Christian Philosophy of Science

Integrating the Bible with the school's science curriculum goes deeper than the use of scientific facts to illustrate spiritual truth, though such use is clearly scriptural. It also goes deeper than merely quoting Bible verses that refer to scientific subjects. It involves finding the scientific facts and principles that are taught in the Bible and incorporating them into the teaching where they are relevant to the subject at hand, thus consolidating truth gained from Bible study and from observations by men. All truth is God's truth.

The Psalmist declares that God is the Creator and Sustainer of the world in which we live (89:11). Paul reminds us that this world is governed in an orderly way by specific laws and properties of matter and energy that God has established (Colossians 1:16–17). In order to fulfill His biblical mandate to subdue the earth and be good stewards of its resources, we must discover and understand all we can about the world in which we live.

Students must be trained to carefully and objectively study God's world. The truths of biblical creationism and the sacredness of human life must be instilled in the student's heart. Evolution must clearly be presented as a theory. While the Bible is not a science book, it is true where it touches on areas of science. Thus, scientific theories must be evaluated in light of God's holy inspired Word. It is God, rather than humans and their technology, who will be able to effect a positive and permanent solution to humankind's problems in this fallen, sinful world.

Helping our students to think critically and constructively from a Bible-based Christian worldview should be a major concern of ours. Our students should see that technology itself is generally amoral. How we use it, though, becomes morally significant. Our students must continue to rely on God and His plan, giving Him the praise for all scientific discoveries and advancements and seeking to apply these for His glory.

Students and teachers must be engaged in both the study of science and the study of the Bible in order for this kind of integration to take place. Christian school teachers need to search for ways to involve pupils in learning science from a biblical world- and life view. It is our prayer that the instruction preceding the Science Fair, as well as the actual Science Fair, will enhance the efforts of the teacher.

Finding and incorporating biblical principles in the teaching of science must be done. However, using scientific facts to illustrate spiritual truth and highlighting Bible verses that refer to scientific subjects are worthy teaching strategies. The following biblical principles are just a few of the many truths that can provide the biblical theme/concept for your students' science projects:

Illustrations of Biblical Themes/Concepts

A. As we observe nature, God uses His creation to teach eternal truth.

1. "The heavens declare His righteousness, and all the peoples see His glory" (Psalm 97:6, NKJV).
   "The heavens declare the glory of God; and the firmament shows His handiwork" (Psalm 19:1, NKJV).
   "For the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead; so that they are without excuse" (Romans 1:20, KJV).

   a) In Genesis 9, God makes the rainbow as a reminder of His faithfulness to His promise that He would not again cover the earth with a flood.

   b) Matthew 6 points to God's faithfulness to clothe the grass of the field. Certainly, He is faithful to care for the needs of His children.

B. God cares about the resources He has provided. Caring for these resources is part of humankind's responsibility to God.

1. "The heaven, even the heavens, are the LORD's: but the earth hath he given to the children of men" (Psalm 115:16, KJV). "But in the seventh year shall be a sabbath of rest unto the land, a sabbath for the LORD: thou shalt neither sow thy field, nor prune thy vineyard. That which growth of its own accord of thy harvest thou shalt not reap, neither gather the grapes of thy vine undressed: for it is a year of rest unto the land" (Leviticus 25:4–5, KJV).

   a) We learn from Genesis 2:15 that God placed man in the garden to dress and keep it, not to do as he pleased with it, and not to tear it down. Numerous ecological projects are available to the students (for example, the research of the impact of the destruction of wetlands).

   b) Disease prevention and precautions to be taken against the spread of infection are discussed in Leviticus 15. Student research could explore the areas of hygiene, water pollutants, and disease control techniques.

2. "The grass withereth, the flower fadeth: but the Word of our God shall stand forever" (Isaiah 40:8, KJV).

   a) God uses the shortness of the life of plants as a contrast to the enduring character of the Word of God (Isaiah 40:8; 1 Peter 1:24–25).

   b) God uses the small size of a mustard seed to emphasize the fact that faith does not have to be big to produce big results (Matthew 13:31–32).

   c) John 4:35 calls attention to the whitened harvest fields, loaded with grain and needing immediate harvesting, to show the urgency of reaching people with the gospel. The Word of God abounds with principles, concepts, and themes of science. May the Lord grant you wisdom as you seek to bring these truths to the attention of your students, as well as assist them with the preparation of their projects.

Objectives

1. Encourage students to develop and apply creativity, skill, and logical thinking to the solutions of science, engineering, and mathematical problems, and to be challenged to further scientific study.
2. Encourage students to increase in knowledge, interest, and understanding of God's universe and all His creation.
3. Provide opportunities for students to display their science projects and observe the work of other Christian school students in the field of science.

Study, Third-Year Study, etc. The return of a project is not to be viewed as a shortcut to preparations for the current year's ACSI Science Fair.

4. The ACSI Science Fair includes grades 1–12. The grade divisions are as follows:

   Elementary—Grade Divisions: 1–2, 3–4, 5–6

   Junior High—Grade Division: 7–8

   Senior High—Grade Divisions: 9–10, 11–12

   Note: If your school is participating in a Science Fair for grades 6–12, your sixth-grade students must follow the junior/senior high rules for experimental projects only.

5. Each ACSI regional office will determine the number of student entries per school.

6. Students may use computers for research to compile information, just as they would use an encyclopedia or any other printed material. They may also use the computer to create their own graphs and display board headings, and to prepare the written report.

7. Information concerning details for the day of the event, such as maps for the location of the host school and the display area within the school, as well as time schedules for judging and public viewing will be communicated to registered schools by the chairperson.

C. Awards

Awards will be presented for all projects, according to their criteria merit. Awards are determined by each ACSI regional office.

Scoring Chart

Elementary	Rating	Junior/Senior High
50–41 points	Superior	100–86 points
40–31 points	Excellent	85–71 points
30–21 points	Good	70–56 points

D. Categories

1. Life Science

   a) Observe, investigate, describe, and classify living things

   b) Major disciplines: Zoology, Botany

   c) Areas of study include life cycles, structure, function, reproduction, heredity, interdependence, behavior, changes

2. Physical Science

   a) Observe, investigate, describe, and explain the structure and properties of nonliving matter and energy

   b) Major disciplines: Physics, Chemistry, Oceanography, Meteorology, Astronomy

   c) Areas of study include changes, interactions, motions, forces, reactions

3. Engineering (grades 9–12 only)

   a) Projects that directly apply scientific principles to manufacturing and practical uses

   b) Includes civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering

Display Safety Standards

The following rules that are based on the rules of the International Science and Engineering Fair (ISEF) must be followed. A copy of the ISEF rules may be obtained online at www.societyforscience.org/isef/students/rules_regulations.asp.

Note: The following rules only apply to what is included in the actual display. The following items can be used for the project only if they are represented by photographs, drawings, or artificial items in the actual display.

A. Not Allowed in Project Display

Anything potentially dangerous to the public is prohibited in your ACSI Science Fair display, including, but not limited to, the following as determined by the entrant's adult sponsors and the event chair:

1. No living organisms, including plants
2. No taxidermy specimens or parts
3. No preserved vertebrate or invertebrate animals
4. No human or animal food
5. No human/animal parts or body fluids (for example, blood, urine)
6. No plant materials (living, dead, or preserved) that are in their raw, unprocessed, or nonmanufactured state (exception: manufactured construction materials used in building the project or display)
7. No laboratory/household chemicals, including water (exceptions: water that is integral to an enclosed apparatus)
8. No poisons, drugs, controlled substances, hazardous substances or devices (for example, firearms, weapons, ammunition, reloading devices)
9. No dry ice or other sublimating solids
10. No sharp items (for example, syringes, needles, pipettes, knives)
11. No flames or highly flammable materials
12. No batteries with open-top cells
13. No photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, or other lab procedures
14. No active Internet or email connections as part of displaying or operating the project at the ACSI Science Fair
15. No glass or glass objects unless deemed by the entrant's adult sponsors and event chair to be an integral and necessary part of the project (exception: glass that is an integral part of a commercial product such as a computer screen)
16. No apparatus deemed unsafe by the entrant's adult sponsors and the event chair (for example, large vacuum tubes or dangerous ray-generating devices, empty tanks that previously contained combustible liquids or gases, pressurized tanks)

B. Allowed in Project Display *but* with the Restrictions Indicated

1. Soil or waste samples if permanently encased in a slab of acrylic
2. Postal addresses, World Wide Web and email addresses, telephone numbers, and fax number of the entrant only
3. Photographs and/or visual depictions if

    a) They are not deemed offensive by the entrant's adult sponsors and the event chair

b) Their origins are credited (such as the photographer, a website, magazines, newspapers, journals)

c) They are photographs or visual depictions of the entrant

d) They are photographs of human subjects who have signed consent forms

4. Rockets or any apparatus with unshielded belts, pulleys, chains, and moving parts with tension or pinch points if for display only and not operated

5. Class II lasers if

a) Operated only by the entrant, and only during judging

b) Labeled with a sign reading "Laser Radiation: Do Not Stare into Beam"

c) Enclosed in protective housing that prevents physical and visual access to the beam

d) Disconnected when not being operated

6. Class III and IV lasers if only for display and not operated

7. If adequately insulated, any apparatus producing temperatures that will cause physical burns

8. Behavioral studies for which there are signed consent forms (See ISEF forms listed on Project Approval Form.)

C. Electrical Regulations at the ACSI Science Fair

1. Entrants requiring 120 or 220 Volt A.C. electric circuits (maximum allowed and as available at facility) must provide a UL-listed 3-wire extension cord that is appropriate for the load and equipment.

2. All electrical connectors, wiring, switches, extension cords, fuses, etc., must be UL-listed and must be appropriate for the load and equipment. Connectors must be soldered or made with UL-listed connectors. Wiring, switches, and metal parts must have adequate insulation and over-current safety devices (such as fuses) and be inaccessible to anyone other than the entrant. Exposed electrical equipment or metal that possibly may be energized must be shielded with a nonconducting material or with a grounded metal box to prevent accidental contact.

3. There must be an accessible, clearly visible on/off switch or other means of disconnect from the 120 or 220 Volt power source.

Project Requirements

A. Display Overview

Experimental/Engineering Project Display

1. Title
2. Abstract
3. Background information, including problem and hypothesis
4. Experimental design/engineering design
5. Results, including tables and graphs of data
6. Conclusion(s)
7. Written report
8. Logbook, including ASCI Project Approval Form and additional ISEF forms as needed
9. Equipment, samples, or other items from your experiment
10. Biblical application/illustration (also include in written report)
11. Photographs and/or diagrams to show steps in the process

B. Display Board Criteria

1. Maximum Size

The exhibit display area may not exceed 48" wide by 30" deep by 72" high from the tabletop. Those exceeding the limit will be penalized in points.

2. Display Board

a) Possible materials for backboard displays are plywood, wood, Peg-Board, pressed wood, foam core, and cardboard. Backboard sections should be joined together securely to make a rigid support for the display. Items should be securely attached to the backboard. Projects must be freestanding for table display.

b) The project display should be attractive, creative, eye-catching, neat, and informative.

c) The project title, hypothesis (experimental projects only), and abstract (250 words or fewer) must be on the display.

d) Computer-generated graphics and lettering must be the student's work.

e) Computers may be used for simulation, modeling, animation, data display integral and essential to understand, analyze or interpret the project and not for general PowerPoint or other visual or sound presentation.

f) The student's name, grade, and school name must be on an identification label (provided in this manual), and the label must be placed on the back of the project in the lower right-hand corner.

The student's name and school name must not be visible to the judges.

3. Electric

All exhibits requiring electricity must be designed for 120 or 220 Volts. The entrant needs to provide appropriate UL-listed cords.

4. Gas/Water

No gas or water outlets will be provided.

5. Suitability for Exhibition

Dangerous/unsafe exhibits will not be permitted. (Please refer to the Display Safety Standards.) The fair officials reserve the right to remove any project deemed objectionable or hazardous.

C. Display/Project Information

1. Title/Topic

a) Topic

(1) A good project is one that is chosen to fit your interests and abilities, so the time you spend selecting a topic is very important for your future success. *You will be working with this project for a long time.*

(2) Do not choose a topic that you will be unable to do, or a topic that requires equipment that is too costly to obtain. Stay within your abilities and means. Sometimes, equipment can be borrowed from a teacher or a friend, but you should check before choosing your topic.

(3) Be sure that topics encompassing sensitive issues are dealt with from an appropriate Christian perspective, and avoid any topic that may be offensive.

(4) Consider the following suggestions:

(a) Look through the project topic ideas listed in this handbook.

(b) Examine scientific magazines and textbooks for labs and problems.

(c) Read current-affairs magazines for possible ideas.

b) Title

(1) Use a question format.

(2) Make it short, yet descriptive, conveying specific information about your project.

2. Abstract

An abstract is a summary and description of what was done and what happened as a result (250 words or fewer).

Example: "Three brands of tennis balls were tested to determine which one retained its bounce over the longest period of time. The balls were regularly bounced over a five-week period. Of the three brands tested—Brand A, Brand B, and Brand C—Brand B retained its bounce best."

3. Background information, including research

a) Include a problem and a hypothesis, presented separately.

(1) State the problem in one sentence. It is the question you set out to answer.

(2) The hypothesis predicts what you believe will happen.

4. Experimental design/Engineering design and hypothesis

Include a drawing or diagram of the project.

5. Results including tables and graphs of data

Include a graph, table, or picture with an explanation, pointing out comparisons or trends.

6. Conclusions

a) Specifically state whether the hypothesis is correct and if not, state the changes that are needed to attain desired results.

b) State what further experimentation could be done to broaden the scope of the problem.

7. Written Report

   Elementary school students: Each exhibit must include a written report. Reports for grades 1–3 should be handwritten (though 3rd graders have the option of using word processing); reports for grades 4–6 may be either handwritten or typed. The extent of detail and length of reports will depend on the grade level of the student, ranging from a few sentences for students at grade levels 1–2 to 200–250 words for students at grade levels 5–6. All sources must be identified/referenced, whether they are from the Internet, computer software, etc. The written report must include the biblical application/illustration that also appears on the display.

   Junior/Senior high school students: Each exhibit must include a research report typewritten in APA or MLA style. The exhibit must include not only details of literary research done on the hypothesis but also an explanation of biblical application. The length of the report for grades 7–8 is to be about 500 words, and for grades 9–12 about 700 words.

8. Logbook

   The logbook is the history and the record of progression of your science project. It begins the first day you receive the assignment and ends the day you turn it in. It is a diary for your science project. Every time you work on your project, you need to record your work in your logbook. When your experimentation begins, you will refine your procedure in detail and write it out in your logbook, step-by-step, drawing and labeling any apparatus you use and explaining how all the variables are controlled.

   If you complete an experimental or engineering project, you must include the ACSI Project Approval Form in your logbook, as well as any other necessary ISEF forms.

   Consent forms are required for photographs of individuals as well as for behavioral studies. These signed consent forms must be placed in the logbook.

   Your data is first taken in your logbook. Your results are first formulated in your logbook. Resulting data will be summarized in your written report.

   Everything you do on your project is in your logbook!

   Remember: From start to finish, everything must be in your logbook. Keep the book neat and clean. It will be displayed with your project at any fair you attend.

9. Examples and Equipment (adhere to safety standards)

   Adhere to safety standards regarding the equipment, samples, and other items from your experiment.

10. Biblical Application/Illustration

    Each project must include a related biblical application/illustration, and it must be included on the visual display. The student should demonstrate an understanding of this application/illustration in the written and oral presentations.

11. Photographs and/or Diagrams

    Photographs and/or diagrams should be included in the logbook or on the display to demonstrate the experimental process.

12. Project Forms

The ACSI Science Fair follows the guidelines and rules of the International Science and Engineering Fair (ISEF) to ensure safe, approved projects.

a) The ACSI Project Approval Form, required for all entrants, replaces ISEF Forms 1–3.

b) The following ISEF forms may be necessary:
- Human Subjects Form (4)
- Vertebrate Animal Form (5)
- Human and Vertebrate Animal Tissue Form (6)
- Continuation Projects Form (7)

c) The ISEF Forms can be accessed at www.societyforscience.org/isef/.

13. Engineering

Engineering projects are investigative in nature and design and use a modified scientific method. An engineering project often answers the question, "What are the effects of A on B?" Engineering projects generally seek broad answers to problems involving physical or engineered systems. Because they do not lead to yes/no answers, it is often difficult to formulate a hypothesis for an engineering project. The project often involves the use of constructed equipment, instruments, or tools in the investigation. The results of the inquiry are the goal, rather than proving or disproving a hypothesis.

a) Define a need or a problem.

b) Develop design criteria. Equipment, instruments, or tools are devised to assist in the investigation.

c) Search literature to see what has already been done to meet this need.

d) Prepare preliminary designs. A plan of investigation should be developed, including provision for data taken at the null condition to serve as a control.

e) Build and test a prototype. The equipment is used to conduct the investigation according to the plan.

f) Record data, and make observations.

g) Analyze data (statistical methods can often be to determine the results).

h) Draw conclusions from the results to provide answers to the problem.

i) Retest and redesign as needed and desired.

Project/Category Topic Ideas

A. Experimental Project Ideas

1. Questions to Ask to Prompt Ideas

a) Which is dirtier, rainwater or tap water? Collect and compare water samples.

b) What material produces the most static cling to a balloon?

c) How does sunlight (or lack of it) affect the growth of a plant?

d) Which type of soil is best for growing? (Using the same kind of plant, try different types of soil, ones with different added nutrients, etc.)

e) Which paper towel is most absorbent? What ingredient/content makes the difference?

f) What ordinary household product(s) can be used to prevent rust?

g) What household/cooking items effectively prevent sliced apples from browning?

h) Do fingernails grow faster than toenails? Carefully outline nails; chart growth over a specific period.

2. Books to Read for Additional Ideas/Suggestions

Important: The following list of books is for your convenience in finding project ideas. All projects, regardless of their source, may need to be altered/modified to comply with the ACSI Science Fair Coordinator's Handbook rules.

The Know How Book of Experiments by Heather Amery
Research Adventures for Young Scientists by George Barr
More Research Adventures for Young Scientists by George Barr
Mr. Wizard's Experiments for Young Scientists by Don Herbert

B. Problem-Solving Project/Category Ideas

Primary category	Ideas
1. Life Science	Animal Behavior—ethology, learned or instinctive animal behavior, learning, animal biorhythms, etc.
2. Physical Science	Astronomy—study of the composition, motions, and structure of the universe.
3. Physical Science	Biochemistry—molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, etc.
4. Life Science	Biology/Microbiology—bacteriology, virology, proto-zoology, fungal and bacterial genetics, yeast, animal ecology, plant ecology, plant and animal life in an ecological area, etc.
5. Life Science	Botany—agriculture, agronomy, horticulture, forestry, plant biorhythms, palynology, plant anatomy, plant taxonomy, plant physiology, plant pathology, plant genetics, hydroponics, algology, mycology, etc.
6. Physical Science	Chemistry—physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, materials, plastics, fuels, pesticides, metallurgy, soil chemistry.
7. Physical Science	Computer Science—development of computer hardware, software engineering, internet networking and communications, graphics (including human interface), simulations/virtual reality or computational science (including data structures, encryption, coding, and information theory).
8. Physical Science	Crystallography—chemistry (crystal composition), mathematics/computers (symmetry), and physics (lattice structure).

9. Physical Science	Earth/Space Sciences—geology, geophysics, physical oceanography, meteorology, atmospheric physics, seismology, petroleum, geography, speleology, mineralogy, topography, optical astronomy, radio astronomy, astrophysics, etc.
10. Life Science	Ecology-Pollution—study of the eutrophication of lakes: social sciences (human beings who caused the problem), chemistry (process of eutrophication), botany (growth of algae), engineering (water purification systems), medical sciences (health effects on human beings), microbiology (effects on microorganisms), zoology (fish population), and biology (study of relations between organisms and polluted environment).
11. Physical Science	Engineering/Electronics—civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering, power transmission and generation, electronics, communications, architecture, bioengineering, lasers, computers, instrumentation, etc.
12. Life Science	Human Psychology/Social Sciences—psychology, sociology, anthropology, archaeology, ethnology, linguistics, animal behavior (learned or instinctive), learning, perception, urban problems, reading problems, public opinion surveys, educational testing, etc.
13. Physical Science	Instruments—the design and construction of a telescope, bubble chamber, laser, or other instrument would be properly placed in engineering if the design and construction were the primary purpose of the project. If a telescope was constructed, the telescope was used to gather the data, and an analysis of the data was presented, the project should be placed in earth/space sciences.
14. Life Science	Marine Science—animal behavior (schooling of fish), botany (marine algae), zoology (sea urchins), or biology (plant and animal life of tide pools, estuaries, etc.).
15. Physical Science	Mathematics—calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability, topology, logic, operations research, other topics in pure and applied mathematics.
16. Life Science	Medical Sciences—medicine, dentistry, pharmacology, veterinary medicine, pathology, ophthalmology, nutrition, sanitation, pediatrics, dermatology, allergology, speech and hearing, etc.
17. Physical Science	Meteorology—study of the structure and composition of our atmosphere, weather and climate, and storms.
18. Physical Science	Oceanography—study of the structure and dynamics of the ocean.
19. Physical Science	Physics—solid state, optics, acoustics, particle, nuclear, atomic, plasma, superconductivity, fluid and gas dynamics, thermodynamics, semiconductors, magnetism, quantum mechanics, biophysics, etc.
20. Physical Science	Rockets—chemistry (rocket fuels), earth/space science (use of a rocket as a vehicle for meteorological instruments), engineering (design of a rocket), physics (computing rocket trajectories), or medical sciences (effects of rocket acceleration on mice).
21. Physical/Life Science	Space-Related Projects—many projects involving "space" do not go into earth/space sciences: botany (effects of zero gravity on plants), medical sciences (effects of gravity on humans), engineering (development of closed environmental system for space travel).

22. Life Science	Speech and Hearing—human psychology/social sciences (reading problems), engineering (hearing aids), medical sciences (speech defects), physics (sound), and zoology (structure of the ear).
23. Life Science	Vitamins—biochemistry (how the body deals with vitamins), chemistry (analysis), and medical sciences (effects of vitamin deficiencies).
24. Life Science	Zoology—animal genetics, ornithology, ichthyology, herpetology, entomology, animal ecology, anatomy, paleontology, cellular physiology, animal biorhythms, animal husbandry, cytology, histology, animal physiology, neurophysiology, invertebrate biology, etc.

C. Website Resources

Please note: The following list of websites does not imply ACSI endorsement of the organizations or of materials on the websites. ACSI does not endorse the content on these websites or guarantee that all content would be suitable and/or appropriate for ACSI Science Fairs. Please be sure to select items that will meet the criteria presented in this manual.

www.billnye.com/flash.html
www.cdli.ca/sciencefairs
http://homeworkspot.com/sciencefair
www.super-science-fair-projects.com
www.all-science-fair-projects.com
http://scienceclub.org//kidproj1.html
www.ars.usda.gov/is/kids/fair/ideas.htm
www.scienceproject.com
www.neiu.edu/~pjdolan/chemistry.htm
www.rossarts.org/naples/ideas.htm
www.top-science-fair-projects.com
http://youth.net/nsrc/sci/sci.index.html
www.madsci.org/experiments
http://camel.math.ca/Education/mpsf
http://pbskids.org/zoom/activities/sci/
http://sln.fi.edu/tfi/activity/act-summ.html
www.exploratorium.edu/science_explorer/index.html
http://school.discovery.com/sciencefaircentral/scifairstudio/ideas.html
www.spotsylvania.k12.va.us/bms/bmssf.htm
www.energyquest.ca.gov/projects/index.html
http://earthquake.usgs.gov/4kids/sciencefair.html
http://mathforum.org/teachers/mathproject.html
http://faculty.washington.edu/chudler/experi.html
http://parentingteens.about.com/library/sp/blscpro31.htm
http://photoscience.la.asu.edu/photosyn/education/sciencefair.html
www.ag.ohio-state.edu/~breads/sciencefair.html

DISPLAY BOARD SAMPLE

ABSTRACT

"Three brands of tennis balls were tested to determine which one retained its bounce over the longest period of time. The balls were bounced over a five-week period. Of the 3 brands tested – Brand A, Brand B and Brand C – Brand b retained its bounce best."

BACKGROUND INFORMATION

Problem

Hypothesis

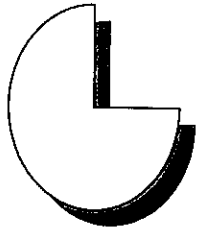
CONCLUSION:

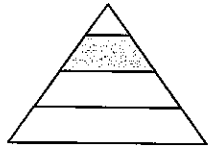
TITLE

EXPERIMENTAL DESIGN

RESULTS:

TABLES/GRAPHS

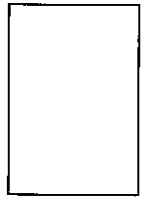




PICTURES/DIAGRAMS

WRITTEN REPORT

ATTACHED TO DISPLAY BOARD HERE



BIBLICAL APPLICATION

SHOULD INCLUDE A VERSE OR PASSAGE ALONG WITH EXPLANATION OF HOW IT RELATES TO PROJECT

ACSI Project Approval Form — Part 1

Student's Name _____ Grade _____

Review the research information on the reverse side, complete the following information, and sign below.

This project involves the following area(s):

- ☐ Controlled substances
- ☐ Human subjects
- ☐ Pathogenic agents (all bacteria, fungi, etc. isolated from the environment should be considered potentially pathogenic)
- ☐ Recombinant DNA
- ☐ Vertebrate animals
- ☐ None of the above

Project work will be conducted at the following location(s):

- ☐ Research institution
- ☐ School
- ☐ Field
- ☐ Home

This project involves use of the following substances or devices:

- ☐ Chemicals (e.g., hazardous, flammable, explosive, or highly toxic chemicals; carcinogens; mutagens; and all pesticides)
- ☐ Equipment (e.g., welders; lasers; voltage greater than 220 volts)
- ☐ Firearms
- ☐ Radioactive substances
- ☐ Radiation (e.g., X-ray or nuclear; unshielded ionizing radiation of 100-14—nm wavelength)
- ☐ Tissues
- ☐ None of the above

The following additional ISEF forms will be necessary for this project: (Forms 4–7 can be found at www.societyforscience.org/isef/.)

- ☐ Human Subjects Form (4)
- ☐ Vertebrate Animal Form (5)
- ☐ Human and Vertebrate Animal Tissue Form (6)
- ☐ Continuation Projects Form (7)

Sponsor

I have reviewed the student's research plan and proper safety standards and methods that will be used. I will assume reasonable responsibility for compliance to safety standards and requirements.

_____ | _____

Sponsor Signature—Check sponsor classification below: Date

- ☐ Adult Sponsor
- ☐ Designated Supervisor
- ☐ Qualified Scientist

Qualifications to sponsor this project:

_____

_____

_____

_____

Parent/Guardian

I have reviewed the research plan, project areas, and substances/devices as indicated above. I approve of the adult sponsor and the location(s) where the research will be conducted. I consent to my child participating in this research project.

_____ | _____

Parent Guardian Approval Signature Date

Student

- I will comply with safety standards and requirements while conducting the research for this project.
- My display will be compliant with the safety standards.
- I will do 90% or more of the work.

_____ | _____

Student Acknowledgement Date

This form must be included in the logbook. For nonexperimental projects without a logbook, this form needs to be available for the judges during the Science Fair.

Brief Research Plan Check nonexperimental, experimental, or engineering.

1. ☐ Experimental: Question being addressed
   ☐ Engineering: Question being addressed

2. ☐ Experimental: Hypothesis/Problem/Engineering Goals
   ☐ Engineering: Hypothesis/Problem/Engineering Goals

3. ☐ Experimental: Description in detail of method or procedures
   ☐ Engineering: Description in detail of method or procedures

4. Bibliography

Sample Project Plan for an Experimental Project

ACSI Science Fair Experimental Project

Date of Fair: 2/29/2005 **Project #:** XXX (assigned by chairperson on the day of the fair)

Name: Ellie May

Grade: 6 **Teacher:** Mr. Easyway

Project title: The Effect of Bright Light on Bleach Effectiveness

Problem that will be investigated: Bleach is effective in removing stains from clothing, and bright sunlight also tends to bleach colors. I will investigate whether the effects can be combined to increase the effectiveness of bleach in stain removal.

Description of experiment: Several pieces of white cotton cloth will be stained with grape jelly. Then the pieces of stained cloth will be exposed to bleach, bleach and a bright sunlamp, and a sunlamp alone to determine if the combination of bleach and the sunlamp is more effective in stain removal than the bleach or sunlamp alone.

Experimental hypothesis: Bleach is more effective when used with bright light to remove stains.

Experimental control: Several pieces of stained cloth will be kept separate and exposed only to water instead of water and bleach. The controls will be kept out of bright light for the experiment.

Experimental variable: The experimental variable is the exposure to bright light.

Control variables: The control variables are everything else that could affect the removal of the stain. The amount of the bleach in the water will remain the same, the time of exposure will remain the same, the intensity of the light will remain the same, the same cloth and stain will be used for all samples, and the water temperature will remain the same.

Materials required: Cotton cloth, household bleach, grape jelly, sunlamp, camera, and film

How will special materials and equipment be obtained? The sunlamp will be purchased at a hardware store.

Planned experimental procedure (use back side if needed):

1. Divide cotton cloth into 24 squares, number each with a marking pen, and stain each with a smear of grape jelly. Let jelly stand for five minutes before rinsing each piece in cold water for one minute.

(Procedure continued on back.)

Data to be taken: Photograph the results and display.

Planned method of presentation (graphs, tables, photographs, etc.): Photographs and actual pieces of cloth used in experiments

Sample Experimental Project Worksheet

ACSI Science Fair Experimental Project

Date of Fair: _____ Project #: _____ (assigned by chairperson on the day of the fair)

Name: _____

Grade: _____ Teacher: _____

Project title: _____

Problem that will be investigated: _____

_____

Description of experiment: _____

_____

Experimental hypothesis: _____

_____

Experimental control: _____

_____

Experimental variable: _____

_____

Control variables: _____

_____

Materials required: _____

_____

How will special materials and equipment be obtained? _____

_____

Planned experimental procedure (use back side if needed): _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Data to be taken: _____

_____

Planned method of presentation (graphs, tables, photographs, etc.): _____