

Main Criteria: Connecticut Core Standards

Secondary Criteria: JoVE

Subject: Science

Grade: 9-12

Correlation Options: Show Correlated

Adopted: 2004

DOMAIN / CONTENT STANDARD	CT.SI.	Scientific Inquiry: Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation. Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists.
STATE FRAMEWORK	D.INQ.1.	<p>Identify questions that can be answered through scientific investigation.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design
STATE FRAMEWORK	D.INQ.2.	<p>Read, interpret and examine the credibility and validity of scientific claims in different sources of information.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Aseptic Technique in Environmental Science • Calibration Curves • Capillary Electrophoresis (CE) • Chromatography-Based Biomolecule Purification Methods • Cyclic Voltammetry (CV) • Density Gradient Ultracentrifugation • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Dialysis: Diffusion Based Separation • Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Gas Chromatography (GC) with Flame-Ionization

		<p>Detection</p> <ul style="list-style-type: none"> • High-Performance Liquid Chromatography (HPLC) • Internal Standards • Introduction to Mass Spectrometry • Ion-Exchange Chromatography • Manipulating an Independent Variable through Embodiment • Method of Standard Addition • Observational Research • Pilot Testing • Placebos in Research • Preparing Anhydrous Reagents and Equipment • Protein Crystallization • Raman Spectroscopy for Chemical Analysis • Reliability in Psychology Experiments • Sample Preparation for Analytical Preparation • Scanning Electron Microscopy (SEM) • Self-report vs. Behavioral Measures of Recycling • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Two-Dimensional Gel Electrophoresis • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF)
STATE FRAMEWORK	D.INQ.3.	<p>Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.</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
STATE FRAMEWORK	D.INQ.4.	<p>Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Dialysis: Diffusion Based Separation • Dissolved Oxygen in Surface Water • Ethics in Psychology Research

		<ul style="list-style-type: none"> • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Introduction to Titration • Manipulating an Independent Variable through Embodiment • Observational Research • Pilot Testing • Placebos in Research • Realism in Experimentation • Reliability in Psychology Experiments • Solutions and Concentrations • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Turbidity and Total Solids in Surface Water • Within-subjects Repeated-measures Design
STATE FRAMEWORK	D.INQ.5.	<p>Identify independent and dependent variables, including those that are kept constant and those used as controls.</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
STATE FRAMEWORK	D.INQ.6.	<p>Use appropriate tools and techniques to make observations and gather data.</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 • Determining the Density of a Solid and Liquid • Histological Sample Preparation for Light Microscopy • Introduction to Fluorescence Microscopy • Introduction to Light Microscopy • Introduction to Serological Pipettes and Pipettors • Introduction to the Bunsen Burner

		<ul style="list-style-type: none"> • 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
STATE FRAMEWORK	D.INQ.7.	<p>Assess the reliability of the data that was generated in the investigation.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Aseptic Technique in Environmental Science • Calibration Curves • Capillary Electrophoresis (CE) • Chromatography-Based Biomolecule Purification Methods • Cyclic Voltammetry (CV) • Density Gradient Ultracentrifugation • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Dialysis: Diffusion Based Separation • Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Gas Chromatography (GC) with Flame-Ionization Detection • High-Performance Liquid Chromatography (HPLC) • Internal Standards • Introduction to Mass Spectrometry • Ion-Exchange Chromatography • Manipulating an Independent Variable through Embodiment • Method of Standard Addition • Observational Research • Pilot Testing • Placebos in Research • Preparing Anhydrous Reagents and Equipment • Protein Crystallization • Raman Spectroscopy for Chemical Analysis • Reliability in Psychology Experiments • Sample Preparation for Analytical Preparation • Scanning Electron Microscopy (SEM) • Self-report vs. Behavioral Measures of Recycling • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Two-Dimensional Gel Electrophoresis

		<ul style="list-style-type: none"> • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF)
STATE FRAMEWORK	D.INQ.8.	<p>Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.</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 • Assessing Dexterity with Reaching Tasks • Bacterial Growth Curve Analysis and its Environmental Applications • Balance and Coordination Testing • Basic Mouse Care and Maintenance • Binocular Rivalry • Biofuels: Producing Ethanol from Cellulosic Material • Blood Pressure Measurement • C. elegans Chemotaxis Assay • Calcium Imaging in Neurons • Calibration Curves • Capillary Electrophoresis (CE) • Carbon and Nitrogen Analysis of Environmental

Samples

- **Categories and Inductive Inferences**
- **Cell Cycle Analysis**
- **Cell-surface Biotinylation Assay**
- **Children's Reliance on Artist Intentions When Identifying Pictures**
- **Chromatin Immunoprecipitation**
- **Chromatography-Based Biomolecule Purification Methods**
- **Co-Immunoprecipitation and Pull-Down Assays**
- **Column Chromatography**
- **Community DNA Extraction from Bacterial Colonies**
- **Conducting Reactions Below Room Temperature**
- **Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry**
- **Coordination Chemistry Complexes**
- **Crowding**
- **Culturing and Enumerating Bacteria from Soil Samples**
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- **DNA Methylation Analysis**
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- **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**
- **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**
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- **Dichotic Listening**
- **Dissolved Oxygen in Surface Water**
- **Drosophila Development and Reproduction**
- **Electro-encephalography (EEG)**
- **Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat**
- **Electrophoretic Mobility Shift Assay (EMSA)**
- **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**
- **Expression Profiling with Microarrays**
- **Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction**
- **Eye Tracking in Cognitive Experiments**
- **FM Dyes in Vesicle Recycling**
- **Fate Mapping**
- **Fear Conditioning**
- **Fractional Distillation**
- **Freezing-Point Depression to Determine an Unknown Compound**
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- **Förster Resonance Energy Transfer (FRET)**
- **Gas Chromatography (GC) with Flame-Ionization Detection**
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- **Genetic Crosses**
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- **Growing Crystals for X-ray Diffraction Analysis**
- **Habituation: Studying Infants Before They Can Talk**
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- **How Children Solve Problems Using Causal Reasoning**
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- **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**
- **Introduction to the Spectrophotometer**
- **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
- 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
- Motion-induced Blindness
- Motor Learning in Mirror Drawing
- Motor Maps
- Multiple Object Tracking
- Mutual Exclusivity: How Children Learn the Meanings of Words
- Nuclear Magnetic Resonance (NMR) Spectroscopy
- Numerical Cognition: More or Less
- Nutrients in Aquatic Ecosystems
- Object Substitution Masking
- Observational Research
- PCR: The Polymerase Chain Reaction
- Patch Clamp Electrophysiology
- 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
- The Factorial Experiment
- The Ideal Gas Law
- The Inverted-face Effect
- The Morris Water Maze
- The Multi-group Experiment
- The Precision of Visual Working Memory with Delayed Estimation
- The Rouge Test: Searching for a Sense of Self
- The Simple Experiment: Two-group Design
- The Split Brain
- The Staircase Procedure for Finding a Perceptual

		<p>Threshold</p> <ul style="list-style-type: none"> • The TUNEL Assay • The Transwell Migration Assay • The Western Blot • 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 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 • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Water Quality Analysis via Indicator Organisms • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF) • Yeast Maintenance • fMRI: Functional Magnetic Resonance Imaging
DOMAIN / CONTENT STANDARD	CT.SL.	Scientific Literacy: Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science. Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media.
STATE FRAMEWORK	D.INQ.1.	<p>Identify questions that can be answered through scientific investigation.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design
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		<ul style="list-style-type: none"> • 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
STATE FRAMEWORK	D.INQ.4.	<p>Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Dialysis: Diffusion Based Separation • Dissolved Oxygen in Surface Water • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Introduction to Titration • Manipulating an Independent Variable through Embodiment • Observational Research • Pilot Testing • Placebos in Research • Realism in Experimentation • Reliability in Psychology Experiments • Solutions and Concentrations • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Turbidity and Total Solids in Surface Water • Within-subjects Repeated-measures Design
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		<p>Embodiment</p> <ul style="list-style-type: none"> • Method of Standard Addition • Observational Research • Pilot Testing • Placebos in Research • Preparing Anhydrous Reagents and Equipment • Protein Crystallization • Raman Spectroscopy for Chemical Analysis • Reliability in Psychology Experiments • Sample Preparation for Analytical Preparation • Scanning Electron Microscopy (SEM) • Self-report vs. Behavioral Measures of Recycling • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Two-Dimensional Gel Electrophoresis • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF)
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Children's Motivation

- **Assembly of a Reflux System for Heated Chemical Reactions**
- **Assessing Dexterity with Reaching Tasks**
- **Bacterial Growth Curve Analysis and its Environmental Applications**
- **Balance and Coordination Testing**
- **Basic Mouse Care and Maintenance**
- **Binocular Rivalry**
- **Biofuels: Producing Ethanol from Cellulosic Material**
- **Blood Pressure Measurement**
- **C. elegans Chemotaxis Assay**
- **Calcium Imaging in Neurons**
- **Calibration Curves**
- **Capillary Electrophoresis (CE)**
- **Carbon and Nitrogen Analysis of Environmental Samples**
- **Categories and Inductive Inferences**
- **Cell Cycle Analysis**
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- **Children's Reliance on Artist Intentions When Identifying Pictures**
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- **Chromatography-Based Biomolecule Purification Methods**
- **Co-Immunoprecipitation and Pull-Down Assays**
- **Column Chromatography**
- **Community DNA Extraction from Bacterial Colonies**
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- **Determining Spatial Orientation of Rock Layers with the Brunton Compass**
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- **Determining the Empirical Formula**
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- **Internal Standards**
- **Introducing Experimental Agents into the Mouse**
- **Introduction to Catalysis**
- **Introduction to Mass Spectrometry**
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- Introduction to the Microplate Reader
- Introduction to the Spectrophotometer
- Invasion Assay Using 3D Matrices
- Invertebrate Lifespan Quantification
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- Isolating Nucleic Acids from Yeast
- Just-noticeable Differences
- Language: The N400 in Semantic Incongruity
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- Measuring Grey Matter Differences with Voxel-based Morphometry: The Musical Brain
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- Measuring Tropospheric Ozone
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- Observational Research
- PCR: The Polymerase Chain Reaction
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- 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

		<ul style="list-style-type: none"> • Testing For Genetically Modified Foods • The ATP Bioluminescence Assay • The Attentional Blink • The Costs and Benefits of Natural Pedagogy • The ELISA Method • The Factorial Experiment • The Ideal Gas Law • The Inverted-face Effect • The Morris Water Maze • The Multi-group Experiment • The Precision of Visual Working Memory with Delayed Estimation • The Rouge Test: Searching for a Sense of Self • 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 • 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 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 • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Water Quality Analysis via Indicator Organisms • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF) • Yeast Maintenance • fMRI: Functional Magnetic Resonance Imaging
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DOMAIN / CONTENT STANDARD

CT.SN.

Scientific Numeracy: Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

STATE FRAMEWORK	D.INQ.1.	<p>Identify questions that can be answered through scientific investigation.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design
STATE FRAMEWORK	D.INQ.2.	<p>Read, interpret and examine the credibility and validity of scientific claims in different sources of information.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Aseptic Technique in Environmental Science • Calibration Curves • Capillary Electrophoresis (CE) • Chromatography-Based Biomolecule Purification Methods • Cyclic Voltammetry (CV) • Density Gradient Ultracentrifugation • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Dialysis: Diffusion Based Separation • Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Gas Chromatography (GC) with Flame-Ionization Detection • High-Performance Liquid Chromatography (HPLC) • Internal Standards • Introduction to Mass Spectrometry • Ion-Exchange Chromatography • Manipulating an Independent Variable through Embodiment • Method of Standard Addition • Observational Research • Pilot Testing • Placebos in Research • Preparing Anhydrous Reagents and Equipment • Protein Crystallization • Raman Spectroscopy for Chemical Analysis • Reliability in Psychology Experiments • Sample Preparation for Analytical Preparation • Scanning Electron Microscopy (SEM) • Self-report vs. Behavioral Measures of Recycling • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Two-Dimensional Gel Electrophoresis • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF)

STATE FRAMEWORK	D.INQ.3.	<p>Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.</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
STATE FRAMEWORK	D.INQ.4.	<p>Design and conduct appropriate types of scientific investigations to answer different questions.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Dialysis: Diffusion Based Separation • Dissolved Oxygen in Surface Water • Ethics in Psychology Research • Experimentation using a Confederate • From Theory to Design: The Role of Creativity in Designing Experiments • Introduction to Titration • Manipulating an Independent Variable through Embodiment • Observational Research • Pilot Testing • Placebos in Research • Realism in Experimentation • Reliability in Psychology Experiments • Solutions and Concentrations • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Turbidity and Total Solids in Surface Water • Within-subjects Repeated-measures Design
STATE FRAMEWORK	D.INQ.5.	<p>Identify independent and dependent variables, including those that are kept constant and those used as controls.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Calibration Curves • Ethics in Psychology Research • Experimentation using a Confederate

		<ul style="list-style-type: none"> • 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
STATE FRAMEWORK	D.INQ.6.	<p>Use appropriate tools and techniques to make observations and gather data.</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 • Determining the Density of a Solid and Liquid • Histological Sample Preparation for Light Microscopy • 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
STATE FRAMEWORK	D.INQ.7.	<p>Assess the reliability of the data that was generated in the investigation.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Aseptic Technique in Environmental Science • Calibration Curves • Capillary Electrophoresis (CE) • Chromatography-Based Biomolecule Purification Methods • Cyclic Voltammetry (CV) • Density Gradient Ultracentrifugation • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Dialysis: Diffusion Based Separation • Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat

		<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 • Gas Chromatography (GC) with Flame-Ionization Detection • High-Performance Liquid Chromatography (HPLC) • Internal Standards • Introduction to Mass Spectrometry • Ion-Exchange Chromatography • Manipulating an Independent Variable through Embodiment • Method of Standard Addition • Observational Research • Pilot Testing • Placebos in Research • Preparing Anhydrous Reagents and Equipment • Protein Crystallization • Raman Spectroscopy for Chemical Analysis • Reliability in Psychology Experiments • Sample Preparation for Analytical Preparation • Scanning Electron Microscopy (SEM) • Self-report vs. Behavioral Measures of Recycling • The Factorial Experiment • The Multi-group Experiment • The Simple Experiment: Two-group Design • Two-Dimensional Gel Electrophoresis • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF)
STATE FRAMEWORK	D.INQ.8.	<p>Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.</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

- Assessing Dexterity with Reaching Tasks
- Bacterial Growth Curve Analysis and its Environmental Applications

Balance and Coordination Testing

Basic Mouse Care and Maintenance

Binocular Rivalry

Biofuels: Producing Ethanol from Cellulosic Material

Blood Pressure Measurement

C. elegans Chemotaxis Assay

Calcium Imaging in Neurons

Calibration Curves

Capillary Electrophoresis (CE)

Carbon and Nitrogen Analysis of Environmental

Samples

Categories and Inductive Inferences

Cell Cycle Analysis

Cell-surface Biotinylation Assay

Children's Reliance on Artist Intentions When

Identifying Pictures

Chromatin Immunoprecipitation

Chromatography-Based Biomolecule Purification

Methods

Co-Immunoprecipitation and Pull-Down Assays

Column Chromatography

Community DNA Extraction from Bacterial Colonies

Conducting Reactions Below Room Temperature

Conversion of Fatty Acid Methyl Esters by

Saponification for Uk'37 Paleothermometry

Coordination Chemistry Complexes

Crowding

Culturing and Enumerating Bacteria from Soil Samples

Cyclic Voltammetry (CV)

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
- 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
- Dialysis: Diffusion Based Separation
- Dichotic Listening
- Dissolved Oxygen in Surface Water
- Drosophila Development and Reproduction
- Electro-encephalography (EEG)
- Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat
- Electrophoretic Mobility Shift Assay (EMSA)
- 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
- Expression Profiling with Microarrays
- Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction
- Eye Tracking in Cognitive Experiments
- FM Dyes in Vesicle Recycling
- Fate Mapping
- Fear Conditioning
- Fractional Distillation
- Freezing-Point Depression to Determine an Unknown Compound
- From Theory to Design: The Role of Creativity in Designing Experiments
- Förster Resonance Energy Transfer (FRET)
- 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
- 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
- Introduction to the Spectrophotometer
- 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
- 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
- Motion-induced Blindness
- Motor Learning in Mirror Drawing
- Motor Maps
- Multiple Object Tracking
- Mutual Exclusivity: How Children Learn the Meanings of Words
- Nuclear Magnetic Resonance (NMR) Spectroscopy

- Numerical Cognition: More or Less
- Nutrients in Aquatic Ecosystems
- Object Substitution Masking
- Observational Research
- PCR: The Polymerase Chain Reaction
- Patch Clamp Electrophysiology
- 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
- The Factorial Experiment
- The Ideal Gas Law
- The Inverted-face Effect
- The Morris Water Maze
- The Multi-group Experiment
- The Precision of Visual Working Memory with Delayed Estimation
- The Rouge Test: Searching for a Sense of Self
- 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
- 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 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

		<ul style="list-style-type: none"> • Visual Statistical Learning • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Water Quality Analysis via Indicator Organisms • Within-subjects Repeated-measures Design • X-ray Fluorescence (XRF) • Yeast Maintenance • fMRI: Functional Magnetic Resonance Imaging
DOMAIN / CONTENT STANDARD	CT.9.1.	Energy Transformations: Energy Transfer and Transformations: Energy cannot be created or destroyed; however, energy can be converted from one form to another.
STATE FRAMEWORK	D.1.	<p>Describe the effects of adding energy to matter in terms of the motion of atoms and molecules, and the resulting phase changes.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Assembly of a Reflux System for Heated Chemical Reactions • Degassing Liquids with Freeze-Pump-Thaw Cycling • Fractional Distillation • Freezing-Point Depression to Determine an Unknown Compound • Growing Crystals for X-ray Diffraction Analysis • Ideal Gas Law • Igneous Intrusive Rock • Igneous Volcanic Rock • Preparing Anhydrous Reagents and Equipment • Purifying Compounds by Recrystallization • Rotary Evaporation to Remove Solvent • Schlenk Lines Transfer of Solvents • Separation of Mixtures via Precipitation • Solid-Liquid Extraction • Solutions and Concentrations • The Ideal Gas Law • Using Differential Scanning Calorimetry to Measure Changes in Enthalpy
STATE FRAMEWORK	D.3.	<p>Describe energy transformations among heat, light, electricity and motion.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Using Differential Scanning Calorimetry to Measure Changes in Enthalpy • fMRI: Functional Magnetic Resonance Imaging
DOMAIN / CONTENT STANDARD	CT.9.2.	Energy Transformations: Energy Transfer and Transformations: The electrical force is a universal force that exists between any two charged objects.
STATE FRAMEWORK	D.5.	<p>Explain how electricity is used to produce heat and light in incandescent bulbs and heating elements.</p>

		<p>JoVE</p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Proton Exchange Membrane Fuel Cells • Raman Spectroscopy for Chemical Analysis
STATE FRAMEWORK	D.6.	<p>Describe the relationship between current and magnetism.</p> <p>JoVE</p> <ul style="list-style-type: none"> • fMRI: Functional Magnetic Resonance Imaging
DOMAIN / CONTENT STANDARD	CT.9.3.	Energy Transformations: Science and Technology in Society: Various sources of energy are used by humans and all have advantages and disadvantages.
STATE FRAMEWORK	D.8.	<p>Describe the availability, current uses and environmental issues related to the use of fossil and nuclear fuels to produce electricity.</p> <p>JoVE</p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Fractional Distillation • Proton Exchange Membrane Fuel Cells
STATE FRAMEWORK	D.9.	<p>Describe the availability, current uses and environmental issues related to the use of hydrogen fuel cells, wind and solar energy to produce electricity.</p> <p>JoVE</p> <ul style="list-style-type: none"> • Proton Exchange Membrane Fuel Cells
DOMAIN / CONTENT STANDARD	CT.9.4.	Chemical Structures and Properties: Properties of Matter: Atoms react with one another to form new molecules.
STATE FRAMEWORK	D.10.	<p>Describe the general structure of the atom, and explain how the properties of the first 20 elements in the Periodic Table are related to their atomic structures.</p> <p>JoVE</p> <ul style="list-style-type: none"> • Coordination Chemistry Complexes • Nuclear Magnetic Resonance (NMR) Spectroscopy • Raman Spectroscopy for Chemical Analysis • X-ray Fluorescence (XRF)
STATE FRAMEWORK	D.11.	<p>Describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding).</p> <p>JoVE</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

		<p>Saponification for Uk'37 Paleothermometry</p> <ul style="list-style-type: none"> • Determining the Solubility Rules of Ionic Compounds • Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction • Purification of a Total Lipid Extract with Column Chromatography • 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 • Ultraviolet-Visible (UV-Vis) Spectroscopy
STATE FRAMEWORK	D.12.	<p>Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Assembly of a Reflux System for Heated Chemical Reactions • Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat • Introduction to Titration • Ion-Exchange Chromatography • Le Châtelier's Principle • Two-Dimensional Gel Electrophoresis • Using a pH Meter
DOMAIN / CONTENT STANDARD	CT.9.5.	<p>Chemical Structures and Properties: Properties of Matter: Due to its unique chemical structure, carbon forms many organic and inorganic compounds.</p>
STATE FRAMEWORK	D.13.	<p>Explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.</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 • Assembly of a Reflux System for Heated Chemical Reactions • Chromatography-Based Biomolecule Purification Methods • Column Chromatography • Conducting Reactions Below Room Temperature • Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry • Coordination Chemistry Complexes • Density Gradient Ultracentrifugation • Dialysis: Diffusion Based Separation • Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction

		<ul style="list-style-type: none"> • Fractional Distillation • Introduction to Catalysis • MALDI-TOF Mass Spectrometry • Nuclear Magnetic Resonance (NMR) Spectroscopy • Performing 1D Thin Layer Chromatography • Preparing Anhydrous Reagents and Equipment • Purification of a Total Lipid Extract with Column Chromatography • 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 • Tandem Mass Spectrometry • Two-Dimensional Gel Electrophoresis • Ultraviolet-Visible (UV-Vis) Spectroscopy
STATE FRAMEWORK	D.15.	<p>Explain the general formation and structure of carbon-based polymers, including synthetic polymers, such as polyethylene, and biopolymers, such as carbohydrate.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • 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 Molecular Developmental Biology • An Introduction to Saccharomyces cerevisiae • An Introduction to Transfection • 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 • Annexin V and Propidium Iodide Labeling • Bacterial Transformation: Electroporation • Bacterial Transformation: The Heat Shock Method • C. elegans Maintenance • Capillary Electrophoresis (CE) • Cell Cycle Analysis • Cell-surface Biotinylation Assay • Chromatin Immunoprecipitation • Chromatography-Based Biomolecule Purification Methods • Co-Immunoprecipitation and Pull-Down Assays • Column Chromatography

- Community DNA Extraction from Bacterial Colonies
- Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry
- Cytogenetics
- DNA Gel Electrophoresis
- DNA Ligation Reactions
- DNA Methylation Analysis
- Density Gradient Ultracentrifugation
- Detecting Environmental Microorganisms with the Polymerase Chain Reaction and Gel Electrophoresis
- Detecting Reactive Oxygen Species
- Development and Reproduction of the Laboratory Mouse
- Development of the Chick
- Dialysis: Diffusion Based Separation
- Drosophila Larval IHC
- Drosophila melanogaster Embryo and Larva Harvesting and Preparation
- Electrophoretic Mobility Shift Assay (EMSA)
- Embryonic Stem Cell Culture and Differentiation
- Enzyme Assays and Kinetics
- Explant Culture for Developmental Studies
- Expression Profiling with Microarrays
- Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction
- FM Dyes in Vesicle Recycling
- 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
- Introduction to Catalysis
- Introduction to Mass Spectrometry
- Invasion Assay Using 3D Matrices
- Invertebrate Lifespan Quantification
- Ion-Exchange Chromatography
- Isolating Nucleic Acids from Yeast
- Le Châtelier's Principle
- Live Cell Imaging of Mitosis
- MALDI-TOF Mass Spectrometry
- Metabolic Labeling
- Molecular Cloning
- Mouse Genotyping
- PCR: The Polymerase Chain Reaction
- Photometric Protein Determination
- Plasmid Purification
- Protein Crystallization

		<ul style="list-style-type: none"> • Purification of a Total Lipid Extract with Column Chromatography • 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 • Reconstitution of Membrane Proteins • Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry • Restriction Enzyme Digests • SNP Genotyping • Separating Protein with SDS-PAGE • Separation of Mixtures via Precipitation • Sonication Extraction of Lipid Biomarkers from Sediment • Soxhlet Extraction of Lipid Biomarkers from Sediment • Surface Plasmon Resonance (SPR) • Tandem Mass Spectrometry • The ATP Bioluminescence Assay • The ELISA Method • The TUNEL Assay • The Transwell Migration Assay • The Western Blot • 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
DOMAIN / CONTENT STANDARD	CT.9.6.	Chemical Structure and Properties: Science and Technology in Society: Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.
STATE FRAMEWORK	D.16.	<p>Explain how simple chemical monomers can be combined to create linear, branched and/or cross-linked polymers.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Introduction to Catalysis • Le Châtelier's Principle
STATE FRAMEWORK	D.17.	<p>Explain how the chemical structure of polymers affects their physical properties.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Introduction to Catalysis • Le Châtelier's Principle

STATE FRAMEWORK	D.18.	<p>Explain the short- and long-term impacts of landfills and incineration of waste materials on the quality of the environment.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Dissolved Oxygen in Surface Water • Isolation of Fecal Bacteria from Water Samples by Filtration • Nutrients in Aquatic Ecosystems • Self-report vs. Behavioral Measures of Recycling • Turbidity and Total Solids in Surface Water
DOMAIN / CONTENT STANDARD	CT.9.7.	<p>Chemical Structure and Properties: The Changing Earth: Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles.</p>
STATE FRAMEWORK	D.19.	<p>Explain how chemical and physical processes cause carbon to cycle through the major earth reservoirs.</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 • Carbon and Nitrogen Analysis of Environmental Samples • Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry • Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction • Metabolic Labeling • Purification of a Total Lipid Extract with Column Chromatography • 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
DOMAIN / CONTENT STANDARD	CT.9.8.	<p>Chemical Structure and Properties: Science and Technology in Society: The use of resources by human populations may affect the quality of the environment.</p>
STATE FRAMEWORK	D.23.	<p>Explain how the accumulation of carbon dioxide (CO₂) in the atmosphere increases Earth's 'greenhouse' effect and may cause climate changes.</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material
STATE FRAMEWORK	D.24.	<p>Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.</p>

		<p>JoVE</p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • Detection of Bacteriophages in Environmental Samples • Determining the Solubility Rules of Ionic Compounds • Dissolved Oxygen in Surface Water • Gram Staining of Bacteria from Environmental Sources • Introduction to Mass Spectrometry • Isolation of Fecal Bacteria from Water Samples by Filtration • Le Châtelier's Principle • Making a Geologic Cross Section • Nutrients in Aquatic Ecosystems • Quantifying Environmental Microorganisms and Viruses Using qPCR • RNA Analysis of Environmental Samples Using RT-PCR • Turbidity and Total Solids in Surface Water • Water Quality Analysis via Indicator Organisms • Zebrafish Maintenance and Husbandry
DOMAIN / CONTENT STANDARD	CT.9.9.	Chemical Structure and Properties: Science and Technology in Society: Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.
STATE FRAMEWORK	D.25.	<p>Explain how land development, transportation options and consumption of resources may affect the environment.</p> <p>JoVE</p> <ul style="list-style-type: none"> • Bacterial Growth Curve Analysis and its Environmental Applications • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Measuring Tropospheric Ozone • Nutrients in Aquatic Ecosystems • Proton Exchange Membrane Fuel Cells • Raman Spectroscopy for Chemical Analysis • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Turbidity and Total Solids in Surface Water • Using GIS to Investigate Urban Forestry
STATE FRAMEWORK	D.26.	<p>Describe human efforts to reduce the consumption of raw materials and improve air and water quality.</p> <p>JoVE</p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • Biofuels: Producing Ethanol from Cellulosic Material • Detection of Bacteriophages in Environmental Samples

		<ul style="list-style-type: none"> • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Gas Chromatography (GC) with Flame-Ionization Detection • Isolation of Fecal Bacteria from Water Samples by Filtration • Measuring Tropospheric Ozone • Nutrients in Aquatic Ecosystems • Proton Exchange Membrane Fuel Cells • Quantifying Environmental Microorganisms and Viruses Using qPCR • RNA Analysis of Environmental Samples Using RT-PCR • Turbidity and Total Solids in Surface Water • Using GIS to Investigate Urban Forestry • Water Quality Analysis via Indicator Organisms • Zebrafish Maintenance and Husbandry
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Grade: 9 - Adopted: 2010

DOMAIN / CONTENT STANDARD	CT.CC.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STATE FRAMEWORK		Craft and Structure
GRADE LEVEL EXPECTATION	RST.9-10.4.	<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>JoVE</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*
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- **Co-Immunoprecipitation and Pull-Down Assays**
- **Color Afterimages**
- **Column Chromatography**
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- **Considerations for Rodent Surgery**
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- **Culturing and Enumerating Bacteria from Soil Samples**
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- **DNA Ligation Reactions**

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- Introduction to Titration
- Introduction to the Bunsen Burner
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- Ion-Exchange Chromatography
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- 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

- The Attentional Blink
- The Costs and Benefits of Natural Pedagogy
- The ELISA Method
- The Factorial Experiment
- The Ideal Gas Law
- The Inverted-face Effect
- The McGurk Effect
- The Morris Water Maze
- The Multi-group Experiment
- The Precision of Visual Working Memory with Delayed Estimation
- The Rouge Test: Searching for a Sense of Self
- 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
- 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)

		<ul style="list-style-type: none"> • 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
GRADE LEVEL EXPECTATION	RST.9-10.5.	<p>Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</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

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- 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
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- Plasmid Purification
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- Primary Neuronal Cultures
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- 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
- The Attentional Blink
- The Costs and Benefits of Natural Pedagogy
- The ELISA Method
- The Factorial Experiment
- The Ideal Gas Law
- The Inverted-face Effect
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- The Multi-group Experiment
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- 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
- 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

		<ul style="list-style-type: none"> • Zebrafish Reproduction and Development • fMRI: Functional Magnetic Resonance Imaging
DOMAIN / CONTENT STANDARD	CT.CC.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STATE FRAMEWORK		Integration of Knowledge and Ideas
GRADE LEVEL EXPECTATION	RST.9-10.7.	<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 • Assessing Dexterity with Reaching Tasks • Bacterial Growth Curve Analysis and its Environmental Applications • Balance and Coordination Testing • Basic Mouse Care and Maintenance • Binocular Rivalry • Biofuels: Producing Ethanol from Cellulosic Material • Blood Pressure Measurement • C. elegans Chemotaxis Assay

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- 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
- Dialysis: Diffusion Based Separation
- Dichotic Listening
- Dissolved Oxygen in Surface Water
- Drosophila Development and Reproduction
- Electro-encephalography (EEG)
- Electrochemical Measurements of Supported Catalysts Using a Potentiostat/Galvanostat

- Electrophoretic Mobility Shift Assay (EMSA)
- Enzyme Assays and Kinetics
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- The Simple Experiment: Two-group Design

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DOMAIN / CONTENT STANDARD	CT.CC.WHST.9-10.	Writing Standards for Literacy in Science and Technical Subjects
STATE FRAMEWORK		Text Types and Purposes
GRADE LEVEL EXPECTATION	WHST.9-10.1.	Write arguments focused on discipline-specific content.
INDICATOR	WHST.9-10.1(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>JoVE</p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design

DOMAIN / CONTENT STANDARD	CT.CC.WHST.9-10.	Writing Standards for Literacy in Science and Technical Subjects
STATE FRAMEWORK		Text Types and Purposes
GRADE LEVEL EXPECTATION	WHST.9-10.2.	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
INDICATOR	WHST.9-10.2(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>JoVE</p> <ul style="list-style-type: none"> • The Multi-group Experiment • The Simple Experiment: Two-group Design
INDICATOR	WHST.9-10.2(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>JoVE</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
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- Anxiety Testing
- Approximate Number Sense Test
- Are You Smart or Hardworking? How Praise Influences Children's Motivation
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- 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
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- 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
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- 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
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- **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
- The Attentional Blink
- The Costs and Benefits of Natural Pedagogy
- The ELISA Method
- The Factorial Experiment
- The Ideal Gas Law
- The Inverted-face Effect
- The McGurk Effect
- The Morris Water Maze
- The Multi-group Experiment
- The Precision of Visual Working Memory with Delayed Estimation
- The Rouge Test: Searching for a Sense of Self
- 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
- 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

		<ul style="list-style-type: none"> • 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
DOMAIN / CONTENT STANDARD	CT.CC.WHST.9-10.	Writing Standards for Literacy in Science and Technical Subjects
STATE FRAMEWORK		Text Types and Purposes
GRADE LEVEL EXPECTATION	WHST.9-10.3.	(See note; not applicable as a separate requirement)
INDICATOR	WHST.9-10.3(a)	<p>Note: 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 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>JoVE</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