricothyrotomy
- Tandem Mass Spectrometry
- Testing For Genetically Modified Foods
- The ATP Bioluminescence Assay
- The Ames Room
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- The McGurk Effect
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- The Rubber Hand Illusion
- The Simple Experiment: Two-group Design
- The Split Brain
- The Staircase Procedure for Finding a Perceptual Threshold
- The TUNEL Assay
- The Transwell Migration Assay
- The Western Blot
- Thyroid Exam
- Tissue Regeneration with Somatic Stem Cells
- Transplantation Studies
- Tree Identification: How To Use a Dichotomous Key
- Tree Survey: Point-Centered Quarter Sampling Method
- Turbidity and Total Solids in Surface Water
- Two-Dimensional Gel Electrophoresis
- Ultraviolet-Visible (UV-Vis) Spectroscopy
- Understanding Concentration and Measuring Volumes
- Using Differential Scanning Calorimetry to Measure Changes in Enthalpy
- Using Diffusion Tensor Imaging in Traumatic Brain Injury
- Using GIS to Investigate Urban Forestry
- Using TMS to Measure Motor Excitability During Action Observation
- Using Topographic Maps to Generate Topographic Profiles
- Using Your Head: Measuring Infants' Rational Imitation of Actions
- Using a pH Meter
- Verbal Priming

		<ul style="list-style-type: none"> • Visual Attention: fMRI Investigation of Object-based Attentional Control • Visual Search for Features and Conjunctions • Visual Statistical Learning • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Water Quality Analysis via Indicator Organisms • Whole-Mount In Situ Hybridization • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF) • Yeast Maintenance • Yeast Reproduction • Yeast Transformation and Cloning • Zebrafish Breeding and Embryo Handling • Zebrafish Maintenance and Husbandry • Zebrafish Microinjection Techniques • Zebrafish Reproduction and Development • fMRI: Functional Magnetic Resonance Imaging
CONTENT STANDARD	ND.CC.9-10.WHST.	Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects
BENCHMARK		Text Types and Purposes
GRADE LEVEL EXPECTATION	9-10.WHST.3.	<p>Narrative writing is not applicable as a separate requirement for history, social studies, science, and technical subjects. Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/ explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Manipulating an Independent Variable through Embodiment • Observational Research • Pilot Testing • Placebos in Research • Realism in Experimentation • Reliability in Psychology Experiments • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Within-subjects Repeated-measures Design

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