# Mary Johnston STEAM Fair
# Further Information

## Practical Considerations:

- No classroom time will be allotted for projects – all work is completed outside of school hours.
- Cardboard display backers (poster boards) will be provided to each student for their presentation.
- Tables for presentation will be provided by the school in the gym.
- Students will set-up their projects in the gym the morning of the STEAM Fair. Students are responsible for transporting and setting up their projects, with help from parents/caregivers as needed. Volunteers will also be on hand to help.
- Electrical outlets will be available upon advance request. Students must provide their own extension cords and power bars if needed.
- In the interest of safety, the following are NOT permitted: live animals, hazardous chemicals, live electrical wires, flammable liquids, or open flames. Please check with one of the contacts below well in advance if you have any questions about safety considerations.

**PARENTS PLEASE NOTE:** Your child must bring their project to the gym for set-up on the ***morning of Wednesday, April 4th, 2018.*** *(If this is not possible, please contact Karen MacLeod (below) to make other arrangements)*

**Questions** can be directed to:

Mrs. Karin Bileski, Principal (through the school office)

Karen MacLeod: kmaclec001@rogers.com

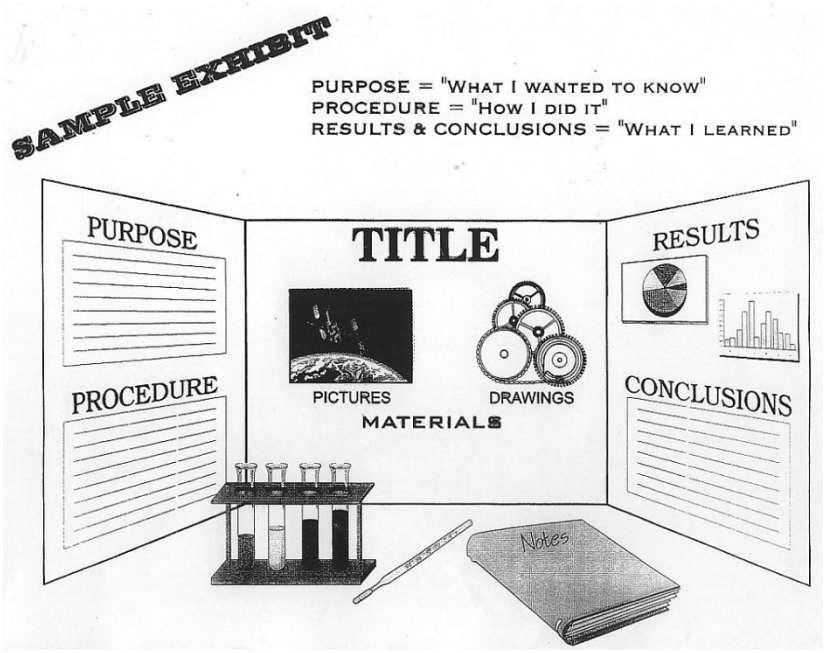
# STEAM Project Information

STEAM projects can be wide-ranging in topic and approach. In general, they are a chance to investigate the world around us through hands-on projects or research studies. The presentation of the project should be structured, however, and most will fall into one of three general domains (with areas of study ranging within each):

- **Experiment**: An investigation undertaken to test a scientific hypothesis
- **Study or Demonstration**: A collection, analysis, and presentation of data and information to describe or demonstrate a fact, topic, phenomenon, or principle
- **Invention/Engineering:** The building or creation of a scientific, technological, or other device, machine, or creation

For experiments, the following procedure is suggested, also known as **The Scientific Method**:

- Ask a question to which you would really like to know the answer. Which paper towel is strongest? What is the best way to make compost? How does a computer work? The possibilities are endless. This is known as ***The Purpose*** or ***What You Wanted to Know***. You may have an idea or a theory that you want to test – if so, this is your ***Hypothesis.***
- Use your research skills to look for the answer to your question. Write or draw ideas that you found. Conduct your experiment or construct your working model. The ***Procedure,*** or ***Method***, whatever it happens to be, tells us ***How You Did It***.
- The ***Results*** and ***Conclusions*** tell us what happened when you did your experiment, what you found out, and ***What You Learned***. You can keep a notebook to help remember the things that you learned.




**You will need to plan and construct your display** for your project *(see diagram – this is only one example, many variations are acceptable)*. **Include your name, grade, topic or title**, information about your experiment or study, along with your notebook (if you kept one) and any pictures, drawings, models, or displays of objects that help demonstrate your project. Building the display provides the chance to develop and practice construction, artistic and written skills. You can try to use attractive lettering and carefully check for correct spelling and neat printing. Computer generated material may be used.

Finally, practice **talking about your project (oral presentation)** so that you can tell others about it at the Fair! On the day of the STEAM Fair, people will come to look at your project and ask you questions, and a friendly judge will ask you to tell them about it (it's not a competition though!). You'll also get to check out the work of all the other students participating in the STEAM Fair.

# Science Resources

**Science Project Ideas** are truly endless! Choose something that really interests you. Here are a few examples:

- How Does the Heart Work?
- Hovercrafts
- Hydro Electric Dam
- How Do Bike Shocks Work?
- Fishing Line Strength
- Do Bridges Stay Up?
- Fingerprints – What Do They Tell Us?
- How Do Braces Work?
- How Do You Make Paper?
- How is a Photograph Made?
- Wolf Communication
- What Do Seeds Need to Grow?
- Making Colours
- How Alligators Swim
- What is Inside a Telephone?
- Laughter is Good Medicine
- Simple Motor
- Hummingbirds
- How Butterflies Protect Themselves
- How is Butter Made?
- Solar Energy
- Will the Titanic Rot Away?
- How do Animals Talk to Each Other?
- Icebergs and How They Form
- Lunar Eclipse
- What Causes a Volcano to Erupt?
- The Digestive System
- How is Honey Made?
- Why Do Things Fizz?
- Lasers
- Quick Rust
- What Is The Eye of the Hurricane?
- How Do Planes Fly?
- Do Animals Talk?
- Uses of Water
- Patterns in Nature
- Use of Our Teeth
- Recycling
- Vaccines
- Animal Homes
- The Life of a Tree
- Musical Instruments
- A Healthy Meal
- Sound
- Whales
- Parts of a Building
- Animal Colourings
- Our Eyes and How We See
- The Four Seasons
- Viruses
- Predicting Weather
- How Computers Are Used
- Making Batteries
- Canada's Natural Resources
- What is Inside Fruit?
- Parts of a Leaf
- Prehistoric Animals
- Where do Beavers Live?
- Good or Bad Insects
- Whistles and Flutes
- Why are Zebras Striped?
- Metals That Conduct Heat
- The Human Heart
- How Does a Tooth Decay?
- How do Greenhouses Work?
- Filtering Water
- What is the Best Wing Design?
- Kites
- Tropical Fish
- Fresh Water Fish
- What type of hockey shot is most accurate?
- How Strong is a Spider's Web?
- What Affects the Strength of Concrete?
- Build a Hygrometer
- Build a Clock
- Are Manufacturer's Claims Truthful?
- What is Physical Fitness?
- How Does a Wind Turbine Work?
- What is Protein?
- Wind Chill
- World Population
- Calendars and Time – Why do we have leap years??
- Nests
- Reptiles
- Gravity
- Your Backyard Ecosystem
- Melting Rates of Ice
- How Does Frost Form?

***Your Original Idea Here...***

- _____

And check out the attached list of **Internet resources** (then find your own too!).

The **Public Libraries** also stock a great selection of books on science fair projects and science in general! Librarians can be of great assistance in finding resources on a topic. One example of a more general resource is:

Kramer, Stephen P. *How to Think Like a Scientist: Answering Questions by the Scientific Method*. New York: Thomas Y. Crowell, 1987. (Grades 2-4)

# Invention Information

Invention projects focus on solving a problem or fulfilling a need by creating a new process or product. Students who choose to do an invention project are encouraged to first identify a need or problem, and then solve it by following the same steps that an inventor would follow in creating and patenting an invention. Problem-solving, creativity, research and communication skills are all involved in the invention process. A common procedure for an invention project has five steps:

- Step 1: Learning About Inventors or the invention process
- Step 2: Finding an Idea – Identifying a Need
- Step 3: Research and Planning
- Step 4: Developing and Testing
- Step 5: Presenting the Invention

Here is an overview of the five steps:

**Step 1: Learning About Inventors (and the invention process)** In this step, you begin by learning about other inventors. You can read about them in books, talk to other people about them, and learn about some of the inventions they've made. This will help you know about how other inventors have come up with their creations, and what things are important to being a good inventor (such as thinking creatively, gathering lots of information, and not giving up when things don't work out right away!).

**Step 2: Finding an Idea** This step is the beginning of your invention! You start by finding an idea for something that people need to make life better. You may already have an idea for a new thing or process that would be useful to you or others you know or that would solve a problem. If not, you can find ideas by asking others about what they would like to see changed or could use some help with, or "brainstorming" about what could be better about things you use or do every day. Remember, an invention doesn't have to be a product or a "thing" – it can also be a process or a new way of doing things (for example, a better way to memorize lists, or an easier way to do one of your chores!).

**Step 3: Research and Planning** In this step, you take your idea and start to make a plan for your invention. Your plan will need to list all the steps, information, and materials you will need to make your invention. You can think about what you can read and who you can talk to in order to learn the information you'll need for your invention; about what materials you'll need; about how much time you will need; and about how you will construct and test out your invention. You can list the steps you are going to take in going forward. It's important to have a plan – but remember, even the best plans sometimes need to change along the way, and inventors always keep an open mind!

**Step 4: Developing and Testing** This is the step where you get to actually make and try out your invention! Follow your plan to actually create your invention, and test it out to see if it works and to make sure it's safe. If things don't work as you thought they would, this is your chance to problem-solve, get some help, and be persistent in figuring it out. If your invention is a process or a new way of doing something (instead of a product or object to build), you can describe your process in words and pictures; you should test it out to make sure it works and include the results in your report. During this step, you also will need to prepare your display for the STEAM Fair. You'll want to make a display that is interesting for people to look at, and that

clearly tells and shows about what you've invented. Include your name, title, grade, and class, and you can use pictures, drawings, computer generated information, or whatever you need to help show your invention and how you came up with it. If your invention is a product, you'll bring it (or a model of it) with you to show people, or you'll want to have some drawings or pictures if it's too big to actually build or bring with you.

For some students, and depending on the project, actually creating the invention may be a little tricky. Some students may have great ideas for things that may be beyond their ability or resources to actually create and build. They are not yet engineers with the real-world levels of materials and technology available to build with! Here are some suggestions. If the task of building the actual invention seems too difficult, please consider creating:

- one or more detailed diagrams of the invention, perhaps done in colour with labels
- a written description of how the invention works and who would use it
- additional pictures that would show the how the invention would be used
- a poster and marketing materials that would "sell" the invention to a buyer
- a mock-up or prototype or a 3-D model of the invention (or as close as possible) using found materials (i.e., "stuff" or "junk" around the house) that resembles what the invention would look like if it were produced in a "real" factory
- another alternative... pick something simpler to create

**Step 5: Presenting Your Invention** The grand finale! You'll bring your display to school and set it up in the gym. During the STEAM Fair, people will have a chance to look at your project and ask you about it, and a judge will come to ask you some questions about it too. So you'll want to think about how to explain your invention and practice talking about it. It's your chance to convince everyone of how much the world could use your invention! You'll also get to check out the work of all the other students participating in the STEAM Fair.

# Invention Resources

There are tons of resources out there for the budding inventor, here are a few suggestions.

**Books:**


Caney, Steven. *Steven Caney's Invention Book*. New York: Workman Publishing Co., 1985.

Dunn, Susan and Rob Larson. *Design Technology: Children's Engineering*. Falmer Press, 1990.(Grade K-6)

Eichelberger, Barbara and Connie Larson. *Constructions for Children: Projects in Design Technology*. Available from Dale Seymour Publications. (Grades 1-4)

Jones, Foltz Charlotte. *Mistakes That Worked: 40 Familiar Inventions and How They Came to Be*. New York: Doubleday, 1991.

Karnes, Francis, Suzanne H. Bean, and Rose Mary Wallner.*Girls and Young Women Inventing: Twenty True Stories About Inventors Plus How You Can Be One Yourself.* Free Spirit, 1995. (Grades 3-6)

Kramer, Stephen P. *How to Think Like a Scientist: Answering Questions by the Scientific Method*. New York: Thomas Y. Crowell, 1987. (Grades 2-4)

McCormack, Alan J. *Inventor's Workshop*. Belmont, CA: Pitman Learning, Inc. 1981. (Grades 2-6)

McKissack, Pat and Frederick L. McKissack. *African-American Inventors.* Millbrook Press, 1994. (Grades 4-7)

Rasmussen, Greta. *WakerUppers: A Spirited Collection of Thinking Activities*. Available from Dale Seymour Publications. (Grades 2-6)

Rowland, Dr. Elizabeth and Dr. Leonard Molotsky. *Resource of Creative and Inventive Activities*. Richardson, TX: National Inventive Thinking Association, 1994. (For teachers)

Sobey, Ed. *Inventing Stuff*. Available from Dale Seymour Publications. (Grades 5 and up)

Stanish, Bob. *The Unconventional Invention Book*. Carthage, IL: Good Apple, Inc., 1981.

Striker, Susan. *Build a Better Mousetrap*. New York: Holt, Rinehart & Winston, 1983.

Taylor, Barbara. *Be an Inventor*. New York: Harcourt Brace, 1987. (Grades 3 and up)

Tucker, Tom and Richard Loehle. *Brainstorm: The Stories of Twenty American Kid Inventors.* Farrar Straus & Giroux, 1995. (Grades 4-7)

Yenne, Bill. *100 Inventions That Shaped World History.* Bluewood Books, 1993. (Grades 3-6)


**Websites:**

http://www.bkfk.com/

http://www.eurekalert.org/

http://web.mit.edu/afs/athena.mit.edu/org/i/invent/

http://www.invent.org/

# Over Forty Science, Technology, Engineering and Math Links

Ideas, methods, tips, help, and more… just a few clicks away!! Sorted ***alphabetically*** – there are some cool ones near the end too!

**websites checked December 2015; content not screened or endorsed by MJPS; unfortunately, some links do have advertisements and promotional links embedded.*

http://www.ag.ohio-state.edu/~breads/sciencefair.html
Bread-Related Science Fair Topics

http://www.agclassroom.org/kids/science.htm
Agriculture In The Classroom - Science Projects

http://www.all-science-fair-projects.com/
Science Fair Projects With Complete Instructions

http://www.amasci.com/scifair/chem.html
Science Fair Idea Exchange - Chemistry Science Projects

http://www.ummz.lsa.umich.edu/
University of Michigan - Museum of Zoology

http://billnye.com/?billnyeresourcetax=home-demos
Bill Nye, the Science Guy - demos you can try at home

http://www.britannica.com/
Encyclopædia Britannica Online - Free 7-day trial

http://cms.math.ca/Education/mpsf/
Canadian Mathematical Society - Math Projects for Science Fairs

http://www.cdli.ca/sciencefairs/
Eastern Newfoundland Science Fairs Council

http://constructionmanagementdegree.org/blog/2010/100-awesome-engineering-projects-for-kids/
100 Awesome Engineering Projects for Kids

http://www.ehow.com/list_6384656_fun-math-projects-kids.html
Fun Math Projects for Kids – eHow

http://www.education.com/science-fair/engineering/
Education.com – Engineering Science Projects for Kids at various grade levels

http://www.education.com/science-fair/applied-mathematics/
Education.com - Applied math projects for kids

http://www.energyquest.ca.gov/projects/
California Energy Commission - Energy education website

http://www.eskimo.com/~billb/index.html
Science Hobbyist Website

http://www.exploratorium.edu/
Exploratorium - The museum of science, art and human perception

http://www.exploratorium.edu/science_explorer/index.html
Exploratorium - Science Explorer activities

http://www.exploratorium.edu/snacks/
Snacks... the kind you can learn from and have fun with

http://faculty.washington.edu/chudler/experi.html
Neuroscience Experiments for kids

http://faculty.washington.edu/chudler/fair.html
Tips for a successful science fair project...

http://faculty.washington.edu/chudler/neurok.html
Learn about the nervous system

http://www.fi.edu/tfi/activity/
Bioscience, Communications, Computers, Earth Science, Energy,
Mathematics, Oceanography, Physical Sciences, Space, Transportation

http://www.funology.com/
'Find things to do, anywhere, by yourself or with anyone' – including science fair projects

http://www.homeworkspot.com/sciencefair/
'Science Fair Project Center'

http://www.howstuffworks.com/
HowStuffWorks... credible, unbiased, and easy-to-understand explanations

http://www.juliantrubin.com/sciencefairprojectsaz.html
Projects and Experiments Topics - Index A-Z

http://www.letstalkscience.ca/programs-resources/activities.html
Let's Talk Science – activities to try on various topics

http://www.life123.com/parenting/education/math-activities/math-project-ideas.shtml
Math project ideas for kids

http://littleshop.physics.colostate.edu/onlineexperiments.htm
'Little shop of physics' online experiments – Colorado State University

http://www.madsci.org/experiments/
Edible/Inedible Experiments Archive

http://www.madsci.org/libs/libs.html
MadSci Library, “an excellent starting point for exploring science resources”

http://members.ozemail.com.au/~macinnis/scifun/projects.htm
Science project procedures and ideas

http://quest.arc.nasa.gov/
Math, science and engineering activities, resources, and challenges for students from NASA

http://orion.neiu.edu/~pjdolan/sfc.htm
Science Fair Project Ideas in a number of science domains

http://www.pbskids.org/dragonflytv/
PBS Public Television – DragonflyTV (including a “SciGirls” section)

http://www.sciencebob.com/
The Adventures of Science Bob

http://www.sciencebuddies.org/mentoring/science-projects.shtml
Project ideas and planning suggestions through Science Buddies

http://www.scienceclub.org//kidproj1.html
Science Projects - for beginners as well as medium and advanced projects

http://www.scienceclub.org/~sciclub/cgi-bin/scifair/hint.html
A quick description of “How To Run A Science Fair Project”

http://www.sciencekids.co.nz/projects/technology.html
Science Kids.com – technology-related science fair ideas

http://www.sciencemadesimple.com
Easy science experiments & science project ideas, methods, articles, and examples

http://kidsspace.torontopubliclibrary.ca/sciencenet.html
Toronto Public Library – ScienceNet search portal

http://www.scitoys.com/
Science Toys You Can Make

http://school.discoveryeducation.com/sciencefaircentral/
Discovery Channel/School –“Science Fair Central” – idea finders, timelines, parent resources

http://www.spartechsoftware.com/reeko/
Reeko's Mad Scientist Lab – Science projects and experiments for all ages

http://www.tryscience.org/experiments/experiments_home.html

TryScience site – projects and experiments in a range of science, math, tech domains

http://www.wpl.ca/

Waterloo Public Library

***NOTE:***

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