PURDUE
AGRICULTURE
RESOURCES FOR K-12 EDUCATORS
Purdue zip Trips
Purdue Agricultural Communication

Virtual electronic field trips that bring Purdue University scientists into your classroom. Through the wonders of technology, students interactively visit labs, greenhouses, aquaculture facilities, Discovery Park, the veterinary school, and other amazing places that are off limits to your students even in a real-life field trip. The centerpiece of each zipTrip is a live webcast featuring factual, unbiased scientific information presented in an entertaining way. Your students will be able to email questions during the show for the scientists to answer. And each trip includes supplementary online videos that feature the work of Purdue scientists. Archived zip Trips are available.

Archived Trips:
- We’re All Animals
- Disease Detectives
- It’s a Gene Thing
- The Science of Nutrition
- About Plant Science: The Green Machine

Web address:
http://www.purdue.edu/ziptrips/

Contact:
Steve Doyle
Video Producer
765.496.1548
doyles@purdue.edu

Classroom Mini Economy
Purdue Agricultural Economics

A hands-on form of instruction that prepares students to function in today's rapidly changing and independent society. By organizing their own economy, students learn economic concepts, money management, and decision-making skills. Students also experience entrepreneurship and real life by operating their own classroom businesses. The curriculum shows teachers how to implement the mini-economy in their classrooms with an advanced section dedicated to middle school classes. It also includes an Economic Primer for Teachers, Reproducible Mini-Economy Aids, and Student Worksheets. K-6 Indiana Economic Standards.

Subjects:
- Economics
- Math

Grades:
K-6

Web address:
http://www.econed-in.org/me.asp

Contact:
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**Economics & Entrepreneurship: Operating a Classroom Business in the Elementary and Middle School**

Purdue Agricultural Economics

This newly revised curriculum will tell you how to organize and run a simple real-money classroom business. The curriculum also introduces you to the economic and business concepts you can teach students along the way. The curriculum comes with three tests, an attitude survey to give students, and a Literature Connection, which describes children's literature books to use to reinforce economic concepts. If you're at all interested in helping your students understand the world of economics and business, this curriculum is for you. Available from Council for Economic Education, but may be offered free to Indiana teachers in Indiana Council and Center workshops. K-8th standards.

**Subjects:**
- Economics
- Math

**Grades:**
K-8

**Web address:**
http://www.econed-in.org/cbe.asp

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**Energy, Economics, and the Environment**

Purdue Agricultural Economics

The Indiana Council for Economic Education, through the support of Indiana Michigan Power, offers workshops each summer on the important Energy, Economics, and the Environment (EEE) curriculum, originally developed by the Indiana Department of Education. This newly revised curriculum offers basic information on key topics such as water and forest resources, renewable and non renewable energy sources, solid waste, and global warming. The curriculum at each level revolves around age-appropriate case studies, which help students apply sound economic reasoning to important energy and environmental issues. Elementary, middle, and high school.

**Subjects:**
- Economics
- Math
- Science
- Technology

**Grades:**
K-12

**Web address:**
http://www.econed-in.org/resources.asp

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Indiana Stock Market Game

The Indiana Stock Market Game is a widely popular teaching tool used in grades four through twelve. It fits into many different disciplines and activities such as social studies, math, business education, and even language arts. Teachers can organize the program to fit their particular needs. Using actual data from the stock markets, teams of students are given a hypothetical $100,000 to create and manage a portfolio of stocks and mutual funds. Before they know it, students are learning about financial markets such as the New York Stock Exchange, understanding the basics of personal investing and enhancing skills learned in math, reading, and technology. Lessons found in the Teacher Support Center are aligned to national and state academic standards in Social Studies, Economics, Mathematics, Language Arts, and Business. To view the correlation, register or login and go to the Teacher Support Center, click on "Standards" under the section "In the Classroom."

Subjects:
- Economics
- Math
- Social Studies
- Language Arts
- Business

Grades:
4-12

Web address:
http://www.econed-in.org/stockmarket.asp

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Kids Econ Posters

KidsEcon Posters teach economic principles. We want to give teachers across the nation every opportunity they deserve to help make finance and economics accessible to students of all ages. At the heart of the KEP curriculum are colorful posters describing concepts. Each set of posters contains a Teacher’s Guide containing a one-page lesson on each poster. Each lesson gives an explanation of the concept, teaching ideas, and a Literature Connection. The posters can also be supplemented by great activities such as KidsEcon Bingo, KidsEcon Activity Cards, and Herschel's World of Economics DVD's.

Topics:
- The Basics
- The 6 Core Principles
- Personal Finance
- Interest
- Entrepreneurship
- Financial Literacy

Subjects:
- Economics
- Math

Grades:
K-6

Web address:

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Plant Science Word Searchers & Crossword Puzzles

Purdue Agronomy

Word searches and crossword puzzles to encourage understanding and review of plant science vocabulary words.

Topics:
- Soil
- Earth
- Erosion
- The Living Environment
- Water
- Scientific Method
- Corn

Subjects:
- Science

Grades:
High School

Web address:
https://ag.purdue.edu/agry/k12/Pages/worksheets.aspx

Contact:
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Demonstrations in Soil Science Videos and Lab Activities

Purdue Agronomy

Detailed lab activities including background information. Accompanying YouTube videos featuring Purdue Agronomy professor.

Topics:
- Measuring Soil and Water pH
- Why is Rain Acid?
- Testing Soils for Aluminum Toxicity
- Soil Has a Charge
- Chemical Movement in Soils
- Nitrates or Nitrites in Water or Food
- Exposing a Rainbow of Color: How Chromatography Works!
- Soil Colors
- Clay Properties
- Soil Erosion
- Earthworm Activity and Biology
- Preserving Soil Monoliths and Specimens in Vinyl Plastic
- Germination and Vigor of Seeds (Warm Tests/Cold Tests)
- Quick Test to Determine Seed Viability
- Phosphorus in Plants
- Starch Goes to Sugar as Plants Use Their Stored Energy for Regrowth
- Plant Growth Experiments

Subjects:
- Science

Grades:
High School

Web address:

Videos:
https://ag.purdue.edu/agry/k12/Pages/Demonstrations.aspx

Contact:
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Fun with Fungi in the Classroom
Purdue Botany and Plant Pathology

A simple lesson plan focusing on using reading materials to introduce fungi to preschool and kindergarten level students. Included are a few activities with mushrooms.

Subjects:
- Reading, Math,
- Art,
- Science

Grades:
- Preschool- Kindergarten

Web address:

Contact:
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Soil, Water, and Forage Educational Coloring Books and Animated Short Videos
Purdue Agronomy

Animated 4 minute videos with accompanying educational coloring books.

Topics:
- Travels of Bob, the Soil Bacterium
- Freddy Forage’s Friends
- Peter the Ped of Soil
- Splish Splash the Drop of Water

Subjects:
- Science

Grades:
K-4

Web address:
https://ag.purdue.edu/agry/k12/Pages/books.aspx

Contact:
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Fungi: the Good, the Bad, and the Ugly
Purdue Botany and Plant Pathology

A lesson plan that introduces fungi as beneficial, harmful, and just plain odd looking organisms. There is considerable hands-on time in this curriculum. This unit can be extended for two weeks of study.

Topics:
- Yeast
- Dermatophytosis (Ringworm)
- Molds & Spores

Subjects:
- Science

Web address: https://ag.purdue.edu/btny/Documents/Good_Bad_Ugly_Fungus.pdf

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Growing a Pineapple at Home
Purdue Botany and Plant Pathology


Subjects:
- Science
- History
- Math

Web address: https://ag.purdue.edu/btny/Documents/Growing_a_Pineapple_at_Home.pdf

Contact:
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**K12 Fungi Curricula**

Incorporating fungi into your classroom is not difficult, and you may find that using fungi as a theme or as a research subject is both a novel and fascinating process. This resource includes some of the Indiana Academic Standards that can be met with the use of some creative thinking about fungi. Be sure to visit the Web Resources also listed. We invite you to open the world of fungi to your students.

**Subjects:**
- Science

**Grades:**
K-12

**Web address:**
[https://ag.purdue.edu/btny/Documents/Fungi_Curricula.pdf](https://ag.purdue.edu/btny/Documents/Fungi_Curricula.pdf)

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**K-12 Plant Path-Ways to Science**

This website is sponsored by the American Phytopathological Society (APS) Education Center to assist science and biology teachers in the K through 12 grades interested in developing interactive laboratories and demonstrations that teach the basic principles of science and the scientific method.

**Topics:**
- Antigen-Antibody Testing
- Plant Biotechnology
- Crime Scene Investigation (CSI) with Powdery Mildew Fungi
- DNA the Easy Way
- Nematodes (Roundworms)
- Plant Parts & Diseases
- Plants Get Sick Too!
- Powdery Mildew Fungi
- Tobacco mosaic virus
- Water Molds (Oomycetes)
- Who Done It? Or what's that brown fuzzy stuff on my plum?

**Subjects:**
- Science

**Grades:**
High School

**Web address:**

**Contact:**
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Manual of Instructional Materials for Teachers and Naturalists Teaching About Fungi
Purdue Botany and Plant Pathology

A collection of teaching materials put together by the North American Mycological Association (NAMA). Additional materials include games, outdoor activities, and extracurricular assignments.

Topics:
- Math & Science Units
- Mushroom Dissection Lab
- Making Spore Prints
- Charting Mold Growth
- Spring Mushrooms
- Mushroom Cultivation
- Art from Fungi
- Making Yeast Bread
- and more!

Subjects:
- Math
- Science
- Art

Grades: K-12


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Professors in the Classroom
Purdue Botany and Plant Pathology

Do you ever wish you had help showing students the connection between your classroom and the outside world? Many of our faculty are willing to come and speak to your high school classes -- free of charge. The Department of Botany and Plant Pathology offers 3 talks that can be given to your class by Purdue professors.

Talks:
- Agricultural Research: Why it is More Important Than Ever
- GMO’s: What Are They and Why All the Fuss?
- What is Life?

Subjects:
- Science

Web address: https://ag.purdue.edu/btny/Pages/TeachingResources.aspx

Contact:
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**Arrest the Pest**

Purdue Entomology

A collection of teaching materials put together by the North American Mycological Association (NAMA). Additional materials include games, outdoor activities, and extracurricular assignments.

**Lessons:**
- Invasive Species Investigator
- Criminal History of the Emerald Ash Borer: Meet the Green Menace
- Scene of the Crime: Learn to Identify Ash Trees
- Looking for Clues: Signs and Symptoms of EAB
- Arrest the Pest: NAAB Your Community's Attention

**Subjects:**
- Science
- Social Studies
- Math
- Language Arts

**Web address:**
http://extension.entm.purdue.edu/arrestthatpest/index.php

**Contact:**
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Education and Outreach Coordinator
765-494-0997
gpearso@purdue.edu

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**Genomics Analogy Model for Educators (G.A.M.E.)**

Purdue Entomology

The G.A.M.E. website is a tool for high school science teachers and higher education instructors that teach genomics but do not have a molecular biology background. Useful analogies and resources are available for teachers to use in their classroom. Includes lessons, worksheets, and activities, including a LEGO activity.

**Lessons:**
- How a Protein is Made
- Alternative Splicing
- Sequencing Gel
- Gel Electrophoresis

**Subjects:**
- Science
- Technology

**Grades:**
High School

**Web address:**
http://www.ydae.purdue.edu/game/default.html

**Contact:**
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Inquiry Lesson Plan: Now You See It! Now You Don’t: The Purpose and Benefit of Camouflage in the Insect World

Purdue Entomology

A two part activity. Learners determine the benefits and purposes of camouflage for insects through observation and investigation. Learners experiment with tempera paints and ping-pong balls, in order to camouflage the ping-pong balls in the specified environment. Students engage in cooperative learning by working together in groups. Within groups the students take on a specific role: naturalist, environmentalist, and landscape engineer.

Subjects:
- Science
- Engineering

Grades:
3-5

Web address:
http://extension.entm.purdue.edu/outreach/lessonPlans/Lesson_1.pdf

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Lesson Plan: Metamorphosis
Purdue Entomology

Students engage in hands on learning by passing around the different developmental stages of the milkweed bug, blow fly, mealworm, butterfly, and tobacco hornworm. Students contemplate the difference between immatures and adults.

Subjects:
- Science
- Language Arts
- Social Studies
- Math

Grades:
K-6

Web address:
http://extension.entm.purdue.edu/outreach/lessonPlans/Metamorphosis.pdf

Contact:
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Lesson Plan: The Insect (Arthropod) Exoskeleton
Purdue Entomology

Students engage in hands on learning by holding an exoskeleton, caterpillar, cockroach, and beetle. Then to learn about the protection exoskeletons provide, students examine how liquids react on different surfaces including human skin, a paper towel, a caterpillar or cockroach, and an exoskeleton.

Subjects:  
-Science

Grades:  
2-6

Web address:  
http://extension.entm.purdue.edu/outreach/lessonPlans/ExoskeletonTG.pdf

Contact:  
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On or Off Campus
Entomology Educational Presentations & Visits
Purdue Entomology

Staff in the Department of Entomology are available for school and educational event presentations and visits, on or off-campus. If you are interested, please email gpearso@purdue.edu or complete our online request form. We will consult with you to determine staff availability to schedule a program! We ask for a minimum 6 week advance notice of a program request. There is a $50 presentation fee for events outside the immediate Lafayette/West Lafayette area.

Subjects:  
-Science

Grades:  
K-12

Web address:  
http://extension.entm.purdue.edu/outreach/form.php

Contact:  
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Education and Outreach Coordinator  
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gpearso@purdue.edu
The Nature of Teaching
Purdue Forestry and Natural Resources

The place to go for teaching resources that focus on nature. On the site teachers can find free lesson plans, printables, posters, a photo library, information on upcoming workshops, and more.

Lesson Plans:
- Animal Diversity & Tracking
- Food Webs
- Reptiles, Amphibians, & the Scientific Method
- Mammals & Ecosystems
- Ashes to Ashes: We All Grow Up
- Eco-Illapse
- Coloration Exploration
- Discovering the Watershed
- Common Indiana Mammals

Subjects:
- Science
- Math
- Natural Resource Management

Grades:
K-12

Web address: https://ag.purdue.edu/extension/nature/Pages/default.aspx

Contact:
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Extension Wildlife Specialist
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4-H Natural Resource Lesson Plans
Purdue Youth Development and Agricultural Education

28 Lesson Plans and Activities were developed from Indiana natural resource 4-H project manuals are intended for classroom use. Other educators can contact their County Extension Youth Educator for manuals and assistance or visit Purdue's The Education Store (Enter project name in search box.) The resource pages are given after the grade level and manual order number.

Topics:
- Entomology
- Forestry
- Geology
- Soil and Water Conservation
- Weather
- Wildlife

Subjects:
- Science
- Technology
- Engineering

Grades:
3-8

Web address: http://www.ydae.purdue.edu/natural_resources/Resources/Lesson%20Plans/LessonPlans.Activities.htm

Contact:
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**Energy Investigators**

**Facilitator’s Guide and Student Handbook**

Purdue Youth Development and Agricultural Education

A curriculum developed to help middle-school youth learn about energy conservation and alternative methods of energy generation. Includes information about the 5 hands-on activities in the student handbook as well as academic standards met by this curriculum.

**Activities:**
- Generating Electricity
- Comparing Electricity Options
- Measuring Electricity
- CO₂ Production & Absorption
- Carbon Sequestration & Storage

**Subjects:**
- Science
- Technology

**Grades:**
7-8

**Web address:**

**Student handbook:**
[https://mdc.itap.purdue.edu/item.asp?Item_Number=4-H-1014-W#.VlQzs3arSM8](https://mdc.itap.purdue.edu/item.asp?Item_Number=4-H-1014-W#.VlQzs3arSM8)

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**Apple Genomics**

Purdue Youth Development & Agricultural Education

Computer simulations to help students visualize and understand complex genomic processes which take place on a microscopic scale.

**Simulations:**
- What is the Apple Genome?
- DNA Cloning
- Gene Expression - From DNA to RNA
- cDNA Cloning
- Isolating Plasmid Bacteria from DNA
- Modeling DNA with LEGOs
- Microarrays and Gene Expression

**Subjects:**
- Science
- Technology

**Grades:**
High School

**Web address:**
http://www.ydae.purdue.edu/Apple_genomics/

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**THE APPLE GENOMICS PROJECT**
Indiana’s Water Riches
Purdue Youth Development & Agricultural Education

Five water education lesson plans incorporating science concepts. Includes creative readings for students, vocabulary, and worksheets.

Lessons:
- How We Use It
- Where it Comes From and Where it Goes
- Water Above and Below the Ground
- Making Drinking Water Safe
- Conservation

Subjects:
- Science
- Technology

Grades:
3-5

Web address:
Lesson 1
http://www.ydae.purdue.edu/natural_resources/Resources/WaterRiches/Newsletters/water%20riches%20Unit%201.pdf
Lesson 2
Lesson 3
http://www.ydae.purdue.edu/natural_resources/Resources/WaterRiches/Newsletters/water%20riches%20Unit%203.pdf
Lesson 4
http://www.ydae.purdue.edu/natural_resources/Resources/WaterRiches/Newsletters/water%20riches%20Unit%204.pdf
Lesson 5
http://www.ydae.purdue.edu/natural_resources/Resources/WaterRiches/Newsletters/water%20riches%20Unit%205.pdf

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Insects as Bioindicators of Water Quality
Purdue Youth Development and Agricultural Education

Learners take samples from stream habitats and capture insects, use bioindicator cards to identify the insects, and complete the calculations to determine the stream water quality rating. Includes instructions, data sheets, flashcards, and index table.

Subjects:
- Science
- Math

Grades:
Middle School – High School

Web address:
http://www.ydae.purdue.edu/natural_resources/Resources/BioindicatorWQ/Index.html

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Interactive Genetics Learning Modules
Purdue Youth Development & Agricultural Education

Online modules targeted for middle school students to learn taxonomy, domestication, nature vs. nurture, gene types, quantitative traits, trait selection, breeding strategies, genetic testing, and biotechnology.

Modules:
- Taxonomy
- Domestication
- Nature Vs. Nuture
- The Types of Genes
- Quantitative Traits
- Trait Selection
- Inbreeding and Line Breeding
- Crossbreeding
- Genetic Testing
- Biotechnology

Subjects:
- Science
- Technology

Grades:
Middle School

Web address:
http://www.ydae.purdue.edu/animal_genetics/

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Junior Master Gardener Curriculum
Purdue Youth Development and Agricultural Education

An international youth gardening program of the university cooperative Extension network. JMG engages children in novel, “hands-on” group and individual learning experiences that provide a love of gardening, develop an appreciation for the environment, and cultivate the mind. Three lessons are available for free, the entire curriculum can be purchased from http://jmgkids.us/curriculum/

Lessons:
- Gas Gobblers
- How Tall is that Tree?
- Secret Smells

Subjects:
- Science
- Math

Grades:
3-8

Web address:
Gas Gobblers

How Tall is that Tree?

Secret Smells

Contact:
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Sensible Disposal of Unwanted Medicines
Purdue Youth Development and Agricultural Education

Five inquiry based lesson plans to help youth understand why chemicals from medicines are found in the environment, the harm chemicals can cause, and what can be done about it. Uses scientific concepts, includes hands-on experiments, diagrams, and worksheets.

Lessons:
- So What’s the Big Deal?
- What are the Issues?
- What Should I be Concerned About?
- What are my Options?
- How Can I Let Other People Know About the Issues?

Subjects:
- Science
- Health
- Technology

Grades:
High School

Web address:

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Purdue Youth Development & Agricultural Education

Four lesson plans to help youth understand their local water resources. Includes teacher reference pages with objectives, an introduction for each Activity, materials needed and, in some cases, worksheets. Incorporates science concepts, and one activity involves mathematical calculations.

Lessons:
- Floods, Flood Planes, and Flood Probabilities
- Your Drinking Water
- Pollution Sources
- Terminology/ Water Resource Terms

Subjects:
- Science
- Math

Grades:
Middle School

Web address:

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