# Free Teacher Workshops

**Presented by Bio-Rad Laboratories**

**Step-by-Step, Hands-on Experience**

## Boston, MA | Boston Convention and Exhibition Center

### Thursday | April 2

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<td>8–9:30 AM</td>
<td>CRISPR: the Gene Editing Technology’s Whats, Hows, Safety, and Ethics</td>
<td>Conserving Panda Populations: Understanding Reproductive Endocrinology (Grades 9-16)</td>
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<td>Wow! I Did Real CRISPR Gene Editing!</td>
<td>Modern Biology is Revolutionizing Human Lives! Are Your Students Prepared?</td>
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<td>2–3:30 PM</td>
<td>Is It Really CRISPR? Genotype Your Gene Editing Results!</td>
<td>Algae Blooms: Agriculture, Ecology, and Economy (AP Biology/Environmental, Aquatic Sciences)</td>
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<td>4–5:30 PM</td>
<td>The Opioid Epidemic: Exploring the Genetic Associations of Opioid Abuse</td>
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### Friday | April 3

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<td>DNA to Antibodies, Protein Drug Treatments in the 21st Century</td>
<td>Contagion! Track the Spread of Dangerous Viruses Throughout the Country</td>
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<td>Phenomenon-Based, Hands-On Evidence for Evolution</td>
<td>Think Like an Engineer in Your Biology Class</td>
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<td>Building Biology Learning Through Connected Concepts — Reinforcing “Big Ideas”</td>
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Fresh Catch of the Day — What Is Scrod, Anyway?

DNA barcoding is becoming a key piece to solving the puzzle of species identification. Learn how your students can participate in global efforts aimed at species identification at the molecular level, and how these efforts connect to conservation, local marketplace regulation, and biodiversity.

Is It Really CRISPR? Genotype Your Gene Editing Results!

Extend your students’ understanding of CRISPR, experimental design, and scientific controls without the need for sequencing! In this hands-on workshop, you will perform bacterial colony DNA extraction and PCR, and learn about how to use gel electrophoresis to genotype Out of the Blue CRISPR Kit results.

Mushroom Ecology and Why It Matters for Biofuel Production

With rising levels of greenhouse gases, bioengineers apply observations in mushroom ecology toward finding a biofuel solution. In this hands-on workshop, use an inquiry-based approach as you extract enzymes from mushrooms and optimize reaction rates for biofuel production.

Teach photosynthesis and cellular respiration together in the context of an algae bloom case study, your students can engage in authentic inquiry investigations to learn about two connected processes and their ecological and economical implications.

Can your students save the Giant Pandas? See how your students can explore challenging topics such as homeostatic regulation, cell-to-cell communication, and the effect of reproductive hormones, immunological responses, and ecosystem balance by engineering a hormone detection system that can be used for Giant Panda population conservation efforts.

With CRISPR-Cas9 technology safety, affordably, and ethically in the classroom. In this hands-on workshop, use CRISPR to edit a gene found only in bacteria with basic biotechnology techniques and equipment. The activity integrates modeling, math, bioinformatics, and ethics.

Wow! I Did Real CRISPR Gene Editing!

CRISPR gene editing has revolutionized science. Now you and your students can use CRISPR-Cas9 technology safely, affordably, and ethically in the classroom. In this hands-on workshop, use CRISPR to edit a gene found only in bacteria with basic biotechnology techniques and equipment. The activity integrates modeling, math, bioinformatics, and ethics.

CRISPR: the Gene Editing Technology’s Whats, Hows, Safety, and Ethics

CRISPR has created a buzz in the world of science. It has the potential to revolutionize medicine, agriculture, and everyday life. In this talk you will learn about CRISPR-Cas9 history, science, technology, ethics, and the numerous cross-cutting concepts that you can integrate into your CRISPR lessons.

Think Like an Engineer in Your Biology Class

Incorporate NGSS science and engineering practices into your biology class by engaging students to define the problem of world hunger. Considering constraints, students design a treatment plan (solution), in the form of an evidence-based argument, for protein-energy malnutrition.

Do your students ask, “What do I have to remember about this?” or clearly not understand the big concept behind the activity that you prepared? See how to design a series of activities that help students make connections and build a deep understanding of the major concepts being conveyed.

Phenomenon-Based, Hands-On Evidence for Evolution

Come learn how to use the results of protein electrophoresis as a phenomenon to engage students. The skill of polyacrylamide gel electrophoresis will be used to engage the lesson and elicit questions about similarities and differences in living organisms. Time for Q&A with research scientists!

Contagion! Track the Spread of Dangerous Viruses throughout the Country

Disease can spread like wildfire through populations. In this hands-on workshop you will become an epidemiologist and track diseases like coronavirus, ebola, measles, and HIV to name a few. See if you can track down patient zero.

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Conserving Panda Populations: Understanding Reproductive Endocrinology (Grades 9-16)

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Modern Biology is Revolutionizing Human Lives! Are Your Students Prepared?

Glowing cats? Personalized medicine? Designer babies! Empower and prepare your students to think critically as modern biology revolutionizes medicine, industry, and human lives. Learn from a leader in high school and undergraduate biotechnology education how to build your bioscience lab program step-by-step with equipment, supplies, and student credentials.

Algae Blooms: Agriculture, Ecology, and Economy (AP Biology/Environmental, Aquatic Sciences)

Teach photosynthesis and cellular respiration together in the context of the dead zone in the Gulf of Mexico. Using algae beads together with an algae bloom case study, your students can engage in authentic inquiry investigations to learn about two connected processes and their ecological and economical implications.

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