# It's time to get ready for the 2012 Science Fair!

The Aquarian Charter School Science Fair will be held on **Thursday, March 22nd** and **Friday, March 23rd**. The State Science Fair is March 23, 24, and 25th.

The schedule of events is as follows:

**January**: Teachers will discuss the Science fair and their expectations with their classes. Students decide on a topic and work on their projects at home.
**Important note:** A science project is required for 3rdthrough6th grade students and will be part of their 4th quarter science grade. Projects are optional for K through 2nd students. K through 2nd classrooms will do a whole class project.

***Entry forms*** **are due to teachers before March 1st. Teachers decide when entry forms must be turned in to them. All projects to be entered must have an entry form! The entry form is part of the grade.** ***(Teachers: Forms are due to the science fair committee no later than March 1st)***

**March 22nd**
Students set up their projects in the gym upon arrival. Students are expected to have an entry form on file with the science fair committee or the project will not be accepted.

Judges will interview students throughout the day. The Science Fair committee will tally scores and place ribbons between 1:00 and 3:00.

Science Fair open to families 3:00-5:00

**March 23rd**
Classrooms will view the fair throughout the day.

## All projects must be taken home at the end of the day.

**March 23rd** State Science Fair begins. We strongly encourage participation in this. Student projects do not have to win first place at Aquarian to be able to participate. For more information please visit: **http://www.alaskasciencefair.org**

# Aquarian Charter Science Fair Entry Form

Student name(s)_____ Grade_____
_____ Teacher_____

**Does your project need an electrical outlet for presentation? (Circle one)**
**Yes No**
**Note: Electricity will not be available at the State Science Fair.**

What branch of science are you exploring? (see category descriptions)

- Life science
- Physical science
- Earth science
- Social science

What kind of project are you doing? (see descriptions)

- Model
- Experiment
- Collection
- Demonstration
- Research

What do you plan to study/present?

_____

_____

_____

Parent Signature_____ date_____
Teacher Signature_____ date_____

**RETURN THIS FORM TO YOUR TEACHER**
**Entry Form is due to the Science Fair Committee by Thursday, March 1st**

# Student Science Project Time Line

**January 15th** Science fair packet available on the Aquarian website, from your teacher or in the office. Think about what you are interested in finding out more about. There is a list in the packet of project ideas if you need help. Search for books, websites etc. that give you information about your interest area.
**Get specific about your topic and your question.** If you have more than one question or topic, choose the one you think you can answer with the resources you have.

**January to February 20th** Study your topic, take notes, continue to research, make your hypothesis and do your experiments. Remember live animals, plants, molds, chemicals are not allowed in your display Take photos or draw sketches of your process!

**February 21st to March 1st** Evaluate your findings so far. Make your conclusions. Make graphs or other visuals if appropriate, get photos developed. Think about how to display your findings. Gather materials needed for this. (eg poster board, photos, markers lettering etc.)
**Turn in your completed entry form to your teacher. This is part of your grade if you are in 3rd through 6th grade!**

**March 1st Entry forms turned in to the Science Fair Committee**

**March 1st to March 20th** Complete your project board (This always takes longer than you think!!) The visual presentation of your knowledge is evidence of your pride in what you do. **DON'T WAIT UNTIL THE LAST MINUTE!** The work should be yours – not mom's or dad's!

**March 22nd** Bring your project to school. You will be assigned a spot in the MPR based on what you told us about your project on the entry form. You will be interviewed by a judge or judges. They will ask you questions! KNOW YOUR STUFF! You are the expert on your project.

**March 23rd** Everyone in the school will see your project on display! Pick up your project after school and take it to the State Science Fair if you can. All projects must be picked up at the end of the day Thursday. If you need help, make sure a parent knows.

# DECIDING ON A SCIENCE FAIR TOPIC

Selecting a project topic can be difficult, so be sure to pick a topic you like. Projects and displays should show the results of research and careful thought. You may do an experiment, create a demonstration, show a collection, etc. You should think about what you enjoy, what area of science seems most interesting, how difficult the topic will be, whether the materials will be easy to find, what help might be needed, and how involved your parents will be.

## Again, try to pick a topic that you will enjoy and that will interest you!

Here are a few ideas to help you and your parents start thinking about Science Fair.

## Experiments

A student poses a problem, designs an experiment to investigate the problem, records and reports the results, and makes conclusions based on the results (that is, they follow the scientific method). The final project is a display of the steps the student took, any successes or failures, and the implications of the data. See the separate sheet on what is or is not an experiment.

Examples:
- How are crystals formed?
- What liquids make coins corrode faster?
- Which paper towel absorbs the most water?
- How do leaves lose water?
- How does the color of an object affect how warm it gets?
- Do preservatives stop bread mold from growing?
- How does changing the fulcrum affect a level?
- How do charged objects act towards each other?
- What materials conduct electricity the best?

# Collections

**COLLECTIONS SHOULD BE DISPLAYED WITH PHOTOGRAPHS OR DRAWINGS ON THE SCIENCE FAIR PROJECT BOARD ONLY.** A collection is an assembly of items that shows variety, diversity and distinctions within a chosen subject area. Collections should show as many samples as possible to represent the diversity of the topic. Students should use clear labels and written materials to explain details of the collection.

Examples: Rocks, seashells, birdhouses, plant seeds
Grouped pictures of herbivores, carnivores, and omnivores
Groups of biodegradable vs. non-biodegradable materials

# Demonstrations or Models

These projects demonstrate a particular science principle or fact, or display some kind of scientific apparatus or instrument. A student may want to demonstrate how something works, a science phenomenon, or how something is created in a lab. The student should label any parts and describe the topic being demonstrated in all written materials.

Examples: Make a model of the human eye to show how it works.
Use clay to show features of the earth's surface.
Use pulleys, levers, or ramps.
Make a pinhole camera.
Make a model of our solar system.
Show how a flashlight works.
Show what causes light to bend.

# Research

In this type of project, a student investigates a chosen topic by consulting primary sources, speaking with experts (scientists, nurses or doctors, etc.), and investigating a scientific site (fish hatchery, lab, factory, etc.) The student should explore the topic in depth and report the information in an interesting manner through photos, a journal, drawings, etc.

# What is a Science Experiment?

1. Choose a **problem** to solve.
2. State your problem as a **scientific question**.
3. **Research** your problem.
4. Form a **hypothesis.**
5. **Plan** your project.
6. Set up a **time schedule.**
7. Make a list of all the **materials** you will need.
8. **Collect** all your materials.
9. **Conduct** your experiment several times.
10. **Record** the data.
11. **Organize** the data in an orderly format.
12. **Draw conclusions** from the data.
13. Prepare your **report**, graphs, drawings, and diagrams.
14. Construct your **science fair display**.

# What <u>is not</u> a Science Experiment?

*A collection of related or unrelated objects
*A list of things
*A report not supported by data or experiment
*A model, illustration, or piece of equipment unrelated to an experiment

Student _____
Partner _____
Project Number _____

# Science Fair Experiment/Demonstration Scoring Guide

| | |
|---|---|
| Question and hypothesis are clearly shown in display | (10) _____ |
| Display include pictures, diagrams, photos, journal that support project research | (5) _____ |
| Oral presentation reveals observations made by student | (10) _____ |
| Procedures clearly outlined | (10) _____ |
| Data displayed (graphs, tables, comparisons) | (10) _____ |
| Results clearly stated | (10) _____ |
| Conclusion is logical and thoughtful | (10) _____ |
| Project is unique | (5) _____ |
| Student completed project (How much help did parents provide?) | (10) _____ |
| Project appropriate for student | (5) _____ |
| Project is neat, visually appealing | (5) _____ |
| Project is well-organized | (10) _____ |
| TOTAL | _____/100 |

Judge's Comments:

Student _____
Partner _____
Project Number _____

# Science Fair Research/Model
# Scoring Guide

| | |
|---|---|
| Question is clearly shown in display | (10) _____ |
| Display include pictures, diagrams, photos, journal that support project research | (5) _____ |
| Sources identified and listed on board | (10) _____ |
| Experts consulted/interviewed | (10) _____ |
| Data displayed (graphs, tables, comparisons) | (10) _____ |
| Scientific web site investigated and/or scientific location visited | (10) _____ |
| Effective oral presentation | (10) _____ |
| Project is unique | (5) _____ |
| Student completed project (How much help did parents provide?) | (10) _____ |
| Project appropriate for student | (5) _____ |
| Project is neat, visually appealing | (5) _____ |
| Project is well-organized | (10) _____ |
| TOTAL | _____/100 |

Judge's Comments:

# Category Descriptors

## Life Sciences

Also called the biological sciences or biology, these involve the study of living organisms. There are two main fields of the Life Sciences. Botany deals with plants and Zoology with animals. Paleontology and Ecology are included in Life Sciences, also.

## Physical Sciences

These examine the nature of the universe. They study the structure and properties of nonliving matter, from tiny atoms to vast galaxies. The Physical Sciences include: Astronomy, Chemistry, and Physics. (Technically, Geology and Meteorology are considered Physical Sciences. However, we have decided to put these types of projects into a separate category.)

## Earth Sciences

Geology and Meteorology are included in this category. Geology investigates the composition, structure, and history of the earth. Geologists analyze how such forces as earthquakes, volcanic eruptions, and wind or water erosion change the earth's surface. They also study meteorites and materials brought back from the moon. Branches of Geology include Petrology, the study of rocks; Mineralogy, the study of minerals; and Seismology, the study of earthquakes. Geochronology seeks to determine the age and history of the earth and its parts.

## Social Sciences

This branch of science deals with the individuals, groups, and institutions that make up human society. They focus on human relationships and interactions. Social scientists rely heavily on careful

observations and the systematic collection of data to arrive at their conclusions. The main branches of Social Sciences include: Anthropology, Economics, Political Science, Psychology, and Sociology. (Projects based on surveys concerning likes and dislikes fall into this category.)

## Important Reminder

When making a decision about which category your project falls under, be sure to pay close attention to your question. What question are you attempting to answer? For example, if your question is: "Who would more often choose to run races during P.E. class, first grade boys or first grade girls?" your category would be Social Sciences. If you were to ask: "Who has the fastest heart rate after running a 50-yard dash, first grade boys or first grade girls?" your category would be Life Sciences. If you were to ask: "Would a first grade boy run 50 yards faster in rubber-soled P.E. shoes or leather-bottom street shoes?" your category would be Physical Sciences. All three projects have something to do with first graders, but the answer to each question falls within a different category of science.

# Possible Science Projects

What conditions affect the speed of seed germination?

Does aspirin prolong the life of cut flowers?

Does the depth of planting a seed affect the growth of the plant?

How accurately can ____ graders judge the serial weight of selected objects?

In what concentrations of saltwater can roots grow?

How much potato plant tissue is necessary for the development of a potato bud?

Which orange drinks have the highest concentrations of Vitamin C?

Under what conditions is popcorn best stored?

What common liquids are acid, base, neutral?

Does water temperature affect the speed required for salts to dissolve?

What materials dissolve in water?

What materials absorb the most water? (ranking objects)

How well do various materials conduct electricity?

Which foods are preferred among students at _____?

Which television programs are the most popular among ___ year old students?

What is the average amount of television watched daily among ___ year old students?

What is the effect of sight and smell on taste?

What is the average number of seeds in a _____ apple?

Do the sizes of apples correspond to the number of seeds?

What is the effect of watering a _____ plant with different concentrations of detergent?

What are the effects of temperature on the germination of _____ seeds?

What are the effects of various household chemicals on the growth of small fast-growing plants such as radishes, beans, etc.?

In what type of materials (sand, peat, cotton, clay, etc.) do _____ plants grow the best?

Which brand of paper towel is actually most absorbent?

Which detergents break up oil best?

In what liquids (besides water) can bean seeds be germinated?

What are the effects of small quantities of oil (detergent, etc.) on microorganisms found in pond water?

What characteristic do children and adults consider to be most important in order to be popular?

Can people identify different kinds of Kool-Aid by taste alone? (blindfolded)

Can leaves be smothered?

Will plants grow better in sunlight or artificial light?

Is there any difference between the bacteria in the mouth of a human and the bacteria in the mouth of an animal?

Which mouthwashes and toothpastes will kill the most mouth bacteria?

Which metals conduct heat best?

What is the effect of different colors of light on plants?

How do plants react under a high frequency sound?

Are dark colors really warmer than light colors?

What shape glass causes water to cool off fastest?

How does salt concentration affect the freezing temperature of water?

Will artificial color alter a cat's food preference?

# Hints For Good Science Fair Displays

## Overall Considerations

A good display is important to your project! The purpose of your display is to grab people's interest – then tell them the story of your project, all in the short time they may spend looking at it. The display should stress the most important ideas, then provide *some* detail once interest has been stirred. If the display is hard to read, if it is cluttered with less important details, or if there is no logical way to follow the project from idea to conclusion, people may not make the extra effort to understand what you have done. Here are a few ideas to help you design a good display.

## Display Panels

A freestanding display creates an enclosed environment for your project and is ready to go anywhere. It's not hard to make a 3-panel display that is hinged and freestanding. Some good panel materials are:

- Mat Board – available at art supply stores or frame shops
- Cardboard – found anywhere (Consider large appliance boxes)
- Poster Board – found anywhere (But must be reinforced)
- Duct Tape – great for creating invisible hinges on the back of your panels
  to connect three together
- Paint, Construction Paper, or Contact Paper – great for creating a one-color background

## Colors

Colors may serve many different purposes. You might use colors to unite certain aspects of your project that belong together. Colors can

also convey or reinforce certain ideas. For example, in a heat exchange experiment, red might convey *hot* and blue *cold*. A bright color among pale colors, or against black and white, can make something really stand out. An overall color theme can give focus to your display and make it easier to read and more pleasing to look at. (Including your report cover in your color theme is a nice touch, too!) Too many colors, or colors that don't go together, will detract from your display. For example, a yellow background with a red border and blue and green type could be garish and hard to read – the blue and green might be too much alike to tell apart easily, and the red and yellow might be too bright for their purpose. Be stingy with your colors - save them for when they are most needed!

Good Color Combinations: Dark or vibrant blue with white accents
Black with red or white accents
Red with black or white accents
Black with strong yellow accents

## Panel Layout

A good layout has balance. Pictures don't have to be the same size or look the same. In fact, that might be boring! PLACEMENT is what matters – one large photo or picture can be balanced with two or three small ones. (A layout example is on the back of this page) A good picture CAN BE worth 1,000 words, so think about the photos or illustrations you will use to summarize the various aspects of your project.

## Lettering/Headlines/Types

The attention-getting headlines should be readable from way down the aisle. The subheadings should be readable from across the aisle, and the body text by someone standing next to your display. Be cautious when using "fancy" type styles. Text in script or ornate fonts and styles can be difficult to read.

# DISPLAY AND SAFETY REGULATIONS

1. A student may enter only one project, and it must be his/her own work.
2. The student is responsible for setup and removal of the project. He or she must supply whatever tools are necessary for setup and removal.
3. Name and class should be noted on the back of the Science Fair display. Please do not put this information on the front where it could be seen by an observer or judge.

## DISPLAYS MAY NOT CONTAIN THE FOLLOWING:

* Live animals or plants or dried plants
* Shells, rocks, or minerals
* Food materials (NO EXCEPTIONS)
* Soil, solutions, chemicals, household products or water, dry ice or other sublimating solids. (display of clean, empty containers is acceptable)
* Drugs or drug look a-likes
* Microorganisms, algae, mold, bacteria, or protozoa
* Preserved animal parts (Teeth, fingernails, feathers, hair and bones may be OK if preserved and sealed in plastic)
* Exposed electrical apparatus or open batteries (wiring must be insulated)
* Flammable gases or open flames
* Unshielded fans, light bulbs, belts, pulleys, chains or moving parts with tension or pinch points
* Photos of animals in surgical or lab procedures
* Sharp items such as needles, scissors, glass tubing, syringes, or pipettes
* Awards, medals, flags, or trading cards

# Science Fair Judging Criteria

**We are looking for excellence in these three areas:**

1) Project Content/Scientific Content or Process Skills: Judges will look for whether you used some or all of these: observation skills, measurement, making comparisons, and/or accurate data collection and reporting. They will also look at whether your information is scientifically correct.

2) Creativity/Appropriateness: Does your project show a level of uniqueness or original thought? Is it appropriate for your grade level?

3) Display/Neatness: Is the display neat and easy to read? Does it show good workmanship, correct spelling and accurate illustrations? Is the information displayed in a way that it is easy to identify the important parts?

# Potential Interview Questions

Students should be prepared to answer these potential interview questions. Each interviewer will be asking more than just scientific questions regarding the Science Fair project.

* How did you get the idea for your project? Tell me how you went about doing it.
* Where did you find the information about the project? Did you interview anyone?
* What was the hardest part about finding information?
* What observations did you make while working on the project?
* What three things did you learn from this project?
* What was your favorite part?
* If you had help from someone, in what ways did s/he help you?
* If you do the project again, how or what would you change?
* Did this project make you think of any future projects you would like to try?

# Sample Layout and Display Dimensions

## Variables

**Manipulated:** Amount of vitamins in the food
**Responding:** Mass of the cats
**Controlled:** sex, mass, breed, age of kitten, type of cat food, surroundings, exercise, attention, play opportunities.

## Procedure

**Materials:**
- Two kittens
- 30 pounds of Purina Cat chow
- Two bowls
- Scale accurate to 0.1 pounds
- 12 oz. Bottle of feline

**Methods:**
- Determine the mass of each cat before beginning.
- Feed each kitten 1 cup of food at 7 am and 5 pm daily. Separate the kittens into separate rooms, and don't let them out until they have finished eating.
- Add two drops of liquid vitamin to Kitten A's food just before feeding him. Do this at each feeding.
- Repeat this procedure each day for four weeks.
- Measure the mass of each cat at the end of each week.

## How do vitamin supplements affect the growth of my cats?

Hypothesis: If I give vitamin supplements to my cats with their food, they will grow larger.

PICTURE or DIAGRAM
CAPTION

PICTURE or DIAGRAM
CAPTION

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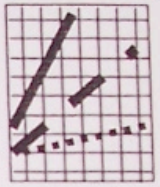
## Results



| | | | | |
|---|---|---|---|---|
| Cat A | | | | |
| Cat B | | | | |

## Conclusions

- My results support my hypothesis. The cat with vitamins grew larger than the cat without vitamins.
- I was unable to control for some variables in this experiment. For instance, Kitten A played all the time, while Kitten B slept most of the day.
- I would be interested in repeating this experiment, to see if the results would be similar.
- This experiment makes me wonder which specific vitamins cause growth. I would like to study this question in later experiments.

**References:**
I got the idea for this project from Science Plus Green by Joe Blow and Company.
My mother, Jane Doe, helped me make the graph.
Dr. Leonard Nimoy , a veterinarian, helped me with the vitamin supplements.

top to bottom 108" Max.

front to back 96"

side to side 48"