

What Is Operation Physics?

Operation Physics is a highly motivational, teacher-friendly, proven-to-be-effective graduate course for teachers grades 3-9. This **tuition-free five (5) credit hour**, graded Kent State course combines basic physical science concepts with hands-on materials and activities. \$800 in materials **free**.

From The Lab To The Classroom

The course includes instruction in Physical Science concepts appropriate for middle school and constructivist teaching strategies that will lead to student (and teacher) involvement and understanding. Activities are designed to help teachers learn basic concepts, and most of the activities can be used or adapted for use in the middle school classroom.

Instructors

The Operation Physics team is made up of instructors with extensive physical science education experience. All of the members have successful presentation experience and have demonstrated leadership ability and professional activity.

Stan Christensen	Physics Professor Kent State University
Gene Easter	Physics Instructor Brushfire Education Consultant
Dave Reber	Science Teacher Black River MS
Wendy Sherman	Science Education Professor Kent State University

Operation Physics Units

The following topics are introduced to provide teachers with knowledge of basic physics.

Sound: Participants gain experience with properties of sound waves and their expression in everyday life.

Light: Pinhole cameras, light boxes, and radiometers detect behavior of light images and shadows, reflections and optical illusion.

Color and Vision: Physiology of the eye, perception, vision-correcting lenses, rainbows, and effects of color mixing are demonstrated and applied.

Electricity: Static charges, electrical fields, conductors and insulators, and basic circuits are investigated with hands-on materials and activities.

Magnetism: Effects of various magnets and magnetic fields and some relationships to electricity are made tangible.

Matter And Its Changes: Observable properties of Matter, its physical states, and models to explain the nature of matter are explored.

Energy And Heat: Basic relationships between matter and energy and ways to illustrate the laws of thermodynamics in daily life.

Measurement: Origins of measurement systems, importance of basic and derived measurements and their applications in classroom and at home.

Forces and Motion: Time, space, velocity, inertia, and acceleration are introduced with student-involving experiences and devices to take into are classrooms.

Simple Machines: The how and why of simple machines leads to consideration of forces, work, and power.

Forces In Fluids: See how air and water respond to forces, share Bernoulli's insight, discover how a bumblebee flies.

Astronomy: Perspectives on the sun, the seasons, our local planetary system and the stars challenge students to engage in activities related to time space and motion.

This Is For You!

Not much background in physical science, but you'd teach it if you could?

Or, you'd teach physics concepts and critical thinking better and more often if you had practical lessons for middle grade students?

You've noticed that children's perceptions and explanations about natural events are sometimes different from your own?

You've heard about "hands-on", "minds-on" inquiry and want to try some?

Does the mention of Ohio Science Standards make you feel uncertain about how to prepare your students?

You'd like a solid graduate course in which to explore selected topics in physics, children's thinking, and science education?

If you answered YES to two or more of the above questions, consider taking Operation Physics – KSU graduate course funded by the Ohio Board of Regents and supported by area schools.

Class Calendar 2007 -2008

KENT STATE University Cuyahoga Falls High School Cuyahoga Falls, Ohio

June 11-15	8:00am-3:30pm
Sept. 28	Fri evening 6:00pm-9:00pm
Sept. 29	8:00 am-3:30pm
Nov 2	Fri evening 6:00pm-9:00pm
Nov 3	8:00 am-3:30pm
Dec 7	Fri evening 6:00pm-9:00pm
Dec 8	8:00am-3:30pm
Feb 1	Fri evening 6:00pm-9:00pm
Feb 2	8:00am-3:30pm
Mar 7	Fri evening 6:00pm-9:00 pm
Mar 8	8:00am-3:30 pm
Apr 4	8:00am-3:30 pm
Apr 5	8:00am-3:30pm