

Boat of Knowledge in the Science Classroom (BookS)

Funded by the National Science Foundation through Ohio University (2010-2018)



Lesson Plan Videos: Table of Contents

The following table of contents is sorted by three categories: 1) Biology and Environmental Science, 2) Chemistry, and 3) Physics, Engineering, and Math. Due to the integrative nature of lesson plans, some of them may have been listed under multiple categories. Within each category, lessons have subcategory tags attached for better understanding the content of each lesson. For more information, please contact: Dr. Tiao J. Chang at chang@ohio.edu or 172 Stocker Center, Ohio University, Athens, Ohio 45701.

Biology and Environmental Science Lessons

Video Title (video length in minutes)	Subcategories
Acid Mine Drainage (4:56)	Chemistry, Environmental Science, Water Quality
Acid Mine Drainage: An Overview and Sustainability (4:04)	Chemistry, Water Quality, Environmental Science
Acid Rain (4:04)	Chemistry, Environmental Science
Air Quality (20:48)	Chemistry, Environmental Science, Physical Science

Algae Blooms & Eutrophication (5:04)	Environmental Science, General Biology, Water Quality
Bacteria (6:17)	General Biology
Bacteria as an Indicator of Water Quality (7:13)	Environmental Sciences, General Biology
Bacteria, Viruses, and Fungi, Oh My! (7:44)	General Biology
Big Orange Problem: Acid Mine Drainage (15:04)	Water Quality, Chemistry, Environmental Science
Biofuels (29:04)	Chemistry, Engineering, Environmental Science
Biomagnification (10:31)	Environmental Science, General Biology
Blood Genetics (10:38)	Genetics, General Biology
Blood Types (7:18)	General Biology, Genetics
Cells are 3D - Did you knew? (4:35)	General Biology
Clean Water Act: A Brief Introduction and History (6:32)	Water Quality, Environmental Science
Creating an Index (3:24)	Water Quality, Environmental Science
Delineating a Watershed (6:44)	Water Quality, Environmental Science
Dissolved Oxygen: Water Quality (8:24)	Chemistry, Water Quality, Environmental Science
DNA Part I: Structure and Replication (15:35)	Genetics, General Biology
DNA Part II: Protein Synthesis (15:35)	Genetics, General Biology
Effects of Urbanization on the Environment (11:01)	Engineering, Environmental Science, Water Quality
Effects of Water Pollution - Are there any? (5:00)	Water Quality, Environmental Science, General Biology, Chemistry
Environmental Causes of Endocrine Disruptors (11:16)	Environmental Science, General Biology
Evolution: A Basic History of the Theory (5:28)	General Biology
Evolution: An Introduction to Basic Concepts (9:01)	General Biology
Fish Kills (2:46)	Environmental Science, Water Quality
Flatworms, Crayfish, and Water Pennies, Oh My! Using Macroinvertebrates to Determine Water Quality (8:53)	Water Quality, Environmental Science
Global Warming Debate (11:55)	Chemistry, Environmental Science, Physical Science
Groundwater Basics and Environmental Applications (12:58)	Water Quality, Environmental Science, Engineering
Groundwater Pollution Tracing (9:53)	Water Quality, Environmental Science, Engineering
How Populations Grow (11:10)	Environmental Science, General Biology
How Populations Grow: An Introduction (5:38)	Environmental Science, General Biology
Invasive and Endangered Species in Ohio: Tied Together (13:21)	Environmental Science, General Biology

Invasive Species General (8:20)	Environmental Science, General Biology
Invasive Species: Great Lakes Case Study (17:17)	Environmental Science, General Biology
Local Environment Pollution Legacies in Southeastern Ohio (8:52)	Environmental Science
Luminescence (8:44)	General Biology, Chemistry
Macroinvertebrates as Bioindicators (7:24)	Water Quality, Environmental Science
Neurotoxins in our Everyday Lives (17:15)	Environmental Science, General Biology
Not in My Backyard! (10:41)	Environmental Science
Overpopulation	Environmental Science
Photosynthesis & Cellular Respiration in Sewage Treatment (11:08)	Environmental Science, General Biology, Engineering, Water Quality
Physics of the Human Body: Motion and Balance (20:57)	Physics, General Biology
Pigments & Photosynthesis (11:05)	Environmental Science, General Biology
Punnett Squares (15:00)	Genetics, General Biology
Rain Garden Ecology (14:47)	Engineering, Environmental Science, Water Quality
Recombinant DNA (RDNA) (4:39)	Genetics
Relative Humidity (13:27)	Environmental Science, Physical Science
Scientific Method (5:31)	Physics, General Biology, Chemistry
Soil Erosion (1:53)	Engineering, Environmental Science, Physical Science
Soils (5:11)	Environmental Science, Physical Science
Stream Discharge Measurement (12:14)	Water Quality, Environmental Science
Structures, Statics, and the Environment (9:21)	Engineering, Environmental Science
Sustainable Food Production (8:50)	Engineering, General Biology
Sustaining Aquatic Biodiversity: Overfishing (9:53)	Water Quality, Environmental Science
Testing for Bacteria in Fresh Water (3:29)	Environmental Science, Water Quality
The Clean Water Act (5:27)	Environmental Science
The Human Water Cycle Pt. 1: How Humans Interact With Water (6:54)	Engineering, Environmental Science, Water Quality
The Human Water Cycle Pt. 2: Wastewater Treatment (11:05)	Engineering, Environmental Science, Water Quality
The Water Quality Index: An Introductory Experience (3:31)	Environmental Science, Water Quality
Topographic Maps (8:23)	Engineering, Environmental Science
Toxicology (12:52)	General Biology

Trees (4:38)	Environmental Science, General Biology
Viruses: A Basic Introduction (7:37)	General Biology
Viruses - Living or Non-Living? (4:41)	General Biology
Waste Management Pt. 1: Waste Generation & Characterization (9:15)	Engineering, Environmental Science
Waste Management Pt. 2: Landfill Siting & Design (13:51)	Engineering, Environmental Science
Water: Basic Properties (8:36)	General Biology, Chemistry, Physical Science
Water Budgets: The Hydrologic Cycle and Topographic Maps (16:31)	Water Quality, Environmental Science, Engineering
Water Filtration Basics (5:56)	Water Quality, Environmental Science, Physical Science
Water Hardness (13:47)	Chemistry, Engineering, Environmental Science, Water Quality
Water Parameters (7:43)	Environmental Science, Water Quality
Water Pollution - A simple approach (6:25)	Water Quality, Environmental Science, General Biology, Chemistry
Water Pollution: A Problem for Everyone (5:27)	Water Quality, Environmental Science
Water Pollution: Causes and Consequences (9:15)	Water Quality, Environmental Science
Water Pollution: Contaminants & Testing Procedures (7:34)	Environmental Science, Water Quality
Water Quality and Biological Monitoring using Macroinvertebrates (19:11)	Water Quality, Environmental Science
Water Quality and Pollution - Am I drinking safe water? (6:22)	Water Quality, Environmental Science, General Biology, Chemistry
Water Quality Index (6:01)	Environmental Science, Water Quality
Water Quality Index: A Brief Overview (4:26)	Environmental Science, Water Quality
Water Quality Variables (3:29)	Environmental Science, Water Quality
Waterborne Illnesses (9:26)	Water Quality, Environmental Science
Watersheds 101 (8:37)	Environmental Science
What's in the Fish? (6:03)	Water Quality, Environmental Science

Chemistry Lessons

Video Title (video length*)	Subcategories
Acid Mine Drainage (4:56)	Chemistry, Environmental Science, Water Quality
Acid Mine Drainage: An Overview and Sustainability (4:04)	Chemistry, Water Quality, Environmental Science
Acid Rain (4:04)	Chemistry, Environmental Science

Acid-Base Chemistry (9:09)	Chemistry
Air Quality (20:48)	Chemistry, Environmental Science, Physical Science
An Introduction to Chemical Bonds (10:51)	Chemistry
Big Orange Problem: Acid Mine Drainage (15:04)	Water Quality, Chemistry, Environmental Science
Biofuels (29:04)	Chemistry, Engineering, Environmental Science
Chemical Reactions (10:35)	Chemistry
Conversion (Units) (9:40)	Physics, Math, Engineering, Chemistry
Dissolved Oxygen: Water Quality (8:24)	Chemistry, Water Quality, Environmental Science
Effects of Water Pollution - Are there any? (5:00)	Water Quality, Environmental Science, General Biology, Chemistry
Electrochemical Sensors (13:14)	Chemistry, Engineering
Global Warming Debate (11:55)	Chemistry, Environmental Science, Physical Science
Luminescence (8:44)	General Biology, Chemistry
Properties of Matter (15:10)	Physical Science
Relative Humidity - Understanding and Applying the Concept (7:16)	Engineering, Chemistry
Reverse Osmosis and Filtration (10:59)	Chemistry, Engineering
Scientific Method (5:31)	Physics, General Biology, Chemistry
Solubility and Solute-Solvent Interactions (8:39)	Chemistry
Water Hardness (13:47)	Chemistry, Engineering, Environmental Science, Water Quality
Water Pollution - A simple approach (6:25)	Water Quality, Environmental Science, General Biology, Chemistry
Water Pollution - Contaminants and Testing Procedures (7:34)	Water Quality, Environmental Science, General Biology, Chemistry
Water Quality and Pollution - Am I drinking safe water? (6:22)	Water Quality, Environmental Science, General Biology, Chemistry
Water: Basic Properties (8:36)	General Biology, Chemistry, Physical Science

Physics, Engineering, and Math Lessons

Video Title (video length*)	Subcategories
3D Printing (6:50)	Physics, Engineering
Air Resistance (7:22)	Physics, Math, Engineering
Alternative Energy: A Brief Introduction (11:08)	Engineering, Environmental Science
Alternative Energy (8:47)	Engineering

Archimedes' Principle (23:51)	Physical Science
Bernoulli's Principle and Darcy's Law - Part I (11:45)	Physics, Engineering
Bernoulli's Principle and Darcy's Law - Part II (9:52)	Physics, Engineering
Biofuels (29:04)	Chemistry, Engineering, Environmental Science
Bridge Engineering Basics (15:24)	Physics, Engineering
Careers in STEM (8:20)	Engineering
Communicating with Mars	Physics, Engineering
Computer Networks	Physics, Engineering
Conversion (9:40)	Physics, Math, Engineering, Chemistry
Delineating a Watershed (6:44)	Water Quality, Environmental Science
Density Applications (11:19)	Physical Science
Earth Layers (4:17)	Physics, Engineering
Electrochemical Sensors (13:14)	Chemistry, Engineering
Engineering Challenge (Advanced - 13:26)	Physics, Engineering
Float or Sink? Hypothesis Formation using Density (11:19)	Physical Science
Global Warming Debate (11:55)	Chemistry, Environmental Science, Physical Science
GPS and Mapping I (14:13)	Physics, Engineering
GPS and Mapping II (15:01)	Physics, Engineering
Groundwater Basics and Environmental Applications (12:58)	Water Quality, Environmental Science, Engineering
Groundwater Flow (16:08)	Engineering, Physics
Groundwater Pollution Tracing (9:53)	Water Quality, Environmental Science, Engineering
Groundwater Pumping: Introduction and Effects (8:52)	Water Quality, Environmental Science, Engineering
How Statistics Lie to you (13:42)	Engineering
Hydroelectricity (11:22)	Engineering, Physics
LEED (14:07)	Environmental Science, Engineering
Not in My Backyard! (10:41)	Environmental Science
Parallel Computing (10:41)	Computer Science, Engineering
Physics of the Human Body: Motion and Balance (20:57)	Physics, General Biology
Popsicle Bridges (11:24)	Physics, Engineering
Potential and Kinetic Energy (9:44)	Physics, Engineering, Math

Projectile Motion (11:17)	Physics, Engineering, Math
Properties of Matter (15:10)	Physical Science
Prove it! (6:57)	Engineering
Rainfall (10:41)	Physics, Engineering
Relative Humidity - Understanding and Applying the Concept (7:16)	Engineering, Chemistry
Reverse Osmosis and Filtration (10:59)	Chemistry, Engineering
River Transportation: Shipping Goods using Barge Tows (8:50)	Engineering
Rockets (15:02)	Physics, Engineering
Scientific Method (5:31)	Physics, General Biology, Chemistry
Soil Erosion (1:53)	Engineering, Environmental Science, Physical Science
Spatial Interpolation (GIS) (12:44)	Physics, Engineering
Speed (4:28)	Physics, Engineering, Math
Speed of Light! (7:46)	Physics, Engineering
Spreadsheets in Science (5:24)	Computer Science
Structures, Statics, and the Environment (9:21)	Engineering, Environmental Science
The Human Water Cycle Pt. 1: How Humans Interact With Water (6:54)	Engineering, Environmental Science, Water Quality
The Human Water Cycle Pt. 2: Wastewater Treatment (11:05)	Engineering, Environmental Science, Water Quality
Thermal Energy (12:34)	Physical Science
Toilet Paper History of Life Timeline (4:56)	Physical Science
Topographic Maps (8:23)	Engineering, Environmental Science
Waste Management Pt. 1: Waste Generation & Characterization (9:15)	Engineering, Environmental Science
Waste Management Pt. 2: Landfill Siting & Design (13:51)	Engineering, Environmental Science
Water Budgets: The Hydrologic Cycle and Topographic Maps (16:31)	Water Quality, Environmental Science, Engineering
Water Filtration Basics (5:56)	Water Quality, Environmental Science, Engineering
Water Hardness (13:47)	Chemistry, Engineering, Environmental Science, Water Quality

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University Staff

PI and Co-PIs

Tiao J. Chang (PI)
Teresa Franklin (Co-PI)
Kelly Johnson (Co-PI)
Chang Liu (Co-PI)

Project Coordinators

Dave Diggle
Sarah El-Dabaja
Yanhui Fang

Boat Captain

Dave Diggle

External Evaluators

Barry Oches
Judy Coil
Dana Larsen
Sue Nichols

Digital Coordinator

Kenneth Dobo

Graduate Fellows

Ebenezer Aluma (PhD)
Nathan Andre (MS)
Marc Behrendt (PhD)
Rebecca Bennett (MS)
John Bentz (MS)
Brett Blevins (MS)
Ivan Caballero (MS)
Andrew Copley (MS)
Danielle D'Amore (PhD)
Sam Drerup (PhD)
Sarah El-Dabaja (PhD)
Yanhui Fang (PhD)
Tremaine Gissentaner (MS)
Elaine Goetz (PhD)
Amir Golan (PhD)
Tom Haskell (PhD)
Jackie Haynal (MS)
Tyler Hogue (MS)
Khaled Jaber (PhD)
Kurt Kleski (MS)
Sean Krupa (PhD)
Blake Liberati (MS)
Andrew Long (MS)
Andrew Lucas (MS)
Jonathan Maple (MS)
Josh Minnich (MS)
Sertac Ozercan (PhD)
Allen Rodriguez (PhD)
Derek Smetzer (MS)
Chris Stephan (MS)
Mariah Thrush (PhD)
Justin Wiseman (MS)
Xin Ye (PhD)
Ying Zhong (PhD)
Qing Zhu (PhD)

Participating Teachers

Andrea Anderson (Athens High School)
Eric Anderson (Federal Hocking High School)
Amy Braverman (Alexander High School)
Andy Dodd (Tri-County Career Center)
Gordon Gifford (Trimble High School)
Kathy K. Hudson (Meigs High School)
Larry King (Warren High School)
Keith McGuire (Gallia Academy)
Mike A. Miller (Marietta High School)
Ann Ohlinger (Southern High School)
Joani Powers (Meigs High School)
S. Jefferson Slattery (Athens High School)
Kris Thrush (Bloom Carrol High School)
Ryan Werry (Warren High School)