

## STEM Squires: *Science*

A **scientist** is someone who studies science. People who grow up to be **scientists** are usually are curious about how things work and specialize in finding out things about the unknown and the known. They try to find out why things work and why they don't work.

**Task:** You will take part in your school's Science Fair, which takes place in the spring.

- *Please follow the specific guidelines which are provided when you sign up for the science fair.*
- *No cover sheet or evaluation is necessary for this category.*

## STEM Squires: *Technology*

Technology is the making, modification, usage, and knowledge of tools, machines, techniques, crafts, systems, and methods of organization, in order to solve a problem, improve a preexisting solution to a problem, achieve a goal. We use technology every day in our daily lives. Let's find out how it's changed and where it's going.

*\*Research how technology is used in different capacities through our daily life.*

**Task:** Compare how technology has affected our lives. Has it made our lives better or worse with or without this technology? Choose one form of technology or technological device to research.

Guidelines:

### Kindergarten

- 1 important findings or facts demonstrating the importance and the changes that have transpired due to this new technology or technological device.  
( How has it improved our lives)

- *Presentation must include at least one form of documentation verifying research ( Interviews, data copied from internet, books, websites, videos, etc. )*
- *Must have a visual representation of this research and findings. ( Ex: Posters. PPT, report, diorama, timeline, pictures, audio or video tapes. etc.*

### First Grade

- 2 important findings or facts demonstrating the importance and the changes that have transpired due to this new technology or technological device. ( How has it improved our lives)
  - *Presentation must include at least one form of documentation verifying research ( Interviews, data copied from internet, books, websites, videos, etc.)*
  - *Must have a visual representation of this research and findings. (Ex: Posters. PPT, report, diorama, timeline, pictures, audio or video tapes. etc.*

### Second Grade

- 3 important findings or facts demonstrating the importance and the changes that have transpired due to this new technology or technological device.  
( How has it changed our lives )
  - *Presentation must include at least two form of documentation verifying research*
  - *Must have a visual representation of this research and findings. ( Ex: Posters. PPT , report, diorama, timeline, pictures, audio or video tapes. etc.*

### Third Grade

- 3 evaluations of this technology demonstrating the impact of the changes that have transpired due to this new technology or technological device.  
(What aspects of our lives have been changed and in what ways ?)
  - *Presentation must include 3 forms of documentation verifying research*
  - *Must have a visual representation of this research and findings and some type of graph charting the changes and improvements. (Ex: Posters. PPT, report, diorama, timeline, pictures, audio or video tapes. etc.)*

## Fourth Grade

- 4 evaluations of this technology demonstrating the impact of the changes that have transpired due to this new technology or technological device.

(What aspects of our lives have been changed and in what ways and to what degree.) *Also, what do you project will change in the future with this new technology and what impact do you foresee on the future generations?)*

- *Presentation must include 3 forms of documentation verifying research*
- *Must have a visual representation of this research and findings and some type of graph charting the changes and improvements. (Ex: Posters, PPT, report, diorama, timeline, pictures, audio or video tapes. etc.)*

## STEM Squires: *Engineering*

**Engineers** are people that see a problem in the world around them and work to solve it. This can entail creating something new or making improvements to something that has already been invented. Engineers are *problem-solvers who use a variety of skills to help them. Are you an engineer? You bet!*

## Kindergarten

**Task:** With help from an adult, find something in your home that an engineer designed.

- *What is the object and what does it do?*
- *Why do you think an engineer designed this?*
- *How does it make your life easier?*

## First Grade

**Task:** Imagine that your principal asked for your help. There is a large thorn bush at the edge of the school playground. Every day at recess, some of the recess balls get kicked or thrown under this bush and it is nearly impossible to get them out without getting scratched. The principal does not want to cut down this bush. *Can you design a tool that would help the other boys and girls get their missing recess balls from under this thorn bush without getting scratched?*

- *What is the name of your design and how does it work?*
- *What materials would you need to build your design?*
- *How would this make life easier for the boys and girls at your school?*

## Second Grade

**Task:** Have you ever seen your mom or dad carry a heavy load of laundry to the basement or laundry room? This is not an easy task for any adult- the basket is heavy and something always falls out along the way! *Can you design a tool that would make the task of getting laundry to the washing machine easier for your parents?*

- *What is the name of your design and how does it work?*
- *What materials would you need to build your design?*
- *How would this make life easier for adults who have to carry heavy baskets of laundry?*

## Third Grade

**Task:** Think of a problem that you have encountered in your home. For example, perhaps you don't like waiting for your hot dinner to cool down. Maybe you hate it when the shower is cold because your sister used all the hot water! There are many things in our home lives that we would love to improve upon! *Can you create a device that would help to make this problem easier to deal with- or even go away? Now is your chance to tell about your creation and to **create** it using materials from your home. \**

- *What is the name of your invention and how does it work?*
- *What household problem does your invention help to solve?*

- *Who would benefit from your invention?*
- *What materials would you need to build your design?*
- *How did you create your invention?*
- *What problems did you have along the way? How did you solve these problems?*

## Fourth Grade

**Task:** Now that you are the oldest student in your school, you probably know just about everything there is to know about it. There are most likely some things that you love and some that you don't. Maybe you dislike waiting in the long cafeteria line. Maybe you can't stand how crowded the halls or the stairways can be at dismissal. Perhaps the slow and noisy pencil sharpener in your classroom drives you crazy! There are many things in our school that we can make better! *Can you create an invention that would help to make this problem easier to deal with- or even go away? Now is your chance to improve upon one of thing about your school!\**

- *What is the name of your invention and how does it work?*
- *What school-wide problem does your invention help to solve?*
- *Who would benefit from your invention?*
- *What materials would you need to build your design?*
- *How did you create your invention?*
- *What problems did you have along the way? How did you solve these problems?*

*\*In addition to answering the thinking questions, students are also responsible for creating an invention. This invention may be shared at the evaluation conference but photographs are also acceptable.*

# STEM Squires: Math

## Mathematicians

Mathematicians have an extensive knowledge of mathematics, and utilize this knowledge to solve mathematical problems. They may do research, or work in applied mathematics in fields such as science, engineering, business, and industry.

## Kindergarten

**Task:** Provide examples and non-examples of objects that are symmetrical.

Information on symmetry can be found at: <http://www.squidoo.com/teaching-symmetry-to-kindergarten-kids>

- *Find at least three examples of symmetrical objects. Draw the line of symmetry.*
- *Find at least three objects that are **not** symmetrical.*
- *Draw objects, print or cut out photos/pictures.*
- *Group pictures by category (symmetrical/non symmetrical), mount on poster board or construction paper, and label.*

## First Grade

**Task:** Conduct a survey by creating a specific question and a limited number of responses. Survey a sample of people gathering responses on a tally chart. Organize responses on a bar graph or pictograph. Draw conclusions and compare data.

Information on conducting a survey can be found at: [www.squidoo.com/chartsandgraphs](http://www.squidoo.com/chartsandgraphs) and [www.mathsisfun.com/data/survey-conducting.html](http://www.mathsisfun.com/data/survey-conducting.html)

- *Create a survey question with three to four responses.*
- *Conduct the survey. Include at least 15 people in your survey.*
- *Organize the data into tally chart form.*
- *Transfer data to a bar or pictograph.*
- *Present the tally chart and graph on a poster or as a computer printout.*

- *Draw conclusions and make comparisons by writing four to six statements about the results.*

## Second Grade

**Task:** Create a three dimensional “geometric-junk” piece using two and three dimensional geometric figures.

Information on geometry can be found at: [www.mathsisfun.com/geometry/index.html](http://www.mathsisfun.com/geometry/index.html)

- *Use various three dimensional geometric solids, create a new object or figure (e.g. robot, animal, space ship).*
- *Add details using two dimensional shapes (e.g. circles, polygons)*
- *Provide a list of two and three dimensional figures and shapes used in your project.*
- *Project and list are to be included in your presentation.*

## Third Grade

**Task:** Create an album which includes photos with captions or illustrations with captions that show the use of math in real world situations. Photos or pictures are to be presented in a photo album format or digitally. Provide at least one picture for each bolded category.

Ideas can be found at: <http://52brandnew.com/2012/10/23/teaching-math-through-real-life-experience/>

- **Money**-show and tell how you use money in your real world (spending, saving, making change)
- **Multiplication**-show and tell how you use multiplication in your real world (array, times-as-many, or equal groups)
- **Measurement**-show and tell how you measure in your real world (linear, capacity, weight)
- **Time**-show and tell how you spend time in your real world (seconds, minutes, hours)
- **Fractions**-show fractions in your real world (fractional part of a figure, fractions of a set)

## Fourth Grade

**Task:** What do you want to be when you grow up? Research a career you find interesting. Tell how math would help you do that job. Identify and describe 3-5 areas of math that you would use to do that job.

Information on math career paths can be found at: <http://www.maa.org/careers>

- Write a report that names and describes the job you might like to do.
- Name 3-5 areas of math that you would use to do your job.

## STEM Squires: Careers

**Careers:** A particular occupation or job for which you are trained.

If you become familiar with careers, you can make decisions about what you would like to study, and what you want to be when you grow up. The more you know, the better chance you have of choosing the best career for your futures! (The PA State Department of Education set clear standards for Career Education, which include Career Awareness, Career Acquisition, Career Retention/Advancement, and Entrepreneurship. Please refer to [www.pacareerstandsards.com](http://www.pacareerstandsards.com) for more information.)

## Kindergarten (Career Awareness)

**Task:** Visit someone in your community at their job for one hour.

- List the job responsibilities
- How does this career help your community?
- List 5 of your personal interests. Would you want to have that career when you grow up? Why or why not?
- How does this job use Science, Technology, Engineering (problem-solving), or Mathematics?
- Must use at least 1 resource

## First Grade (Career Acquisition)

**Task:** Visit someone in your community at their job for one hour.

- *How does that career use Science, Technology, Engineering (problem-solving), and Mathematics?*
- *Create an advertisement to hire new people for that job. (ex: a commercial, an advertisement, a flyer)*
- *List the skills needed for that job*
- *Must use at least 1 resource*

## Second Grade (Career Retention)

**Task:** Visit someone in your community at a job you think matches your personality, for one hour (You can use online assessments such as [pacareerzone.org](http://pacareerzone.org) to find matches).

- *Interview an employee with at least 5 questions*
- *Research the education needed to get that job, and what life-long learning do workers do to keep that job.*
- *What attitudes or work habits contribute to their success?*
- *Do they work on a team? With others? Individually?*
- *Must use at least 2 resources*

## Third Grade (Career Advancement)

**Task:** Visit someone in your community with a career in Science, Technology, Engineering (problem-solving), or Mathematics for one hour.

- *Design something that could improve that job, make that job easier, or help the job Go Green. (“Going green” is a popular term used to describe the process of changing one’s lifestyle for the safety and benefit of the environment. People who “go green” make decision about their daily lives while considering what impact those decisions may have on global warming, pollution, loss of animal habitats, and other environmental concerns. )*
- *What is the name of your invention, and how does it work?*
- *Must use at least 3 resources*

## Fourth Grade (Entrepreneurship)

Task: Be an entrepreneur!

- Define *entrepreneur*, and traits of successful entrepreneurs. (ex: risk-takers, positive attitudes)
- Create a chart of age-appropriate entrepreneurial opportunities (ex: bake sale, pet care)
- Explore job areas that match your personality (you can use online assessments such as [pacareerzone.org](http://pacareerzone.org) to find matches)
- If you were to start a new business, what would it be? How would it work? What skills would you need to be successful? Who would you want to work with? How would your role change over time? How would it relate to Science, Technology, Engineering, or Mathematics?
- Write a letter to someone persuading them to help you start your business. Include the skills you have that would help it be successful.
- Must use 3 resources