Bio-Rad Explorer Kits Modifications for Socially-Distanced Classrooms

Bio-Rad Explorer kits are designed to be used in a workstation format, for example 8 workstations of 4 students. Kit protocols and curricula are designed to this specification, and this is the configuration that offers the best, most comprehensive user and learning experience.

To help teachers adjust and accommodate changing learning environments, however, modifications can be made to support different numbers of single-student workstations.

Please note:
- These modifications are designed to accommodate the largest number of students as possible; workflows may be adjusted and the purchase of additional reagents or plastics may be required — those requirements are listed.
- This is a partial list of Bio-Rad kits and modifications that can be used in socially distanced classrooms or even by students at home. Contact a Curriculum Training Specialist for other options.
- Always follow your local guidelines and regulations regarding social distancing, use of shared equipment, home use of kits, and disposal of reagents.

This list will be updated frequently, so please check back. Supplementary resources, including PowerPoint presentations, links to videos, and case studies, are available online at bio-rad.com/classroomresources.

<table>
<thead>
<tr>
<th>Catalog #</th>
<th>Kit Name</th>
<th>EDU Price (USD)</th>
<th>In Class</th>
<th>At Home</th>
<th># Workstations</th>
<th>Standard Protocol</th>
<th>Modified Protocol</th>
<th>Tradeoffs of Using Modified Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>12005534EDU</td>
<td>Photosynthesis and Cellular Respiration Kit for General Biology</td>
<td>$145.00</td>
<td>X</td>
<td>X</td>
<td># Workstations</td>
<td>Standard protocol: 24</td>
<td>Modified protocol: 48</td>
<td>Create models and design experiments with algae beads to explore photosynthesis and cellular respiration. Each student uses sets of 3 algae beads in PCR tubes with CO2 indicator solution to observe both processes in parallel (saves time).</td>
</tr>
<tr>
<td>1790123BDEU</td>
<td>Photosynthesis and Cellular Respiration Kit for AP Biology</td>
<td>$145.00</td>
<td>X</td>
<td>X</td>
<td># Workstations</td>
<td>Standard protocol: 8</td>
<td>Modified protocol: 17 or 34</td>
<td>Design experiments that use algae beads and CO2 indicator solution to discover low environmental conditions impact both photosynthesis and cellular respiration. Students use cassettes containing 10 beads in 1 ml CO2 indicator. Each workstation uses 1 cassette to examine both processes in parallel (saves time and allows a direct comparison).</td>
</tr>
<tr>
<td>1880055EDU</td>
<td>pGLO Bacterial Transformation Kit</td>
<td>$90.00</td>
<td>X</td>
<td>--</td>
<td># Workstations</td>
<td>Standard protocol: 8</td>
<td>Modified protocol: 24</td>
<td>Use bacterial transformation with an inducible promoter to make glowing E. coli. Each workstation performs four transformations: the experimental and three controls. Transformation requires use of a thermal bath, and visualization requires a UV light source.</td>
</tr>
<tr>
<td>12012608EDU</td>
<td>Out of the Blue Genotyping Extension Kit</td>
<td>$495.00</td>
<td>X</td>
<td>--</td>
<td># Workstations</td>
<td>Standard protocol: 8</td>
<td>Modified protocol: 40</td>
<td>Use multiplex PCR and gel electrophoresis to confirm the edit in the lacZ gene. Each student builds a personal gel electrophoresis chamber to separate food coloring and candy dyes. The gel electrophoresis chamber is reusable (can be used for multiple classes) with purchase of additional agarose and buffer. Each kit contains sufficient reagents and ammutes for 36 students (36 workstations).</td>
</tr>
<tr>
<td>1880590EDU</td>
<td>Genes in a Bottle Kit</td>
<td>$134.00</td>
<td>--</td>
<td>X</td>
<td># Workstations</td>
<td>Standard protocol: 36</td>
<td>Modified protocol: 18 samples</td>
<td>Extract your DNA from your own cheek cells (patio) and bottle it in a keepable necklace. Each kit contains sufficient reagents and ammutes for 36 students (36 necklaces).</td>
</tr>
<tr>
<td>1880595EDU</td>
<td>STEM Electrophoresis Classroom Kit</td>
<td>$275.00</td>
<td>$495.00</td>
<td>X</td>
<td>X</td>
<td># Workstations</td>
<td>Standard protocol: 8</td>
<td>Modified protocol: 48</td>
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</tbody>
</table>

This activity requires: - Collection of nasal samples, so instructions may choose to have students perform the activity at home - Disposable alcohol (not included); a vessel for transporting the alcohol to students will also be required for home use: 1884799EDU 10 ml crimp-seal centrifuge tubes (50) - Disoomin P(T) Transfer Plates (50) - Science of Opioid Dependence Kit
Modifications for home use
Students can use the electrophoresis chamber from the STEM Electrophoresis Kit. Each workstation prepares a subset of the samples and reference dye, 2 of each.

Modifications for home use
Students can use the electrophoresis chamber from the STEM Electrophoresis Kit. Each workstation performs objects of a subset of the samples.

Modifications to extend number of stations for social distancing
Each workstation analyzes a complete set of 12 samples.

Electrophoresis chamber required, but not included.

Modifications for social distancing
- Workstations processing a portion of the samples and references, or
- Students performing the hands-on portion of this curriculum as a remote activity (2) can be performed remotely.
- Each workstation performs the separation of all the samples and share the procedure and results with students virtually.

Giant Panda Problem Kit
17005278EDU
$138.00

Each workstation analyzes controls and samples in duplicate, not triplicate. Students can use disposable plastic transfer pipets instead of microtubes. Purchase additional disposable plastic transfer pipets to extend to 22 workstations.

Proteins, Enzymes, and ELISA
Do not require shared equipment

ELISA Immuno Explorer Kit
17004592EDU
$138.00

Each workstation analyzes a complete set of 3 samples with two sets of PCR primers (test and control).

Modified protocol: 36

- Purchase of 1662003EDU Protease (1.3 ml)
- Purchase of 1662400EDU Disposable Plastic Transfer pipets (50)
- Use of fewer replicates than are optimal for a complete experiment

Biofuel Enzyme Reactions Kit for AP Biology
17001235EDU
$135.00

Each workstation analyzes 1 sample through the procedure.

Modified protocol: 22

- Students are provided a piece of mushroom to extract using a microcentrifuge tube and pipet tip as needed and passel. no* teacher provides extracts.
- Each workstation analyzes controls and samples in triplicate.

Modified protocol: 12

- Activity (3) can be performed by students with the electrophoresis chamber from the STEM Electrophoresis Kit. Alternatively, the instructor can perform the separation of all the samples and share the procedure and results with students virtually.

Modifications for home use
- Each workstation performs objects of a subset of the samples.

Electrophoresis chamber required, but not included.

Modifications to extend number of stations for social distancing
- Each workstation analyzes a complete set of 2 samples. They must pool results to see the entire experiment.

PCR Amplification
Require microcentrifuge, thermal cycler, electrophoresis cell, power supply, and gels

PVNS PCR Information Kit
16621002EDU
$210.00

Modified protocol: 40

- Use PCR and gel electrophoresis to analyze your PVNS Au repeat allele.

Standard protocol: 8

- Use PCR and gel electrophoresis to determine if your test contains a GNO.

Modified protocol: 20

- Each student extracts their own DNA using the tea/fibroblasts DNA extraction protocol (purchase of protocol required).

GMO Investigator Kit
16625553EDU
$187.00

Modified protocol: 8

- Use PCR and gel electrophoresis to analyze your PVNS Au repeat allele.

Standard protocol: 8

- Use PCR and gel electrophoresis to determine if your test contains a GNO.

Modified protocol: 20

- Workstations share components, accommodated up to 12 workstations at a time. Reagents sufficient for 3 sessions with 12 workstations are provided (yarn plastic and cuvettes in between each set).

Psych Science Investigator PCR Basics Kit
16636003EDU
$149.00

Standard protocol: 8

- Use PCR and gel electrophoresis to determine if your test contains a GNO.

Modified protocol: 12

- Use PCR and gel electrophoresis to analyze your PVNS Au repeat allele.

Crime Scene Investigator PCR Basics Kit
16636003EDU
$185.00

Modified protocol: 12

- Use PCR and gel electrophoresis to analyze your PVNS Au repeat allele.

Standard protocol: 8

- Use PCR and gel electrophoresis to analyze your PVNS Au repeat allele.

Modified protocol: 40

- Use PCR and gel electrophoresis to determine if your test contains a GNO.

Standard protocol: 8

- Use PCR and gel electrophoresis to analyze your PVNS Au repeat allele.

Modified protocol: 40

- Use PCR and gel electrophoresis to determine if your test contains a GNO.

Standard protocol: 8

- Use PCR and gel electrophoresis to analyze your PVNS Au repeat allele.

Modified protocol: 20

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