

Cherry Creek AP Institute in Biology

This workshop will prepare you to teach a course aligned with the Curriculum Framework for AP Biology. Laboratory experience will be emphasized in our workshop to help participants feel adept and confident to guide students in inquiry labs. Each day we will work through two or more of the AP Investigations. The laboratory component of the course has a heavy emphasis on inquiry and development of science skills, so our workshop will give you practice in these areas.

Participants in the Cherry Creek AP Institute in Biology will have the opportunity to perform numerous labs, receive suggestions on how to develop a new course, share hints for improving student achievement, and participate in content updates. During the week, we will discuss selection of textbooks and other materials, equipment suggestions, and provide ordering information. Participants will have many opportunities to network and develop a support system with other members of our class. When you leave, you will have a notebook and brain full of ideas, new skills, and confidence that you are ready to teach a fine course!

To help you become more confident as a teacher of AP Biology, we will address:

1. Content and Science Practices: Understanding and Using the Curriculum Framework

- What topics will you teach?
- How can you incorporate science practices into your daily teaching?
- Develop a syllabus and prepare for the AP Audit

2. Inquiry as a lab focus

The lab component of our session will help you gain expertise in basic lab procedures, familiarize you with equipment and lab prep, and teach you ways to adapt existing teacher-directed labs to inquiry labs.

- The classic AP Biology Lab Manual is a rich resource for background in fundamental lab procedures. What elements of the classic AP Biology Lab Manual can we use? How can we turn these into inquiry experiences?
- The new Investigations: Which should I choose? What are the hints I need for them to be successful?
- How can lab work be assessed? Poster sessions and other ideas will be discussed.

3. Conceptual Exams that incorporate Science Practices

- What are the elements of the exam?
- What experiences can we give our students so they are able to demonstrate conceptual understanding rather than simply factual knowledge?
- Where can you find test items? Learn to write your own test items.

4. What Should I Bring?

If you are currently teaching an AP Biology course, you may wish to bring a copy of your **textbook** and your **syllabus**. Also pack a **calculator** and **laptop/iPad** (if possible) which we will use both in class work and to develop your new course and audit. Some teachers have also found it useful to bring a **digital camera** to record lab setup and procedures. Our classroom will have wireless internet access.

There will be many opportunities to network and develop a support system with other members of our class. You will work in groups to develop your own course outline/pacing guide using the Curriculum Framework or share yours with new teachers. To do this, bring your **school calendar/blank calendar**. Besides digital and print versions of many materials prepared by your instructor, you will receive a wealth of resources from publishers including copies of several textbooks. The temperature of your classroom fluctuates, so plan for this. Casual wear is appropriate—we will be in lab every day and Denver is usually quite hot in July.

5. More Detail/Daily Syllabus

What follows are activities and topics that we anticipate including in the summer workshop at Cherry Creek. The information in blue type shows materials the instructor needs to prepare or think about; the black type is the actual syllabus. As you will see, *there is a heavy emphasis on laboratory activities*. I look forward to working with you soon! If you have any questions, email me at MissMizzou@aol.com

Theresa Holtzclaw

Peas should be soaked on Sunday!

MONDAY

Monday Blocks	ACTIVITY
1	<ul style="list-style-type: none"> Welcome and participant introductions Name/school/assignment/NEEDS/special info Distribute books and handouts Set up Box or Google Drive Sharing
2	<p>Introduction to the Curriculum Framework for AP Biology</p> <ul style="list-style-type: none"> Overview of the Curriculum Framework (use the ppt) Big Ideas Activity AP* Biology Investigative Lab Manual
3 <i>Big Idea 4 Interactions</i>	<p>AP* Lab 11: Animal Behavior with Pillbugs; Experimental Design</p> <p>9:30-10:00 Demonstrate Wet vs. Dry /Control (+ and -)</p> <p>10:00-10:15 Experimental Design/Pillbug stories</p> <p>10:15-11:00 Guided Inquiry</p> <p><i>Controlled experiment/graphical representation of data</i></p> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 200px;">Take more pillbugs!</div>
4	<p>Science Practices (Discussion + use Pillbug Lab as example)</p> <p>Chi-Square Analysis of Data/ Importance of Mathematics as a Science Practice</p> <p>See Kim Foglia's Activity on CD in Lab Folder</p>
	LUNCH
5 <i>Big Idea 2 Energy and Homeostasis</i> <i>Big Idea 4 Interactions</i> <i>Big Idea 1 Evolution</i>	<p>PLANT TIME</p> <p>AP* Investigation 5: Photosynthesis with Floating Disks</p> <p>AP* Investigation 11: Transpiration</p> <ul style="list-style-type: none"> Whole plant set up Making and using a potometer Stomatal Peels Calculating leaf surface area <p>Design Your Own Plant Investigation</p> <ul style="list-style-type: none"> Brainstorm: What is a question you could answer with one of these techniques? Develop question, write hypothesis, procedure, safety considerations and prepare data chart. <p>AP* Investigation 1: Artificial Selection (Introduction to Fast Plants) (How to plant and to work with Fast Plants; look at trichomes later in week)</p>
6	<p>What Content and Skills Do I Need to Teach?</p> <p><i>Practice Exam</i></p>
Homework	<ul style="list-style-type: none"> Evaluate the MC portion of the exam (page 31-38 of Workshop Handbook) Note to self: Pour agar plates by today!

Labs will be set up every afternoon after the last session. You are welcome to stay to ask questions, make comments, and assist with set-up so you know what to expect when you do the lab.

TUESDAY

Tuesday Blocks	ACTIVITY
1	<ul style="list-style-type: none"> • Mass Transpiration Plant/Calculate % Mass Lost/Graph Data • Bell Question
2 <i>Big Idea 4 Interactions</i>	<p>Enzyme Lab Variation (Need yeast and fresh peroxide)</p> <ul style="list-style-type: none"> • Learn a technique • Evaluate initial and final rates of an enzyme reaction • Develop a procedure to answer a question about one factor affecting enzyme activity • Report results
3 <i>Big Idea 2 Cell Processes</i>	<p>AP* Investigation 4: Diffusion and Osmosis (Ward's Procedure)</p> <ul style="list-style-type: none"> • Part 1B Diffusion in agar cubes <i>Set up cubes; during wait time begin other parts</i> Timing of cubes is <i>important</i> (15 minutes OK) but other lab parts OK to run over lunch. • Part 2A and 2B: Diffusion/Osmosis with model cells (dialysis bags) Add cell filled with albumin placed in water • Modify data sheet to include above, as well as columns for prediction and explanation • Part 3B and Assessment: Determine osmolarity of potato cores using unknown solutions. • If time permits, 3A: Observing Osmosis in Living Cells (Will need Elodea or Red Onion)
	LUNCH
4	<ul style="list-style-type: none"> • Conclude Data Collection, Osmosis/Diffusion Lab. Post results. • <i>Content Update:</i> Water potential • Discuss and explain results
5 <i>Big Idea 2 Cell Processes</i>	<p>AP* Lab 5: Cell Respiration</p> <ul style="list-style-type: none"> • How to build a respirometer ; Use only room temperature water. • Overview of respiration and how this lab relates to flow of matter
6	<p>Experimental Design and Moving to Inquiry</p> <ul style="list-style-type: none"> • Share Best Practices for evaluation of student lab work • Miniposter Discussion • CB materials in binder
7	<p>Computer Time</p> <ul style="list-style-type: none"> • Introduction to AP Insight • AP* Central, The LabBench, Course Description, Labs, etc. • Syllabus Work • HHMI Resources
8	<ul style="list-style-type: none"> • Diversity in the Classroom: Equity and Access
Homework	<ul style="list-style-type: none"> • Work on Syllabus/Course Schedule; Question _____ • Do LabBench for Lab 6, both 6A and 6B • Finish MC Test <p><i>(streak plates)</i></p>

WEDNESDAY

Wednesday Blocks	ACTIVITY
1	<ul style="list-style-type: none"> • Mass Transpiration Plant/Calculate % Mass Lost/Graph Data; Post Data from all groups and add to graphs • Report Exam Data/Discuss Exam Insights
2	<p>AP* Investigation 8: Colony Transformation: Molecular Biology Lab</p> <ul style="list-style-type: none"> • <i>Content Update:</i> Principles of electrophoresis, <i>DNA is DNA is DNA</i>, Plasmids, restriction enzymes, cloning • <i>The LabBench</i> to help introduce this lab • Make predictions of results/ role of controls
3 <i>Big Idea 3 Genetics</i>	<p>Science Practices: Emphasis on Mathematics</p> <ul style="list-style-type: none"> • Statistics Primer
	LUNCH
4 <i>Big Idea 3 Genetics</i>	<p>Discussion of AP* exam</p> <ul style="list-style-type: none"> • How to Teach Essay Skills with Concept Generalizations • Hints for Top Scores (getting it all in, preparing for the exam, review . . .) • Multiple Choice strategies • Reading Guides
5	<p>Investigation 3: Comparing DNA Sequences (BLAST)/Computer Time (Use GULO gene and materials from Webb)</p>
6 <i>Big Idea 1: Evolution</i>	<p>Discussion of AP* exam</p> <ul style="list-style-type: none"> • How to Teach Essay Skills with Concept Generalizations • Hints for Top Scores (getting it all in, preparing for the exam, review . . .) • Multiple Choice strategies • Reading Guides
7	<ul style="list-style-type: none"> • Science Practices Work
Homework	Work on your Syllabus/Course Schedule

THURSDAY

Thursday Blocks	ACTIVITY
1	BQ: 2015 Essay OR Write 2018 Q 3,4,5 <ul style="list-style-type: none"> • Equity and Access • Share Your Best Practices
2 <i>Big Idea 3 Genetics</i>	Mitosis and Meiosis Labs <ul style="list-style-type: none"> • Modeling Mitosis and Meiosis (use Smanik variation and pipe cleaners) • A look at <i>Sordaria</i> (Can use Flinn activity here)
3	Audit, Pacing, Pearson/text work
4	Raffle
	LUNCH
5	<ul style="list-style-type: none"> • Additional AP* Topics: Getting It All In, Preparing for the Exam • Participant Sharing • Pacing and Planning • Syllabus Work
6	A Day with a Reader (How the Essays are Graded)
7	Analyze results of Colony Transformation Lab. <ul style="list-style-type: none"> • Calculate transformation efficiency. Discuss results. (Plasmid Mapping Activity)
8 <i>Big Idea 1 Evolution</i>	Population Genetics and Evolution (Hardy Weinberg) (Do "Grebe Grebe". Emphasize differences between cases/why must calculate allele frequency by hand rather than use formula. Practice HW problems.)
9	<ul style="list-style-type: none"> • Wrap up Unfinished Business • Review/Summary • Workshop Evaluations