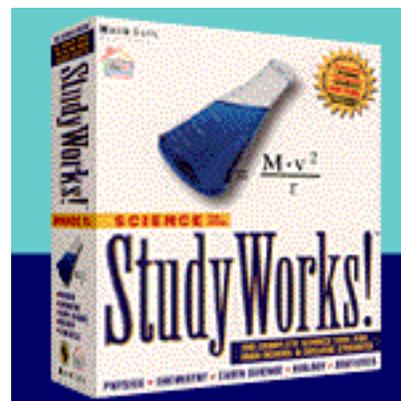


StudyWorks™ for Science

Platform: Windows and Macintosh

Available on CD-ROM only

Available for ground shipment



Imagine a full-screen graphing calculator and a math-smart word processor combined into one integrated tool. Now imagine an electronic encyclopedia of facts and formulas at your fingertips and a built-in Web link that lets you connect with other students and pick up hints on your homework. StudyWorks is an all-in-one study tool that helps you work faster, more accurately -- and learn more at the same time. Calculate, graph, access helpful information - - then create great-looking documents that combine text, formulas and graphics. You'll find hundreds of drag-and-drop equation, in-depth explanations, worked-out examples and lots of great illustrations, graphs, and animations to strengthen problem-solving skills.

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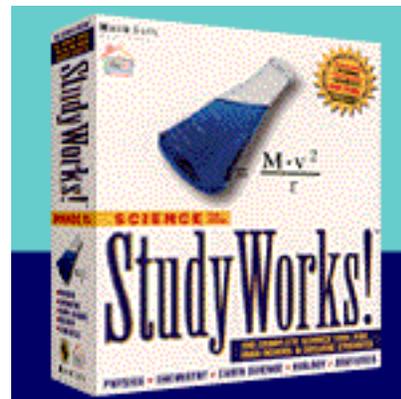
The screenshot shows the StudyWorks software interface. At the top, there's a menu bar with 'File', 'Edit', 'View', 'Insert', 'Format', 'Math', 'Window', and 'Help'. Below the menu bar is a toolbar with various icons for editing and calculation. The main window displays a physics problem: "Problem 1: An egg is dropped from the top of the Sears Tower in Chicago, which is 443 meters tall. Neglecting air resistance, how far will it have fallen after 5 sec?". The solution is shown with the following variables and equations:
 $t := 5 \text{ sec}$
 $a = 9.81 \frac{\text{m}}{\text{sec}^2}$
 $x_0 := 0 \text{ m}$
 $v_0 := 0 \frac{\text{m}}{\text{sec}}$
 $x := x_0 + v_0 t + \frac{1}{2} a t^2$
 $x = 122.6 \text{ m}$
A graph titled "Height vs. Time" shows a parabolic curve starting at (0,0) and ending at (9.5, -443). The x-axis is "Time, in seconds" (0 to 10) and the y-axis is "Height, in meters" (-500 to 0). To the right of the graph is a 3D illustration of the Sears Tower with a red vertical line indicating the height of the fall. Three points are marked on the line: (0,0), (5, -122.6), and (9.5, -443). A "Split" button is located at the bottom of the illustration.

In a StudyWorks worksheet, you can write equations, perform calculations, create graphs, even add text -- anywhere you want.

StudyWorks for Science covers core concepts in physics and statistics and key examples from chemistry, biology, and earth science. Topics include: Earth and Solar System, Genetics, Thermochemistry, Motion and Acceleration, Electromagnetism, Probability, and more.

StudyWorks™ for Science

FEATURES & SPECS (page 1 of 3)



StudyWorks!™ for Science covers core concepts in physics and statistics and key examples from chemistry, biology, and earth science. Some of the topics include:

Earth and solar system
Erosion
Plate tectonics
Ecosystems
Weather and climate
Genetics
Population
Stoichiometry
Properties of gases
Thermochemistry
Properties of solids
Properties of solutions
Acids and bases
Reaction rates
Forces and momentum
Motion and acceleration
Energy
Waves
Thermodynamics
Light and optics
Electric currents
Electromagnetism
Quantum theory
Data Analysis
Probability
Correlation and regression

Perform all the numeric and symbolic calculations you'll ever need

- Work with numbers, variables, functions, equations, vectors, matrices.
- Units of measurement and dimension checking.
- Statistics and data analysis functions.
- Matrix operations including determinants, dot products, cross-products, inverse, and transpose.
- Derivatives, integrals, summations and products.

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StudyWorks™ for Science

FEATURES & SPECS (page 2 of 3)

- Find roots of a polynomial.
- Solve equations and systems of equations.
- Trigonometric, exponential and hyperbolic functions.
- Symbolic integration and differentiation.
- Expand, simplify and factor expressions.

Turn data and functions into powerful graphs

- X-Y and polar plots, vector plots, 3-D scatter, bar, contour, surface and parametric surface plots.
- Annotate and format graphs.
- Trace and zoom.
- Animation.

StudyWorks is live and interactive

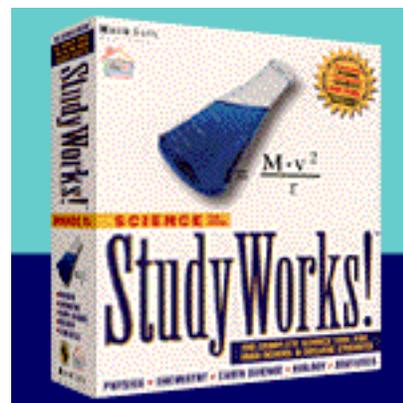
- Change inputs and watch StudyWorks recalculate the result.
- A unique environment for exploring and understanding math and science concepts.

Get the online help you need

- Online science reference book includes standard formulas, research material and information.
- Move information from the reference book to a StudyWorks worksheet with drag-and-drop ease.
- Online animated tutorial and context-sensitive help provide answers to a wide range of questions and problems.
- A special section offers help in preparing for the SAT II tests.

Create great-looking documents in seconds

- WYSIWYG report writer makes it easy to prepare presentation-quality homework papers and lab reports.
- Includes print preview and technical spell checker.
- Export worksheets to Microsoft Word for full word-processing capabilities.



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StudyWorks™ for Science

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Plus all the right connections

- Import data from TI, Casio and HP graphing calculators for analysis and integration with text and graphs in StudyWorks.
- Send worksheets to classmates and teachers using most major e-mail systems.
- Browse our special home page for high school students and teachers on the World Wide Web.
- Link with other worksheets on the Web.

System Requirements

Windows

IBM PC or compatible (486 or higher)

Microsoft Windows 3.1 (or higher) or Windows '95, 8 MB of RAM and 10 MB of swap space

14 MB of free disk space

SVGA color monitor

CD-ROM drive

Web link requires internet access

Macintosh

PowerMac or 68040 (PowerMac recommended)

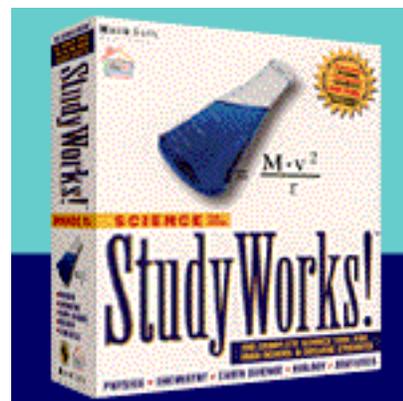
8 MB of RAM

16MB of free disk space

CD-ROM drive

Macintosh System 7.1 or later

Web link requires internet connection and MacTCP



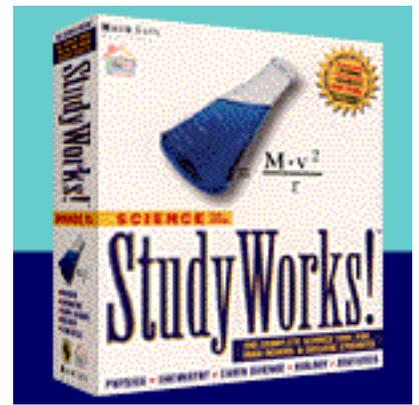
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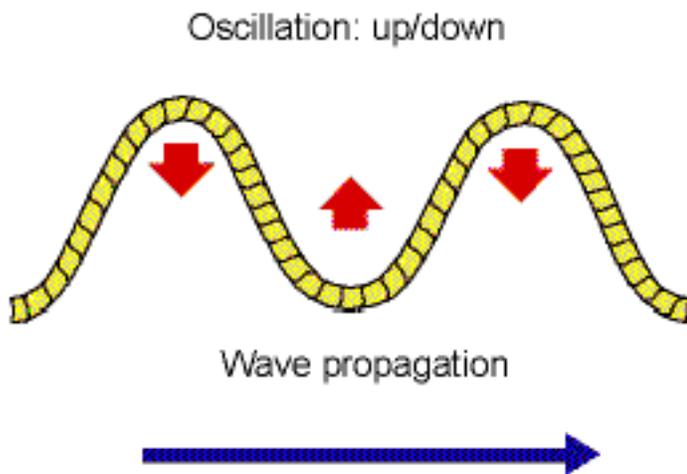
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SAMPLE PAGE (page 1 of 4)



Waves: Equation of a Traveling Wave

The traveling wave equation describes evolution of a wave both in time and in space. For example, sound and light propagation is described using traveling waves. See also **Waves Made Simple**.



Variables

Wavelength: λ

Velocity: v

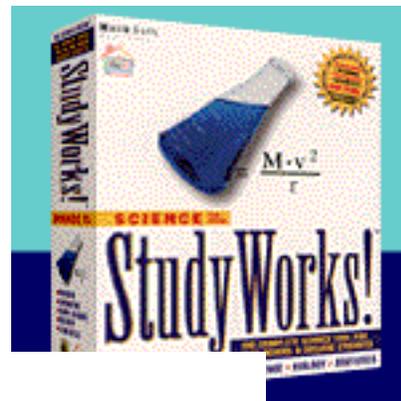
Amplitude: A

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Formulas

Period:

$$T = \frac{\lambda}{v}$$

Wave number:

$$k = \frac{2 \cdot \pi}{\lambda}$$

Angular frequency:

$$\omega = \frac{2 \cdot \pi}{T}$$

Equation of traveling wave (traveling to the right): $y(x, t) = A \cdot \sin(k \cdot x - \omega \cdot t)$

Example

Let us construct a sinusoidal traveling wave with the following parameters:

Amplitude:

$$A := 5$$

Wavelength:

$$\lambda := 10 \cdot \text{m}$$

Propagation velocity:

$$v := 2 \cdot \frac{\text{m}}{\text{sec}}$$

The other wave parameters can now be calculated using the equations given above:

Period:

$$T := \frac{\lambda}{v}$$

$$T = 5 \cdot \text{sec}$$

Wave number:

$$k := \frac{2 \cdot \pi}{\lambda}$$

$$k = 0.63 \cdot \text{m}^{-1}$$

Angular frequency:

$$\omega := \frac{2 \cdot \pi}{T}$$

$$\omega = 1.26 \cdot \frac{\text{rad}}{\text{sec}}$$

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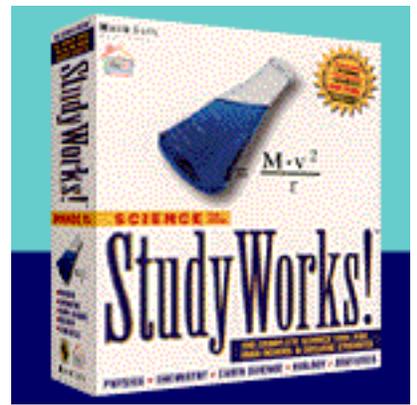
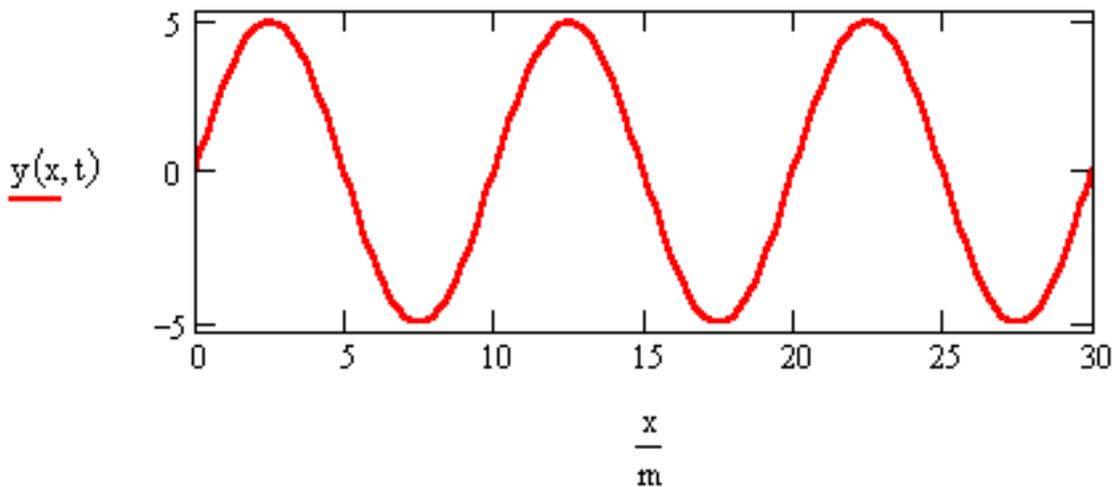
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We are now ready to graph this wave:

$$y(x,t) := A \cdot \sin(k \cdot x - \omega \cdot t) \quad x := 0 \cdot \text{m}, \frac{\lambda}{50} .. 3 \cdot \lambda$$

$t := 0 \cdot \text{sec}$ at the instant zero



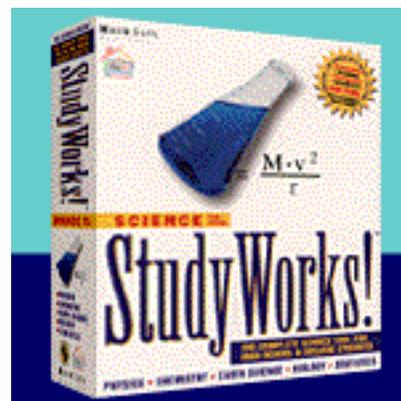
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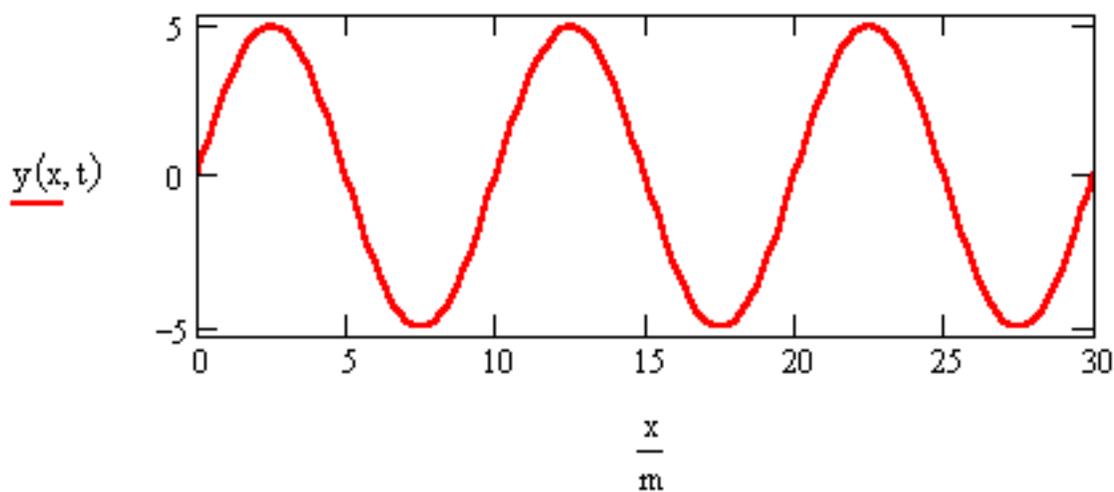
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And by using StudyWorks' animation feature, we can visualize this traveling wave even better. Click on the plot below to see an animation (Windows AVI file, size 395K) of the traveling wave.



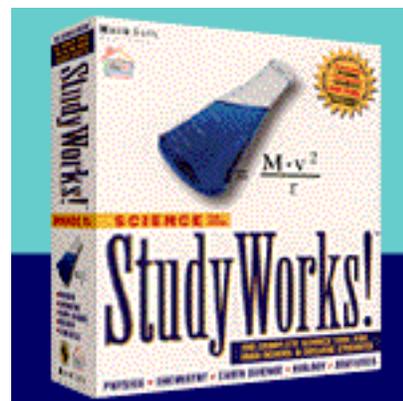
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StudyWorks™ for Science

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The screenshot shows a window titled 'StudyWorks! - [Chemistry Lab - Specific Heat]'. The window contains a worksheet with the following content:

The calorimeter shown below can be used to determine the **specific heat** of a solid substance. Specific heat is the amount of heat needed to raise one gram of something one degree Celsius.

The diagram shows a calorimeter setup. It consists of two nested coffee cups with a lid. Inside the cups is a solution of known mass. A yellow sample is placed at the bottom of the cups, labeled 'Sample that reacts with solution'. A thermometer is inserted into the solution, labeled 'Thermometer used to measure initial and final temperatures'. A stirrer is also inserted, labeled 'Stirrer distributes heat'. The cups are labeled 'Nested coffee cups and lid provide insulation'.

Variables

- c specific heat in **joule/gm°C**
- q heat transferred in **joule**
- m mass of substance in **gm**
- ΔT change in temperature in **°C**

Formula +

$$q = c \cdot m \cdot \Delta T$$

Press F1 for help auto NUM | Page 1

Students can hand in homework assignments that are easy to read. They can combine equations, text, graphs, even illustrations into one great-looking document. Equations and formulas can be annotated with explanatory text so you know how well your students understand the concepts behind your work. In a StudyWorks worksheet, you can write equations, perform calculations, create graphs, even add text -- anywhere you want.

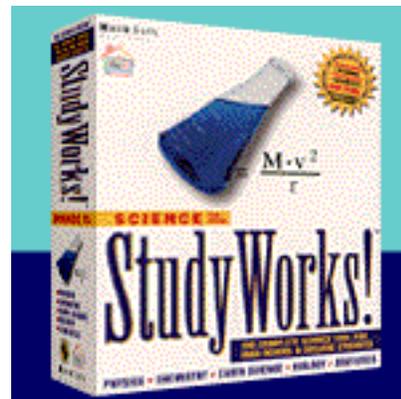
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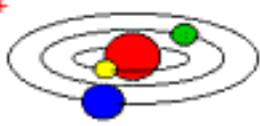
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StudyWorks - [Planet Lab Report Done]

File Edit View Insert Format Math Window Help

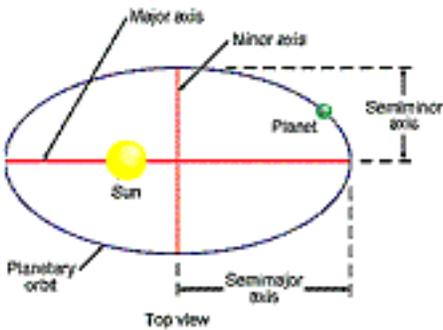
Name: Amy LeBlanc and Joe Corsi
Date: November 12, 1996



Objectives Understand Kepler's Law of Planetary Motion and be able to apply it to different planet orbits.

Step 1: State Kepler's Law of Planetary Motion in words.

The planets travel around the Sun in an ellipse. An ellipse has two axes, the major and minor, as shown in the drawing here.



auto NUM Page 1

The screenshot shows a software window titled 'StudyWorks - [Planet Lab Report Done]'. It features a menu bar with 'File', 'Edit', 'View', 'Insert', 'Format', 'Math', 'Window', and 'Help'. Below the menu is a toolbar with various icons. The main content area displays a report for 'Amy LeBlanc and Joe Corsi' dated 'November 12, 1996'. A diagram shows a central red sun with four planets (blue, yellow, green, and red) orbiting in elliptical paths. Below this, an 'Objectives' section states the goal is to understand Kepler's Law of Planetary Motion. 'Step 1' asks the user to state the law in words. A text block explains that planets orbit the Sun in an ellipse, with labels for 'Major axis', 'Minor axis', 'Planet', 'Sun', 'Semimajor axis', 'Semiminor axis', and 'Planetary orbit'. A 'Top view' diagram shows an ellipse with a yellow sun at one focus, a green planet at another point on the orbit, and the two axes labeled. The software interface includes a status bar at the bottom with 'auto' and 'NUM Page 1'.

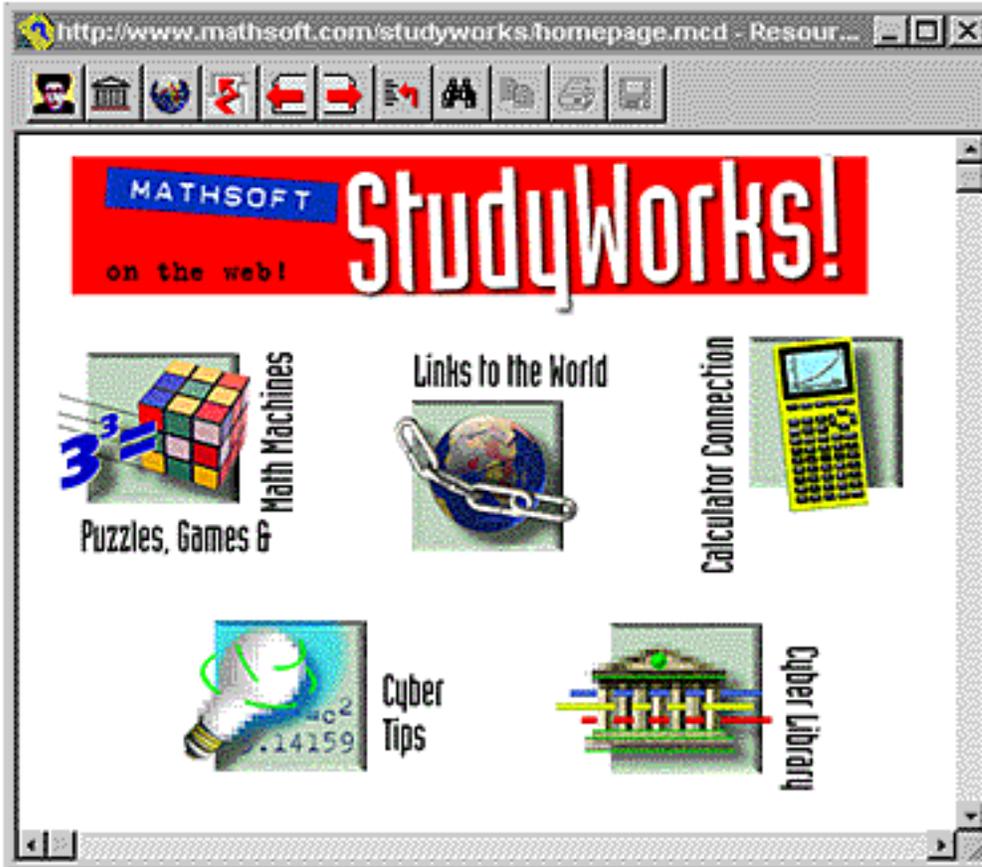
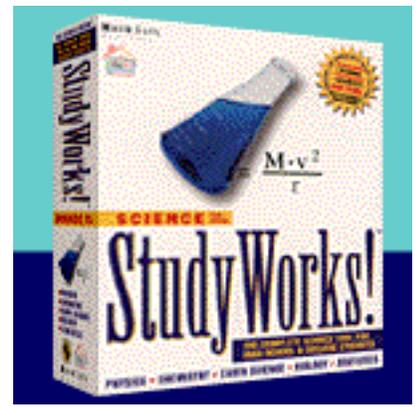
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With Internet access, the StudyWorks Web Link gives you continuously updated information and links to other interesting sites

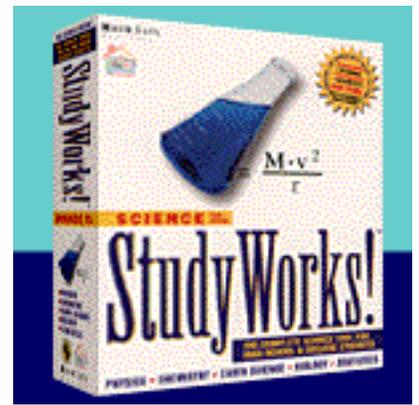
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StudyWorks - [Untitled-1]

File Edit View Insert Format Math Window Help

My name: Jane Seymour
Date: February 2, 1996
Period: 6 - Ms. Johnson

Problem: If a weight of 175-newton is attached to the end of a spring having spring constant of k , how far does the spring stretch?

$F_x = 175 \text{ newton}$ $k = 1000 \frac{\text{newton}}{\text{m}}$

$\Delta x = \frac{F_x}{k}$ $\Delta x = 17.5 \text{ cm}$

Answer: The spring will stretch by 17.5 centimeters.

Restoring Force of a Spring - Resource Center

Forces

Restoring Force of a Spring

The "restoring force" F_x exerted by a spring is proportional to the change Δx in stretching or compression of the spring. This result is known as "Hooke's Law".

Variables

Force constant of the spring: k

Displacement of the spring: Δx

Formula

Spring restoring: $F_x = k \cdot \Delta x$

The diagram illustrates Hooke's Law with two parts. The top part shows a spring at rest, labeled "Spring at rest", with a force constant k and a displacement Δx of zero. The bottom part shows a spring stretched, labeled "Spring stretched", with a force constant k , a displacement Δx , and a restoring force F_x pointing to the right.

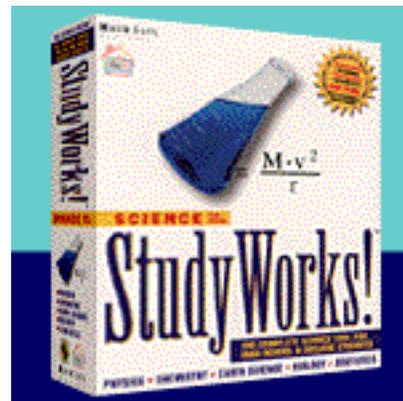
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The StudyWorks reference library covers a wide range of math and science subjects, including algebra, calculus, statistics, earth science, biology, chemistry and physics.

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