STEM Activities by Subject

General STEM activities and resource websites:

- [Understanding Science](#) – tools, resources and information to help us become better science educators, explain why science is important in education, and more
- [How to Smile](#) – a wealth of STEM activities on a variety of topics; many from 4-H
- [California 4-H Youth Development: Science, Engineering, and Technology](#) –
- [Federal Resources for Educational Excellence](#) – Click on Math or Science to explore hundreds of educational resources available on these topics
- [Science NetLinks](#) – a wide range of STEM activities organized by grade level
- [National Science Digital Library](#) – a database of science resources featuring a variety of resource formats in subjects including education, engineering, health/medicine, mathematics, science, social studies, and technology
  - [General Science & STEM Gateways & Resources](#) – a listing of on-line libraries and directories for further STEM resources
- [MATC Electronic Bookshelf](#) – Mathematics information across the disciplines; mostly college-level information, but useful for understanding the foundations of science and expanding mathematics education in other disciplines; must enter name and e-mail address when downloading materials.
- [Kansas Foundation for Ag in the Classroom](#) – lesson plans for all grade levels
- [Iowa State Extension Afterschool Lesson Plans](#) – complete series lesson plans for various grade levels
- [ARTStem](#) – teaching and learning at the intersection of the arts and STEM disciplines

STEM-Based Leadership Development General Resources

- [4-H Yes Recruitment and Training Guide](#) – Youth Experiences in Science; guide for recruiting and training teens in helping Cloverbud youth in STEM activities.
- [Science is Here, E-SET](#) – STEM leadership training resources
- ["Youth in Governance and Youth Adult Partnerships: An Examination of Promising Practices"](#) – 4-H center for youth Development, through its extension the University of California has established a research center specifically for 4-H activities.

Research

- [Prepare and Inspire: K-12 Education in Science, Engineering, Technology, and Math (STEM) for America's Future](#) – a presidential report regarding STEM activities, September 2010
- [Garden-Based Learning in Basic Education: A Historical Review](#)
- "[Integration of Visual Art, Life Skills, and Technology](#)"
- ["Awakening Young Minds through Visual Arts in After-school Programs"](#)

Subjects

A

Astronomy

- [Kids Capture Their Universe](#) – Astrophotography program includes online telescope, imaging software and more.
- [ASPIRE Lab](#) – features lessons on a variety of astronomy, atmospheric, and other related science topics
- [Planet-Quest](#) – NASA-linked site that uses technology to engage learning about space
- [Amazing Space](#) – Click on "For Everyone" tab, then "Online Explorations" for interactive games/learning tools; additional resources under "For Educators and Developers" tab
- [NASA](#) – lessons for all grade levels in a searchable format
- General Astronomy: Resources and background information for the educator to understand terms and key ideas in astronomy
    - [Astronomy 162](#)
    - [Astronomy Tutorial](#)
    - [Windows to the Universe](#)
    - [Exploring the Earth](#) – visual representations of earth, landforms, and much more to support explanations of difficult concepts

Aerospace

- [Science Fun with Airplanes](#)
- [Rockets Away!](#)

B

Brain stuff

http://www.amnh.org/education/resources/rfl/pdf/brain_edguide.pdf
http://faculty.washington.edu/chudler/introb.h
Optical illusions: http://kids.niehs.nih.gov/illusion/illusions.htm

Bird watching

- [The Great Backyard Bird Count](#) – annual event in February; possible service opportunity
    - [Bird Sounds Audio Quiz](#)
- [All About Birds](#) – ideas to involve youth in learning about birds plus resources to support engagement
- [Bird Source](#) – more on-line events/activities for identifying and counting birds

C

Cake Decorating

Careers

- [I Want a Job in Agriculture](#)
- [Energy Careers Resources](#)

Child Development and Child Care
- [My Pyramid Planner for Preschoolers](#)
- Teacher Enrichment Initiatives, [Self-Assessment & Family Relationships](#)

Citizenship

- [Presidential Timeline](#) – webquests and other task-based activities that involve youth in learning about key events in US History
- [Community Service Learning Guide](#) – step-by-step process for involving youth groups in community service
- [Citizens in Cyberspace](#) – interactive site where youth learn to be good online citizens
- Citizen Science
  - [Sunflower Project](#) – You can sign up and learn about the importance of bees in pollination, watch your sunflowers grow and be part of a real life scientific study.
  - [Urban Birds Project](#) - Learn about urban birds while helping participate in Cornell's ornithology project.
  - [Project Firefly](#) - A Citizen Science Project. Firefly Watch combines an annual summer evening ritual with scientific research.
  - [Lost Lady Bugs](#) - A team of Cornell scientists is asking children for their help. They need them anywhere and everywhere in the country to start looking for ladybugs: "Find 'em, photograph 'em and send 'em."
  - [4-H Million Trees Project](#) - 4-H youth across the nation can participate. To learn more or to get involved, go to this site. You can also check the map on the participant's page to see virtual push pins for each club involved.

Clothing

Cloverbuds

- [Iowa Cloverkids](#) – lesson plans on a variety of topics for Cloverbuds
- [Give me 5 a Day](#) – a free children's book encouraging eating 5 fruits and veggies a day (counting and simple addition included)

Communications

- **General**
  - [The Kennedy Center Arts Edge](#) – a resource for art educators
- **Public speaking**
  - [Visual Communication & Graphic Design](#) – Michigan State University Extension
  - [Vocal Expression & Public Speaking](#) – Michigan State University Extension
- **Story telling**
  - [A Listening Doll](#) – Create traditional Native American storyteller dolls
  - [Map it out](#) – Learn how illustrations contribute to storytelling:
- **Creative writing**

- o [Characterization in Literature and Theater](#) – creating effective, believable characters
- o [Counting Crows](#) – Using Innovative Thinking to Tackle Life's Challenges and using literature
- o Science Fiction Writing

Cultural arts

- **General**
  - o [National Gallery of Art](#) – web-based tools for creating art; requires Adobe Shockwave (free download)
  - o [The Kennedy Center Arts Edge](#) – a resource for art educators
  - o [KidSpace: Resources for 4-H Visual Arts Programs](#)
- **Color wheel**
  - o [Color Techniques for Landscape Design](#)
  - o [Color Symphony](#) – podcast of color mixing activity
- **Geometry and the Visual Arts**
  - o National Gallery of Art
    - http://www.nga.gov/kids/zone/cubits.htm
    - http://www.nga.gov/kids/zone/riverrun.htm
  - o [Ragtime Quilt](#) – Florida 4-H

D

Diversity

- Teacher Enrichment Initiatives
  - o [A Look at Them](#)
  - o [My Older Friend](#)
  - o [Population Demographics](#)
  - o [Language/Idioms & Spreadsheets/Statistics](#)

E

Energy

- Power of Wind
  - o [Video Introduction to Electricity](#) – scroll down to find video link
  - o [Power of Wind](#) – downloadable lessons and extensions of the standard 4-H curriculum
  - o [Power of Wind, Interactive Media](#)
- [Solar Energy](#) – building solar cookers and solar water heaters
- [Hydroelectricity Education through Multimedia](#)
- [Balloon Powered Cars](#)

- [Reactions – Magnets](#)
- [Additional Energy Resources](#)

Earth Sciences

- **Entomology**
  - Amateur Entomologists Society Bug Club
    - [Activities](#)
    - [Resources](#)
  - [Make an Entomology Exhibit](#)
  - [It Came from Planted Earth](#) – curriculum from seeds to value-added products and more
  - [Crime-Solving Insects](#) – using the life cycle of flies in forensic science
  - [Nature's Partners: Pollinators, Plants, and You](#)
  - [Making an Insect Collection](#)
- **Environment**
  - [Litter Is a Waste Out of Place](#) – three lessons about litter
  - [Endangered Species](#)
  - Kansas Foundation for Ag in the Classroom
    - [Ecosystem Science](#)
    - [Earth Science Lesson Plans](#)
  - [Invasive Species](#) – information and multimedia resources
  - [Exploring Trees and Ponds](#) – requires registration to download activities
  - [Biofuel Blast](#)
- **Geology**
  - [Coal Lessons](#)
  - [Reactions – Volcanoes](#)

Electricity

- [Fruity Batteries](#)

F

Finances

- [Got Money?](#) – financial activities

Food & Nutrition

- [It Came from Planted Earth](#) – curriculum from seeds to value-added products and more
- [Fun with Food](#) – using food to demonstrate concepts in agriculture and nature
- [Food Safety](#) – information and mold activity
- [Give me 5 a Day](#) – a free children's book encouraging eating 5 fruits and veggies a day (counting and simple addition included)

- Teacher Enrichment Initiatives,
  - Nutrition Unit
  - Nutrition & Body Image
  - A Study of Obesity

Food Preservation

G

GPS and Mapping Activities

- GPS Activities- intro to maps, hurricane tracking, youth favorite places, topo maps, GPS & compass, geocaching, and additional resources
- Maps and Map Projections – Colorado University
- Map Projections – USGS (United States Geological Survey)
- 4-H Favorite Places – an online activity designed to teach youth about GIS/GPS

H

Health

- Teacher Enrichment Initiatives – activities & lessons to teach about all parts of the mind & body
- Looking Good, Feeling Good: From the Inside Out
- Green Genes – DNA curriculum
- National Institute of Environmental Health curriculum:

I

Intergenerational Programs

- Teacher Enrichment Initiatives
  - A Look at Them
  - My Older Friend
  - Population Demographics
  - Language/Idioms & Spreadsheets/Statistics

P

Photography

- [Online Photography](#) – online photography simulator that allows youth to frame and take photos and edit selected photos.
- [4-H Photography Resources Blog](#)
- Analyzing Photographs
  - [Analyzing Photographs: From Theory to Practice](#) – teaching analysis through photography
  - Library of Congress – sociology, analysis skills
    - [American Environmental Photographs 1891-1936](#)
    - [“Taking the Long View,” Panoramic Photographs 1851-1991](#)

Plant & Soil Science

- [Junior Master Gardeners](#) – curriculum, resources, etc.
- [It Came from Planted Earth](#) – curriculum from seeds to value-added products and more
- Kansas Foundation for Ag in the Classroom
  - [Willie & the Beanstalk](#) – lesson plans focused on soybean science
- [Biofuel Blast](#)

R

Recycling

- **Composting**
  - [How to Compost](#) – resource page for composting curriculum and activities for adults and youth; includes vermiculture resources as well
- **General**
  - [Litter Is a Waste Out of Place](#) – three lessons about litter
  - [Meet the Greens](#) – activity handbook for youth that includes many group recycling activities

Robotics

- [Robotics Online](#)

S

Science Discovery

- **Forensic Science**
  - [Who Dunnit?](#) – forensic science (CSI-style) curriculum
  - [Crime-Solving Insects](#) – using the life cycle of flies in forensic science
- **General**
  - [Science Pirates](#) – interactive game that teaches science

Shooting Sports

- Catapults/Trebuchets
  - [Catapults](#) – this resource is open-ended in such a way as to allow the youth to explore and discover design components on their own (on the model of the Design It curriculum)
  - [Knight for Hire](#)
  - [Cotton Ball Catapult](#)

Small Animals

- Youth Development through Veterinary Science, from UC-Davis
  - [2: Fur, Feathers, Skin and Scales](#)
  - [3: The Eyes Have It](#)
  - [4: You've Got to Have Heart](#)
  - [5: Dem Bones, Dem Bones](#)
  - [6: Food In, Waste Out](#)
  - [7: Is Your Bird Feeling Blue?](#)
  - [8: Is Your Dog Feeling Down?](#)
  - [9: Is Your Goat Feeling Green](#)
  - [10: Is Your Horse Healthy?](#)
  - [11: Is Your Snake Sick?](#)

T

Theater Arts

- Set & Prop Design
  - [Making Faces and Places](#) – interactive online program allowing youth to create a scene; design techniques
  - [Visual Communication & Graphic Design](#)
- [Vocal Expression & Public Speaking](#) – could introduce technology to help with visual aids

V

Videography

- [4-H Filmmaking Studio and Workshop](#) – in far right column, under resources, click on the Filmmaking Studio and Workshop link
- [Scratch](#) – 2-dimensional animation program available through MIT
- [Alice](#) – 3-dimensional animation program available through Carnegie Mellon University

W

Water Safety

- [Kayaking Information and Safety Curriculum](#)

Wildlife curricula

- [Animal Habitats](#) – Kennedy Center ArtsEdge activity
- [Action Bioscience](#) – biodiversity activities are targeted for middle school or older youth
- [Nature's Partners: Pollinators, Plants, and You](#) – targets grades 3-6
- [Exploring Trees and Ponds](#)

Woodworking

Weather
- [Antarctica's Climate Secrets](#) – hands-on activities for hosting a showcase of Antarctic Research

Water

- [Water Quality Awareness in Urban Environments](#)
- [Kansas Lakes, Ponds, and Reservoirs](#)
- [Piece Like a River](#)
- [Give Water a Hand](#)
- [Pond Mapping](#) – environmental assessment of small bodies of water
- [NASA Oceanography](#)
- [It Came from Planted Earth](#) – curriculum from seeds to value-added products and more
- [Reactions – Water/Density](#)