

## Grades 7 to 12

### 83 objects

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*The Association for Media and Technology in Education in Canada (AMTEC) has awarded TVOntario the Award of Excellence in the "School, K-12 Interactive category".*

What are WebITs? In simplest terms, WebITs -- which stands for "Web-based Interactive Tutorials" -- are manageable, reusable "chunks of instructional media." They allow student participation. Instead of just reading text related to a particular concept, the learner can view a learning object (such as a short animation) and can manipulate the variables online in an experiment to observe cause and effect. These interactive exercises allow students -- and teachers -- to work through a list of experiments ranging from predicting the outcome of genetic crosses and calculating mortgage interest, to demonstrating the effects of oxygen, light, and CO<sub>2</sub> levels on a plant.

*NOTE:* Users will require Macromedia Flash Player 6 or higher to access the learning objects. For MAC users, we recommend the use of Netscape or Safari.

### Objects

#### Biology

##### *Transmission of Genes*

BPN 888001

Investigate how some traits are passed from parents to offspring.

##### *Predicting Heredity*

BPN 888002

See how genetic material is mixed during a special type of cell division called meiosis.

##### *The Structure of Biochemical Compounds*

BPN 888003

See examples of carbohydrates, proteins, and lipids and build your own versions of these biologically important molecules.

##### *Cell Membrane Transport*

BPN 888004

Investigate the different methods used by cells to move materials across their cell membranes.

##### *Structure of Nucleic Acids*

BPN 888005

See the structure of deoxyribonucleic acid and ribonucleic acid and identify parts of these large molecules.

##### *Photosynthesis*

BPN 888006

Experiment with various factors that affect photosynthesis in order to achieve a healthy, productive plant.

##### *Succession*

BPN 888007

Manipulate the temperature and rainfall of a new volcanic island and watch as plant species populate the island in orderly succession.

##### *Gas Exchange*

BPN 888008

Experiment with the factors affecting gas exchange in the lungs and learn how gasses get into and out of your cells.

##### *Energy Pyramid*

BPN 888015

Learn about the interdependency of various organisms for food and energy through interactive exercises and quizzes.

##### *Protein Synthesis*

BPN 888016

Learn about the main stages of protein synthesis: transcription and translation.

##### *Physiological Effects of Coffee*

BPN 888017

Observe the effects of coffee on the nervous system, blood pressure and metabolism. Manipulate variables to see its effects.

##### *Homeostasis and the Brain*

BPN 888018

Examine the human brain and its role in maintaining homeostasis, which is maintenance of a stable internal environment.

##### *Biochemical Reactions*

BPN 888019

This object describes various reactions, including redox, hydrolysis, condensation and neutralization.

##### *Laws of Thermodynamics*

BPN 888020

Explore the 2 laws of thermodynamics, which is the study of heat change. Manipulate variables to see the examples of both laws in action.

##### *Enzymes-The Body's Catalysts*

BPN 888043

Discover why enzymes are so important to the metabolic reactions of living cells. Explore the effects of pH reactions that involve enzymes, and learn about some of the enzymes used by the body in the digestive process.

**Biogeochemical Cycles**

BPN 888045

Explore the different biogeochemical cycles that constantly cycle and recycle the nutrients that our planet requires to sustain life. Examine the water cycle, the carbon cycle, the nitrogen cycle and the phosphorous cycle.

**Regulatory Systems of the Body**

BPN 888046

Discover how the body maintains homeostasis and examine the structures and functions of the human endocrine system and the human central nervous system.

**Population Cycle**

BPN 888047

Determine experimentally the characteristics of population growth of two groups; predator population and prey population.

**Hardy Weinberg Equilibrium and Evolution**

BPN 888048

Learn about Hardy-Weinberg equilibrium, a state, which in contrast to evolution, allows for a population to remain unchanged. Use a formula predict allele frequency.

**Biological Tests**

BPN 888059

Conduct simulated laboratory tests to determine the presence of macromolecules such as carbohydrates, lipids and proteins.

**Calculus****Polynomials, Factors and Graphs**

BPN 888035

Recognize the general characteristics of the graph of a polynomial function whose equation is given in factored form.

**Composite Functions**

BPN 888036

Manipulate functions, composite functions and inverse functions to reveal how they interrelate.

**Slope of a Tangent**

BPN 888037

Learn how to determine the slope of a tangent line to the graphs of polynomial functions and rational functions.

**Limit of a Function**

BPN 888038

Learn how to determine the limits of exponential and rational functions.

**Graphs of the First and Second Derivatives**

BPN 888039

Learn to sketch the graphs of the first and second derivatives of a function, given the graph of the original function.

**Optimization**

BPN 888040

Learn how optimization problems arise in real-life circumstances, such as material costs when designing specific areas or perimeters.

**Related Rates**

BPN 888041

Using real world applications, solve related rates problems involving polynomials and rational functions.

**Exponential and Logarithmic Functions**

BPN 888042

Identify key characteristics of the graph of exponential and logarithmic functions, and solve problems involving these functions.

**Earth and Space Science****Earth and the Solar System**

BPN 888021

Compare the earth with other objects in the solar system with respect to such properties as mass, size, composition, rotation, and magnetic field.

**Solar Radiation and Subatomic Particles**

BPN 888022

Investigate the interaction of radiation and impacting particles with earth materials such as air, water, and rock.

**Craters**

BPN 888050

Learn what craters are, the difference between the Moon and the earth with respect to meteor collision and the impact of meteor colliding with earth in the past and the future.

**Minerals**

BPN 888051

Identify different minerals by their physical and chemical properties.

**Rocks**

BPN 888052

Explore the earth's many layers, see how rocks and their constituent minerals are continuously being recycled, and apply a series of tests to identify common rocks.

**Introduction to Plate Tectonics**

BPN 888053

Review the concept of plate tectonics, take a look at processes inside the Earth, and identify major areas of tectonic activity and plate boundaries.

**Earthquakes and Tsunamis**

BPN 888054

Consider how the Earth's processes may result in earthquake tremors, learn how energy is transferred to create an earthquake, examine the factors that may result in earthquakes and how these results are measured.

**Physics****Sound and Sound Waves**

BPN 888026

Compare the speed of sound in different media and examine the effects of temperature on sound.

**The Velocity of Transverse Waves**

BPN 888027

Qualitatively analyse the velocity of transverse waves.

**Producing Resonance in Air Columns**

BPN 888028

Analyse, through animation and interactive exercises, the conditions required to produce resonance in air columns.

**Refraction of Light**

BPN 888029

Learn about Snell's law to predict and calculate the refraction of light as it passes from one medium to another.

**Newton's Laws**

BPN 888030

Learn about Newton's laws to analyse the mathematical relationship between a net force acting on a mass, and its acceleration.

**Power, Energy and Time**

BPN 888031

Using real-world situations, you will learn how power, energy and time relate to one another. Using mathematical formulae to represent these relationships, calculate and analyse solutions to a variety of problems.

**The Direction of a Magnetic Field**

BPN 888032

Apply the right-hand rule to analyse and predict the direction of such magnetic fields in both long, straight conductors and a solenoid.

**Direct Current (DC) and Alternating Current (AC)**

BPN 888033

Compare direct current (DC) and alternating current (AC) in qualitative terms and learn the importance of alternating current in the transmission of electrical energy.

**Graphical Representation of Population Growth**

BPN 888034

Examine how mathematical equations are used to create graphs and charts that represent typical patterns of growth in populations, using the example of population growth and survivorship curves.

**Effects of Pollutants on Aquatic Life**

BPN 888044

Examine three types of aquatic pollution and learn the effects that various types of pollutants can have on aquatic life over a period of time.

**Gravity and Tides**

BPN 888049

Discover how the position of the moon and your location on earth are related to the ebb and flow of tides.

**Chemical and Physical Reactions of Household Products**

BPN 888061

Through demonstrations, observe the reactions of some common household products and the resulting physical and chemical changes.

**Nuclear Waste Disposal**

BPN 888064

Learn about nuclear energy, its advantages and disadvantages, and explore alternate sources of renewable energy.

**Circular Motion**

BPN 888076

Explore the concept of circular motion, which is a balance between an object's forward motion and the force attracting the object toward the centre of rotation.

**Field Theory**

BPN 888077

Discover fields, which are models for representing the way a force can exist between two bodies not in contact and are used to explain how forces are transmitted in space.

**Mass Versus Charge Ratio**

BPN 888078

Learn how to determine the mass and the charge of particles by examining the tell-tale tracks they leave behind when traveling through a particle detector.

**Particle Waves**

BPN 888079

Examine how light can be both a wave and particle at the same time, while gaining an understanding of the nature of light.

**Photoelectric Effect**

BPN 888080

Discover how Albert Einstein was the first physicist to correctly determine how photons of light transmit energy to electrons, hence the photoelectric effect.

**Physics: Standard Model**

BPN 888081

Learn about the basic composition of all matter, and how the force carriers, called bosons, come into play.

**Projectile Technology**

BPN 888082

By building the world's most exciting amusement ride, a spherical pod that incorporates projectile and circular motion, learn about projectile technology.

**Relativity**

BPN 888083

Learn about the two basic assumptions, or postulates, of Einstein's Theory of Special Relativity. The first: the laws of physics hold true for all frames of reference. The second: the speed of light is measured as constant in all frames of reference.

**Science****Understanding WHMIS Legislation**

BPN 888023

Learn about WHMIS labels by selecting and applying appropriate techniques for handling and storing laboratory materials.

*NOTE: This object deals with specific Canadian Standards.*

**Metal Reactivity**

BPN 888024

Learn how different elements react with other substances and how different factors affect reactivity, and learn how to predict the reactivity of metal elements with certain chemical substances.

**Designing Electrical Circuits**

BPN 888025

Explore the differences between series and parallel electrical circuits.

**Determining Combustion Levels**

BPN 888055

Determine, through experimentation, how easily various flammable liquids burn (combustion).

**Analyzing Electrical Circuits**

BPN 888056

Learn about electrical circuits and how electricity flows to common household appliances. Learn to identify faulty circuits through computer simulations.

**Disposal of Community Garbage**

BPN 888057

Through simulations, explore alternate methods of disposal and evaluate some of the various options for waste disposal.

**Conditions for Micro-Organism Growth**

BPN 888058

Perform simulated laboratory exercises to analyze conditions needed by micro-organisms for growth.

**Differences in Bonding**

BPN 888060

Learn how chemical and physical characteristics of everyday substances are the differences in the bonding of their constituent parts.

**Composting**

BPN 888062

Learn about composting and how composting programs can be used to divert waste going to landfill.

**Effect of Gravity on Surface Tension and Fluid Flow**

BPN 888063

Explore, through laboratory investigation, the way surface tension is formed in a liquid and how surface tension can oppose the force of gravity acting to push objects down through a fluid's surface.

**Nutrient Content of Food**

BPN 888065

Learn about the different nutrients your body uses to grow, and identify the role and sources of each of these food components to develop good eating habits.

**The Impact of Exercise on Cardio-vascular Function**

BPN 888066

Observe, through experimentation, the impact of exercise on cardio-vascular functioning, and the impact on people who perform low, medium and high levels of exercise.

**The Principle of Heat Expansion of Metal**

BPN 888067

Analyze the principle of heat expansion of metal — what it is, how it works, and how it can be applied to everyday technology.

**Personal Finance****Mortgage Interest**

BPN 888009

Calculate mortgage interest and compare that amount with the original value of the property.

**Mortgage Amortization**

BPN 888010

Create the factors that make up an amortization table.

**Designing a Budget**

BPN 888011

Design a budget suitable for a family or an individual.

**Mortgage Effects**

BPN 888012

Compare the effects of various payment periods, payment amounts, and interest rates on the length of time needed to pay off a mortgage.

**Present Value**

BPN 888013

Determine the size of a mortgage based on payment schedule and the payment amount.

**Laws of Exponents**

BPN 888014

Simplify algebraic expressions involving integral exponents, using the laws of exponents.

**Math*****Simplify Polynomials by Expanding Expressions***

BPN 888068

Learn how to use the one simple but powerful rule for expanding -- the distributive property.

***Identifying Like Terms***

BPN 888069

Identify terms that are similar and terms that aren't using a method called math tiles.

***Linear Relations***

BPN 888070

Explore linear relations and how to express them as stories, equations or as a line on a graph.

***Powers***

BPN 888071

Learn about powers, bases and exponents, how to multiply and divide powers and how to handle powers with mixed bases.

***Pythagorean Theorem***

BPN 888072

Explore the Pythagorean Theorem and its usefulness in real-world mathematical applications such as construction, navigation art and design.

***Simplifying Polynomials by Combining***

BPN 888073

Learn how to use math tiles to combine terms.

***Solving Equations***

BPN 888074

Learn how to balance equations, find the steps to a solution, and check your solutions.

***XY-Plane***

BPN 888075

Discover how to use the xy-plane to position points on a grid with just two numbers, and how to use it for algebra, geometry and other areas of mathematics.