Explorelearning®

Gizmos®

Idaho State Department of Education Curricular Materials Adoption 24-25

Reviewer Guide

What is Gizmos?

With Gizmos, kids get it.

Gizmos is a library of interactive math and science labs and simulations for grades 3-12.

Experiment with the best STEM learning tools for the classroom. With a library of over 550 virtual simulations, Gizmos gives everyone something to graph, measure, compare, predict and prove. The lesson materials are designed to support and stimulate mindful interaction, guiding students to extend their learning and make connections.

That's hundreds of experiences where students practice **thinking and acting like mathematicians.**

Table of Contents

The following links will help you navigate the key sections of the review guide:

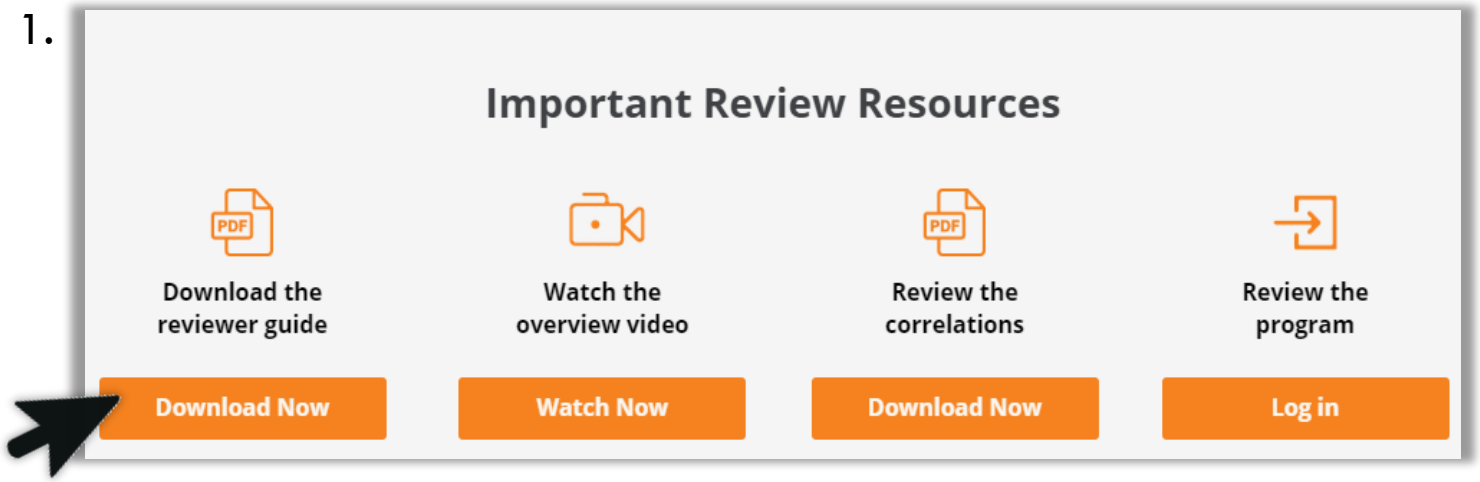
The button on the top-right corner will bring you back here to the Table of Contents.

Download the Reviewer Guide

This reviewer guide will take you through an intuitive, step-by-step process for understanding **Gizmos simulations**, including the review steps, navigation, instruction, and pedagogy.

1. Click the **Download Now** button on the Adoption Review Site to download the reviewer guide.
2. Take note of the colored tabs at the top of each page to track your progress through the four sections of the reviewer guide.

1.



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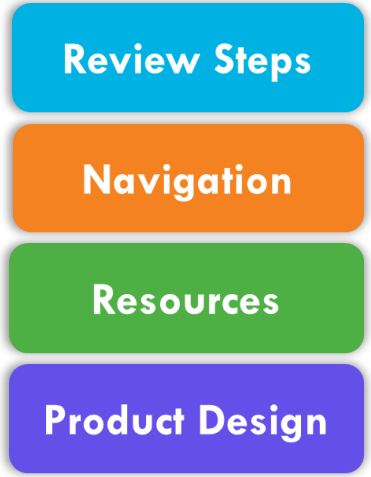
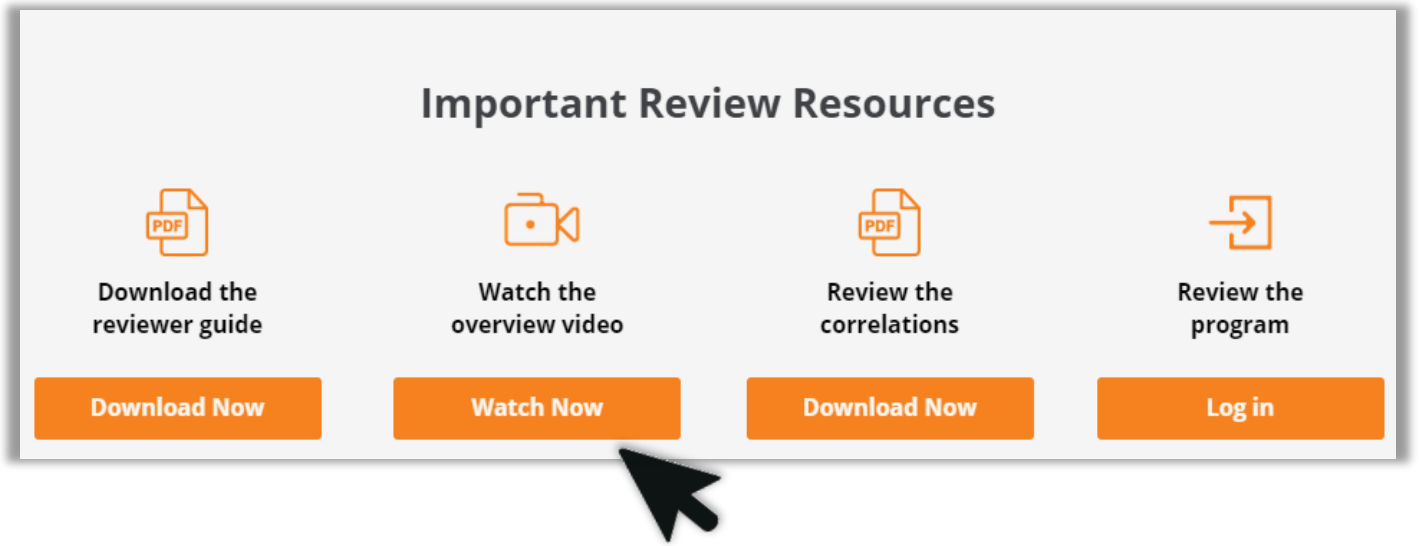


Watch the Gizmos Overview Video

Click the **Watch Now** button on the Adoption Review Site to watch the overview video.

You'll learn how the flexible design of Gizmos helps all students **develop a deep understanding of the why behind what they learn**. The instruction can be delivered for whole-class, small-group, or individual instruction, and the blended learning model can be used across in-person, remote, flipped, or hybrid teaching environments.

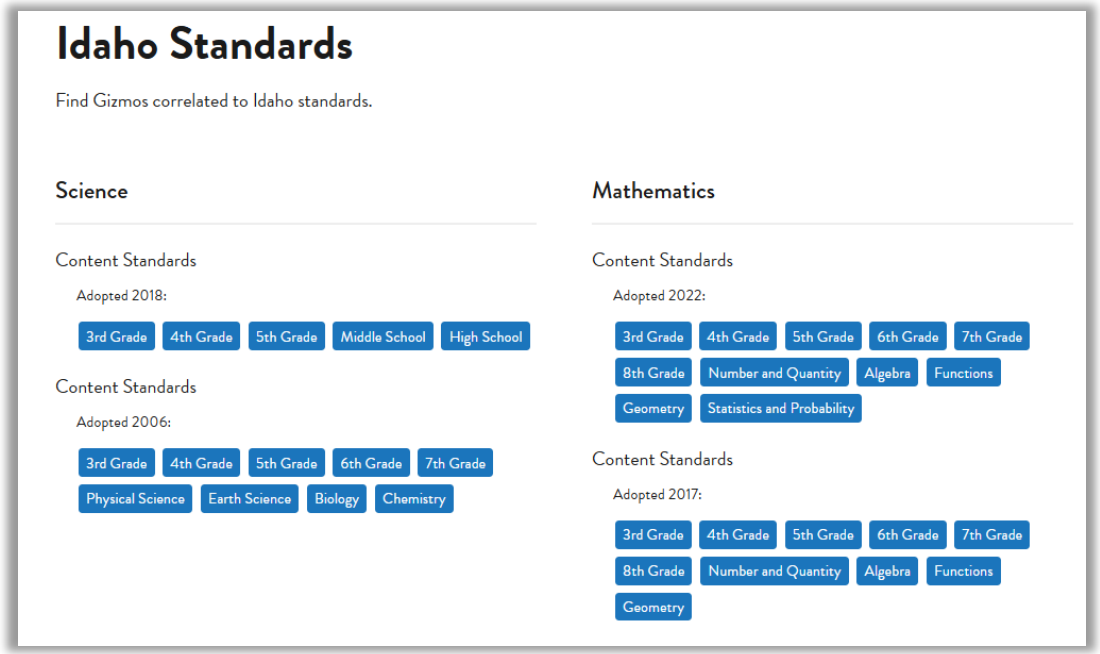


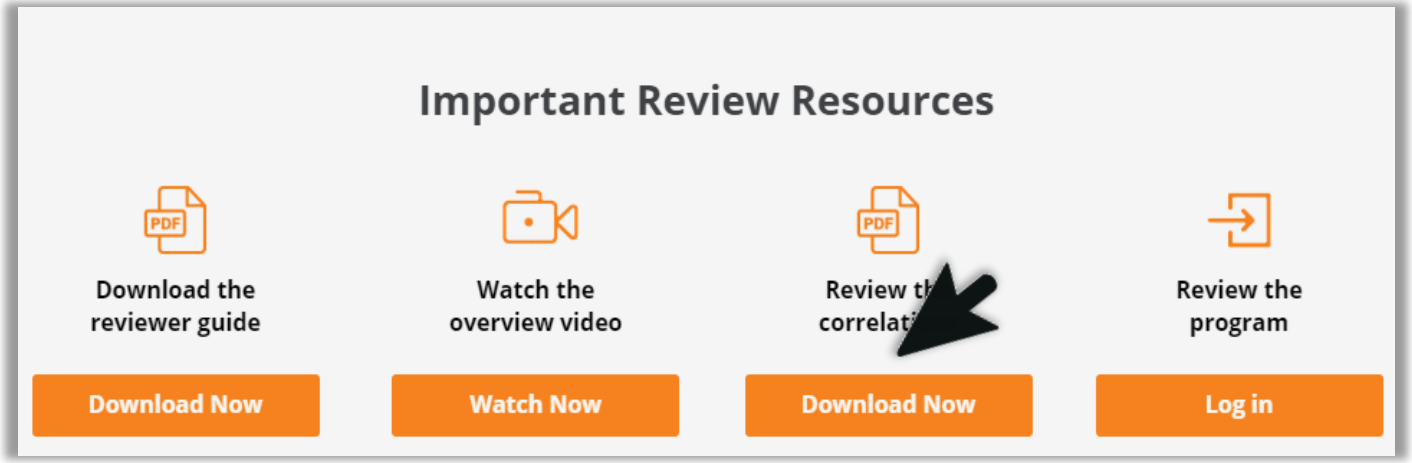
Review Gizmos Correlations to Academic Standards

Want to know how many Gizmos align to the Idaho State Department of Education Standards?

Download the correlation document to view a complete list of Gizmos Correlations to Idaho State Department of Education content standards.

Click the **Download Now** button to download and review the correlations.



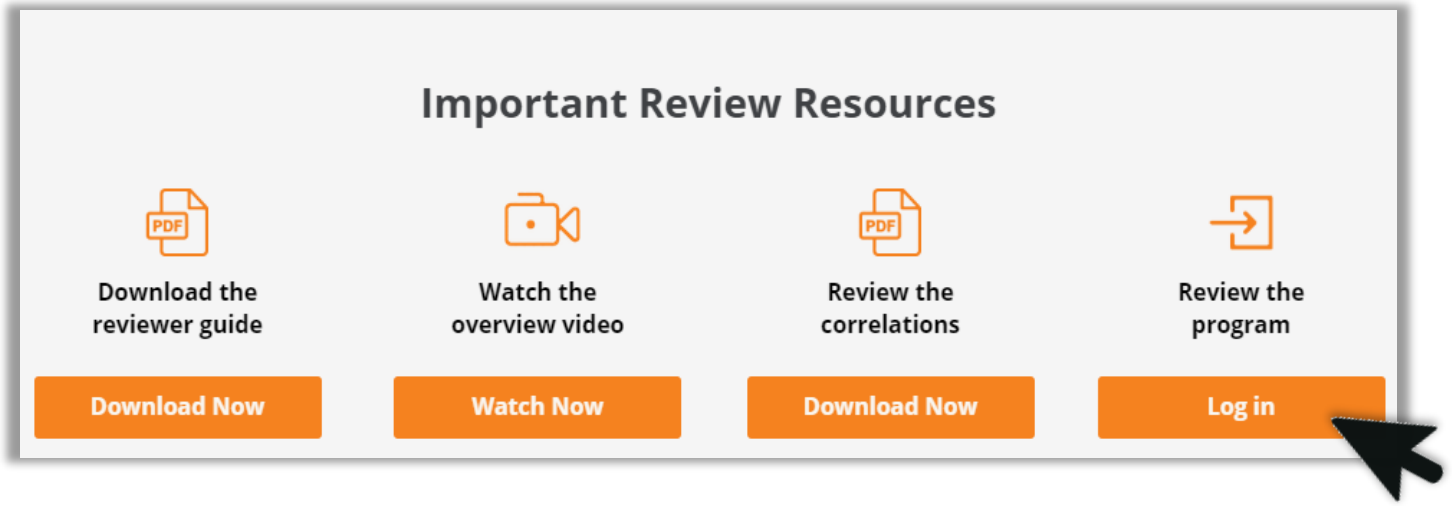


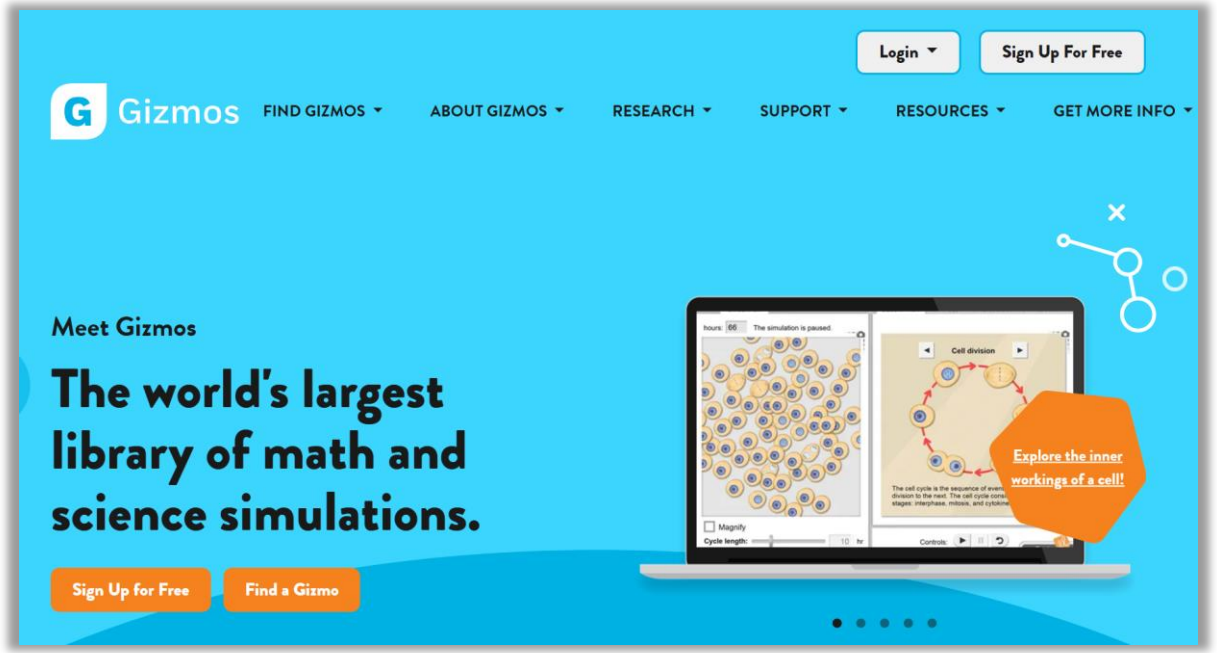
Review the Program

Click the **Log In** button below **Review the Program** to go to the Gizmos login page. Log in with the username and password you received in the Digital Samples Letter.

Once you log in using the username and password, you will land on **My Homepage**.

Please note: Gizmos is web-based.
There are no textbooks or teacher edition books; however, there are instructional materials available for download.





Gizmos website homepage

Getting to Know the Gizmos Features

Now that you're logged in, you will experience Gizmos navigation and learn about resources and product design. This reviewer guide will overview key program features on the pages following, denoted by colored tabs at the top of each page.

Navigation

1. Getting Started
2. Searching For Gizmos By Standard

Resources

1. Instructional Materials and Resource Overview
2. Teacher and Student Resources
3. Reporting and Progress Monitoring

Product Design

1. Intentional Instructional Design
2. Higher-Level Thinking Skills
3. Scaffolding Gizmos
4. Implementation and Teaching Strategy Support

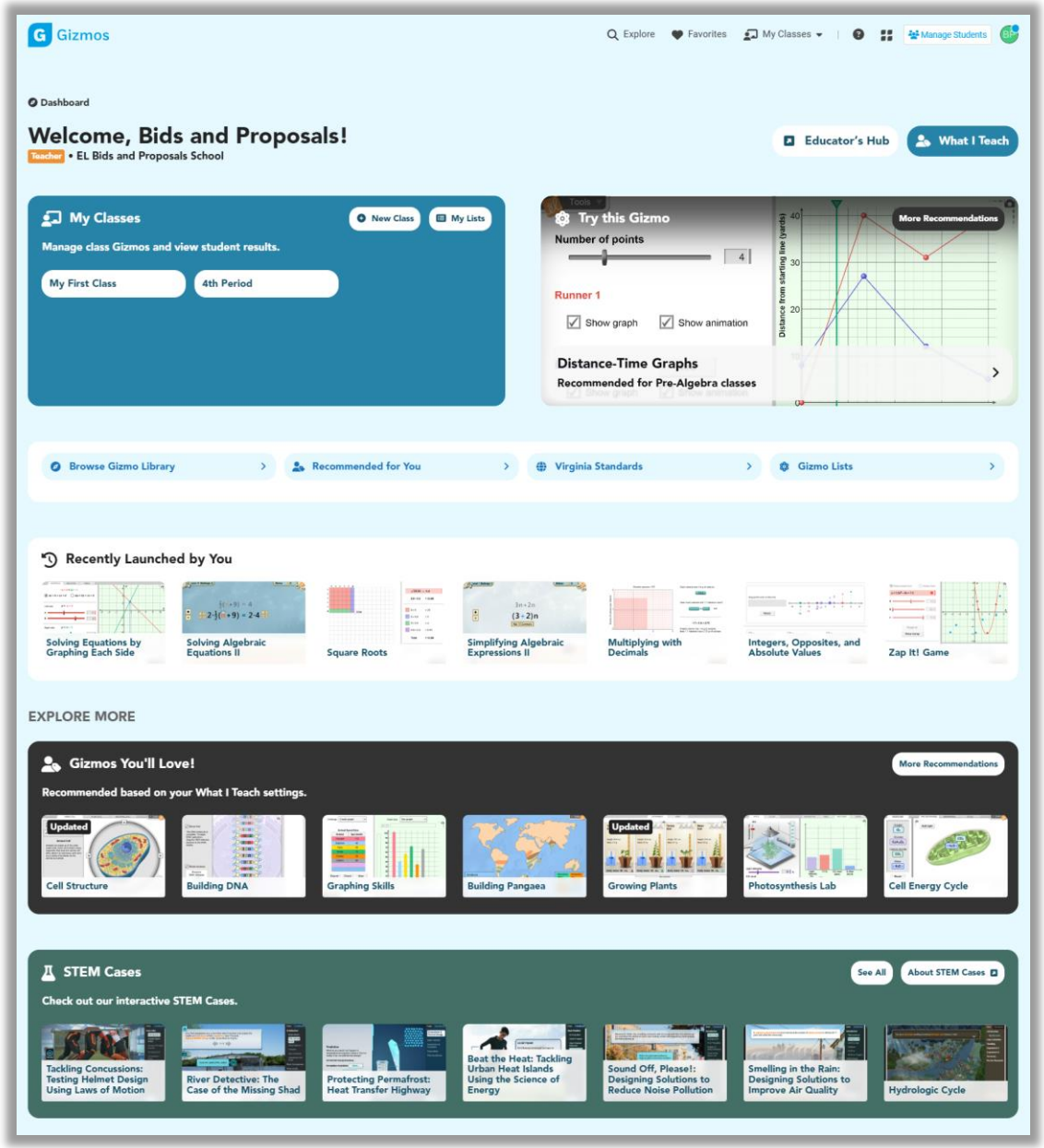
Getting Started

The navigation section of the reviewer guide will show you how to get started and search Gizmos.

When you log in, you arrive at **My Homepage.** From here, first:

1. **Take a tour of the page.** Several recorded and live webinars on integrating Gizmos into instruction are available to support the implementation.
2. **Watch the quick start video,** accessed from the bottom right corner of the page.

Your teacher account (username and password) includes access to everything a teacher needs to use Gizmos. It also provides access to what a student sees. A student account is available (though not necessary for this review) by clicking "Class 1" under My Class and then "Class Roster." There, you will see one enrolled student. You can log in to Gizmos as a student with the student username and password.

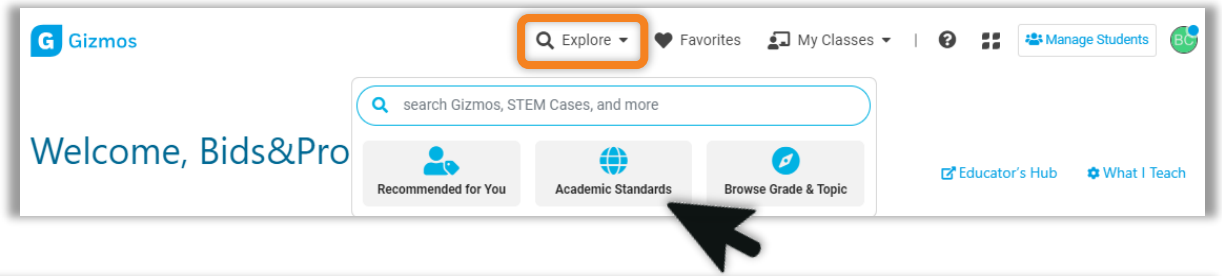


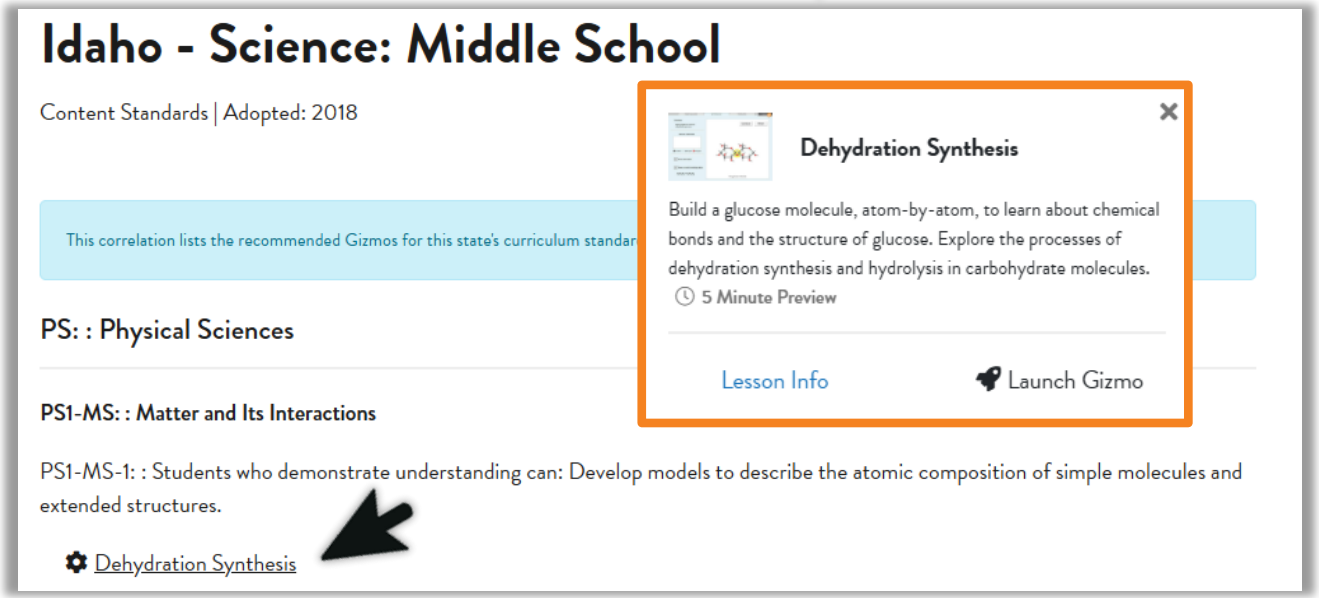
Searching For Gizmos By Standard

In addition to the provided correlations you downloaded and reviewed from the Adoption Review Site, the Gizmos website also allows teachers to find and assign Gizmos that support specific academic standards, grade levels, topics, or textbooks.

To find Idaho State Department of Education standards-aligned Gizmos:

1. Click on the **Explore icon** in the top navigation bar.
2. Select **Academic Standards.**
3. Select **any grade level for math or science** to review.
4. Search for and **experience Gizmos** that correlate to the learning benchmarks for that grade/course by selecting a Gizmo and clicking **Lesson Info.**





Educators can also **Find Gizmos** by

- Searching a keyword/category
- Browsing by grade and topic

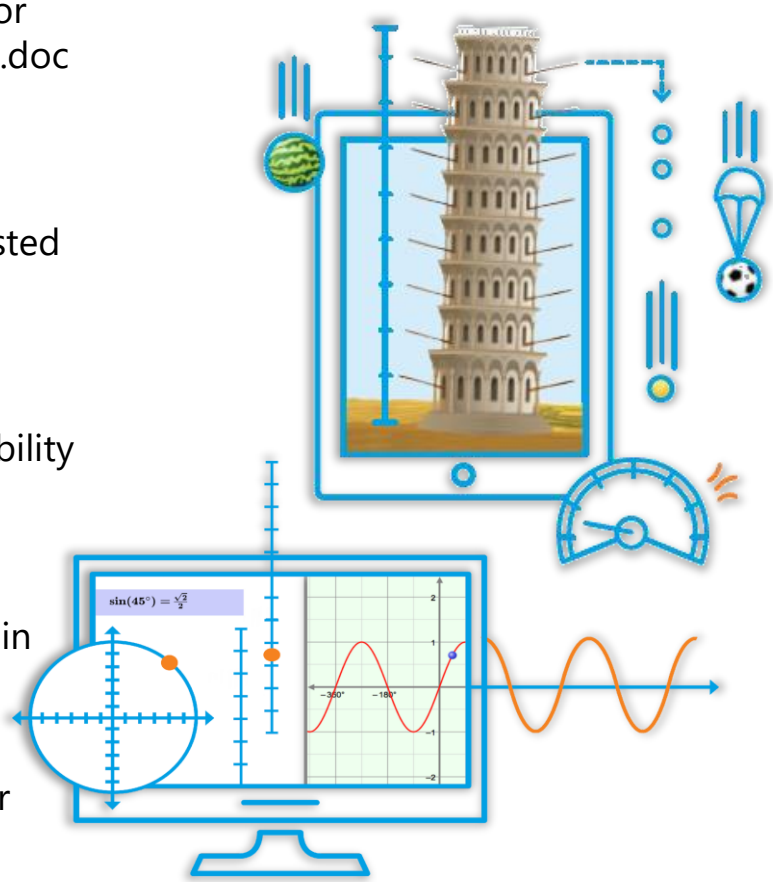
Instructional Materials and Resource Overview

All Gizmos simulations offer a complete set of lesson materials, which teachers can use as-is or customize based on their needs. All lesson materials can be viewed, printed, or downloaded (.doc or .pdf) from each simulation page.

Customizable lesson materials are included for each simulation:

- **Teacher Guides** provide an overview of the lesson, learning objectives, vocabulary, suggested lesson sequence, suggestions for pre- and post-Gizmo lessons, scientific background, and selected web resources.
- **Student Exploration Sheets** (and answer keys) provide structure for students through multiple lessons and ensure students grasp the main concepts without diminishing their ability to explore the Gizmos independently.
- **Vocabulary Sheets** present the critical language and concepts for the lesson.
- **Assessment Questions** (five per simulation) provide a check for understanding with built-in multiple-choice quizzes that offer immediate student feedback and teacher-reported assessment results.

The Teacher Guide and Student Exploration sheets also provide multiple activities and teacher prompts that allow students to present, collaborate, and discuss their results, answers, and reasoning.

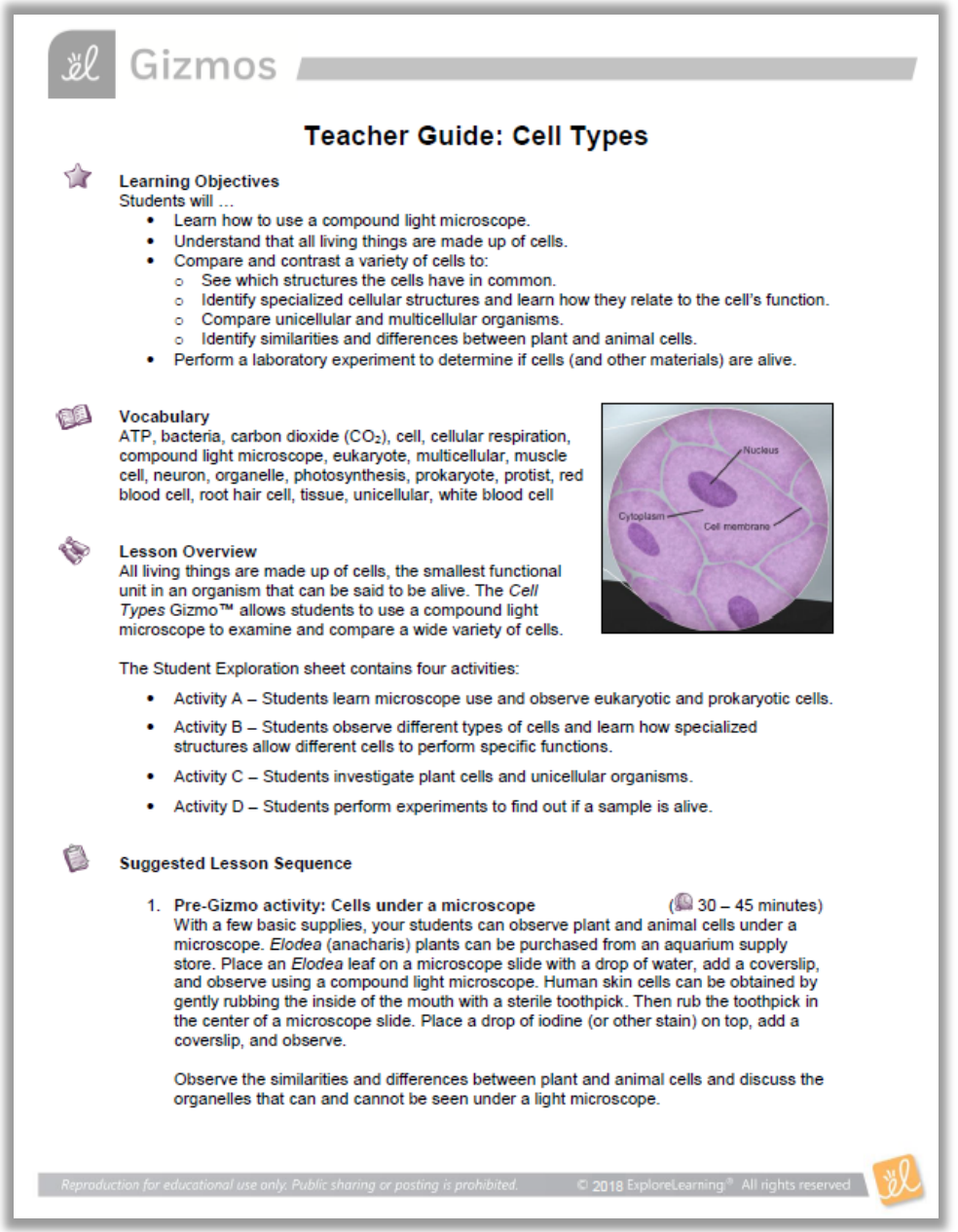


Teacher Guides

The Teacher Guide outlines everything an educator needs to prepare students for the content in the Gizmos lesson and connect to their prior knowledge. Each Teacher Guide overviews the goals and objectives, outlines lesson procedures and activities, and provides information about the simulation.

Each Teacher Guide includes the following:

- Overview of the lesson
- Learning objectives
- Vocabulary terms and definitions
- Scientific background
- Suggested lesson sequence with pre-Gizmos and post-Gizmos activities
- Suggestions for differentiation strategies, discussion questions, and extension and follow-up activities
- Selected web resources
- Demonstrations the teacher can use before students work independently or in groups on the lesson activities



Gizmos

Teacher Guide: Cell Types

Learning Objectives
Students will …
- Learn how to use a compound light microscope.
- Understand that all living things are made up of cells.
- Compare and contrast a variety of cells to:
  - See which structures the cells have in common.
  - Identify specialized cellular structures and learn how they relate to the cell's function.
  - Compare unicellular and multicellular organisms.
  - Identify similarities and differences between plant and animal cells.
- Perform a laboratory experiment to determine if cells (and other materials) are alive.

Vocabulary
ATP, bacteria, carbon dioxide (CO_2), cell, cellular respiration, compound light microscope, eukaryote, multicellular, muscle cell, neuron, organelle, photosynthesis, prokaryote, protist, red blood cell, root hair cell, tissue, unicellular, white blood cell

Lesson Overview
All living things are made up of cells, the smallest functional unit in an organism that can be said to be alive. The *Cell Types* Gizmo™ allows students to use a compound light microscope to examine and compare a wide variety of cells.

The Student Exploration sheet contains four activities:
- Activity A – Students learn microscope use and observe eukaryotic and prokaryotic cells.
- Activity B – Students observe different types of cells and learn how specialized structures allow different cells to perform specific functions.
- Activity C – Students investigate plant cells and unicellular organisms.
- Activity D – Students perform experiments to find out if a sample is alive.

Suggested Lesson Sequence

1. **Pre-Gizmo activity: Cells under a microscope** (30 – 45 minutes)
With a few basic supplies, your students can observe plant and animal cells under a microscope. *Elodea* (anacharis) plants can be purchased from an aquarium supply store. Place an *Elodea* leaf on a microscope slide with a drop of water, add a coverslip, and observe using a compound light microscope. Human skin cells can be obtained by gently rubbing the inside of the mouth with a sterile toothpick. Then rub the toothpick in the center of a microscope slide. Place a drop of iodine (or other stain) on top, add a coverslip, and observe.

Observe the similarities and differences between plant and animal cells and discuss the organelles that can and cannot be seen under a light microscope.

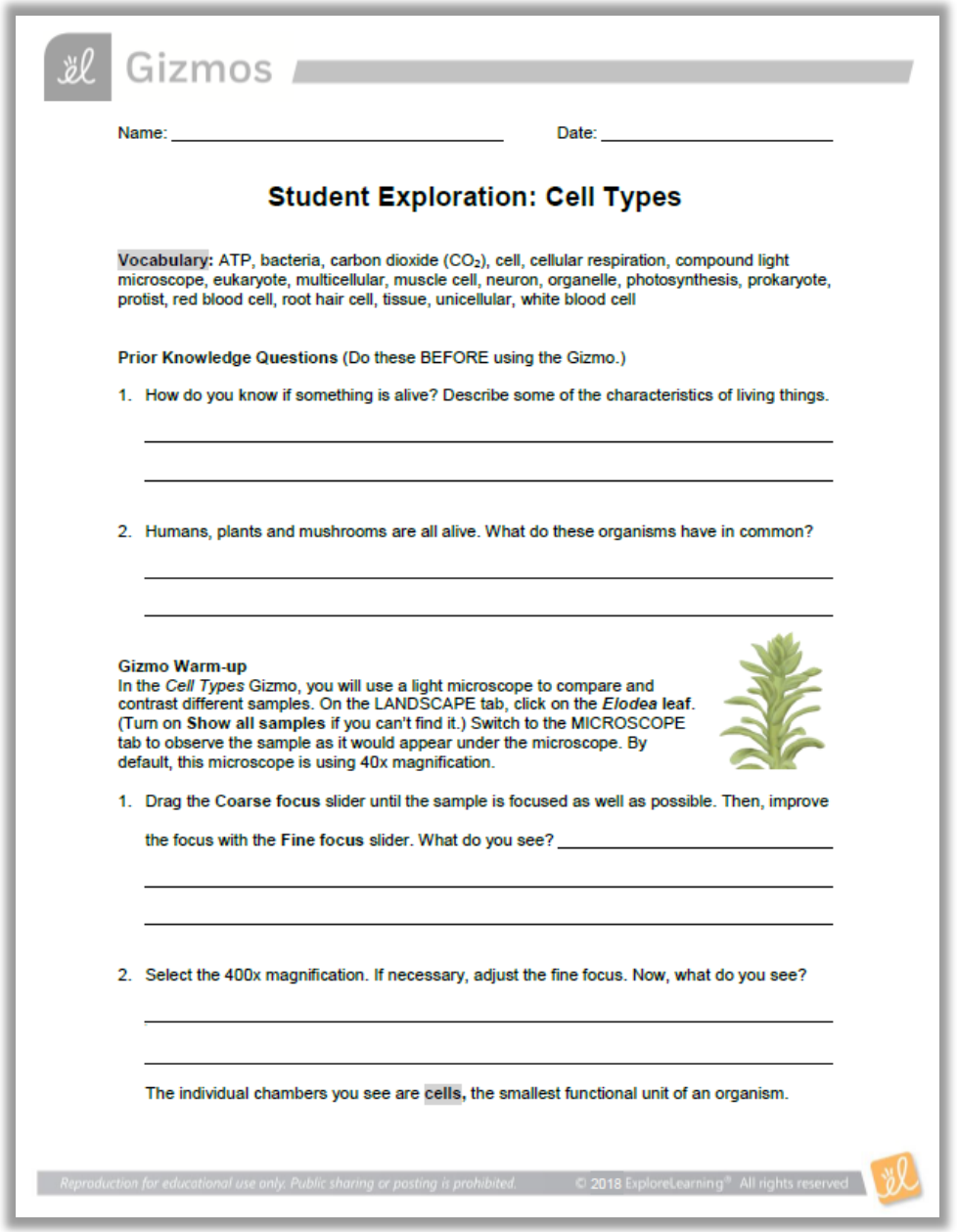
Student Exploration Sheets

All simulations feature Student Exploration sheets with multiple activities that drive scaffolded instruction. The lesson materials follow a "structured inquiry" approach that provides in-depth, thought-provoking questions. Students have the freedom and guidance to figure out relationships independently.

The Gizmos inquiry-based approach provides multiple opportunities for teachers to:

- Facilitate discourse
- Pose purposeful questions
- Elicit and elaborate on student thinking as they experiment and explore
- Demonstrate key concepts before students work independently or in groups on the lesson activities.

These multi-page resources can be used as formative assessments, scaffolded notes, or review material for summative assessments!



Gizmos

Name: _____ Date: _____

Student Exploration: Cell Types

Vocabulary: ATP, bacteria, carbon dioxide (CO_2), cell, cellular respiration, compound light microscope, eukaryote, multicellular, muscle cell, neuron, organelle, photosynthesis, prokaryote, protist, red blood cell, root hair cell, tissue, unicellular, white blood cell

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. How do you know if something is alive? Describe some of the characteristics of living things.

2. Humans, plants and mushrooms are all alive. What do these organisms have in common?

Gizmo Warm-up
In the *Cell Types* Gizmo, you will use a light microscope to compare and contrast different samples. On the LANDSCAPE tab, click on the ***Elodea* leaf**. (Turn on **Show all samples** if you can't find it.) Switch to the MICROSCOPE tab to observe the sample as it would appear under the microscope. By default, this microscope is using 40x magnification.

1. Drag the **Coarse focus** slider until the sample is focused as well as possible. Then, improve the focus with the **Fine focus** slider. What do you see?

2. Select the 400x magnification. If necessary, adjust the fine focus. Now, what do you see?

The individual chambers you see are **cells**, the smallest functional unit of an organism.

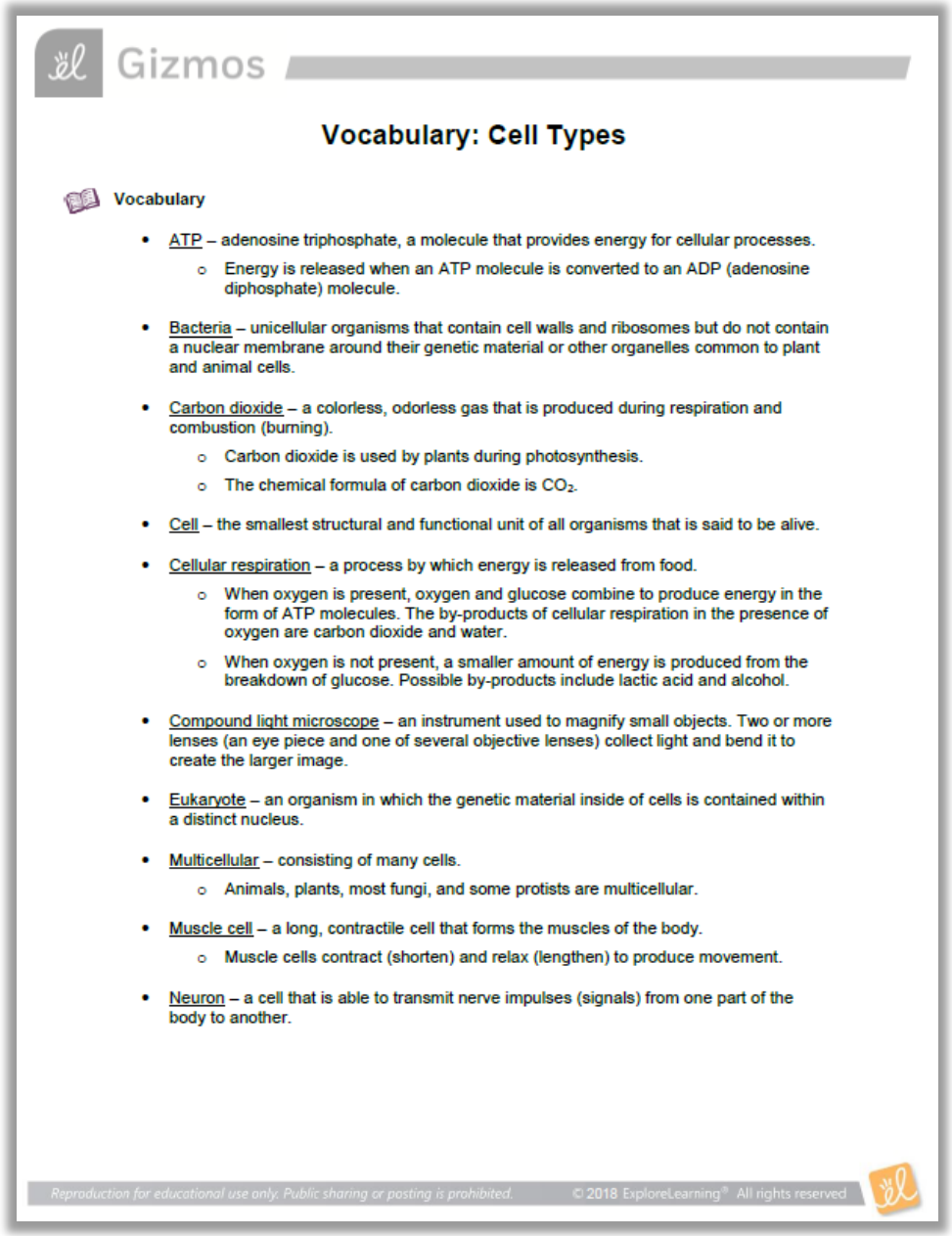
Vocabulary Sheets

Gizmos lesson materials offer a variety of tools to help develop and **deepen students' understanding of content using STEM language**.

Each Vocabulary sheet provides students with definitions, examples, and helpful information. These are designed to help students understand and use the concepts, terms, and symbols they see in Gizmos lessons.

When terms are used in the Student Exploration sheets, they are visibly highlighted. This helps students **understand the vocabulary in context.**

Vocabulary sheets (and the Student Exploration sheets) allow students to build on prior knowledge and communicate content knowledge using multiple modes of representation (e.g. discussions, pictures, models, writing, graphs), which specifically **support English Language learners and students with special needs.**

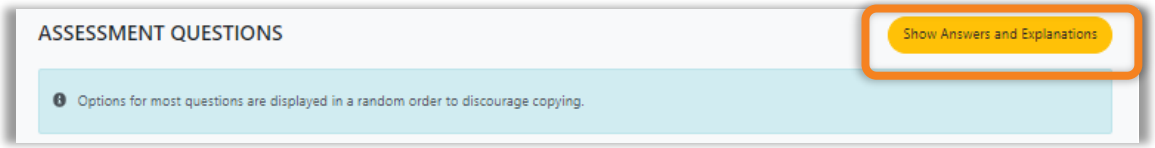


Gizmos

Vocabulary: Cell Types

Vocabulary

- ATP – adenosine triphosphate, a molecule that provides energy for cellular processes.
  - Energy is released when an ATP molecule is converted to an ADP (adenosine diphosphate) molecule.
- Bacteria – unicellular organisms that contain cell walls and ribosomes but do not contain a nuclear membrane around their genetic material or other organelles common to plant and animal cells.
- Carbon dioxide – a colorless, odorless gas that is produced during respiration and combustion (burning).
  - Carbon dioxide is used by plants during photosynthesis.
  - The chemical formula of carbon dioxide is CO_2.
- Cell – the smallest structural and functional unit of all organisms that is said to be alive.
- Cellular respiration – a process by which energy is released from food.
  - When oxygen is present, oxygen and glucose combine to produce energy in the form of ATP molecules. The by-products of cellular respiration in the presence of oxygen are carbon dioxide and water.
  - When oxygen is not present, a smaller amount of energy is produced from the breakdown of glucose. Possible by-products include lactic acid and alcohol.
- Compound light microscope – an instrument used to magnify small objects. Two or more lenses (an eye piece and one of several objective lenses) collect light and bend it to create the larger image.
- Eukaryote – an organism in which the genetic material inside of cells is contained within a distinct nucleus.
- Multicellular – consisting of many cells.
  - Animals, plants, most fungi, and some protists are multicellular.
- Muscle cell – a long, contractile cell that forms the muscles of the body.
  - Muscle cells contract (shorten) and relax (lengthen) to produce movement.
- Neuron – a cell that is able to transmit nerve impulses (signals) from one part of the body to another.



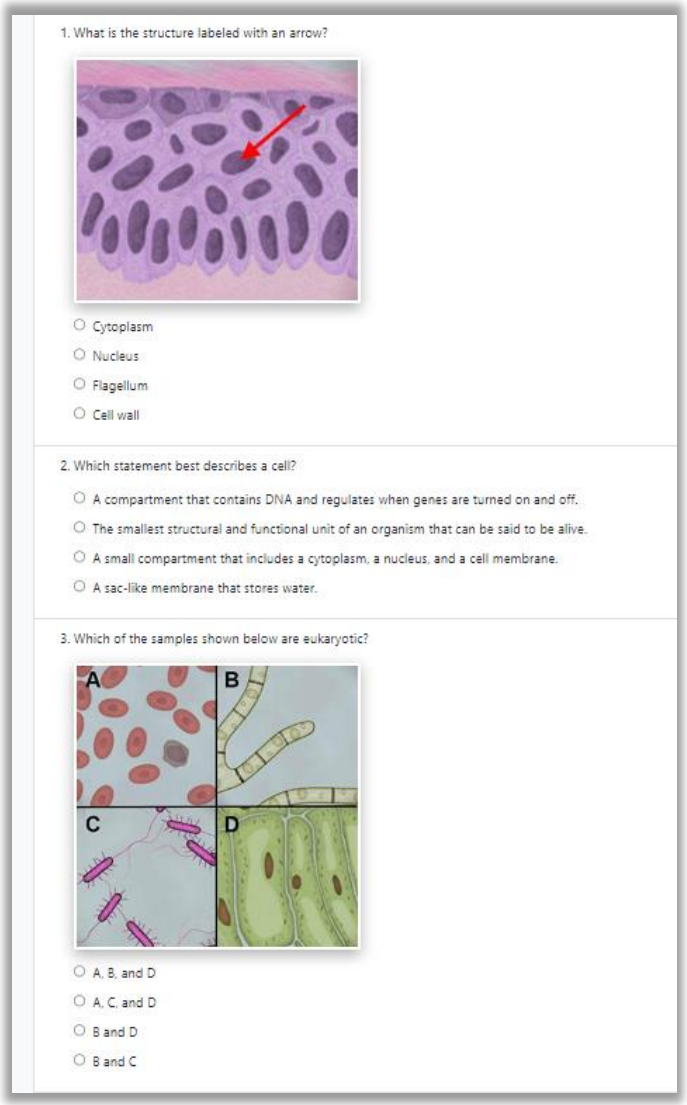
Assessments and Answer Keys

Gizmos include two forms of assessments that serve as checks for understanding:

- **Teachers monitor progress and critical thinking** as students work to complete the Student Exploration sheet. These activities frequently allow students to explain their thinking and summarize what they have learned.
- **Five multiple-choice questions assess student understanding** at the end of the lesson.

The multiple-choice problems are graded instantly once the assessment has been submitted online. **Immediate feedback** is provided to students, and results are available for teachers to see. Teachers may reset results manually to allow students to retake the assessment. Answer keys can be accessed on each Gizmos lesson page using a teacher login.

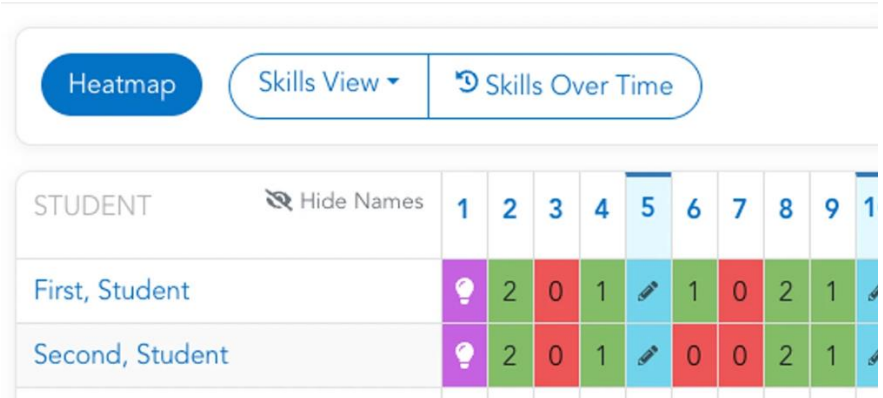
Gizmos STEM Case Studies provide an **additional written-response assessment** in which students report their findings through scaffolded lab reports at the end of the simulation.



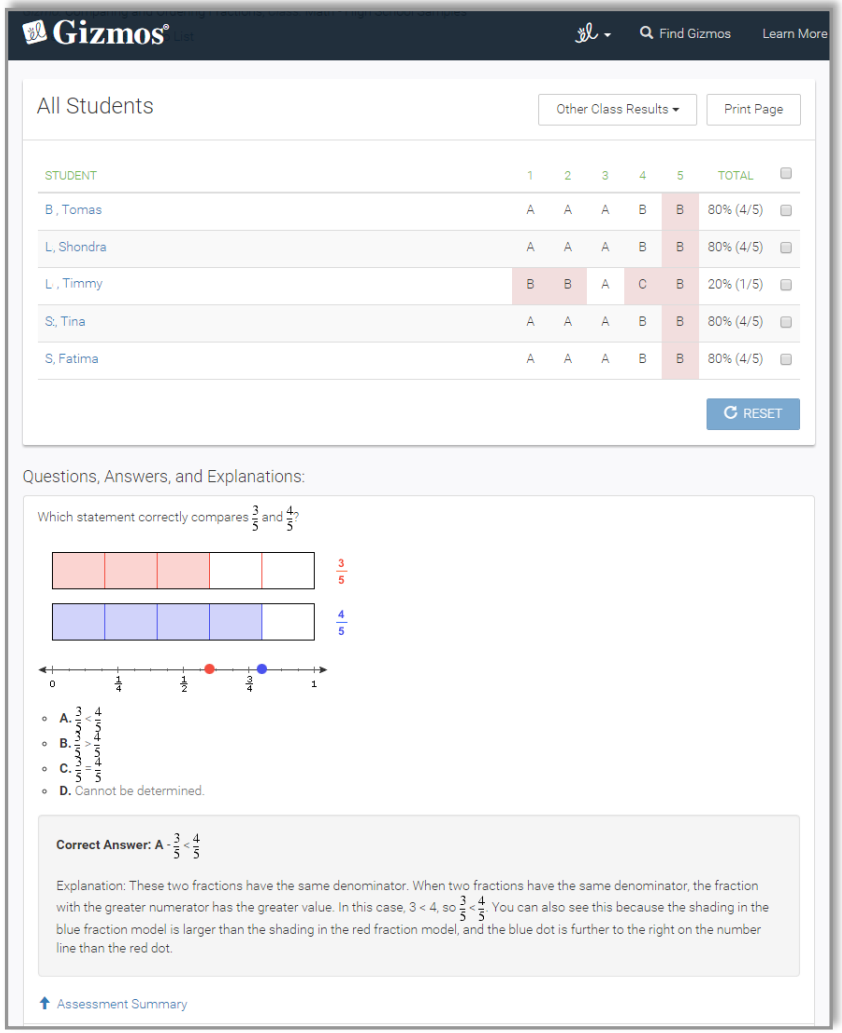
Reporting and Progress Monitoring

Gizmos reports show the **percentage of assessment questions answered correctly for each student** and offer a quick visual (using highlighting) to indicate which questions were answered incorrectly. This color coding helps the teacher to quickly scan results for the most troublesome items within a topic or for an individual student.

In addition to the immediate feedback and scoring, STEM Case reports also show student achievement and progress **in real-time as a "heat map,"** allowing teachers to address problem areas and differentiate instruction quickly.



STEM Cases Heat Map



Simulation Report

Higher-Level Thinking Skills

The instructional design of Gizmos and the supporting instructional resources make it easy for teachers to **encourage higher-level thinking skills—critical thinking, problem-solving, real-world application, and open-ended collaboration and communication.** With Gizmos, students get a chance to be hands-on with STEM, learning these skills and more:

- Make predictions and hypotheses, then test their thinking
- Design experiments to achieve specific outcomes
- Contribute data and analyze results
- Present findings and communicate problem-solving methods

Gizmos supports teachers in connecting STEM concepts across grades and links to higher-level thinking in other content areas.

How Gizmos Encourages Productive Struggle

By allowing students to figure out relationships on their own as they face problems they don't immediately know how to solve, students become active learners rather than passive recipients of information. They develop the grit to creatively approach, think about, and solve problems.

Scaffolding Gizmos

The open-ended design of Gizmos helps teachers facilitate rigorous student practice for a wide range of learners. The simulations provide a challenging learning experience for all students—including special education students, multilingual and English Language Learners, and advanced students, such as those enrolled in talented and gifted programs—through flexible materials that allow for modifications to ensure that **every student feels supported to reach new challenges**.

All Gizmos simulations focus on a related set of skills or concepts, with multiple lesson activities at varied levels of complexity and depth of content to support scaffolding. The activities can be assigned one-by-one or together to cover the desired range of topics. Customization allows teachers to modify lessons to meet student needs. Examples include providing sentence stems for student responses, running Student Exploration sheets or Vocabulary sheets through translation tools, offering opportunities for further independent exploration, or assigning a different Gizmos simulation on a similar topic for remediation.

How Gizmos Empowers Flexibility and Differentiation

Gizmos can be used at any stage of the learning process—to introduce a topic, as pre-work, to practice skills, for review, to assess skill understanding, for enrichment, or for homework. Teachers also have access to all grade-level materials, so they can assign higher-level or lower-level lessons to support students.

Implementation and Teaching Support

With a consistent focus on inquiry and standards-based instruction, ExploreLearning's professional development team helps teachers take confident first steps toward long-term success with Gizmos. As we seek to be a partner in building exemplary science programs with the Idaho State Department of Education, we go beyond product training—our professional learning experiences support teachers in identifying and integrating best practices in instruction. Our goal is to help teachers gain a deep understanding of high-quality, research-based science instruction and create the best learning experiences for all students. **What are our steps for long-term implementation success?**

STEP 1: Getting Started	STEP 2: Strengthening Pedagogy	STEP 3: Building Systemic Support
Introductory workshops give teachers the time and confidence they need to integrate new technology into instruction. Learn the basics of how to use *Gizmos* simulations and STEM cases and what they help teachers and students accomplish in the classroom.	Higher-level workshops instruct teachers in using proven teaching strategies and help drive instructional change. Strengthen pedagogy in inquiry, the 5E model, and meeting new practice standards.	Support services and project management programs help develop successful ongoing implementations over time. Build a strong implementation with planning support, pacing guide alignments, classroom lesson modeling, coaches' workshops, etc.

Thank you for reviewing ExploreLearning Gizmos®!

We hope you enjoyed learning about our library of simulations and case studies.

Please reach out to ELBids@explorelearning.com if you have any questions during your review. You can also reach us at 866.882.4141.