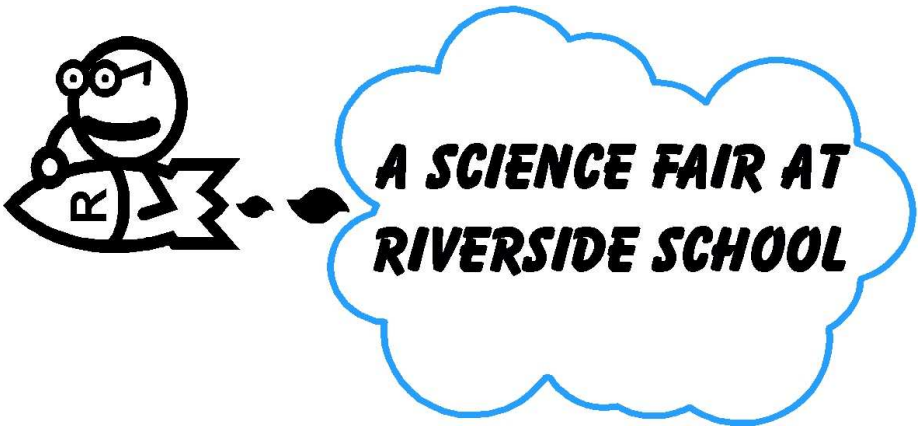
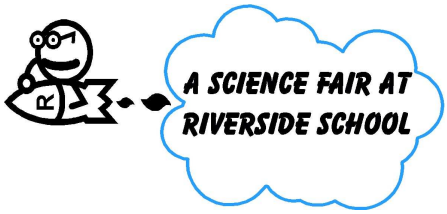
Explorations in SCIENCE

MY SCIENCE PROJECT BOOKLET

Name _____

Grade/Teacher _____





Have you ever wondered …

How much weight can a helium balloon lift?

Why are new pennies shiny and old pennies brown?

Why do they put salt on the roads when it snows?

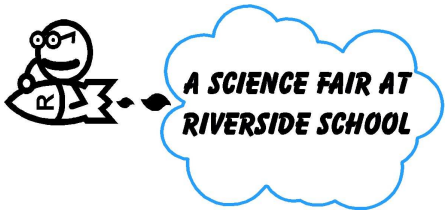
How do you make recycled paper?

Well, last year some students had these very questions. They searched the web, did some reading, and conducted experiments to find answers. All of it as part of the Riverside School Science Fair: Explorations in Science.

Explorations in Science is open to all students. It is completely voluntary and non-competitive. It is not part of any student's grade. The whole thing is just for fun.

This booklet contains the following information to help you do your project:

Like a whole bunch of stuff in life, all you have to do is to just get started.



Here is what you need to do….

Choose a topic. Think of several and then just choose one. It doesn't have to be a hard one. Pick something that is part of your every day life. Use the Project Steps as a guide.

Submit an entry form by Monday, March 8, 2010

Complete the enclosed Entry Form. PUT it in the ROCKET located in the school lobby along WITH a check made out to the Riverside School PTA.

You can participate as an individual or as a team of two people. A partner can be a sibling or a friend from your class, your grade, or from another grade.

If a student is submitting as a member of a team, EACH partner in the group must submit an Entry Form AND a separate check for $7. So, a two-person team submits two $7 checks ($14 total).

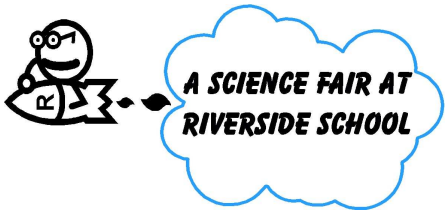
Pick up a display board on Thursday, March 18, 2010

Each project receives one board. A student submitting a project as an individual receives one board and students submitting a project as a team receive only one board.

Bring your project to school on Tuesday, April 6 for the Open House.

You will get to set up your project in the gym between 3:15 and 4:00. Parents, grandparents, friends, and family will see your project that evening between 6:30 and 7:30. Be prepared to tell every one that stops by your area during the Open House all about your project!

Pick up your project after school on Wednesday, April 7.



Science Fair Entry Form

Name _____

Grade/Teacher

_____

Project Title/Question

_____

_____

Project Partners (if any)

_____

Each partner on a project team must submit an Entry Form and must submit a check for $7.00 made out to the Riverside School PTA. A team of two students will have two Entry Forms and checks totaling $14.00.

Student's Signature

_____

I am aware of my child's science fair topic. I have reviewed the topic with my child and their partner (if any) and have reviewed the safety guidelines enclosed herein.

Parent's Signature

_____

PROJECT STEPS

The following project steps are based on the **scientific method**, which is a subjective tool scientists use to find the answer to a question. It is the process of thinking through possible solutions to a problem and then testing them. As you complete each of the following steps you will be following the **scientific method**:

- **Research** topic or question
- **State** the question to be solved
- **Hypothesize** possible answers to the question
- **Experiment** to test if hypothesis is right
- **Conclusions** summarize results and confirm or disprove hypothesis

Step 1: Choose a project topic.

Think about an area of science that interests you or a topic that you are curious about. There are many ways to do this and many resources to help you. You can:

- Make an observation about something in the world you are curious about
- Read through the list of science categories in the resource section at the back of this packet and see if any topic comes to mind
- Look through the science fair project books on display in the Media Center or go to the public library (you can browse available titles via the library links on the school's website)
- Visit the websites listed on the school website www.greenwichschools.org/rs or find new websites.

For example, you might say:

I like sports; I would like to do something with sports.

I think rainbows are cool but I notice that I only see them on rainy days when the sun comes out.

Step 2: Write a question about your topic.

Once you have selected a topic, you need to write a specific question about that topic. Come up with a question whose answer can be found by doing an experiment or shown by a demonstration. If you have trouble phrasing a question, think in terms of "why" or "how," or, try inserting different words in the following blanks: "What is the effect of _____ on _____?"

For example, you might ask:

Why do some balls bounce higher than others?

What causes a rainbow?

Note: If your question changes from your original entry, write your new question on your acknowledgement card and place it in the rocket by Monday, March 29.

Step 3: Collect information to help you develop a hypothesis.

You can get information from books or websites. After you feel you have enough background on your topic, write a hypothesis – a possible answer to your question or explanation of your observation. Your hypothesis should be stated in a way that can be tested or demonstrated.
For example, your hypothesis might be:

A ball's bounce height is related to its weight: heavier balls bounce higher.

Rainbows are caused by the interaction of sunlight with raindrops.

Step 4: Conduct your experiment or demonstration.

Your science project should answer your question in **Step 2** by testing your hypothesis in **step 3**. You might do this by:

- Conducting an experiment (the result will support or disprove your hypothesis)
- Demonstrating a principle (with a model, collection, survey, etc.)

How you test your hypothesis is important. This is called the **procedure** (the step-by-step instructions of how to do your experiment or demonstration.)

Your procedure should state:

- What you are going to measure or observe
- How you will do the experiment or demonstration
- What materials you need to do your experiment or demonstration

You should repeat your experiment to confirm your results. As you do your experiment you may want to take pictures to include in your display.

Step 5: Analyze your results and draw conclusions.

Once you have finished your experiment ask yourself,

- What happened?
- Did your experiment support or disprove your hypothesis? Remember, both positive and negative results are valuable.
- What conclusions can you draw from your experiment?
- Did you answer your question? If not, it may be because the question is too complex and cannot be answered easily. Your results may indicate other areas to investigate to better answer your question.

Step 6: Create your display.

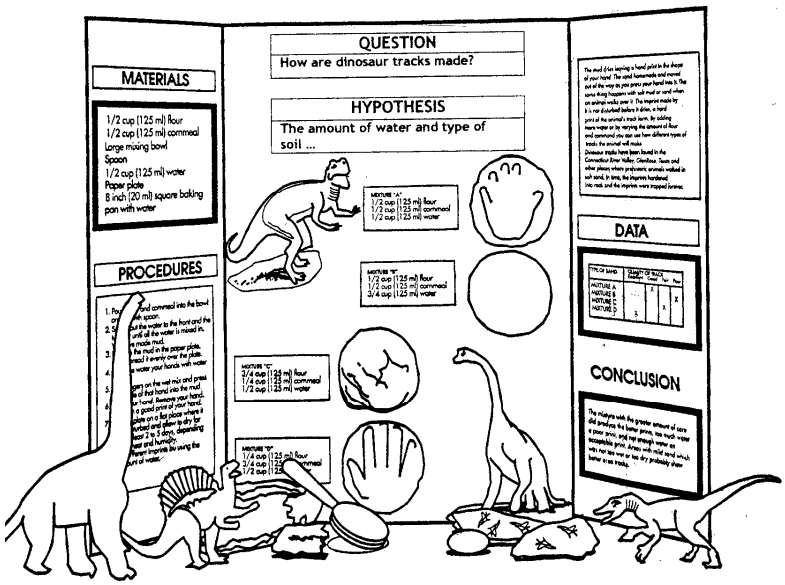
Your display board is 48"x36" (a 24" center panel with two 12" side panels). It is the kind of board that stands up on a table. Everyone must use the display boards

provided. You can use the table space in front of your display board for any models, demonstrations, materials, etc.

Please review and adhere to the attached safety guidelines. Consider using photos to capture the details of your experiment and remember that your project will be unattended during the class walkthroughs.

Below is an example of a science project display. Your display should be self-explanatory. It should tell the story of how your science project progressed. Where appropriate, be sure to include the following items from your worksheet:

- Title (should include question)
- Hypothesis (possible answer to question or explanation of observation)
- Experiment/Demonstration (including procedure, materials and data)
- Results (analysis and conclusions)
- Don't forget to put your name on the display!



Sample project displays can be seen in the Media Center.

PROJECT WORKSHEET

Step 1: Topic/Observation

_____

Step 2: Question (What I observed or am interested in, written as a question)

_____
_____

Step 3: Hypothesis (Possible answer to question or explanation of observation)

_____
_____

Step 4: Experiment/Demonstration (To support or disprove my hypothesis)

_____

Procedure:

_____
_____
_____

Materials:

_____
_____

PROJECT WORKSHEET (Continued)

Data:

_____
_____
_____

Step 5: Results and Conclusions:
Results/Analysis (What happened):

_____
_____
_____
_____

Conclusions (Answer to question; what I learned):

_____
_____
_____
_____

SUGGESTED TIMETABLE

Weeks 1 - 3	**Step 1**	Choose a project topic. Ask questions, make observations, and learn all you can about a particular topic
Week 4	**Step 2** **Step 3**	Write a question about your topic. Define your problem Write a hypothesis. Does it answer your question? Can you test it? **Turn in Entry Form by Monday, March 8th**
Weeks 5 and 6	 **Step 4** **Step 5**	**Pick up display boards on Thursday, March 18th in the Gymnasium between 3:00 – 3:30 PM** Design experiment or demonstration. Gather materials and conduct experiment or demonstration. Begin analyzing results and drawing conclusions. **Submit changes to project question by Thursday, March 29th.**
Weeks 7 and 8	**Steps 4 & 5** **Step 6**	Repeat experiment if necessary; and continue with analysis. Design and create your display.
Week 9		Drop off project in the gym on **Tuesday, April 6th, 3:00 – 4:00PM** Attend Open House on **Tuesday, April 6th , 6:30 – 7:30PM** Pick up your project in gym on **Wednesday, April 7, 3:00 – 3:30PM**

SAFETY GUIDELINES

1. **All projects must have their own power source. No electricity will be available.**
2. **No dangerous chemicals, open flames, flammable liquids or explosives.**
3. **All liquids must be in closed containers.**
4. **No live animals. Live organisms (i.e. mold, bacteria, or plants) must be properly contained.**
5. **No glass, sharp objects, exploding volcanoes or launching of projectiles.**
6. **No commercially available kits or models.**
7. **Students must use the display boards provided.**

WEBSITE / RESOURCES

Please visit the science fair link on the school's homepage (www.greenwichschools.org/rs) where you can:

- download the **student packet**
- print an **entry form**
- search for available **books in the Media Center** and local public libraries
- link to numerous related **websites**
- browse the list of disciplines below to generate your own project ideas:

PHYSICAL SCIENCE

Astronomy
Chemistry
- Elements & Structures
- Reactions & Diffusion
- Heat Flow
- Pressure & Buoyancy
- Solids, Liquids & Gas

Physics
- Statics & Dynamics
  - Structures & Friction
  - Gravity & Motion
- Waves & Energy
  - Electricity & Magnetism
  - Circuits & Batteries
  - Optics & Acoustics
- Quantum Mechanics

Engineering
- Electric, Mech & Optical
- Motors & Engines
- Locomotion
- Sports Physics

LIFE SCIENCE

Cell Biology
Botany
- Structures
- Soil & Light
- Liquids & Growth
- Habitat

Genetics
Human Biology
- Anatomy & Physiology
- Nutrition

Zoology
- Animal Biology
- Sociology
- Migration & Hibernation

MATHEMATICS/COMPUTERS

Number Theory/Calculus
Geometry & Trigonometry
Probability & Statistics
Computers

EARTH SCIENCE

Ecology
- Air & Soil Pollution
- Water Pollution & Drinking

Water
- Fuel & Energy

Geology
- Rocks, Minerals & Crystals
- Geological Formation
- Mapping

Meteorology
- The Water Cycle
- Local & Seasonal Weather
- Weather Stations

Oceanography
- Oceans, Rivers & Streams

Paleontology

MISCELLANEOUS

Product Testing
Textiles
Urban Planning

All systems go……LIFT-OFF!