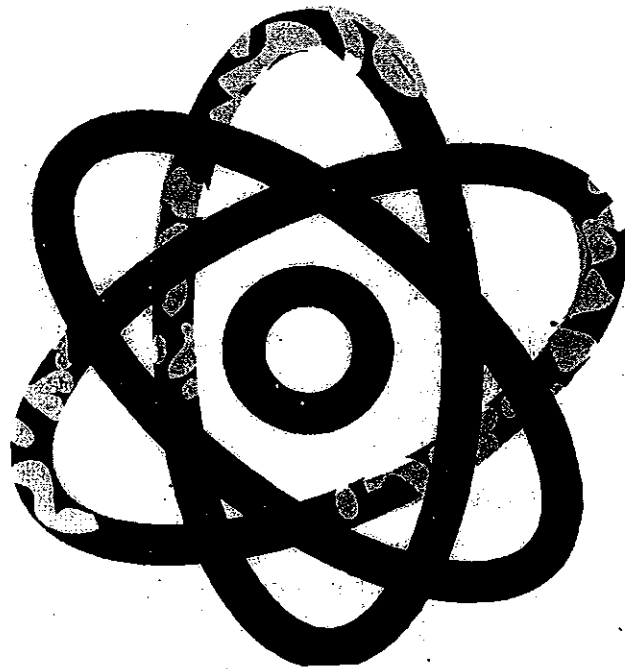


**Elementary Academic**

**Fair**



**Science Project**

**Booklet**

# INTERMEDIATE ELEMENTARY ACADEMIC FAIR SCIENCE

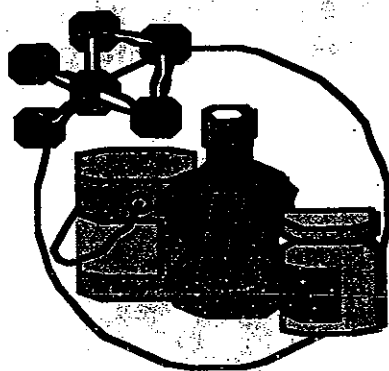
## PHILOSOPHY

The Elementary Academic Fair gives schools the opportunity to display students' outstanding projects in all areas of the curricula, including science.

Students in the elementary schools need to become science literate and proficient in order to compete and survive in a rapidly changing, highly technical world. Teaching students how to do science projects can develop processing skills and problem solving techniques. Learning how to set up an experiment in the primary grades to solving science problems in an organized manner in the intermediate grades, gives students life long skills that will enable them to compete in state and national competitions in middle and high school.

In order to prepare students of the future and to maintain high academic standards it is strongly recommended that the procedures set forth in this booklet be followed. All schools submitting science projects in the Elementary Academic Fair are requested to comply with the rules and regulations set forth. These rules and regulations correlate with state recommendations.

***ELEMENTARY STUDENTS IN BROWARD COUNTY HAVE BEEN DOING SCIENCE PROJECTS FOR OVER TEN YEARS. EACH YEAR THE QUALITY OF THE PROJECTS IMPROVE. IT IS HOPED THAT THIS TREND WILL CONTINUE.***



## **RULES AND REGULATIONS**

These rules and regulations, which are adapted from the State and National Science Fair Rules, must be followed to insure everyone's safety, and to teach students how to properly do a science project. These rules and regulations apply to all grade levels. Teachers, parents, and students should be given a copy of these rules and regulations **PRIOR** to doing a science project. Only those projects that comply with these standards should be selected for entry into the Elementary Academic Fair. It is the responsibility of the entrant's teacher, parent, and school science contact person to insure that all projects exhibited follow the rules and regulations set forth in this booklet.

### **WHO SELECTS PROJECTS TO BE DISPLAYED?**

The school will be responsible for selecting projects to be displayed. It is recommended that the judging criteria in this booklet be used to select projects.

### **WHAT TYPES OF PROJECTS CAN BE DISPLAYED?**

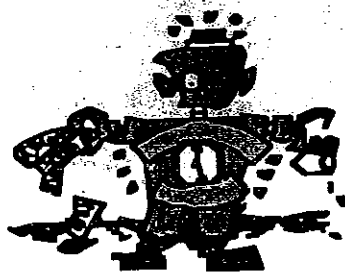
Class projects, individual projects, and cooperative group projects may be displayed.

### **HOW MANY PROJECTS MAY A SCHOOL SUBMIT?**

Each school will be given one table on which to display projects. An additional table may be requested. The tables are 2 1/2 X 8 feet. **Six project boards can be neatly and attractively displayed.**

### **WHAT ITEMS MAY NOT BE DISPLAYED?**

**Chemicals, rubber bands, noxious gases, glass containers, open flames, liquids, foods, explosives, animals, plants, sharp and/or pointed objects, and drugs may not be displayed.**



## **ANIMAL RELATED PROJECTS**

The study of animals by elementary school students under qualified adult supervision is both necessary and important for learning about the life sciences and for encouraging an interest in careers related to the life sciences. Animal projects **MUST** include a concern for the humane and proper treatment of all animals. **ELEMENTARY SCHOOL STUDENTS MAY ONLY DO ANIMAL OBSERVATION PROJECTS.** For example, "Which Color Feeder Attracts Birds the Most"? Students may hang different colored bird feeders in the yard and observe which feeder birds are attracted to the most. Observing the sleeping, eating and playing habits of hamsters and other pets are other animal observation projects that students may do.

**ALL ANIMAL RELATED PROJECTS MUST HAVE A VERTEBRATE ANIMAL VERIFICATION FORM.** This form will need to be kept on file by the parent and teacher. It will be necessary to attach this form to the project if it is displayed in the Elementary Academic Fair.

Any project that has an animal theme to it or anything at all to do with vertebrate animals must be approved **PRIOR** to doing the experiment. A verification form must be signed and included in the project notebook or attached to the project board. It is the responsibility of the school to insure against inhumane treatment of animals. All vertebrate animal projects must have a signed verification form. **The following Florida State Animal Law must be followed:**

**ELEMENTARY STUDENTS MAY NOT DO A PROJECT WHICH CAUSES PHYSICAL OR PSYCHOLOGICAL STRESS TO VERTEBRATE ANIMALS. NO PROJECT MAY BE DONE WHICH MANIPULATES THE BASIC NEEDS OF ANIMALS, SUCH AS FOOD, SHELTER AND WATER.**

For example: Fish cannot be removed from water even for a short period of time. The temperature of the fish tank or container cannot be drastically increased or decreased. In other words, the water cannot be frozen, boiled, or changed in any way to cause stress to the fish.

**ANY PROJECT THAT DOES NOT FOLLOW THE FLORIDA ANIMAL LAW WILL NOT BE DISPLAYED.**

Animal dissections are not permitted. An animal verification form is included in this booklet.

# VERTEBRATE ANIMAL VERIFICATION FORM

THIS FORM MUST BE COMPLETED FOR ALL RESEARCH INVOLVING VERTEBRATE ANIMALS PRIOR TO THE INITIATION OF THE PROJECT. NO PROJECT MAY BE DONE WHICH MANIPULATES THE BASIC NEEDS OF ANIMALS SUCH AS FOOD, SHELTER, AND WATER, SO AS TO CAUSE STRESS.

Any project involving vertebrate animals must have the approval of the school's science fair contact person, parental consent and supervision.

(Print or type)

Student: \_\_\_\_\_

School: \_\_\_\_\_

Date: \_\_\_\_\_

Brief Description: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, \_\_\_\_\_

(Student Signature)

do state that I have complied with the Florida State Statutes - Chapter 85-70, which prohibits projects involving experimentation, which results in physical or psychological stress to vertebrate animals.

APPROVED \_\_\_\_\_

(Science Contact Person)

\_\_\_\_\_  
\_\_\_\_\_

(Teacher)

\_\_\_\_\_  
\_\_\_\_\_

(Parent Signature)

THIS FORM WILL NEED TO BE KEPT ON FILE BY THE PARENT AND TEACHER. IT WILL BE NECESSARY TO ATTACH THIS FORM TO THE PROJECT IF IT IS CHOSEN BY THE SCHOOL FOR DISPLAY IN THE ELEMENTARY ACADEMIC FAIR.

## **HUMAN EXPERIMENTATION**

Experiments with human subjects will be permitted provided that the human subjects are not subjected to any physiological or psychological stress. The human subject verification form must be completed prior to initiation of the project and must be attached to the project notebook or project board.

A copy of the Human Experimentation Form is included in this booklet.

## **SURVEYS**

Surveys are acceptable providing they follow these guidelines:

**\*\* No personal questions that involve invasion of privacy is acceptable.**

**\*\* Permission slips signed by parents are required for those students who participate in surveys related to the tasting of foods and/or drinks.**

## **ARCHAEOLOGICAL EXCAVATIONS**

Exhibits involving archeological excavation will not be accepted if such exhibits show evidence of unsupervised excavation. A written statement of approval should accompany such project.

**If you have any doubt or questions about an animal or human project, please contact the science specialist at 954-767-8407.**



# CERTIFICATION - HUMAN SUBJECT

THIS FORM MUST BE COMPLETED FOR ALL RESEARCH INVOLVING HUMANS PRIOR TO THE INITIATION OF THE PROJECT. ANY PROJECT INVOLVING TASTING OR DRINKING OF FOODS MUST HAVE A SIGNED PERMISSION SLIP FROM THE PARENT OF THE STUDENTS PARTICIPATING INDICATING THAT THE PARTICIPANT IS NOT ALLERGIC TO THE FOODS BEING SURVEYED. SURVEYS THAT REQUIRE QUESTIONS THAT INVADE PERSONAL PRIVACY ARE NOT ACCEPTABLE.

(Print or Type)

Student: \_\_\_\_\_

School: \_\_\_\_\_

Date: \_\_\_\_\_

Title of Project: \_\_\_\_\_

Brief Description of the Project: \_\_\_\_\_

\_\_\_\_\_

I, \_\_\_\_\_ state that no stress, physical or  
(Student's signature)

psychological harm will occur to human subjects participating in my project.

APPROVED \_\_\_\_\_  
(Science Fair Contact Person)

\_\_\_\_\_  
(Teacher)

\_\_\_\_\_  
(Parent Signature)

**THIS FORM WILL NEED TO BE KEPT ON FILE BY THE PARENT AND TEACHER. IT WILL BE NECESSARY TO ATTACH THIS FORM TO THE PROJECT IF IT IS CHOSEN BY THE SCHOOL FOR DISPLAY IN THE ELEMENTARY ACADEMIC FAIR.**

# **THE NOTEBOOK**

Scientists record the information that they obtain when doing research and experiments so that they have a record of everything that has happened. The notebook will contain a title page, table of contents, background information, hypothesis, list of needed materials, procedure for doing the experiment, data collected, conclusion(s), recommendations, acknowledgments, a bibliography, and other pertinent information that the student wishes to include. The following is a step-by-step set of directions for students to follow to help them to learn the scientific method of investigation.

## **TITLE**

There is no specific way in which the title page of the project is to be written. Sometimes it is a declarative statement and sometimes it is in the form of a question. The student may use his/her creative abilities to come up with a catchy title. Illustrating or decorating the title page is permissible and encouraged.

## **TABLE OF CONTENTS**

The Table of Contents will need to be done after the project is completed. However, in the notebook it comes directly after the title page. All parts of the project should be included in the Table of Contents.

## **STATEMENT OF THE PROBLEM**

The Statement of the Problem tells what the project is going to solve. It may be stated in the form of a question. For example, a student wanted to test if all Band-Aids had the same amount of "stickiness." The title of the project was "A Sticky Situation". The Statement of the Problem was: Do All Band-Aids Have the Same Amount of Stickiness?

## **BACKGROUND INFORMATION**

Students will need to research their chosen topic, and write using the Six Traits writing process. Books, encyclopedias, computer programs, internet sites, newspapers, magazines, interviews and information from organizations and institutions are resources that students can use to obtain needed information. Preparing an outline gives the student an organized way of gathering and recording facts. Note taking prevents copying word for word. The more information obtained, the easier it will be to form hypotheses and to carry out the experiment.



## **HYPOTHESIS**

The hypothesis is an educated guess based on information gathered about the particular topic. It can be written using an if/then statement such as: If magnets attract iron, then only those objects that contain iron will be attracted to magnets. It can also be stated as: I think that magnets will attract only those objects that have iron in them because from what I have read, magnets are attracted to iron.

## **MATERIALS**

Make a list of all the materials you need. Try to use inexpensive materials. Check the garage, closets, and cupboards for objects that can be used. Have teachers or parents approve these materials before using them in the experiments. Include the quantity needed (example: 4 paper cups, 3 tablespoons water).

## **PROCEDURE / EXPERIMENT**

The procedure for carrying out the experiment must be written. The procedure is a step-by-step set of directions on how to do the experiment. It is like a recipe. It must be written in such a way that the person doing the experiment will know exactly what to do to be able to get the same results. Write down what was done first, second, etc. Be sure that the directions are clear.

The student should design an experiment, which will fulfill the purpose of the project and test the hypothesis. In an experiment, comparisons are necessary. Take care to have adequate controls. That is, keep conditions the same, whenever possible. For example, if experimenting with fertilizers to determine their effect on plant growth, the following is an example of what you could do:

1. Place 6 or more plants in an area in your house or class so that all plants receive the same amount of light.
2. Water each plant with the same amount of water.
3. Add the same amount of fertilizer to 3 plants. Leave the other 3 plants unfertilized, these will be the controls.

Water and light are constants in your experiment. The fertilizer is the variable. A good experimental design should test only one variable at a time. A log or diary should be used to record the data obtained from the experiment.

When setting up an experiment make sure to do the following:

Have all materials ready.

Follow the procedure exactly as written.

Record the data using a chart, graph, log or observation sheet.

**REMEMBER: IN ORDER FOR THE EXPERIMENT TO BE MEANINGFUL, THE EXPERIMENT SHOULD BE REPEATED AT LEAST THREE TIMES.**

## **DATA AND OBSERVATIONS**

Data is the name given to the information obtained during the experiment. The way in which data is recorded is very important. Record the data using charts, graphs, tables, pictographs, logs, photographs, written observations, or anecdotal records. The more data there is, the more accurate the conclusion will be. Doing an experiment just one time does not give sufficient information to draw a conclusion.

## **CONCLUSION**

Once the information and data have been analyzed, a conclusion can be written. In the conclusion, the project is summarized and evidence is given to support or reject the original hypothesis. If the data collected does not support the hypothesis, the student should not consider the experiment a failure. Part of the conclusion then would be to try to explain why the data did not support the hypothesis.

## **RECOMMENDATIONS**

If this experiment were to be done again, what should be done differently? What new ideas have come from this project? Did the experiment need more trials? Should the study be continued? (Example: same study, year two).

## **ACKNOWLEDGMENTS**

This part of the project gives the student the opportunity to thank all of the people who helped with the project. The student should state what the person did to help with the project.

## **BIBLIOGRAPHY**

This portion of the project lists all of the resources that were used to gather information about the topic. These resources are written in an organized manner. Below is a sample of the types of bibliography that are needed for each specific reference.

**IF MORE THAN ONE RESOURCE IS USED, THEY MUST BE LISTED IN ALPHABETICAL ORDER ACCORDING TO AUTHOR.**

### **MOVIE, FILM, LASER DISC, VIDEO**

"Title", series name if known, publisher, city, copyright date.

### **ENCYCLOPEDIA**

"Title of article", name of encyclopedia, volume number, publisher, city published, copyright date, page numbers.

### **JOURNAL**

Author's last name, author's first name. Journal title, Title of Article, Volume, Page Numbers, Publisher, city published, date, (if the journal is only about one topic, do not add page numbers).

### **BOOK / PAMPHLET**

Author's last name, Author's first name. Book/Pamphlet Title, Volume, Page Numbers, Publisher, city published, date, (if the book/pamphlet is only about one topic, do not add page numbers). If the book/pamphlet is about many topics, add page numbers after the date.

### **INTERVIEW**

Name of person (last, first), title of person, company the person works for or what the person does, where the interview took place, date of interview.

## WORLD WIDE WEB

Author (if known). "Title of page or document". Title of site or larger work (if applicable). Date of document. Online.http://www.address/filename. Date of access.

## E-MAIL

Author of e-mail message. "Subject line of message". E-mail to recipient's name. Date of message.

## ONLINE ENCYCLOPEDIA

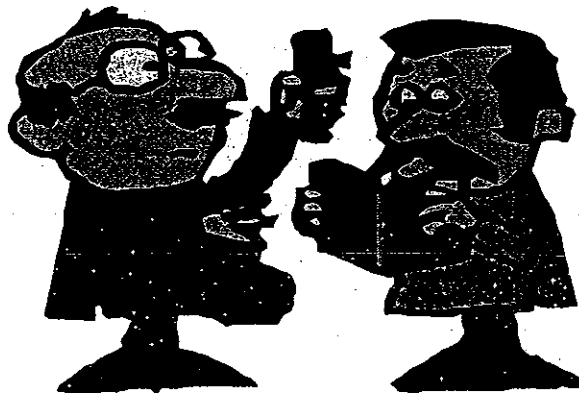
Author. "Title of Article". Title of Reference Work. Title of the Database of Online Service. Date of access.

## CD-ROM (PERIODICAL)

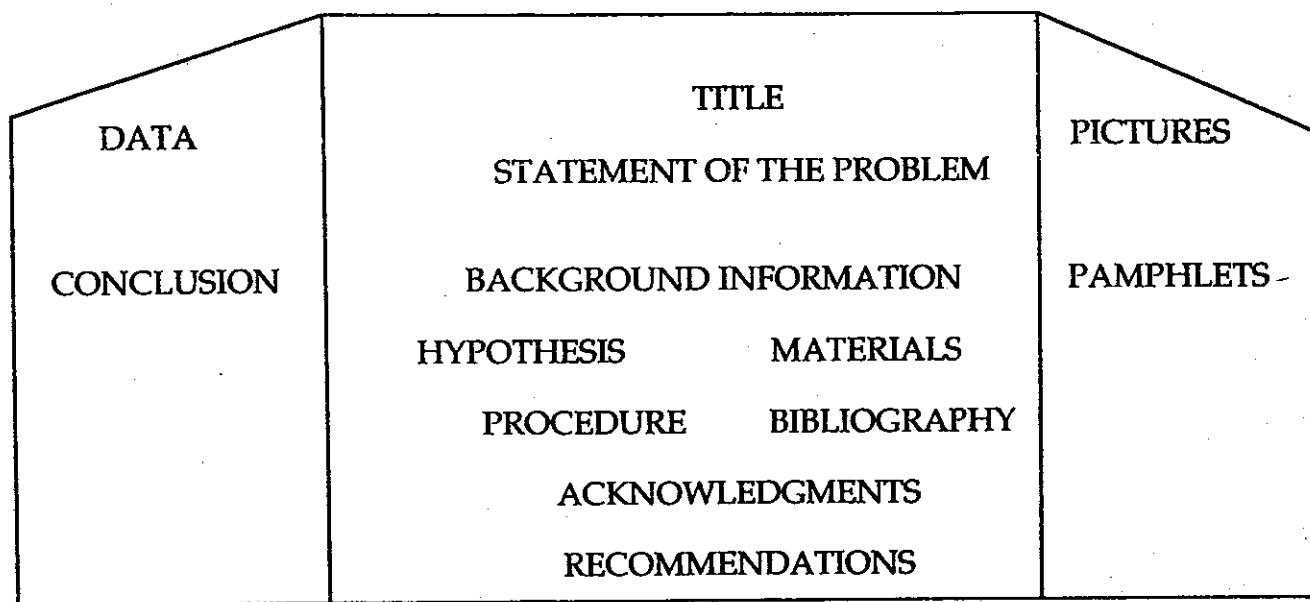
Name of author (if available). "Title of article". Publication information for printed source. Title of database. Publication medium (CD-ROM). Name of Vendor (if relevant). Electronic publication date.

## CD-ROM (NONPERIODICAL)

Name of author (if given). "Title of part of work". Title of Product, Edition or Release (if relevant). Publication medium (CD-ROM). City of Publication: Publisher, Year of Publication.



# THE DISPLAY



The display is an organized and creative way of showing the work that was done on the project. The display contains a summary of the process steps. The Title and Statement of the Problem may be displayed using precut letters or letters designed by the student. The Background Information will be a summary of the research. It may be mounted on colorful construction paper and attached to the board. The total research paper will be kept in the notebook. Display a copy of the Hypothesis, Procedure, Materials, Data and Observation Charts, Conclusion, Recommendations, Acknowledgments, and Bibliography. These should be mounted on colorful construction paper. Include pictures, pamphlets, letters, creative writing, and anything else the student wishes to display pertaining to the project.

Even though the display may seem to be a copy of what is in the notebook, keep in mind that the notebook can be saved and easily stored. The display board may be recycled for other projects.

It is highly recommended that showboards be used to display projects. These showboards are available in many supermarkets, school supply stores, and art stores. Poster board or any other material that is not strong enough for the project to be freestanding may not be used. Wood, pegboard, cardboard boxes and masonite are all acceptable materials from which a display board may be constructed.

**INDIVIDUAL PROJECTS MUST BE NO BIGGER THAN 24" WIDE, 30" DEEP, AND 48" HIGH. THEY MAY BE SMALLER.**

## PLANT STUDIES

- What percentage of seeds in a package will germinate?
- How much of an apple is water?
- Does a plant need some darkness to grow?
- What are the effects of chlorine on plant growth?
- How does light direction affect plant growth?
- Do different types of soil hold different amounts of water?
- Will adding bleach to the water of a plant reduce fungus growth?
- Does sugar prolong the life of cut flowers?
- How much of an orange is liquid?
- Does the color of light affect plant growth?
- Do plants grow bigger in soil or water?
- How much weight can a growing plant lift?
- Does it matter in which direction seeds are planted?
- What plant foods contain starch?

## PHYSICAL SCIENCE

- Which liquid has the highest viscosity?
- Will more air inside a basketball make it bounce higher?
- Do all colors fade at the same rate?
- Does a baseball go farther when hit by a wood or metal bat?
- What kind of glue holds two boards together better?
- Can you use a strand of human hair to measure air moisture?
- How far can a water balloon be tossed to someone before it breaks?
- Does the shape of a kite affect its flight?
- What gets warmer faster - sand or soil?
- In which way does the wind blow most frequently?
- Will a ball bounce higher if it is dropped at a greater distance from the floor?
- Do sugar crystals grow faster in tap water or distilled water?
- What common liquids are acid, base or neutral?
- What determines how fast a piece of candy dissolves?
- Which type of line carries sound waves best?
- Which metal conducts heat best?
- Can same-type balloons withstand the same amount of pressure?
- Does the viscosity of a liquid affect its boiling point?
- What materials provide the best insulation?
- Which keeps things colder - plastic wrap or aluminum foil?

Do liquids cool as they evaporate?

Does the size of a light bulb affect its energy use?

How long a distance can speech be transmitted through a tube?

Does the color of a material affect its absorption of heat?

Does sound travel best through solids, liquids or gases?

Is the amount of erosion affected by the slope of land?

How much heat does a closed automobile absorb?

## **WATER**

Does baking soda lower the temperature of water?

Does the color of water affect its evaporation?

Can you separate salt from water by freezing?

Will water with salt evaporate faster than water without salt?

What type soil filters water best?

What types of bacteria are found in tap water?

## **INTERMEDIATE SCIENCE FAIR PROJECT IDEAS**

- Which liquid freezes most quickly?
- Does color affect the rate at which an ice cube melts?
- Through which materials will magnetism pass?
- Does the shape of an ice cube affect its melting rate?
- What can you do to make a toy parachute fall more slowly?
- Which brand of popcorn makes the largest yield?
- Does color affect the evaporation rate of water?
- Do bigger seeds make bigger plants?
- Do bigger wheels roll faster?
- Does the type of soil affect plant growth?
- Which liquid dissolves pills faster?
- Does color affect heat absorption?
- Does the design of paper airplanes affect the distance they will fly?
- Does temperature affect germination of seeds?
- Which liquid evaporates most quickly?
- Does the color of a birdhouse affect feeding habits of birds?
- Do vitamins affect the germination of seeds?
- Does the kind of water absorbed by seeds affect germination?
- Does music affect plant growth?
- Does temperature affect crystal formation?
- Does temperature affect mold growth?
- What is the most effective way to get rid of stains in clothes?
- Which age group has the best memory?
- What do elementary students fear the most?
- Do the phases of the moon affect germination?
- How does the growth of plants under incandescent lighting compare to the growth of plants under fluorescent lighting?
- Does magnetism affect plant growth?
- Does music affect the time it takes children to put a puzzle together?
- Which shampoo is best for your hair?
- How does over population affect the behavior of an ant colony?
- What foods attract different insects?
- Through which materials will magnetism pass?
- Does the way food is stored affect its freshness?
- Does temperature affect germination of seeds?
- Does temperature affect the way ants behave?
- Does color affect peoples ideas about the taste of food?
- Do the moon phases affect the way children perform in school? ...or behave in school?
- Which materials are effective conductors?
- Do sounds affect the behavior of crickets?



Does music or sound affect sleep or the time it takes to sleep?  
Which shampoo is best for your hair?  
Which leaves, berries, flowers, or vegetables make the best dyes for cloth?  
Which whitener works best?  
Which toothpaste is best for your teeth?  
Are the same insects attracted to traps placed at different heights above ground.  
Does human hair affect the growth of plants?  
Which type of plant grows best under artificial lights?  
Does temperature affect capillary action in celery plants or carnations?  
How does rotation affect plant growth?  
Does the amount of salt in water affect the boiling temperature of water?  
What kind of light bulb last longest and is cheapest?  
What metal is the best conductor of heat?  
Which plastic zip-lock bag brand is the most secure container?  
What is the best method of disposing of plastic garbage bags?  
What is the effect of light and temperature on bread molds?  
Which household kitchen wrap is best to protect against leakage?  
Is there a difference in short term memory skills between males and females?  
Does color affect the short term memory of a list of words?  
How much information do people recall after memorizing a list?  
Does background music have an impact on memory?  
Which fast-food burger contains the least grease?  
Does photosynthesis take place when there is no light?  
How much light do plants need to survive?  
What is the effect of temperature on the rate of photosynthesis?  
Would soapy water harm or help seed sprouting plant growth?  
Does the starting temperature of water affect how long it will take to freeze?  
Which bat hits a ball the farthest, aluminum or wood?  
What is the best shape or design of a boomerang?  
How does the tail affect the flight of a kite?  
Does the color of an object determine how much heat it absorbs from sunlight?  
Does the color of a liquid contribute to its ability to absorb heat?  
Does temperature affect how much salt or sugar can be dissolved in water?  
Does surface area affect the evaporation rate of liquids?  
Which temperature of water helps detergents removes stains best?