FLINN SCIENTIFIC

Digital Learning Solutions

Exclusively from FLINN

FLINN SCIENTIFIC

STEM **DIGITAL LEARNING SOLUTIONS**

Engage All Students in Science & Stem.

EVERYWHERE.

Flinn Scientific creates learning and lab experiences that let students practice science and engineering in authentic, real-world ways—leading to more confidence and success in the classroom.

Our digital solutions are designed so that all students can participate in science labs in a way that best suits their environments and skill levels—promoting curiosity and strengthening their critical thinking and problem-solving skills as they tAP® into their inner scientist and engineer.

Teachers and administrators have access to a meaningful set of reports to understand how students are progressing, how much time they are spending on tasks and what areas of support they need.

Empower your students to think scientifically with Flinn's digital solutions.

FLINN LOVE

Thank you so much for your online Labs. With schools being forced to work from home, I had no idea how I was going to be able to produce quality Chemistry lab instruction on a daily basis. These lessons are quality. My students will get so much more because of you.

Thank You, Thank You, Thank You.

High School Chemistry Teacher
Jefferson, PA

360Science™

Designed for High School Students.

360Science is a complete lab experience—combining **hands-on labs with robust digital activities**, including videos, virtual reality and simulations. **Fully aligned with NGSS and other state science standards**, 360Science is designed for use with any core Science textbook or curriculum.

With 360Science, **labs are differentiated based on four levels** of guidance and challenge: short, guided, open and advanced. Teachers can assign labs to students at their appropriate level—from the prescriptive to the most independent—to engage them with the most personalized and effective lab experience.

360Science is available by individual labs, as a lab series by discipline and in a **unique storyline format**. 360Storylines includes a series of labs and activities teaching supports around specific phenomena, such as Forest Fires and Acid Rain.

Science2Go™

Designed for Middle School & High School Students.

Science2Go was created to ensure **remote and hybrid learners** could "do science labs" without any supplies or equipment—by providing access to real lab data with analysis prompts and videos that engage students in scientific and engineering practices. Science2Go is **aligned to NGSS and other state science standards.**

For **in-school learners**, Science2Go can be used as a:

- **pre-lab activity**, so students feel more prepared and confident when they arrive in the physical lab
- **stand-alone lab** experience during social distancing when all students can't engage simultaneously in hands-on labs or when an online experience would be best for them.

Science2Go is expanding for back-to-school with more videos around phenomena, topics better aligned with core curriculum and the introduction of multiple choices questions for easier grading.

FLINNprep™

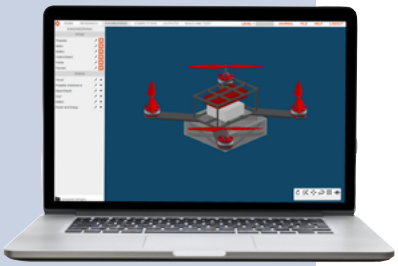
Designed for AP® Science Students.*

With the rigor and challenge of AP® Science, students often need extra support to excel in the course—all the way to the AP® Science exam. FLINNprep offers both online courses and inquiry labs—**aligned with the College Board's Big Ideas and Learning Objectives**—to help students be prepared for the exam.

Online Courses features easy-to-understand content, review and reteach videos, games assessments and full-length practice exams.

Inquiry Labs provides pre-lab content, technique videos, and summary videos with sample exam questions for each experiment so students can see how the lab connects to the AP® exams.

FLINNprep is the **only AP® Solution that relates the labs back to the AP® exam**. In addition, FLINNprep uniquely offers foundational content so that all students can be ready to take the course.



WHITEBOX LEARNING
A Flinn Scientific Company

Designed for Middle School & High School Students.

WhiteBox Learning is a STEM learning system that teaches the engineering design process—in the most real-world way—through **3D virtual models**, **unlimited design iterations and an online competition**. Students engage with 12 applications, exposing them to various STEM careers.

With the **emphasis on engineering practices in NGSS and other standards**, WhiteBox Learning can be used to help reinforce science practices and increase understanding of core science concepts. One high school in Georgia found their GMAS state **science test scores improved by 30 points** when WhiteBox Learning was used in conjunction with science classes.

Whether used as a stand-alone **CTE Engineering solution** or as a complementary program in the science classroom, WhiteBox Learning lets students engineer and optimize virtual models, with the option to build a physical model.

DigitalDissection™

Designed for Middle School & High School Students.

Dissection is one of the lab experiences that students can find extra challenging.

Digital Dissection offers extra support through this process with a virtual dissection lab experience that can be used for **pre-lab practice, post-lab review and as a stand-alone dissection alternative**.

The solution includes multi-media content with video tutorials, interactive diagrams and quizzes around six common specimens.

FLINNSTEM™

Designed for Upper Elementary & Middle Schooll Students.

FlinnSTEM™ is a standards-aligned STEM curricula that uses an engaging hands-on approach to guide students to explore new science concepts, connect to real-world experiences, and discover engineering design and scientific inquiry. FlinnSTEM is the perfect solution used in STEM clubs and afterschool programs

The solution includes 15 modules of student hands-on activities accompanied by digital content for teacher professional development to maximize the student experience.

FLINN SCIENTIFIC

LEARN MORE AT
www.flinnsci.com/STEAM

Contact Us for demos, trials and custom proposals.

We can help you with a FREE demo, trial or custom district proposal. Contact us at customercare@flinnsci.com and an account representative will follow up with you.

Talk to an Expert

Have a question on how to use our digital solutions in your classroom? Our scientists are available to help! Call 800-452-1261 to set up a 1-on-1 training session.

FLINN SCIENTIFIC

360Science™

Phenomena-Based Science
TEACHING MADE EASIER

Flinn's 360Science™ is a complete lab solution that surrounds teachers with all they need to guide high school students in exploring and doing science around real-world phenomena—**with a unique combination of differentiated hands-on lab experiences and robust digital activities**. Aligned with NGSS and other state Science standards, 360Science is designed for use with any core Science textbook or curriculum.

Addressing the Challenge of Labs

The challenges with hands-on science instruction include too little time and too many students at varying comfort and ability levels, leaving teachers to drive all students to a known result with the same detailed lab procedure. However, Science doesn't happen in a single lab period with a scripted process. **Science happens in an environment conducive to exploring and executing the scientific method.** Doing this in a teaching lab is easier said than done. But it's possible with 360Science™.

Differentiated Lab Experiences

With 360Science, teachers customize and differentiate lessons based on students' skill levels. They assign labs based on the amount of guidance and challenge students need—**with these four levels: Short On-time Inquiry Lab, Guided Inquiry Lab, Open Inquiry Lab and Advanced Inquiry Lab.** Adaptable instructions allow for the most effective and personalized lab experience for students. A teacher dashboard is included for easy classroom management.

Digital Activities Enrich the Lab Experience

Every 360Science™ lab integrates multimedia support for students to complement the hands-on lab experience including:

- Introductory and summary videos that demonstrate techniques, review difficult concepts & connect the science to something real.
- Simulations exercises & virtual reality
- Assessments
- Online Safety Course to ensure proper lab protocol

FLINN LOVE ♥

Flinn truly listened to teachers when they created 360Science™. From terrific products to awesome customer service, Flinn always helps us find ways to solve our lab challenges and bring great science experiences to our students!

Sarah, Science Teacher from Sheboygan, WI

FUNDING OPTIONS

Federal funding sources to use for 360Science include:

- ESSER II Funding and CARES Act
- Title I - Part A Grants
- Title IV-A Student Support and Academic Enrichment Grants

360Science is designed for High School Students.

360Science includes hundreds of labs that cover **high school chemistry, biology, physics and environmental science**.

Each lab can be used as individual experience in the classroom or packaged in a unique storyline format.

360Storylines

A storyline is a logical sequence of activities that help students "figure out" the science behind phenomena, things observable in the natural world. 360Storylines is designed to provide all of the tools needed to guide students to a clear understanding of a phenomenon. Each 360Storyine includes a series of three to seven 360Science labs, accompanied by the following materials that tie these labs together:

- implementation guide,
- daily planner,
- driving question template,
- four versions (Short on-time, guided, open and advanced) of each lab activity,
- videos that help students perform unfamiliar techniques and connect what they do to what is observable in the world.

The following 16 complete storylines are available:


Forest Fires


Drought


Fast & Slow Processes


Product Design


Wind


Recipes


Hot & Cold Processes


Pure Elements


Curing Disease


Rising Sea Levels


Batteries


Acid Rain


Fireworks


Volcanoes


Green Processes


Ocean Acidity

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LEARN MORE AT
www.flinn360Science.com

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Talk to an Expert

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FLINN SCIENTIFIC

Science2Go™

Updated for 2021-2022 School Year

Engage Students in Science ANYWHERE

Science2Go™ is a digital lab solution that lets students "do science", engaging in science and engineering practices **in any learning environment—remote, hybrid and in-school**. Whether used as a stand-alone lab or in conjunction with a hands-on experience, Science2Go creates an experience that empowers students to think like a scientist, showing them how to apply this mindset to the phenomena that they will encounter in their everyday lives.

Science2Go is aligned with NGSS and other state science standards.

How Science2Go™ Works

With Science2Go, students are provided access to real lab data with analysis prompts and videos that engage them in scientific practices. Each lab starts with a phenomena-driven video. Students observe and refine experiments, identify design flaws, analyze data and practice scientific reasoning while connecting science to the natural world.

Each lab takes about 30-45 minutes to complete.

Science2Go™ labs include:

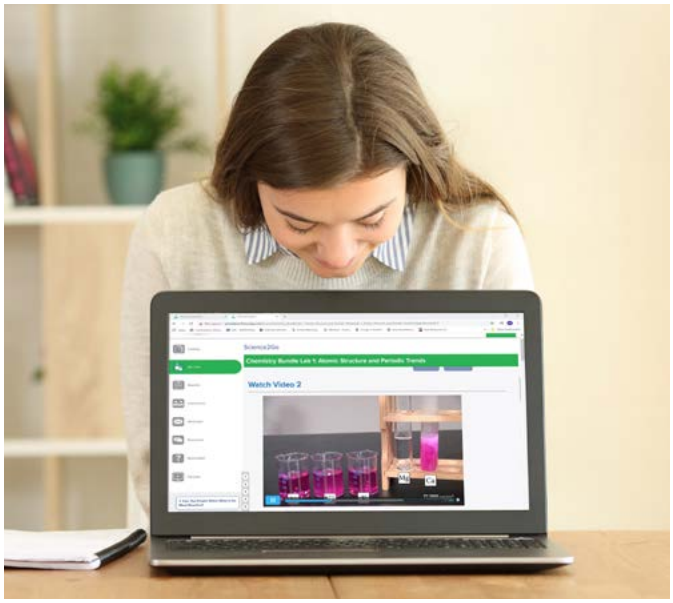
- **Phenomena-driven videos** that pose questions to students—all NEW high school videos for 2021-2022!
- Prompts and analysis questions to guide and engage students in scientific practices
- Multiple choice and other system gradable assessment questions - in addition to open response questions—NEW for 2021-2022
- Topics that align labs with any Science core textbooks and curriculum
- Customization capabilities that allow teachers to edit any lab to best fit their students' needs
- Recommendations for hands-on kits

Multiple Ways to Use Science2Go™

Science2Go is designed to be used as a stand-alone lab experience when students cannot be in the lab or as a pre-lab experience

For remote learners: Students engage in Science2Go's scientific practices at home —without any school supplies or equipment.

For hybrid learners: On the days when they are not in the science lab, students engage with Science2Go at home and are better prepared when they return to the lab. Science2Go also recommends hands-on lab kits that can be used on days when students are in the classroom.



For in-school learners: Science2Go is used as a pre-lab activity so students feel more confident during hands-on lab engagement. It is also perfect as homework to reinforce lab learning.

Schools also use Science2Go in socially distanced labs or other situations when it is not possible for all students to engage simultaneously in hands-on labs.

Benefits of Pre-Lab Experience

Teachers tell us that science labs are often a challenging experience for students. Students must explore and question why things are happening in the experiment, but they often get bogged down in lab procedures.

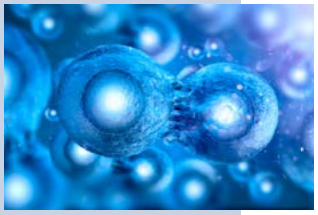
Science2Go will train students to think scientifically, with a mindset to "figure things out". They will feel more prepared and confident going into the science lab.

With only 30-45 minutes spent doing Science2Go pre-lab, students' lab time will be more efficient and successful!

Science2Go™

Science2Go™ is Designed for High School Students

Science2Go is designed to be used with high school students - for both general and honors.
Lab topics are aligned so they can be used with Flinn's 360Science and any core Science textbook and curriculum.



High School Biology

Lab Series 1: Cells, Mitosis, Meiosis, Diffusion and Osmosis, Cellular Respiration, Enzymes, DNA, Genetics, Vitamins and Nutrition: Energy in Foods.

Lab Series 2: Anatomy, Plant Growth and Development, Photosynthesis, Rate of Transpiration, Fermentation, Taxonomy and Classification, Evolution by Natural Selection, Artificial Selection, Taxis and Ecosystems.

High School Chemistry

Lab Series 1: Scientific Methods, Atomic Structure, Chemical Bonds, Intermolecular Forces, Structure-property Relationships, Solutions, Chemical Reactions, Stoichiometry, Thermodynamics and Gases.

Lab Series 2: Redox, Electrochemistry, Kinetics, Chemical Equilibrium, Acids and Bases, Radioactivity, Organic Chemistry, Green Chemistry, Polymers and Advanced Materials.

High School Environmental Science

Stoichiometry, Dating, Greenhouse Effects, Ocean Acidification, Ocean Currents, Seismology/Volcanology, Albedo, Population Growth, Pollution, Wind and Alternative Energy

High School Physics

Seismology/Volcanology, Gravity, Hooke's Law, Conservation of Momentum, SImple Machines, Friction, Electricity, Magnetism, Waves and Sound, Electromagnetic Radiation, Optics and Quantum Mechanics.

Middle School Physical Science *

Chemical Reactions, Heat Transfer, Newton's Laws, Linear Momentum, Kinetics, Waves, Energy, Gravity & Free Fall, Friction, Rockets

Middle School Life Science*

Tree Rings & Climate, Seed Genetics, Building a Kidney Model, Cellular Diffusion & Osmosis, Animal Behavior, Life Cycles, Carbon Dioxide Emissions & Climate Change, Artificial Selection, Ecosystems, Photosynthesis

** Middle School labs include open response questions only*

FLINN LOVE

Thank you so much for your online Labs. With schools being forced to work from home, I had no idea how I was going to be able to produce quality Chemistry lab instruction on a daily basis. These lessons are quality. My students will get so much more because of you. Thank You, Thank You, Thank You.

High School Chemistry Teacher, Jefferson, PA

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FLINNprep™

Support Your Students'
ADVANCED SCIENCE EXPERIENCE

FLINNPrep™ is a complete learning solution that supports students as they interact with the fast pace and rigor of AP® Science sources. As the only AP® solution that comes with both online courses and inquiry labs, FLINNprep is built to cover the full Advanced Placement® Curriculum, from the hands-on to the conceptual, all the way to the exam.

Alignment for Success

FLINNprep's courses and inquiry labs are aligned with the College Board's Big Ideas, Learning Objectives and Science Practices for AP® Curricula**, ensuring content that supports raising students' AP® test scores and preparing them for higher learning**. Included full-length practice exams replicate the real AP® exam experience.

Online Courses

FLINNprep's online courses are a multimedia content source with videos, animations, competitive games to support review, assessments with just-in-time feedback and full-length practice exams. Students have year-round 24/7 access to prepare for their AP® Course work and the AP® Exam on their own time and pace.

Inquiry-Based Labs

Students find AP Science labs extra challenging. FLINNprep is t**he only AP solution that connects the labs back to course content and the exam**. For each lab in the course, FLINNprep provides pre-lab content and technique videos. Then with a summary video, FLINNPrep relates the lab to the AP® exam by providing students with sample exam questions based on each specific experiment.

Flexible and Adaptable for All Students

FlinnPrep can be used as a primary or supplementary content source. Its flexible design and teacher center make it easy to personalize learning for students. Each lab includes two implementation paths, a low-guided procedure to challenge advanced students with inquiry-based science and a high-guided procedure for students who need more direction, **making the program applicable for students in honors, dual-enrollment and community college courses**.

A Year-Round Solution

FLINNprep is a full-year solution that **promotes equity, mastery, and positive AP® exam performance.** FLINNprep can accommodate students beginning in the summer prior to enrollment in the course, by **providing units of "foundational" content.**

FLINN LOVE ♥

FLINNprep is great for review, showing students how and what they should study to prep for semester exams. The inquiry labs enrich the AP® experience and are spot-on in getting students to make connections between course content and the exam and the labs. With FLINNprep, my students did well on the exam.

Elizabeth,
AP Chemistry teacher from Massachusetts

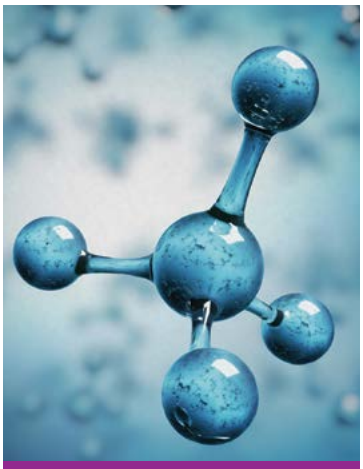
FUNDING OPTIONS

Federal funding sources to use for FLINNprep include:

- ESSER II Funding and CARES Act
- Title I—Part A Grants
- Title IV-A Student Support and Academic Enrichment Grants

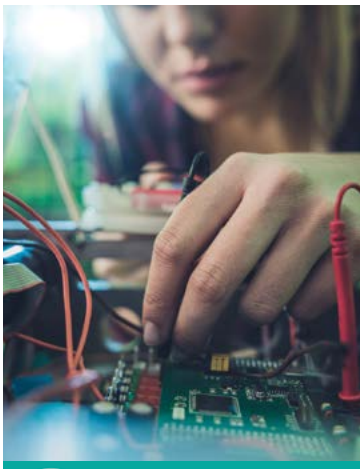
For more information, visit: FLINNprep.com

AP® Biology



AP® Chemistry

AP® Environmental Science



AP® Physics

Authentic Practice Exams

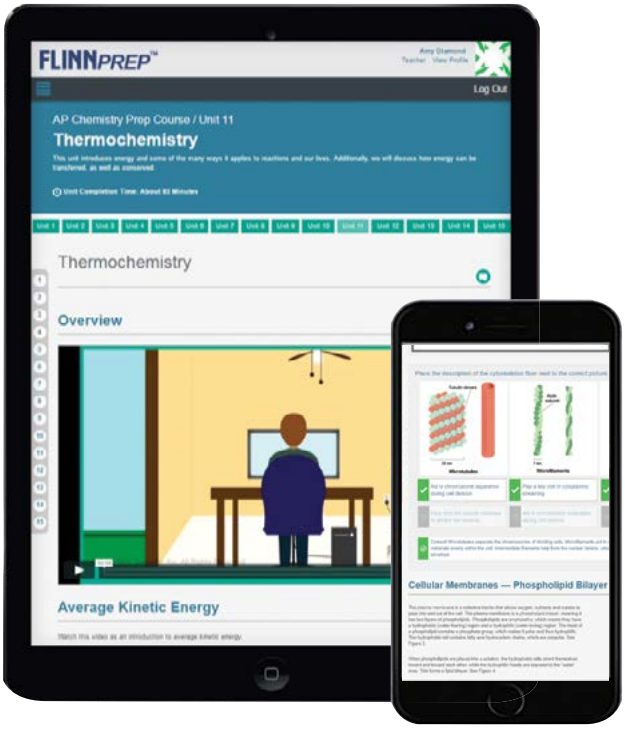
FLINNprep™ courses offer full-length practice exams that are aligned with the Learning Objectives and replicate the real AP® exam experience. Each exam question has been carefully audited to ensure that it is relevant and will prepare students for exam day.

Teacher Approved

Teachers tell us that students need various ways to help prepare for the AP® exam. **Why is FLINNprep™ the best AP® solution for your classroom, school and district?**

- **FLINNprep's online courses provide more than just a test bank of questions**, with multimedia content for reteach, review and reinforcement of learning.
- **FLINNprep's Inquiry labs is the ONLY Solution that relates labs back to the AP® exam**—with summary videos and sample exam questions at the end of each experiment.
- **FLINNprep is a full-year 24/7 solution with units of foundational content,** available in the summer so that **all students** can be prepared to start AP™® courses.

With full-length practice exams and a teacher center to personalize learning, FLINNprep promoting equity, mastery, and increased AP exam performance.



FLINN LOVE

FLINNprep™ has been a valuable supplement to our existing materials. Information is consistent and at the appropriate level for review."

MINGUS UNION HIGH SCHOOL
Cottonwood, AZ

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WHITEBOX LEARNING
A Flinn Scientific Company

Empower Students to Work
LIKE REAL ENGINEERS

WhiteBox Learning is a web-based standards-aligned STEM learning system for grades 6-12 that brings real-world design to the classroom. With twelve applications using **CAD-inspired** engineering software, students design and analyze a 3D model, learning through simulations and **unlimited design iterations**. They then build the physical model to complete the learning experience.

Exposing ALL Students to Real-world Engineering

WhiteBox Learning teaches the engineering design process in the most real world way - with **3D models, unlimited design iterations, and a challenging competition**. The system addresses various learning styles, providing ALL students with an engaging way to gain exposure to engineering design and the **STEM career cluster for Career and Technical Education (CTE)**.

Powerful Analytical Tools for Teachers

The Teacher Control Center (TCC) provides management and monitoring tools to set up classes, assign applications, and adjust content based on student need. The TCC tracks metrics that include time on task, quiz and worksheet scores, and overall class and student progress and performance.

FLINN LOVE ♥

"I have never had any other curriculum that was as complete a package as the WhiteBox System... It is by far the best thing I have ever put in my classroom. Plus, the kids absolutely love it!"

Rocky Shepherd, Middle School STEM Teacher
Weatherford, OK

FUNDING OPTIONS

WhiteBox Learning can be funded by:

- Perkins Grant that is provided to states to improve secondary and post-secondary CTE programs
- ESSER II and CARES Act Funds
- 21st Century Community Learning Center Grants
- Title I - College and Career Readiness
- Title IV-A Student Support and Academic Enrichment Grants
- Title V - Gifted Programs

Explore Our 12 STEM Applications:

How it Works

Integrating 3D design and analysis tools, game-like simulation, and all the custom plans and materials necessary to build a physical model, WhiteBox Learning promotes critical and higher order thinking. Students are empowered with the tools and information necessary to ask and answer their own questions about their designs in a unique and effective cycle called "informed iteration." A familiar interface guides students through the phases of engineering design and scientific inquiry:

Research—Study the principles of engineering design and problem solving, theory-based content, quizzes, worksheets, and tutorials.

Design—Engage in virtual design through teacher-assigned design specifications, background, rules of the challenge and knowledge at work.

Analyze—Students focus on the task at hand and increase their knowledge in STEM through a unique online design tool.

Test—Analysis through game-like simulation is used for classroom or districtwide competition.

Build—Students construct physical models from the results of their data about the optimized virtual design.

INTRODUCING WhiteBox Nationals

WhiteBox Nationals is a competition students encounter during the test phase where they move through five increasingly challenging levels as they test their 3-D model designs. To move up in level, students must meet or exceed required level scores based on quiz and worksheet results, number of design iterations, and design performance. WhiteBox Nationals has proven to be a motivator for students to research and learn the science and math behind optimizing their designs to improve their chances in the competition. Students compete across school, district, and state, nationally and globally.

2020 NEW PRODUCT AWARD THE JOURNAL

TECH & LEARNING BEST OF SHOW AT TCEA WINNER

FLINN SCIENTIFIC

LEARN MORE AT www.whiteboxlearning.com

Get a FREE Demo, Trial, or Custom Proposal

Our account representatives are ready to answer your questions and give you a FREE demo, trial or custom district proposal. Email **customercare@flinnsci.com**, and a regional account representative will follow up with you.

Talk to an Expert

Have a question on how to implement WhiteBox Learning? Our scientists are available to help! Call **800-452-1261** to set up a 1-on-1 training session.

FLINN SCIENTIFIC

FLINNSTEM™

Build a Passion for STEM IN YOUR STUDENTS

FLINNSTEM™ is a **standards-aligned STEM curricula for grades 4-8 that uses an engaging hands-on approach** to guide students to explore new science concepts, connect to real-world experiences, and discover engineering design and scientific inquiry. **Robust professional development is embedded in the program,** giving schools and districts everything they need to teach STEM.

Powered by IMSA Fusion

The award-winning Illinois Mathematics and Science Academy (IMSA), a pioneer in STEM education, conceived, researched and developed this program as a balanced fusion of problem and evidenced-based reasoning with numerous opportunities for students to experiment, challenge, design and collaborate. **Developed for enrichment outside the classroom, FLINNSTEM™ is perfect for after-school programs.**

Inquiry-Based Modules With Hands-On Materials

FLINNSTEM™ includes 15 modules containing all the materials need to engage students in rich, inquiry-based, hands-on activities. Each module provides up to 32 hours of instruction and kits that include materials and reproducible content for students, detailed digital teacher content and professional learning videos for classroom activities.

Built-in Professional Development

Research suggests that teachers need more opportunities to gain content knowledge. FLINNSTEM™ delivers with robust teacher professional development thoughtfully embedded into a student-centered STEM curriculum program. Teachers are provided with great digital content, including background information, suggested inquiry approaches, point-of-use professional development videos, writable student activities and debrief questions.

Use Both Inside and Outside the Classroom

FLINNSTEM™ is adaptable to fit any learning environment. In the regular classroom, the program can be embedded into daily instruction and existing curriculum. FLINNSTEM™ is also perfect for outside the classroom, like after-school programs and STEM-focused clubs.

FLINN LOVE

What more could you ask for? With FLINNSTEM™, the work is already done for you. The training is top of the line. It involves standards that are low and high for students, and engages them in ways that they will not only learn the material but remember it.

Karen Henderson, 8th Grade Teacher
Simmons Middle School, East Aurora, IL

FUNDING OPTIONS

FLINNSTEM™ can be funded by:

- ESSER II Funding and CARES Act
- 21st Century Community Learning Center Grants for after-school and summer programs
- Title II grants for teacher quality to train STEM teachers
- Title IV-A—Student Support and Academic Enrichment Grants

FLINNSTEM™'s 15 modules show students how science, math and technology are part of their daily lives.

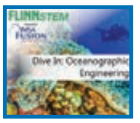
Grades 4-5

Engineering: Design and Build—Student teams conceptualize, build, test and acquire knowledge while becoming familiar with the engineering design process.

Fighting Fire with STEM—Students become cadets of Fire Academy Rescue and embark upon an exploration of the concept of fire, tactics, forensics and innovations in fire fighting and rescue.

Organized Sound: STEM in Music—Students explore the physics and mathematics behind sound, and discover how music relates to sound waves and the development of instrumentation and technology.

Climate Change: The Future is Now—Students participate in a variety of investigations to help establish an understanding of climate science literacy.



Dive In; Oceanographic Engineering—Students engage in identifying problems, designing, testing, and evaluating potential solutions pertinent to the ocean.

You be the Judge—Students are introduced to basic principles and applications of chemistry in order to create and carry out meaningful investigations and lab experiences.

What's the Story, Data?—Students get a glimpse of the emerging field of data science, including how technologies influence the identification and use of data, how it is analyzed, how this has changed how we interact with the world and more!

Synthetic Scorecard: Building the Future of Biology—Students combine biology, engineering, and technology in order to develop an awareness of the discipline of synthetic biology.

Grades 6-8

Taking Flight: Investigating the Aviation Industry—Students immerse in various facets of aviation, including aircraft design, airport structure and runway design, air traffic control and more!

Mars: Manifest Destiny—Students consider the enormous challenge of planning a permanent, sustainable colony on Mars by exploring gravity, orbital mechanics and more!

Biological Toolkit—Students explore the basics of our genetic code, DNA - debating the ethical and social implications of this field, investigating topics at the forefront of biology.

Medieval: STEM Through the Middle Ages—Students explore the STEM that was developed, altered and utilized during medieval times and how that helped lay the foundation for today.

Materials Science: Living in a Material World—Students embark on an 8,000-year journey to see how Materials Science has shaped the course of human civilization.

Secret Communications: Sharing Concealed Messages— Students interact with examples of various encryption methods and the opportunity to get into the mind of a code writer.

Out of the Silo: Agronomic STEM—Students engage in the interplay of STEM with the growing of plants for commercial use, particularly food.

BAYER TOP K-12 STEM PROGRAMS IN AMERICA

STEMWORKS CERTIFIED

CHANGE THE EQUATION

FLINN SCIENTIFIC

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FLINN SCIENTIFIC

DigitalDissection™

Explore Dissection
BEYOND PINS & SCALPELS

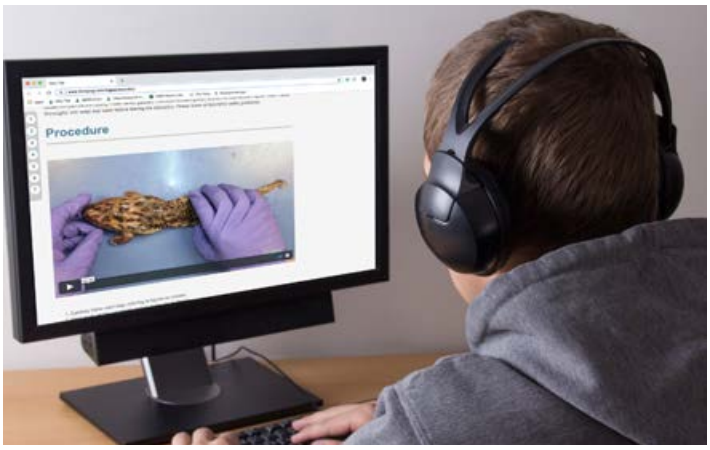
Dissection can be a fun and exciting lab experience, but it also can be intimidating and disorienting to cut into a specimen for the first time. Flinn provides several additional methods to explore the study of comparative anatomy without having to pick up preserved specimens and dissection tools.

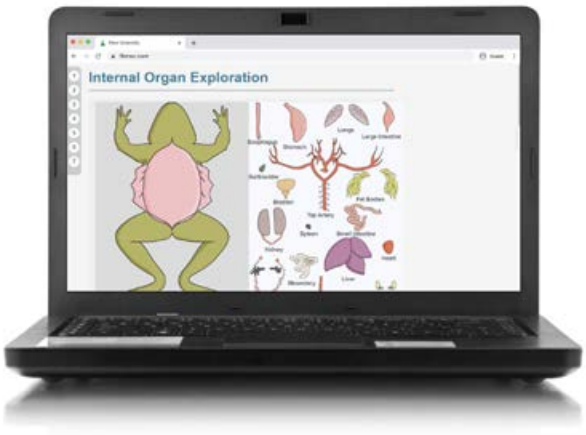
Flinn Digital Dissection Labs let students prepare for dissection, explore organisms and review what they have learned in lab all online. The engaging digital platform offers interactive drag-and-drop diagrams and video tutorials as well as built-in guidelines and step-by-step instructions that ensure students are successful and safe during lab. The digital labs also can serve as a stand-alone dissection alternative.

Digital Dissection will:

- Help students prepare before picking up a scalpel.
- Interactive digital content provides students with lab preparation, hands-on manipulation and reinforcement.
- Built-in safety guidelines and step-by-step instructions ensure that students are safe and successful during lab.
- Quick quiz assessments included in each lab reinforce important facts and techniques.

Flinn also offers a variety of standard and manipulatable plastic and paper models as well as cross-sectioned study aids that put anatomy in your students' hands in an enriching way.





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Chemventory™

Accurate Chemical Inventory MADE EASY

The Flinn Online Chemventory™ is a cloud-based laboratory chemical inventory system that allows multiple users to access a comprehensive and personalized database from any location or device. Maintaining an accurate chemical inventory has never been easier, more flexible and more convenient.

Secure Cloud-Based Service

Having all your chemical inventory information organized and stored on the cloud increases organization and lab safety and ultimately saves you time and money. Chemventory™ can be accessed by any computer or tablet with an internet connection, providing you with convenient access to your database from your chemical storeroom, classroom or anywhere you need to be.

Convenient Centralized Location

Chemventory™ allows you to invite other teachers, lab managers and/or administrators to view or update your centralized database as needed. If your school has multiple chemical storerooms or your district has several school locations, Chemventory™ has the ability to set up multiple databases and provide linked access to users across the school or district.

Customize Your Database

Populate your Chemventory™ by selecting from a list of Flinn chemicals or manually adding information about your current stock. The flexibility of Chemventory™ allows you to classify each chemical by school name, chemical storeroom location and shelf/cabinet location. Sort your list by category or look up chemicals by keyword, Flinn catalog number or alphabetical index.

With just one click of a button, you can email or print a formatted hard copy of your current inventory for reviewing your storeroom or informing your department or administration.

Organize With Safety in Mind

The Chemventory™ program comes fully loaded with GHS pictograms, hazard codes and signal words for more than 2,400 Flinn chemicals. You can easily print labels with all of this essential information to ensure that you are organized and promoting chemical safety.

All-in-One Chemical Inventory

A safe lab starts with the proper identification, storage and record keeping of all your chemicals—having the right amounts on hand can make or break a lab experience. Chemventory™ helps you solve both of these challenges, providing you with the reassurance that your chemical inventory is properly accounted for and ready for whatever lab comes next.

- Keep track of all your chemicals in one central database.
- Print labels with essential safety information so your storeroom is organized and accessible.

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360Storylines

THE COMPLETE SOLUTION FOR NGSS LEARNING

360Storylines

A Storyline is a logical sequence of activities that lead students to an understanding of a phenomenon. With Flinn's 360Storyline—completely aligned to NGSS, all the tools needed to bring students a clear understanding of an assigned phenomenon, including an implementation guide, storyline pacing schedule, driving questions template, leveled hands-on labs and robust digital content designed to work together to bring students a clear understanding of the assigned phenomenon.

With the 360Science™ platform, teachers can differentiate labs based on student need and lab time, with options for Short-on-Time Inquiry, Open Inquiry, Guided Inquiry and Advanced Inquiry.

We've included information on one 360Storyline—Forest Fires. This content will be available for each of the 16 Storylines that will be part of 360Science.

Storyline Overview

This overview provides a synopsis of the storyline, documents what students will do for each lab, and outlines NGSS performance expectations and concepts covered.

Implementation Guide

A complete guide to successfully implementing the program in your classroom includes Sequence & Pacing Schedule, Outcomes, Standards Introduced, Concepts & Subconcepts and Daily Plans.

Teacher Edition

For each lab, teacher guidance and driving questions for both Anchoring phenomenon (AP) and investigative phenomenon (IP), as well as revised explanations and working models.

Lab Introduction

The introduction includes concepts covered in the lab and background information to guide success in the lab.

Short-on-time Inquiry

Based on level (Short-on-time Inquiry), students are provided with an overview of the lab, what is the focus on science practices, materials per group, safety needed, and lab procedures with a Data Table and Analyze and Interpret steps.

Guided Inquiry

Based on level (Guided Inquiry), students are provided with an overview of the lab, what is the focus on science practices, materials per group, safety needed, and lab procedures with a Data Table and Analyze and Interpret steps.

Open Inquiry

Based on level (Guided Inquiry), students are provided with an overview of the lab, what is the focus on science practices, materials per group, safety needed, and lab procedures with a Data Table and Analyze and Interpret steps.

Advanced Inquiry

Based on level (Advanced Inquiry), students are provided with an overview of the lab, what is the focus on science practices, materials per group, safety needed, and lab procedures with a Data Table and Analyze and Interpret step.

360Storyline—**Forest Fires**

NGSS Performance Expectations	
Lab 1	HS-PS3-1
Lab 2	HS-PS1-7
Lab 3	HS-PS1-4
Lab 4	HS-ESS2-6

Catalog Number

AP10995

Key Concepts

- Combustion Reactions
- Bond Energies
- Law of Conservation of Mass
- Law of Conservation of Energy
- Chemical Potential Energy

Synopsis

Lead students to a written understanding/working model of forest fires. Forest fires are examples of fuel sources undergoing exothermic reactions, such as hydrocarbons reacting with oxygen in the atmosphere to produce water vapor and carbon dioxide. The process releases significant amounts of energy because the energy needed to break the bonds in the fuels is smaller than the energy released by the formation of the products: carbon dioxide and water. For a fire to burn, there must be heat, fuel and oxygen. A forest provides a large amount of fuel in the form of trees densely packed together. The energy given off by a single tree can serve as the activation energy that causes an adjacent tree to burn and so on.

What Students Do

Lab 1—Energy Densities of Organic Fuels

Students use calorimetry to determine the amount of energy (on a per gram basis) in multiple fuel sources including wood and ethanol.

Lab 2—Matter Transformation in Combustion

Students combust organic compounds, including sucrose and dextrose, in a closed system.

Lab 3—Measure Energy Flow in Chemical Reactions

Students react calcium oxide with water and barium hydroxide with ammonium thiocyanate. Students carry out each reaction multiple times, varying the masses of starting materials across trials.

Lab 4—Climate Change and the Carbon Cycle

Students create mixtures that contain plant life, water and acid–base indicators. They expose the mixtures to light or darkness.

360Storyline Guide - Forest Fires
Lead students to a written understanding/working model of forest fires. Forest fires are examples of exothermic reactions that result from fuel sources such as hydrocarbons reacting with oxygen in the atmosphere to produce water vapor and carbon dioxide. This process releases significant amounts of energy, because the energy needed to break the bonds in the fuels is smaller than the energy released by the formation of the products (carbon dioxide and water). For a fire to burn there must be heat, fuel, and oxygen. A forest provides a large amount of fuel in the form of trees densely packed together. The energy given off by a single tree can serve as the activation energy that causes an adjacent tree to burn, and so on. Forest fires exacerbate the negative consequences of climate change because burning trees release carbon dioxide into the atmosphere and are rendered incapable of recycling carbon dioxide.

Sequence and Pace

Lab 1—Energy Densities of Organic Fuels (60–75 minutes)

Lab 2—Matter Transformation in Combustion (60–75 minutes)

Lab 3—Measure Energy Flow in Chemical Reactions (60–75 minutes)

Lab 4—Climate Change and the Carbon Cycle (60–75 minutes)

Total time = 240–300 minutes (5–7 class periods)

Outcomes
In **Lab 1**, students discover that different fuels release different amounts of energy owing to their different compositions. In **Lab 2**, students discover that matter is not destroyed in a combustion reaction, but conserved. In **Lab 3**, students discover that there is chemical potential energy stored in bonds and that this energy is released during combustion. In **Lab 4**, students discover that forest fires release carbon dioxide into the atmosphere and also destroy carbon-recycling trees, thus exacerbating the negative consequences of climate change.

Standards Introduced
HS-ESS2-6: Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
HS-PS1-4: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
HS-PS1-7: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
HS-PS3-1: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

360Storylines: Forest Fires

Lab 1: Energy Densities of Organic Fuels

IP: What happens when fuels burn? Write a possible explanation of this phenomenon.	**AP:** Why are forest fires hard to extinguish? Based on what you learned in this experiment, try to formulate an explanation to answer this question. What evidence did this experiment supply to aid in your understanding?
Students may note that when fuels burn the area around them gets hotter, or that fuels "go away" when they burn. At this point they may not be able to make claims about energy densities, or why different fuels contain different amounts of energy. They may note that different fuels are made of different types of "stuff," or they may make very broad statements such as "different fuels release varying amounts of energy because they are different."	Students should recognize that forests provide large reserves of fuel. The scale of a forest fire is many orders of magnitude greater than the scale at which their experiment takes place. They should also recognize that dry fuel burns more readily than wet fuel. This is evident when they try to burn a wet wood splint and compare the energy released by the wet wood splint to the dry wood splint. Students may also note that a forest fire needs some energy input, such as a match. This is evident by the fact that the wood splint must be lit with a lighter.
Revised Explanation: After performing the experiment, what revisions need to be made to your explanation of the ***IP***? What observations did you make that led to these revisions? Write your new explanation.	
Students should recognize that fuels are chemical compounds composed of atoms. When fuels with different numbers of atoms burn they release different amounts of energy. Students should observe that wood and ethanol have different chemical formulas and that when they burn they cause different temperature changes to water held in an adjacent calorimeter. These different temperature changes indicate the release of different amounts of energy.	

ENERGY DENSITIES OF ORGANIC FUELS – MATERIALS LIST

Materials Included in Kit *(for 10 groups of students)*

- Aluminum foil, roll
- Charcoal, 90 g
- Wood splints, package of 100

The kit includes materials to conduct one of the leveled inquiry labs. The following lists convey which materials (per group) are needed for each. Both included and any additional materials that may be needed are presented.

Short Inquiry

Included in Kit:

- Aluminum foil, 3 in. x 3 in. square
- Charcoal, small lump

Additional Materials Required:

- Water, distilled or tap, 50 mL
- Balance (0.01-g precision)
- Butane safety lighter
- Graduated cylinder, 50-mL
- Metal ring with clamp
- Soda can, empty and clean
- Stirring rod, glass
- Support stand
- Thermometer

Guided Inquiry

Included in Kit:

- Aluminum foil, 3 in. x 3 in. square, 2
- Charcoal, small lump
- Wood splint

Additional Materials Required:

- Water, distilled or tap, 50 mL
- Balance (0.01-g precision)
- Butane safety lighter
- Graduated cylinder, 50-mL
- Metal ring with clamp
- Soda can, empty and clean
- Stirring rod, glass
- Support stand
- Thermometer

Measuring the Energy Densities of Organic Fuels: Short-on-time Inquiry Lab

Overview

How much energy is released when an object burns? One way to determine this is to measure the heat flow from the object to its surroundings. If heat flows from the object to its surroundings, then the temperature of the surroundings will increase. This activity will introduce the concept of calorimetry and investigate the energy content of organic fuels.

Focus on Science Practices

SEP 3 Planning and Carrying Out Investigations
SEP 4 Analyzing and Interpreting Data
SEP 5 Using Mathematics and Computational Thinking

Materials Per Group

- Aluminum foil, 3 in. x 3 in. square
- Charcoal, small lump
- Water, distilled or tap, 50 mL
- Balance (0.01-g precision)
- Butane safety lighter
- Graduated cylinder, 50-mL
- Metal ring with clamp
- Soda can, empty and clean
- Stirring rod, glass
- Support stand
- Thermometer

Safety 

Wear safety goggles when performing this or any lab that uses chemicals, heat, or glassware. Allow charcoal sample to cool before touching or discarding it. Use a glass stirring rod to stir the liquid; never stir with a thermometer. This lab should be performed in a well-ventilated room. Wash hands thoroughly with soap and water before leaving the laboratory.

Procedure

1. Place a small clump of charcoal on a 3 in. x 3 in. square of aluminum foil.
2. Measure and record the combined mass of the charcoal/aluminum foil. Place the charcoal/aluminum foil on the base of a support stand.
3. Using a graduated cylinder, measure and add 50.0 mL of water to an empty, clean soda can.

Measuring the Energy Densities of Organic Fuels: Guided Inquiry Lab

Overview

How much energy is released when an object burns? One way to determine this is to measure the heat flow from the object to its surroundings. If heat flows from the object to its surroundings, then the temperature of the surroundings will increase. This activity will introduce the concept of calorimetry and investigate the caloric content of organic fuels.

Focus on Science Practices

SEP 3 Planning and Carrying Out Investigations
SEP 4 Analyzing and Interpreting Data
SEP 5 Using Mathematics and Computational Thinking

Materials Per Group

- Aluminum foil, 3 in. x 3 in. square, 2
- Charcoal, small lump
- Water, distilled or tap, 50 mL
- Balance (0.01 g precision)
- Butane safety lighter
- Graduated cylinder, 50-mL
- Metal ring with clamp
- Soda can, empty and clean
- Stirring rod, glass
- Support stand
- Thermometer
- Wood splint

Safety

Wear safety goggles when performing this or any lab that uses chemicals, heat, or glassware. Allow charcoal sample to cool before touching or discarding it. Thoroughly wet under running water any combusted samples prior to discarding in the trash.Use a glass stirring rod to stir the liquid; never stir with a thermometer. This lab should be performed in a well-ventilated room. Wash hands thoroughly with soap and water before leaving the laboratory.

Procedure

1. Place a small clump of charcoal on a 3 in. x 3 in. square of aluminum foil.
2. Measure and record the combined mass of the charcoal/aluminum foil. Place the charcoal/aluminum foil on the base of a support stand.
3. Using a graduated cylinder, measure and add 50.0 mL of water to an empty, clean soda can.

Measuring the Energy Densities of Organic Fuels: Advanced Inquiry Lab

Overview

How much energy is released when an object burns? One way to determine this is to measure the heat flow from the object to its surroundings. If heat flows from the object to its surroundings, then the temperature of the surroundings will increase. This activity will introduce the concept of calorimetry and investigate the caloric content of organic fuels.

Focus on Science Practices

SEP 3 Planning and Carrying Out Investigations
SEP 4 Analyzing and Interpreting Data
SEP 5 Using Mathematics and Computational Thinking

Materials Per Group

- Aluminum foil, 3 in. x 3 in. square, 2
- Balance (0.01 g precision)
- Butane safety lighter
- Charcoal, small lump
- Graduated cylinder, 50-mL
- Metal ring with clamp
- Soda can, empty and clean
- Stirring rod, glass
- Support stand
- Thermometer
- Water, distilled or tap, 50 mL
- Wood splint

Safety

Wear safety goggles when performing this or any lab that uses chemicals, heat, or glassware. Allow fuel samples to cool before touching or discarding them, and thoroughly wet burned samples prior to disposal. Use a glass stirring rod to stir the liquid; never stir with a thermometer. This lab should be performed in a well-ventilated room. Wash hands thoroughly with soap and water before leaving the laboratory.

Measuring the Energy Densities of Organic Fuels: Advanced Inquiry Lab

Overview

How much energy is released when an object burns? One way to determine this is to measure the heat flow from the object to its surroundings. If heat flows from the object to its surroundings, then the temperature of the surroundings will increase. This activity will introduce the concept of calorimetry and investigate the caloric content of organic fuels.

Focus on Science Practices

SEP 3 Planning and Carrying Out Investigations
SEP 4 Analyzing and Interpreting Data
SEP 5 Using Mathematics and Computational Thinking

Materials Per Group

- Aluminum foil, 3 in. x 3 in. square, 2
- Balance (0.01 g precision)
- Butane safety lighter
- Charcoal, small lump
- Graduated cylinder, 50-mL
- Metal ring with clamp
- Soda can, empty and clean
- Stirring rod, glass
- Support stand
- Thermometer
- Water, distilled or tap, 50 mL
- Wood splint

Safety

Wear safety goggles when performing this or any lab that uses chemicals, heat, or glassware. Allow fuel samples to cool before touching or discarding them, and thoroughly wet burned samples prior to disposal. Use a glass stirring rod to stir the liquid; never stir with a thermometer. This lab should be performed in a well-ventilated room. Wash hands thoroughly with soap and water before leaving the laboratory.

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