

Student-designed Labs and Statistics for AP/IB Science

Summer Workshop Agenda

July 8- July 12, 2019

Day 1 - Common Statistical Calculations and Parameters

Activities:

- Teaching with Games: Statistical Terms Puzzle
- Guiding Student-designed Labs, Step 1: Range of Tolerance Experiments
- Guiding Student-designed Labs, Step 2: Employing the Peer Review Process
- Central Tendency Using Common Parameters: Mean, Variance, Standard Deviation, SEM
- Process of Science: Selecting the Best Graph for Your Data Set
- Special Topic: Unpacking AP and IB Lab Skills, Objectives and Requirements

Day 2 - Hypotheses That Compare Data Distilled into Means

Activities:

- Process of Science: Writing and Using a Null Hypothesis for Hypothesis Testing
- Student-designed Labs: Reflex Testing for Teaching Student's t-test
- Using Demo Labs as a Springboard to Student-designed Experimentation:
 - Demo Ideas for Labs and Extensions on Labs in Physics and Physical Science
 - Demo Ideas for Labs and Extensions on Labs in Chemistry
 - Demo Ideas for Labs and Extensions on Labs in Environmental Science
 - Demo Ideas for Labs and Extensions on Labs in Biology
- Hypothesis Testing: Data Analysis of Circular Motion Using the Student's t-test
- Special Topic: What do Parameters and Statistics Actually Say about a Research Question?

Day 3 – Hypotheses That Compare Observed vs. Expected in Categorical Data

Activities:

- Process of Science: How Do We Define What is 'Expected'? Example: % Composition Labs
- Student-designed Labs: Animal Behavior Experiments for Teaching Chi-squared Calculations
- Hypothesis Testing: Using Mitotic Division to Teach the Chi-squared Test
- Using Competition Labs to Elicit Innovation and Refine Techniques: (Perform Secret Example Lab)
- Special Topic: Analyzing and Answering Data-based Questions for AP or IB Exams

Day 4 - Hypotheses That Test Correlations Between Two Factors (in the field on this day)

Activities:

- Laying the Ground Work for Field Experimentation: Line Transects, Quadrats and Sampling
- Hypothesis Testing: Pearson's Test of Correlation Using Physical Properties Data
- Writing Mathematical Formulas: Modeling Directional Selection and Change Over Time
- Accessing Large Public Data Repositories: Creating Hypothesis Trees and Graphic Analyses
- Special Topic: Error Bars – What Can They Indicate and What Kind Do You Use?

Day 5 – Extending Knowledge Beyond Your Classroom

Activities:

- Writing Mathematical Formulas to Describe Change: Artificial Selection and Allelic Frequencies
- Vertical Teaming: Creating Departmental Guidelines for Lab Reports, Graphing and Scientific Skills
- Finding and Using Available Supplies: Let What You Have Guide the Investigations You Do
- Covering Content Using Inquiry-based Experimentation: Unpacking and Hitting Standards
- Assessing Skills and Knowledge: Create a Dichotomous Key for Graphing and Analyzing Data
- Special Topic: Classroom Management in a Student-centered Learning Environment

Teaching A&P/AP/IB Biology Using a Case Studies Approach

Summer Workshop Agenda

July 15- July 19, 2019

Day 1 – AIDS: Using a Case Study to Teach Tissues, Virology, Reproduction, and the Immune Response

Activities:

- Developing and Using Models: Simulation of the non-specific and specific immune response
- Storyline Teaching: Stop animation movies of the infection process
- Student-designed Inquiry Lab: Disease transmission experiments
- Analyzing and Interpreting Data: DNA sequence mutations that confer resistance
- Science and Engineering Practices: Designing a drug for prevention, treatment or cure
- Phenomenon-based Learning: Simulation of drug efficacy and resistance
- Study Skills: AP/IB curriculum changes and expectations for the AP/IB exam

Day 2 – Diabetes: Using a Case Study to Teach Digestion, Endocrine System, and Homeostasis

Activities:

- Developing and Using Models: Active and passive transport
- Planning and Carrying Out Investigations: Competition labs using diffusion (AP Bio Lab 4)
- Using Games to Generate Data: Homeostasis of insulin and glucagon
- Planning and Carrying Out Investigations: Digestive enzymes experiments (AP Bio Lab 13)
- Engaging in Argument from Evidence: Crash debates on the regulation of processed foods
- Phenomenon-based Learning: Why are we getting fatter?
- Systems and System Models: Removing nitrogenous waste
- Field Trip: Visit a kidney dialysis center
- Study Skills: Planning a cohesive Anatomy and Physiology course

Day 3 – Hemoglobin: The Study of an Allosteric Protein; Gas Exchange Systems

Activities:

- Structure and Function: Modeling protein folding
- Storyline Teaching: Evolution of hemoglobin and the persistence of globin proteins
- Cause and Effect Mechanisms and Explanations: Changes in a molecule caused by its environment
- Evolutionary Connections: Decent with modification as seen in a gene family (BLASTs and Cladograms)
- Patterns, Energy, Cycles and Matter: The evolution of oxygen on a young planet
- Using Games to Teach: Respiration efficiency relay race
- Phenomenon-based Learning: Blood types and antigens
- Planning and Carrying Out Investigations: Transpiration, respiration, and homeostasis (AP Bio Lab 11)
- Study Skills: Free response and short essay writing techniques

Day 4 – Human Neurobiology and Behavior: Creating a Case Study on Addiction and Depression

Activities:

- Developing and Using Models: Nerve conduction, SSRIs, stimulants, and depressants
- Planning and Carrying Out Investigations: Sensory organs, response range, stimulants and depressants
- Storyline Teaching: The cycle of addiction
- Systems and System Models: Muscle contraction
- Obtaining, Evaluating and Communicating Information: Evolution and cladistics using muscle protein data
- Planning and Carrying Out Investigations: Phylogeny using on-line data sets (AP Bio Lab 3)
- Study Skills: Integrating scientific terms into the working vocabulary
- Anatomy in clay with Kelly Canino

Day 5 – Constructing Customized Case Studies for Place-based Teaching

Activities:

- Student-designed case studies and place-based learning
- Statistical skills and data analysis for labs and student-designed experiments
- Collaborative Groups: Construct your own case study
- Study Skills: Increasing student motivation and engagement
- Alignment of AP and IB standards to a case studies curriculum

Writing Lesson Plans Using NGSS Instructional Strategies

Summer Workshop Agenda

July 22- July 26, 2019

Day 1 – Identifying Learning Objectives for Content and Skills

Activities:

- Writing a New Curriculum: Synchronizing a Course with a Mission or Philosophy
- Writing a New Curriculum: Identifying and Ranking Learning Objectives for Content, Attitudes, and Skills
- NGSS Process of Science Practices: Asking Questions and Defining Problems
- Learning New Teaching Techniques: Mind Maps, Systems Maps, and Infographics
- Writing a New Curriculum: Hitting Standardize Targets—AP, IB, College, and State Requirements

Day 2 – Storylines, Hooks and Phenomena to Fit the Learning Arc

Activities:

- Writing a New Curriculum: Using Phenomena and Case Studies to Drive Inquiry and Engage Curiosity
- NGSS Process of Science Practices: Developing and Using Models
- Learning New Teaching Techniques: Teacher-designed and Student-designed Model Activities
- NGSS Process of Science Practices: Constructing Explanations and Designing Solutions
- Learning New Teaching Techniques: Competition Labs and Product Development Challenges
- Writing a New Curriculum: Technology and the Use of Multimedia in Teaching

Day 3 – Backward Mapping

Activities:

- Writing a New Curriculum: Turning Content and Skills Objectives into Activities that Fit the Material
- NGSS Process of Science Practices: Obtaining, Evaluating and Communicating Information
- Learning New Teaching Techniques: Town Hall Meetings, Characters on Trial, and Research t-shirts
- Writing a New Curriculum: Fostering Writing Skills in the Science Classroom
- Learning New Teaching Techniques: Writing in Science with Children’s Books, New Stories, Lyrics, and Poetry
- NGSS Process of Science Practices: Using Mathematics and Computational Thinking
- Learning New Teaching Techniques: Data-supported Graphs and Hypotheses

Day 4 – Writing Lesson Plans that Use NGSS Practices, Multiple Intelligences, and Differentiation

Activities:

- Writing a New Curriculum: Using Games, Simulations, Analogies in Your Course
- NGSS Process of Science Practices: Planning and Carrying Out Investigations
- Learning New Teaching Techniques: The Peer Review for Student-designed Experiments
- NGSS Process of Science Practices: Analyzing and Interpreting Data
- Learning New Teaching Techniques: Data-generating Activities That Add Math to Each Day
- Writing a New Curriculum: Honoring the Diversity of Learning Styles, Languages, and Abilities

Day 5 – Authentic Assessment of Content and Skills

Activities:

- Writing a New Curriculum: Alternatives to the Usual Projects, Presentations, and Tests
- NGSS Process of Science Practices: Engaging in Argument from Evidence
- Learning New Teaching Techniques: Crash Debates, Puzzles, and Games
- Learning New Teaching Techniques: Writing Rubrics that Free the Mind and Unleash the Child

2019 Summer Workshops

Drop the lecture and engage your kids in

Inquiry Science and Critical Thinking Activities

Topic:

Dates:

Student-designed Labs and Statistics for AP/IB Science

July 8-July 12

Teaching A&P/AP/IB Biology Using a Case Studies Approach

July 15-July 19

Writing Lesson Plans Using NGSS Instructional Strategies

July 22-July 26

Daily Meeting Times: Mon-Fri 8am-5pm

Location: Hilton Garden Inn, Asheville, NC

Tuition: \$550 per workshop

10% discount per any person attending multiple workshops

Each Workshop Focuses On:

- Using hands-on, inquiry-based activities to teach a course in general, advanced, AP/IB courses experientially
- Practicing student-centered learning techniques such as simulations, modeling, debates and games to increase interest and raise the level of critical thinking
- Introducing new ways to motivate and engage students during test taking, essay writing, mastery of study skills, textbook reading and note taking
- Training teachers to use student-designed lab experiments to teach scientific thinking and prepare for the AP or IB lab requirements (including IAs)
- To help teachers learn classroom management, testing and assessment techniques used with experiential learning
- In-depth review of each concept topic to identify areas of weak content comprehension and dispel misconceptions (for teachers and students!)

Additional Information: All participants will receive 40 hours of Continuing Education Credits and lesson plans covering the week's material in a manner consistent with AP and IB courses.

Be sure to sign up early, these workshops fill up very quickly. Please use the order form on the back of this flier, or go to www.CatalystLearningCurricula.com

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59 Clemmons Street, Asheville, NC 28801
828-687-0807 Kristen.Dotti@CatalystLearningCurricula.com

www.catalystlearningcurricula.com



The Summer Workshop fee is \$550.00 per person for 5 days of training. A non-refundable \$200 place-holding fee is required to secure a spot in each workshop; the balance will be due by June 1, 2019.

Please indicate your payment method for the place-holding fee and the balance in the form below:

Name of Billing Contact Person: _____	Name of Attendee: _____
Address: _____	Address: _____
Telephone: _____	Telephone: _____
Fax: _____	Fax: _____
E-mail: _____	E-mail: _____
Name of School: _____	Subject(s) You Teach: _____
How did you hear about the 5-Day Summer Workshops? _____	

Payment Method: Check (made out to Catalyst Learning Curricula) or **Purchase Order Number:** _____

Or **Credit Card** information (credit card purchases include an additional \$22 charge):

Card Number: _____ Expiration date: _____

Name on card: _____ 3-digit security code: _____ Billing zip code: _____

Please indicate which Summer Workshop(s) you plan to attend:

- | | | |
|--------------------------|---|-------------------------|
| <input type="checkbox"/> | Student-designed Labs and Statistics for AP/IB Science | July 8-July 12 |
| <input type="checkbox"/> | Teaching A&P/AP/IB Biology Using a Case Studies Approach | July 15-July 19 |
| <input type="checkbox"/> | Writing Lesson Plans Using NGSS Instructional Strategies | July 22- July 26 |

Mail application and place-holding payment to:
 Catalyst Learning Curricula, 59 Clemmons St., Asheville NC 28801
 or email application to Kristen.Dotti@CatalystLearningCurricula.com

A discount rate of \$149/night Sun-Thu has been arranged for participants who choose to stay at the Hilton Garden Inn where the workshops will be held each day (use link at Catalyst Learning Curricula website to receive rate). Accommodation and transportation must be arranged by attendees.

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