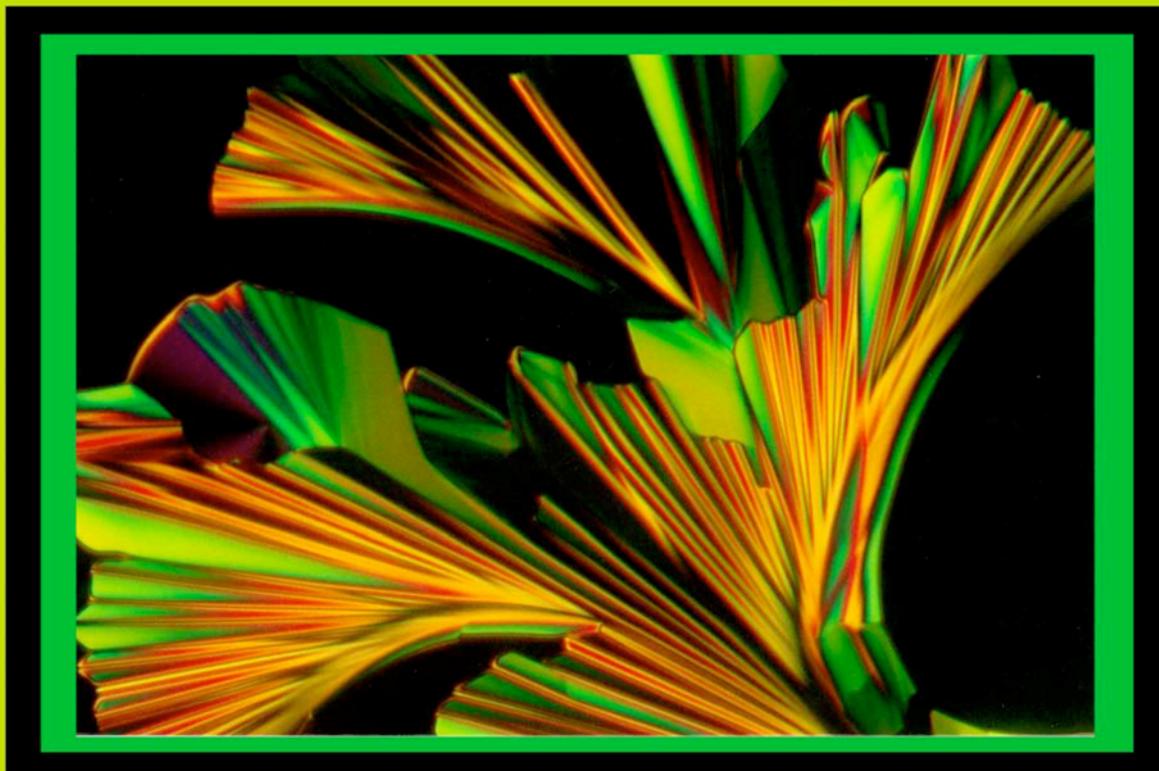


**Looking for ideas to get your students
excited about math and science?**

**The NSF & NIST provide many resources to
inspire and engage your students.**

**And we've made those
resources easy to find ...**

NIST



The Democratic Caucus of the House Committee on Science Presents:

NSF & NIST Resources for Teachers

<http://sciencedems.house.gov/resources/NSFresources.htm>

**Prepared at the direction of Representative Mark Udall,
Member, House Committee on Science**



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The outline below details the variety of NIST & NSF information available at <http://secincedems.house.gov>.

General NSF & NIST Resources for Educators:

NSF Multimedia Resources

Kinetic City

Classroom FeederWatch

The National Science Digital Library

Pathway Project

MathDL

Teacher's Domain

Digital Library Projects at OSU

AskNSDL

Presidential Awards for Excellence in Mathematics and Science Teaching

Presidential Awards for Excellence in Science, Mathematics, and Engineering

Mentoring

Science.gov

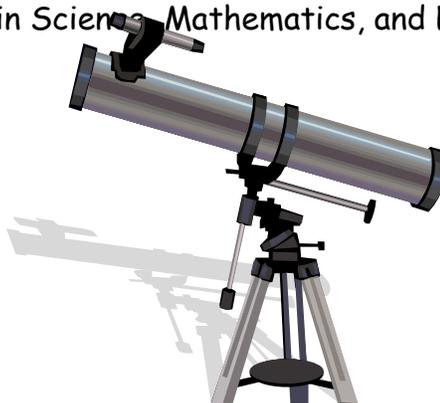
NIST Fun Activities for Kids

NIST Virtual Museum

NIST in Your Home and City

The Metric System

Metric Pyramid



Arctic & Antarctic Classroom Resources

Athropolis Links

Teachers Experiencing Antarctica
and the Arctic

POP Goes Antarctica?

Antarctica Field Trip

Paleomap Project

Astronomy & Space Classroom Resources

University of Hawaii Institute for
Astronomy

The Astronomy Café

Eyes on the Sky and Feet on the Ground

Amazing Space

Biology Classroom Resources

Cool Science for Curious Kids

ActionBioscience.org

Whales Online

Cells Alive

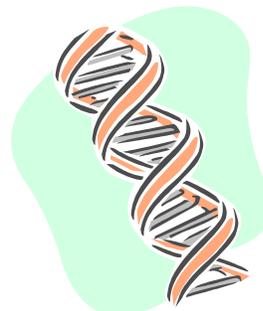
BioTech

bioSURF

Botany for Kids

BBC: Walking with Beasts

T-Rex



Log on for more information:

<http://sciencedems.ouse.gov/resources/NSFresources.htm>

Chemistry & Materials Classroom Resources

Strange Matter
Chem4Kids
The Open Door Web Site
General Chemistry (with Unit Converter)

Computing Classroom Resources

CITADEL
Computer Science Student Resource

Earth & Environment Classroom Resources

Web Weather for Kids
The EnviroLink Network
Triumph of Life
SIOExplorer
Exploring Earth: Explore the
World of Earth Science
Chemicals, the Environment, and You
Avalanche! Slip Sliding Away

Education Classroom Resources

Girls Go Tech
LoLa Exchange (Learning Objects,
Learning Activities)
Ology
Education World
NREL Education Programs

**PLUS: LINKS TO SUMMARIES IN
EACH CATEGORY OF THE EXCITING
RESEARCH BEING DONE BY THE NSF!**

Engineering Classroom Resources

ROBOLAB at CEEQ, K-12 Activities
The ASEE Engineering K-12 Center
PreK-12 Engineering Activities
USGS Earthquake Hazards Program

Mathematics Classroom Resources

MathMovesU
Mathematical Moments
Project Mathematics: Modules for HS
& Community College Math
American Mathematics Competition

Nanoscience Classroom Resources

Nanokids
National Nanotechnology Initiative

People & Society Classroom Resources

PBS TeacherSource
School Space: An Analysis of
Map Perceptions
Regions: A Hands-on Approach
Space Age Tech Comes to Earth
Environmental Explorer

Physics Classroom Resources

IPPEX!
ASPIRE: Astrophysics Science Project
Integrating Research & Education
The Physics Classroom
American comPadre
Activity-Based Physics

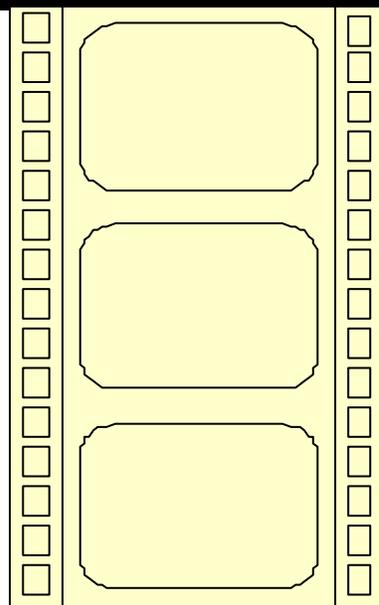


NSF Multimedia Resources

The Now Showing Database

The NSF supports a wide variety of educational and informational projects for the general public, especially our nation's classrooms. The *Now Showing* database contains great resources, including:

- **Film:** IMAX films and other film projects
- **Museum Exhibits:** Permanent, regional and traveling exhibits and associated outreach programs
- **Television:** Innovative programs for both children and adults
- **Radio Shows:** Programs on specific topics geared toward a variety of audiences.



Some of the resources are available for order - others are available for download directly from the site. The resources may contain additional educational aides, such as worksheets and lesson plans that you can incorporate into the classroom!

Visit http://www.nsf.gov/news/now_showing/index.jsp



SPOTLIGHT: The Elegant Universe

With *The Elegant Universe: Einstein's Dream*, NOVA introduces string theory and Albert Einstein's dream of unifying the forces that underlie all phenomena in the physical universe.

In addition to the in-depth analysis the program offers, an accompanying 31-page teacher's guide is also available. Both the full program (divided into segments on specific topics) and the teacher's guide are available for download. Additionally, the program's web page contains links to additional resources.

To view the program and access the resources, visit:

<http://www.pbs.org/wgbh/nova/elegant/>



NSF Sponsored Educational Programs & Clubs

Kinetic City

"Kinetic City" is a fun, web-based after-school science club for kids, ages 8 through 11. Sponsored by the American Association for the Advancement of Science through a grant from NSF, the site combines exciting online animations and activities with hands-on science experiments. Children earn "Kinetic City" power points and collect stickers as they complete missions and learn standards-based science content.



Picture Courtesy of the NSF.

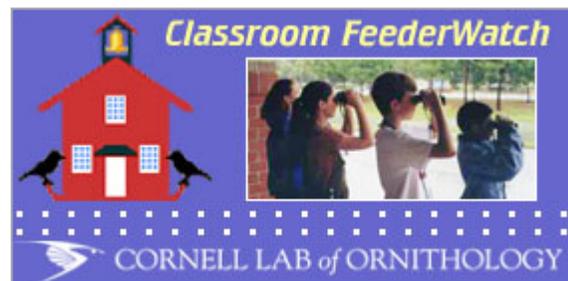
Here's how it works: The "Kinetic City" super crew (Keisha, Curtis, Megan and Max) needs the help of Earth kids to save their planet Vearth, from the science-distorting computer virus Deep Delete. Each of Deep Delete's 60 hideous strains attacks a different area of science with disastrous consequences. After each attack, teams of Earth kids fight back by viewing a short online animation describing the situation on Vearth, performing a series of activities to re-learn the lost science and going on a mission to Vearth during which they answer science questions and gobble up Deep Delete viruses. Their scores appear on their own Kinetic City Club Web page.

*An accompanying teachers resource page is available.

Check it out at: <http://www.kineticcity.com/>

Classroom FeederWatch Program

Classroom FeederWatch is an exciting research and interdisciplinary education curriculum designed for students in grades 5-8. With Classroom FeederWatch, students learn how science and scientists work and in the process become scientists themselves.



Picture Courtesy of the NSF.

Classroom FeederWatch is a valuable teaching tool that prepares students to fully participate in an annual feeder-bird survey conducted by ornithologists at the Lab. Thus, students learn about science and contribute to our scientific understanding of the natural world.

Visit the Classroom FeederWatch Web site:

<http://birds.cornell.edu/cfw/>

*There is a small fee associated with this program, but classrooms can obtain sponsorships.

The National Science Digital Library

The National Science Digital Library

(NSDL) was created by the National Science Foundation to provide organized access to high quality resources and tools that support innovations in teaching and learning at all levels of science, technology, engineering and mathematics education.



As you know, the rapid acceleration of information available via the internet makes locating high-quality, accurate and truly useful educational resources challenging for both you and your students. With the NSDL, educators have access to an efficient and reliable method of discovering and using science and math materials that will help you meet the demands of instruction, assessment and professional development.

NSDL also serves as a nexus for educators, researchers, policy makers and the public by building bridges between:

- private sector and public interests by providing access to resources such as publishers' journal articles, teacher-created lesson plans and real-time data sets from scientists
- the scientific, research and educational communities by applying advanced technologies to stimulate new ways for educators and learners to access and use scientific information
- teachers and learners at all levels, in all locations by supplying content and tools in open-access, non-proprietary formats in an easily accessible online environment.

...And, this resource is absolutely FREE!

To access the plethora of resources available through the NSDL, visit <http://nsdl.org>



The National Science Digital Library: Pathways Project

What are NSDL Pathways?

NSDL Pathways are NSDL projects that provide audience-specific views of selected NSDL resources (these specialized views are also known as portals). Pathway audiences may be grouped by grade level, discipline, resource or data type or some other designation.

Pathway projects are meant to further simplify your search for pertinent classroom resources. NSDL Portals are developed and managed in partnership with organizations and institutions that have an expertise in serving the portal's target audience. Pathway partners act as your reference librarian in your quest to improve the quality of your learning environment.



To view all Pathways available, visit:

http://nsdl.org/resources_for/k12_teachers/index.php?pager=pathways

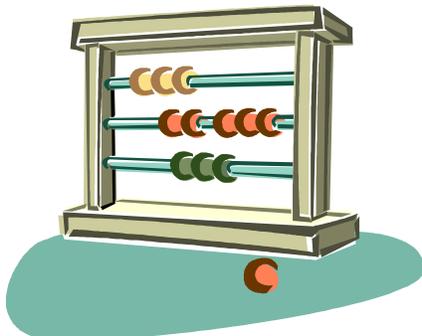


Courtesy of PAEMST



Mathematical Sciences Digital Library: The NSDL Mathematics Pathway to Mathematics Resources for Teachers and Students

MathDL is an online resource published by the Mathematical Association of America. The site provides online math resources for both teachers and students. Highlighted



resources include *Convergence*, a magazine that teaches mathematics using its history; the *Journal of Online Mathematics and its Applications (JOMA)*, a scholarly journal; plus, free classroom-tested and peer reviewed digital classroom resources. You can also access Osslets (open source, sharable math applets), which are free, interactive components you can easily add to web pages you create for your class. The components include ready-to-use curriculum units.

The National Science Digital Library: Pathways Project

Teachers' Domain:

The NSDL Education Pathway to Multimedia Resources for the Classroom and Professional Development

teachers'domain®



*Photo, Logo courtesy
of Teacher's Domain.*

Teachers' Domain is a multimedia digital library for the classroom that provides online learning experiences. This ever-expanding library currently includes collections on:

- **Science**
- (Life Science, Physical Science, Engineering)
- **Social Studies** (The Civil Rights Movement, Brown v. Board of Education).

Plus, you'll have access to:

- High-quality multimedia from NOVA, American Experience and other public television productions and partners
- Video, audio, images and documents
- Explanatory background articles for each resource
- Correlations to national and state curriculum standards
- Media-rich lesson plans
- Resource management tools.

*Registration is required, although membership is free:

<http://www.teachersdomain.org/>

Digital Library Projects at The Ohio State University:

The NSDL Education Pathway to Middle School Teacher Resources



The NSDL Middle School Portal provides access to selected online resources for instruction and professional development from the National Science Digital Library. Subject pathways in mathematics, science and technology present topic lists that take an in-depth look at teachable concepts in science, math or technology. Features include lively text and graphics along with background for teachers, interactive online activities, data analyses and links to related topics.

The National Science Digital Library: AskNSDL

AskNSDL:

Experts Answering Questions for You and Your Students

Receive an Expert Reply!

Ask an expert a question about a subject of your choice! Questions are generally answered in a few days via email.

Once your question is answered, any personally identifying information is removed and the question and answer become part of the AskNSDL archive available to all users.

Questions sent to AskNSDL are answered by a team of volunteer experts including professional scientists, librarians and educators.

A FREE account registration is required. You can even create a login account for your entire class and allow your students to ask questions directly. Replies will be sent to email addresses of your choice.

To access AskNSDL, simply visit:
<http://nsdl.org/asknsdl/>



AskNSDL in Action:

Sample Q&A from the Archives:

Question, asked by Ginni, a Middle School Teacher:

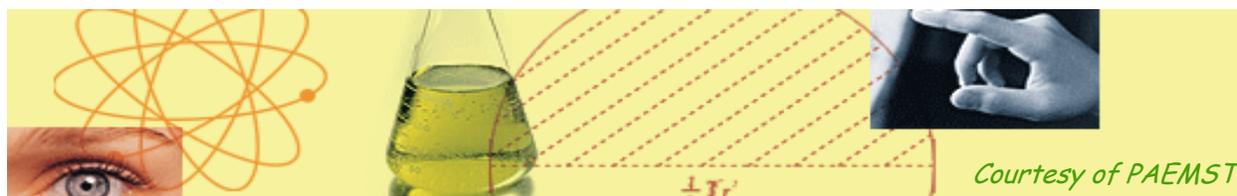
In teaching factoring, what is the sum-product method of factoring a trinomial?

Answer, provided by AskNSDL expert:

I think you are talking about factoring a trinomial $x^2 + Bx + C$ into $(x-r)(x-s)$. It's easy to see that if $x^2 + Bx + C = (x-r)(x-s)$, r and s are the roots of the trinomial, i.e. the values of x that cause the trinomial to evaluate to zero.

Multiplying $(x-r)(x-s)$ gives $x^2 - (r+s)x + (r*s)$. So it must be the case that $B = -(r+s)$, the negative of the sum of the roots, and $C = (r*s)$, the product of the roots.

If the roots are small integers, then it's pretty easy to find them from B and C : There aren't very many ways of factoring C into two integers, and only one of those ways will give a sum of $-B$.



Courtesy of PAEMST

NSF Awards

The Presidential Awards for Excellence in Mathematics and Science Teaching



Courtesy NSF

The Presidential Awards for Excellence in Mathematics and Science Teaching, administered by the National Science Foundation, is the nation's highest honor for teachers of mathematics and science. The Awards recognize exemplary K-12 teachers for their contributions in the classroom and to their profession. As an educator, you recognize the value of exceptional teachers, and so does the National Science Foundation. The Presidential Awards demonstrate the value and appreciation the nation has for the teaching profession. Nominate an outstanding math or science teacher today for this prestigious award.

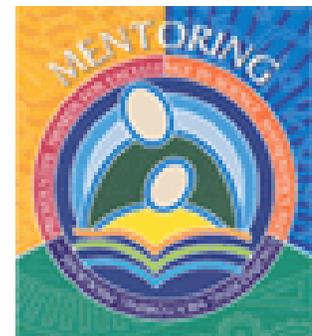
Anyone can nominate an exceptional teacher. The award comes with not only a cash prize and gifts from sponsors, but also the opportunity to join a dynamic network of outstanding teachers and a plethora of professional development resources.

Nominate an exceptional colleague today! For more information, please visit:

Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring

The White House has established the Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM) program. The program, also administered by the NSF, seeks to identify outstanding mentoring efforts/programs designed to enhance the participation of groups underrepresented in science, mathematics and engineering. The awardees serve as exemplars to their colleagues and are leaders in the national effort to more fully develop the nation's human resources in science, mathematics and engineering. You can nominate both individuals and institutions for these annual awards.

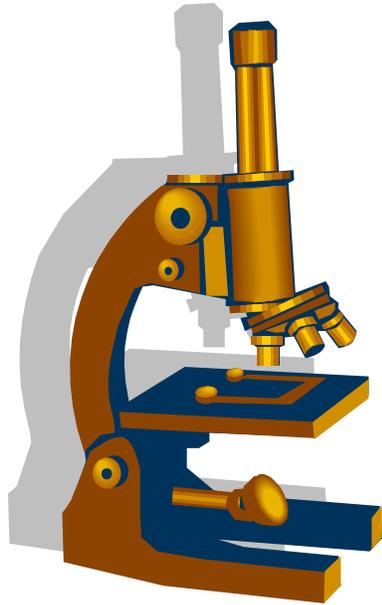
To nominate an outstanding educator, please visit:
<http://www.nsf.gov/pubs/2004/nsf04525/nsf04525.htm>



Courtesy NSF

Science.gov: A Collaborative Effort

Science.gov: A Unified Database of the U.S. Government's Vast Science and Technical Information for Use in Your Classroom!



Since 2002, science resources provided by the government have been available through a single point of access. **Science.gov** is an interagency initiative of 17 U.S. government science organizations (including the National Science Foundation *and* the National Institute of Standards and Technology!) within 12 Federal agencies. These agencies form the voluntary Science.gov Alliance. Visitors to the site can search agency resources via one query.

Science.gov also provides advanced search features and "Alert" services that can deliver the most current science developments right to your desktop each Monday!

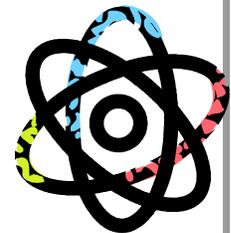
A number of participating agencies are members of CENDI (the Commerce, Energy, NASA, Defense Information Managers Group) which provides administrative support and coordination for Science.gov. These agencies are committed to serving the informational needs of the science-attentive citizen, including science professionals, **students and teachers** and the business community.

Science.gov has a special section designed specifically for **students and teachers** which can be accessed here: http://www.science.gov/browse/w_133A.htm.



SPOTLIGHT: Teacher Leaders in Research Based Science Ed.

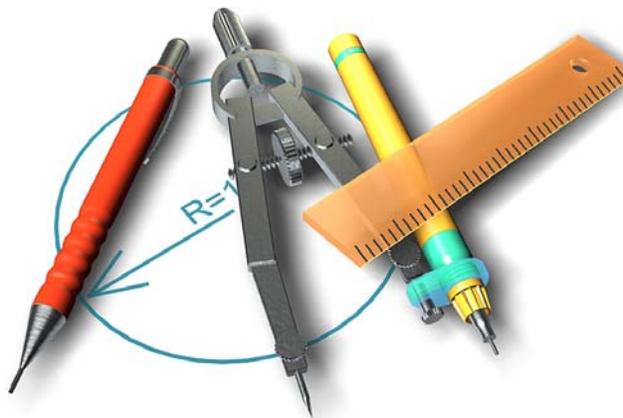
TLRBSE is a Teacher Enhancement Program funded by the National Science Foundation's Directorate for Education and Human Resources. TLRBSE seeks to retain and renew middle and high school teachers of science by integrating the best practices of Research Based Science Education with the process of mentoring. Participants are provided training in astronomy content, pedagogy and leadership skills. In the appealing context of astronomy, the TLRBSE program develops master teachers in research based science education and prepares them as leaders to mentor learning colleagues in this exemplary method. Program is held annually. This listing was provided by Science.gov. For more info: <http://www.noao.edu/outreach/tlrbse/>



NIST Educational Resources: Activities and Exhibits

Fun Activities for Kids

Take a look around. Chances are no matter where you are there is something near you that researchers at the National Institute of Standards and Technology have studied, measured or improved at one time or another.



NIST is one of the nation's oldest and largest science and technology



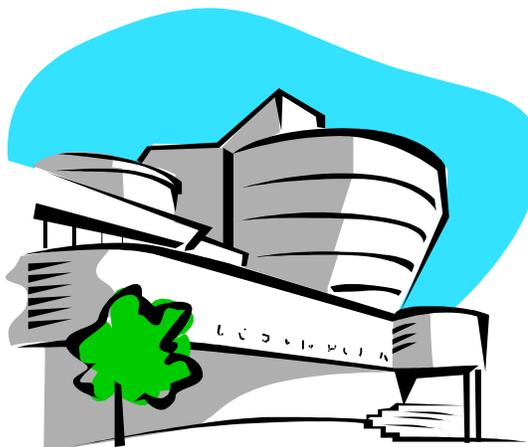
laboratories. The U.S. Congress created NIST about 100 years ago. Back in 1901 life was very different than it is now. There were as many as eight different "standard" gallons. Brooklyn, N.Y., had four different legal measures of the "foot." About 50 percent of scales in grocery stores were wrong, and many shopkeepers used scales that they knew cheated their customers.

The NIST Educational Resources and puzzles will help demonstrate to students the importance of standards and measurements.

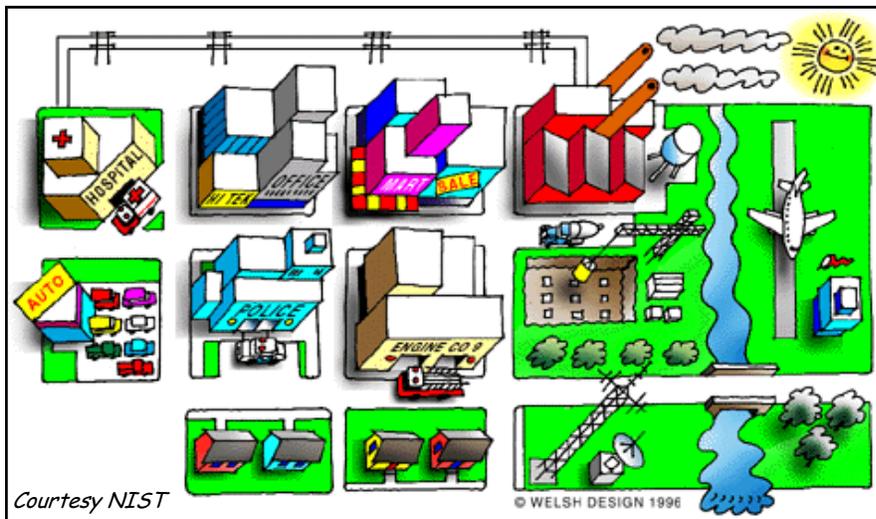
To view these resources or check the official time as kept by the Atomic Clock, visit: http://www.nist.gov/public_affairs/kids/kidsmain.htm

The NIST Virtual Museum

From exhibits that demonstrate the process of the standardization of women's clothing to information on the NIST Stone Test Wall, a wall with over 2,352 individual stones used to test the performance of stone subject to weathering, the NIST Virtual Museum is an excellent classroom resource. Learn about Marie Curie and the Radium Standards and just what Saccharimeter does.



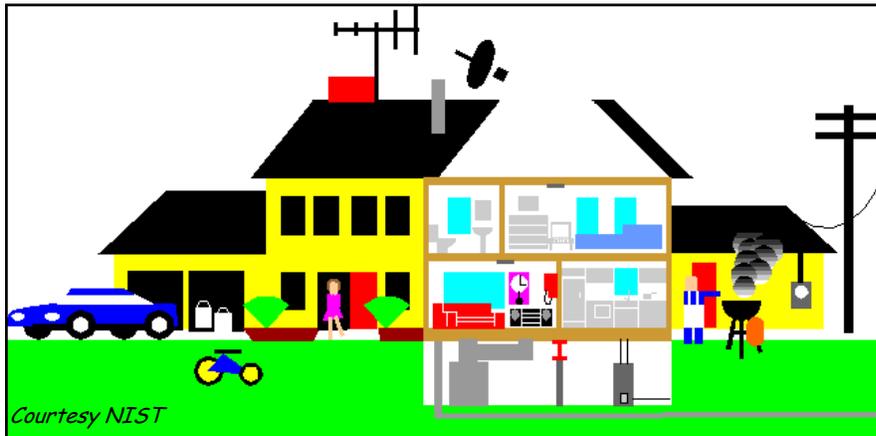
NIST Educational Resources: NIST in Your Life



NIST in Your Home & City!

Having trouble visualizing NIST's importance in your life?

NIST in Your City: http://www.nist.gov/public_affairs/nhouse/ccity/ccity.htm



Check out these two interactive, virtual environments to better understand the importance of standards to us all!

NIST in Your Home: http://www.nist.gov/public_affairs/nhouse/index.html

The Metric System

The metric system is the Standard Unit of Measurement for science, yet many students are confused by it, especially since they are used to our system of measurement. NIST has created a kid's reference page for the metric system with resources that will help them better apply the metric system to their lives.

Visit these resources at:

http://www.nist.gov/public_affairs/kids/metric.htm

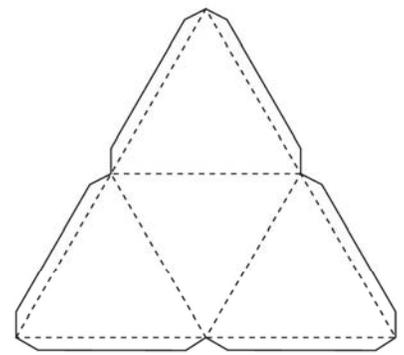


NIST Metric Pyramid

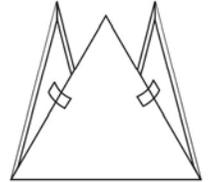
(LC1140 Apr'02)

Reproduction Master

To ensure accurate scale, do not enlarge or reduce. Reproduce one per 11"x8.5" sheet. For best results, reproduce on 110lb index stock, or 67+ lb vellum.



Cut out along outside border. Fold on dotted lines illustrated above.



Fold up sides from base and tape.

Length
 25 mm \cong 1 in
 2.5 cm \cong 1 in
 1 m \cong 3.3 ft
 1 m \cong 39.4 in
 0.91 m \cong 1 yd
 1 km \cong 0.6 mi
 1.6 km \cong 1 mi

Mass or Weight
 28 g \cong 1 oz
 0.45 kg \cong 1 lb
 1 kg \cong 2.2 lb
 1 t \cong 2200 lb (long ton)

NIST Metric Pyramid
 Each edge of the pyramid measures 10 cm or 100 mm.

(LC1140 Apr '02)

Metric Symbols

J	joule
L	liter
mL	milliliter
t	metric ton
kg	kilogram
g	gram
km	kilometer
m ³	cubic meter
m ²	square meter
m	meter
cm	centimeter
mm	millimeter

Energy
 1055 J \cong 1 BTU
 4190 J \cong 1 cal
 1 kWh \cong 3.6 MJ

Area or Surface
 645 mm² \cong 1 in²
 930 cm² \cong 1 ft²
 4047 m² \cong 10.8 Acre
 1 m² \cong 1.196 yd²
 1 hectare \cong 2.5 acre
 1 km² \cong 247 acre
 2.59 km² \cong 1 mi²

Temperature
 Celsius: 0 to 100
 Fahrenheit: 32 to 212
 C = (F - 32) / 1.8
 F = (C * 1.8) + 32

Volume
 1 mL \cong 1 cm³ (cc)
 30 mL \cong 1 oz
 240 mL \cong 8 fl oz (1 qt)
 1 L \cong 1.057 qt
 3.8 L \cong 1 gal
 1 m³ (1 kL) \cong 1.35 yd³
 30 L (0.03 m³) \cong 1 yd³
 100 L (0.1 m³) \cong 1 cu yd



National Institute of Standards and Technology
 Technology Administration, U.S. Department of Commerce