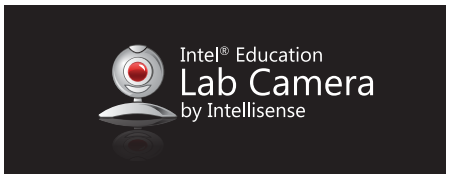
Intel® Education Lab Camera by Intellisense

Intel Education

Lab Camera is a science exploration application with six tools that enable students to carry out scientific concepts using the laptop's or tablet's built-in camera. It's a cost-effective way to enhance STEM curriculum and promote scientific inquiry.



FEATURES/BENEFITS

Value for Schools

- **Enhances project-based learning,** an ideal complement to STEM curriculum
- **Reduces the need for expensive lab equipment**
- **Tools work across several science disciplines,** such as biology, life science, chemistry, physics, etc.

Value for Students

- **Engagement;** fosters deep understanding of scientific principles and phenomena with modern digital tools
- **Anytime anywhere access** to science tools built into the students' device

Value for Teachers

- **Enhances project-based learning** in science disciplines
- **Develops higher-order skills** such as investigation, drawing conclusions, collaboration, analysis, problem solving, deductive reasoning
- **With six tools built into one** application, educators can save time managing and distributing probes and peripherals during valuable class time

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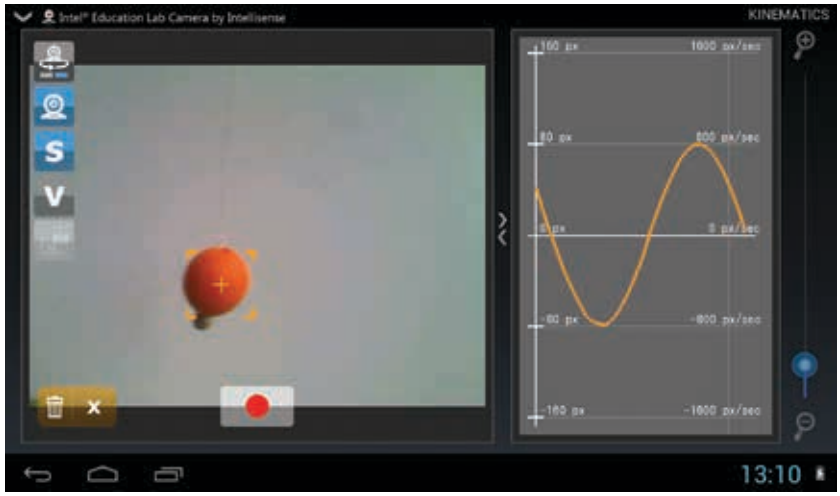
LAB CAMERA TOOLS

- **Time lapse cam:** Record nature's slow processes.
- **Kinematics:** Track and graph horizontal and vertical movement.
- **Microscope:** Explore the world through size and distance.
- **Pathfinder:** Discover invisible paths and detect patterns.
- **Motion cam:** Record movement in targeted areas.
- **Universal logger:** Digitize any instrument that has a digital, radial-dial, or fluid-based display.



USAGE EXAMPLES

Subject	K-5	6-8	9-12
Language Arts	Student groups track plant growth using the Motion Camera tool to observe and record plant growth overnight. Then they write about their scientific observations.	Students track the motion of a pendulum through Lab Camera's Kinematics tool. In their lab report, they describe the motion of the ball as it relates to the force of their push on the ball.	Students set up Time Lapse Camera to record worms feeding and make observations in their written lab reports.
Math	Using Lab Camera's Microscope tool to measure and describe the size of items that cannot be measured by a ruler.	Students use Lab Camera Kinematics tool to represent and analyze the relationship between independent and dependent variables such as motion and velocity.	Students use Lab Camera Pathfinder tool to create a motion map of termite movement and statistically analyze their pattern of movement.
Science	Using the Time Lapse tool, students record cloud movement in their study of weather patterns.	Students use the Kinematics tool to investigate roller-coaster design and learn about velocity and acceleration.	Using Pathfinder, students learn about insect behavior by tracking termite trails.

Intel® Education Teaching and Learning Ideas for Lab Camera*

Teachers and students can use Intel® Education software and unit plans to activate higher order thinking skills and foster greater student engagement.

A science exploration application that enables students to carry out scientific observations and measurements using the laptop or tablet's built-in camera.

Lab Camera* promotes scientific inquiry and makes abstract concepts tangible for students. It provides a cost-effective way to enhance STEM curriculum.

The following unit plans are included as examples on how to use Lab Camera to promote student learning at your school. The unit plans address the following objectives to improve teaching and learning:

Elementary School: Reading Literature

Middle School: Literacy

High School: Probability and Statistics

Intel Education Unit Plan: Pond Water and Pollywogs

Students monitor the motions of the pollywogs in the aquarium using the Path Finder tool in Lab Camera. They examine the tracks for patterns of movement during the stages of pollywog metamorphosis.

On their way to becoming frog experts, students investigate the universal features of habitats, observe frogs in their natural environment, and raise frogs from eggs in an artificial habitat. Students record their observations and reflections in words and pictures in a science log, and use a spreadsheet to record their data collection. They show their understanding of habitats in general and the specific features of a frog habitat in a slideshow presentation. Students create a newsletter illustrating the frog life cycle and habitat, both natural and man-made, and give specific details about the frog exhibit.

Grade Levels:
K-2

Higher Order Thinking Skills:
Analysis and investigation

Key Learning Objectives:
Diversity, habitat, interdependence, life cycle, and metamorphosis

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Intel® Education Solutions

Intel Education Unit Plan: Teacher's Pet

Students set up the Motion Camera tool to observe nocturnal or slow-moving pets at home or in the classroom. Students who do not have pets can arrange to do observations of the pet of a friend, neighbor, or relative. Finally, they discuss activities they will most likely observe and include these in a modified animal observation form.

The teacher announces a desire to get a pet and asks the class to help choose the perfect one. Students research common pets, discover their daily habits and needs, and compare domestic animals to their counterparts in the wild. Along the way, students learn about habitat and animal behavior, and they develop a new understanding of human responsibility for the health and happiness of all animals. Observing animal behavior as a homework activity is another way to have students engage in systematic observation.

Grade Levels:
2-3

Higher Order Thinking Skills:
Analysis and decision making

Key Learning Objectives:
Animal behavior, life cycle, habitat, observation, data collection and analysis, and making comparisons

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Intel Education Unit Plan: The Great Bean Race

With the Time Lapse Camera tool, students set up and use the Web cam in a laptop or tablet to record the periods of the fastest growth for bean plants over 24 hours. Students can compare growth over different 24-hour periods on the same bean plant or different plants.

The Great Bean Race is on! Compete with classrooms from other regions to see which collaborative team can grow the tallest bean plant. Controlling for certain variables, seven or eight teams in each classroom design and conduct a bean-plant experiment to investigate ideal conditions for growth. Students synthesize bean plant information into a newsletter that describes the project, their group's bean plant, and facts about beans.

Grade Levels:
3-5

Higher Order Thinking Skills:
Investigation, drawing conclusions

Key Learning Objectives:
Measurement, comparing variables for growth

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Intel Education Unit Plan: Forensics: Get a Clue

To build a foundation in forensic science, students analyze evidence with forensic labs. Students use the microscope to complete several labs, as described in the unit excerpt.

Contrary to what Sherlock Holmes may have told Watson, criminal investigation is not so elementary. These days, detectives use a vast array of tools to solve crimes. In this project, students delve into the world of criminal investigation and learn how forensic scientists collect, analyze, and process evidence to solve a crime. In preparation for solving a simulated classroom "crime," students engage in deductive reasoning activities and practice math and science forensics labs. Then, using the scientific inquiry process, they collect clues, test and analyze evidence, and draw conclusions to solve the crime. Student groups use a graphic organizer to determine the relationships between the evidence and the suspects to help solve the classroom crime.

Grade Levels:
6-8

Higher Order Thinking Skills:
Analysis, problem solving, and deductive reasoning

Key Learning Objectives:
Scientific inquiry, logic, and data analysis

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Intel Education Unit Plan: Accidental Discoveries

Students use Lab Camera's Universal Logger tool to record behaviors they observe in the process of making a slimy substance. Students will contrast observed results with predictions or expectations to explore the process of scientific discovery by accident.

Accident or serendipity? The essential question "How can we benefit from our accidents?" is explored by asking students to reflect on a time in their life when a mistake or accident reaped positive benefits. Additionally, students analyze what skills and processes they used in their situation. To connect this understanding to the unit, students role play as scientists or investors who have been hired to find a marketable use for a new substance created accidentally in a lab.

Students research the question: How have scientists used their accidents or mistakes to make our world a better place? Students find answers to the question by finding a marketable purpose for the new substance. They must use their knowledge of properties of matter and experimentation processes to prove that their idea will work and eventually persuade people to buy their product.

Grade Levels:
6-8

Higher Order Thinking Skills:
Analyze and synthesize information; classify information

Key Learning Objectives:
Mass, volume, density, measurement, physical and chemical properties of matter, and experimental design

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Intel Education Unit Plan: It's a Wild Ride: A Roller Coaster Design

Students use the Kinematics tool as part of phase three of the lesson to complete investigations of design and motion. They create roller coaster tracks of varying height and compare acceleration, velocity, and distance traveled by marbles released at the top of the track. They can also compare motion through different coaster design elements—slides, loops, and spirals.

In this interdisciplinary simulation student teams must convince a theme park to accept their design through persuasive presentations. It's a Wild Ride is a detailed case study designed for teachers wanting an inside look at the development and implementation of an interdisciplinary project enriched by technology. Students move from learning content-specific knowledge and skills to applying what they learn in a group design task.

Grade Level:
8

Higher Order Thinking Skills:
Investigation, decision making, and analysis

Key Learning Objectives:
Scientific inquiry, observation, and making comparisons

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