Science Fair Student Handbook

Allen Independent School District

2025-2026

If you have any questions, contact your Campus Science Fair Coordinator.

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Welcome To The Student Handbook For Science Fair

Participating in a science fair is fun and rewarding. There are many important things to remember when planning and conducting a project. This handbook will assist you with questions you may have and give you the information you need for completing the project correctly. Remember to allow yourself plenty of time to carry out the project and have fun in the process. Please read the handbook carefully as you decide upon your topic and prepare your science fair project.

Philosophy

An elementary science fair motivates student interest in how their world works, and is an opportunity to demonstrate mastery of the Science Investigation and Reasoning skills that develop scientific literacy. Students apply learned skills and critical thinking in real situations to answer questions and solve relevant problems. Students validate their own scientific knowledge when they communicate and defend their thinking. This type of systematic problem solving is essential for success in the 21st century workplace.

Purpose

The science fair is conducted for many reasons:

- To focus attention on scientific experiences in school.
- To stimulate interest in scientific investigation beyond routine class work.
- To recognize and commend youthful scientific talent and hobby pursuits.
- To offer an opportunity for display of scientific talent through exhibit and demonstration.
- To provide constructive suggestions for teachers and students of science.
- To recognize teachers for outstanding science teaching.
- To stimulate public interest in the scientific abilities of students.

Campus Science Fair Coordinators

Each Allen ISD elementary designates one campus Science Fair Coordinator who will:

- Attend Allen ISD science fair organizational meeting(s).
- Support the Allen ISD Science Fair / Project Guidelines and Safety Rules.
- Inform appropriate faculty /parents of guidelines and information.
- Provide / maintain necessary paperwork.
- Organize and lead a campus-based science fair.
- Complete all registration requirements for campus entry in the Dallas Elementary Regional Science and Engineering Fair.

Campus Science Fairs

- All students in grades K through 6 may enter a building science fair as determined by the campus.
- Each grade level may award honorable mention, 3rd place, 2nd place, and 1st place ribbons.
- One grand prize winner will be chosen from lower level (grades 1-3), one from intermediate level (grades 4-5), and one from 6th grade. There will be a total of 3 grand prizes per campus.
- No ties for first place or Grand Prize are allowed.
- All decisions of the judges are final.

Elementary Regional Science Fair (ERSF)

- Please check the ERSF science fair website for updated information regarding the fairs.
- Each elementary school may submit:
    - One grand prize winner from lower level (grades 1-3)
    - One grand prize winner from intermediate level (grades 4-5)
    - One grand prize winner from 6th grade.
- There will be a total of 3 grand prizes per campus. Kindergarten may not compete beyond the campus fair.
- Students may make improvements on their projects before District and Regional competition.
- All Grand Prize projects must be categorized on the registration form. Elementary exhibits are to be entered by the following categories:
    - Life Science- testing or having an effect on a living organism
    - Earth Science- testing or having an effect on naturally occurring land, water, or air
    - Physical Science- testing or having an effect on natural or man-made materials
    - Engineering- solving a problem by developing or improving a technology
- All decisions of the judges are final.

The campus fair coordinator will submit the entry forms for all projects entered in the Elementary Regional Science Fair.

Science Fair Project An Integration Of Curricula

A science fair project is an exciting and meaningful learning experience for each child. Not only can children enter and compete for ribbons, trophies, and awards, but more importantly children have an opportunity to apply the many skills they are learning in the various academic subjects. A science fair project cuts across almost every curriculum. Examples are as follows:

- **Thinking Skills** – This is perhaps the most important product of a science fair project. Students put much time, effort, and thought into a project. They see the result of their thinking in the form of a project. They have developed or utilized problem-solving skills.

- **Organizational Skills** – Another important skill that students utilize when preparing a project is organization. Students will need the support and advice from teachers and parents, but this is an opportunity to plan, prepare, and organize a project from start to finish.

- **Science** – Children have an opportunity to investigate a myriad of topics of interest to them in science. They apply the skills of scientific inquiry when investigating their topics. Students learn to investigate, experiment, and discover the many wonders of science.

- **Language Arts** – Children use many language arts skills when preparing a project. They must read for information to better understand their topics. Children utilize library skills and study skills when they research the projects. Writing is also an integral part of each science fair project. Students use these skills when displaying their projects, writing for information from organizations or other sources, and/or writing a paper to accompany the projects. Oral language skills are also tapped when students interview professionals for assistance and/or seek help from parents or teachers.

- **Math** – Measurement is an essential component of science projects. Students have opportunities to apply the use of metric measurement and organize data using tables and graphs in meaningful activities.

- **Social Studies** – Many topics that students investigate are related to this curriculum. Mapping is a skill that may be used when preparing a project.

- **Art** – The display of a project is almost as important as the project itself. Children get a chance to design their displays to best enhance their projects.

Information About Science Fair Projects

A Successful Science Project

- Represents your work–not that of an expert or your parents
- Indicates an understanding of the science area chosen
- Shows careful planning that would eliminate a “rush” project
- Has a notebook showing a complete record of all your work
- Has a simple, well-stated title and neat lettering
- Includes photographs, charts, pictures, graphs, etc., which might be necessary to explain your work
- Has accurate, valid, and correct observations
- Tells a complete story–Problem and Solution
- Is original in approach and presentation
- Is self-explanatory
- Is attractive and organized
- Does not have to cost much money
- Is one that gives credit to those who gave help

A Science Fair Project Is Not

- Only a report
- Necessarily a new discovery or an original piece of research
- Constructing a plastic model from a hobby kit
- An enlarged model or drawing
- A weekend chore
- One, two, or even three posters
- Something done by your parents or teachers

Steps in Making a Science Project

- Choose a topic and discuss it with your teacher. Ask your teacher for help and suggestions.
- Once you have chosen your topic problem, find out as much about the topic as possible.
- Keep a science project notebook and record all of your thoughts, preparations, and ideas.
- Set up a work area somewhere around your house where you can work on your project.
- Work on your project a little each day. Don’t wait until the last minute.
- Collect the materials needed for the project.
- Check with your teacher for suggestions and materials.
- Construct your exhibit.
- Mount your pictures, graphs, charts, etc.
- Present your science project to your parents, classmates, and judges.
- Have fun and enjoy the pride and satisfaction of a job well done!

GETTING STARTED

Students may choose to do an experiment-based or an engineering-based project.

Comparison of the Scientific Method and the Engineering Design Process

Keep in mind that although the steps are listed in sequential order, it is likely to return to previous steps multiple times throughout a project. It is often necessary to revisit stages or steps in order to improve that aspect of a project. In real life, the distinction between the two processes is not always clear. Scientists often do some engineering work, and engineers frequently apply scientific principles, including the scientific process. The major distinction between science and engineering is the process of iteration, or making improvements to a design.

The Scientific Method	**The Engineering Design Process**
State your question ● What is the problem you want to solve? Do background research Formulate a hypothesis and identify variables ● What do you think will happen? Design experiment, establish procedure ● Define your variables ● Determine data to be collected ● What materials are needed? Test the hypothesis by doing an experiment ● Observe ● Collect data ● Organize data Analyze the results and draw conclusions ● What did you learn?	Ask ● What's the problem? ● What are the constraints? Imagine ● Do background research and search the literature to see what already has been done ● Brainstorm possible solutions and choose the best one Plan ● Draw a diagram and make a list of materials needed Create ● Follow the plan and test it Improve ● Make the design better and test it

Sample Project

Note: This shows what each step looks like. Depending on your child's grade level, the amount in each section could vary.

Purpose/Question
How does light affect the growth of a bean plant?

Research
This should be background information on your independent and dependent variables in paragraph form.

Hypothesis
If I add light to my bean plants, then they will grow higher than the plants would in darkness.

Controls/Constants
- Same type of seed
- Same size pot
- Same type of soil
- Same amount of water given weekly
- Same air temperature (as much as possible)

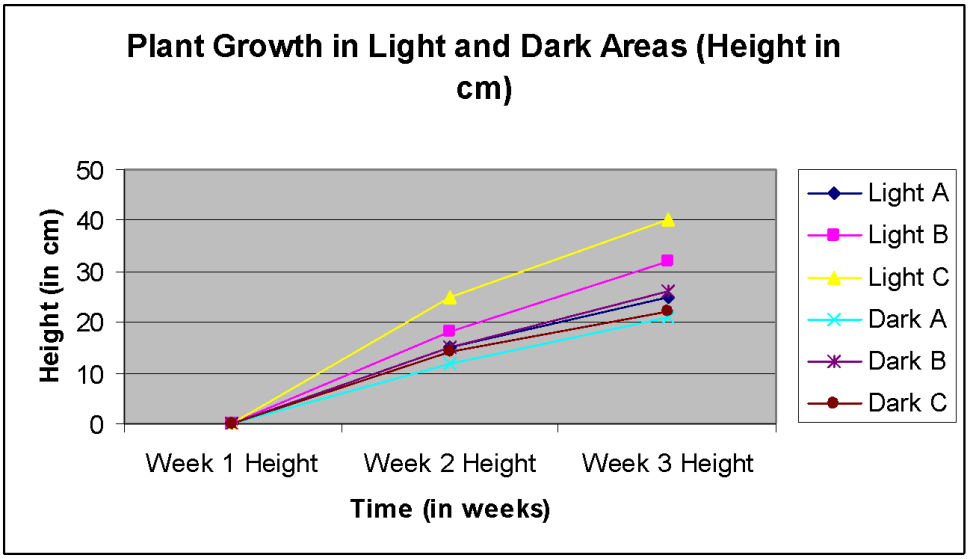
Variable
- Independent variable: the light
- Dependent variable: the height of the plants (in cm)

Materials
- 6 pinto bean seeds (3 are for light, 3 are for dark)
- 6 small clay pots
- Potting soil
- Metric measuring cup
- Water
- Metric ruler
- Camera
- Light source
- Dark area
- Celsius thermometer

Procedures
- The seeds must all come from the same package and should be randomly selected.
- Put 500 ml of soil in each pot.
- Place 1 seed in each pot 5 cm below the soil in the middle of each pot.
- Give each plant 25 ml of water every 7 days.
- Place 3 pots under light source and 3 pots in dark area.
- Record the temperature of both the light and dark places.
- Measure and photograph plants every 7 days before watering.
- Record observations and measurements in logbook.

Results

Plant Growth in Light and Dark Areas (Height in cm)			
Light Type	**Week 1 Height**	**Week 2 Height**	**Week 3 Height**
Light A	0	15	25
Light B	0	18	32
Light C	0	25	40
Dark A	0	12	21
Dark B	0	15	26
Dark C	0	14	22



Week 1 – All plants breaking through soil. No measurements taken because plants just breaking through the soil. Room temperature was consistent at 23°C in both areas.

Week 2 – Light plants are greener than the yellowish-tinted dark plants. Room temperature was consistent at 23°C in both areas.

Week 3 – Dark plants have no new leaves. Light plants have 3 new leaves on each plant. Room temperature was consistent at 23°C in both areas.

Analysis

Based on our data, we can see that the plants exposed to light grew higher than those in the dark at a quicker rate.

Conclusions

In this experiment, plants were placed in light and dark areas to see the effects on plant height. The bean plant grew better in the light than it did in the dark. This supports my hypothesis because the bean plants in light areas grew higher than plants placed in darkness. I noticed that the amount of water was too much, so next time I would reduce the amount of water given to each plant.

Further Questions

How does fertilizer affect plant growth in light?
How does fertilizer affect plant growth in the dark?
Is natural light more effective than artificial light in growing plants?

All About Variables

Definitions of Variables and Control(s)

Manipulated Variable (also called the independent variable) – What you change on purpose in the course of your procedure.

Responding Variable (also called the dependent variable) – What you do not change directly, but rather changes by itself in response to changes in the manipulated variable during the course of your procedure.

Controls -The factors you keep constant or hold fixed. A control is held fixed so that it doesn't affect the outcome of the experiment.

Students must only change **one** variable at a time, conduct repeated trials, and note their results. If they change more than one variable at a time, they will not know what affects their results.

Examples Of Variables

Let's say that the following hypothesis had been selected: The cheaper the paper towel, the less water it will absorb.

Manipulated Variable (Independent Variable): price (Brand) of paper towel

Responding Variable (Dependent Variable): amount of water that is absorbed

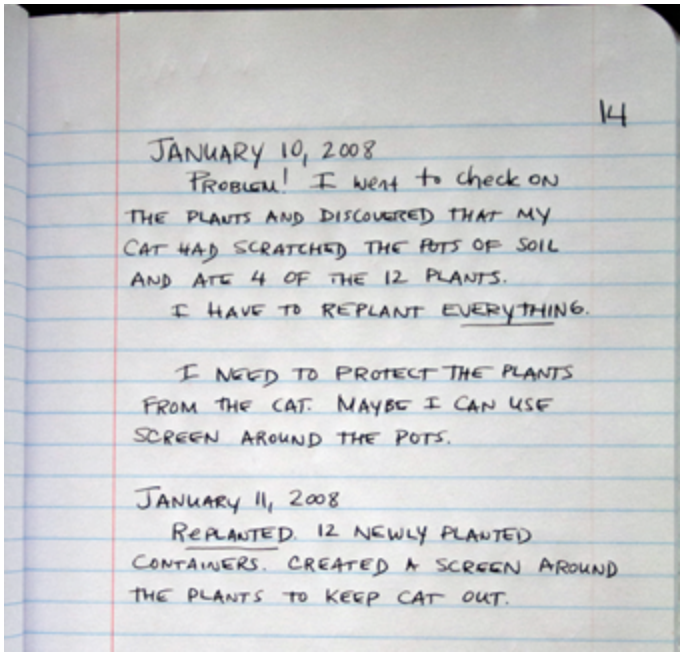
Control(s): size of paper towel, amount of water poured on each towel, temperature of the water used, container in which towels are placed and method of pouring

Your Science Project Notebook

This is an important part of your project. All the data and observations gathered during your experiment should be carefully recorded in a notebook. This includes the data gathered as a result of the experiment itself and much more.

Your notebook should include

- A list of all the materials used.
- Notes on all the preparations you made prior to starting your experiment.
- Information about the resources you use (books, people, libraries, Internet, etc.).
- Detailed day-by-day notes on the progress of the project.
- What you are actually doing.
- Problems you encounter with the experiment.
- Things you would change if you were doing this investigation again.
- Any drawings that might help explain your work.
- Data that was gathered during the course of the experiment (notes, charts, tables, graphs).
- Be sure to date each entry in your notebook.



Your notebook will be linked to your project

Report and Display

Possibly the most important and, at the same time, the most neglected phase of the scientific method is the compilation of a complete report. If scientists as a group fail to report their results, then each of us must wake up in a whole new world every day, doomed to repeat the failures of the past or else to waste time and effort in the rediscovery of old knowledge.

Your report should include

- Your question.
- Your hypothesis/prediction, along with your reasoning for why you arrived at that hypothesis.
- Your research.
- List of variables.
- A summary of your observations and results from the experiment.
- Statement of support or non-support of the original hypothesis based on the data gathered in your experiment.
- Description of any problems or unusual events that occurred during the investigation that might have affected your results.
- What changes you would recommend for next time, and what further experiments might need to be done to fully answer the question?
- What further questions do you have about the topic? What ideas do you have for studying the topic in the future?
- Anything you learned in addition to what you expected to discover?
- Acknowledgments. You should always credit those who assisted you including individuals, businesses, and institutions.
- References.

If this information looks familiar to you, it should. The report is simply a summary of all your work. That's why people tend to neglect it – they are eager to move on to the next problem. Remember, however, it's the most important part of real-world science!

Helpful Hints

A Good Title

Your title is an extremely important attention-grabber. A good title should simply present your research and should make the casual observer want to know more.

Take Photographs

Many projects involve elements that may not be safely or practically exhibited at the fair but are an important part of the project. Photographs of these phases of experimentation can be used in the display. You may NOT use photographs depicting animal dissections or other surgical techniques. You must receive permission to photograph or videotape human test subjects.

Be Organized

Make sure your display is logically presented and easy to read.

Eye-catching

Make your display stand out. Use neat, colorful headings, charts and graphs.

Correctly Presented And Well-constructed

Be sure to adhere to the size limitations and safety rules when creating your display. Display all required forms in your virtual project notebook.

Science Project Notebook And Report

A science project notebook is your most valuable piece of work. It is a day-to-day record of the experiment. Accurate and detailed notes make for a logical and winning project. Good notes show consistency and thoroughness to the judges, and help when writing a paper.

A well written report that includes all needed information is essential to a good project. Check your sentence structure, flow of ideas, and spelling and make certain the report is a summary of all of your work.

Visual Virtual Display

You want to attract and inform. Design a clear and concise display. Make headings stand out and label everything clearly and correctly.

Rules for Judging

Judges look for well thought-out research. They look at how significant your project is in its field as well as how thorough you were. Judges are not interested in memorized speeches. They simply want to talk to you about your project and see if you understand it from start to finish.

Before starting your project, read the Science Fair Project Judging Form carefully. Make sure you understand each of the categories because your project will be judged on these categories. If you have questions, please discuss them with your teacher or Science Fair coordinator.

Information for Parents about Science Fair Projects

- Give encouragement, support, and guidance. (Be positive!)
- Make sure your child feels it is his or her project. Make sure the project is primarily the work of the child.
- Remember the main purpose of a science fair project is to help your child use and strengthen the basic skills he or she has learned and to develop higher-level skills.
- Be aware your child will need help in understanding, acquiring, and using the major science process skills (researching, organizing, measuring, calculating, reporting, demonstrating, experimenting, collecting, constructing, presenting).
- Encourage your child to use reading, writing, arithmetic, and social skills in a creative way to solve a problem.
- Help your child plan a mutually agreed upon schedule, to prevent a last minute project and a disrupted household. A 4 to 8 week plan that uses a check-off sheet is best. The following steps (you may want to add more) should be on your schedule. Always begin with entries in a logbook as your child starts thinking about a project.
    - Find a topic.
    - Narrow down the topic to a specific scientific problem that is appropriate to the child's ability level.
    - Research what is already known about the problem.
    - Develop a hypothesis. (What outcome do you expect?)
    - Develop a procedure/investigation to test the hypothesis. List variables.
    - Make observations and collect appropriate data in a logbook.
    - Interpret the data and other observations.
    - State and display the results using graphs, tables, and/or pictures.
    - Draw appropriate conclusions.
    - Create the exhibit.
    - Write the research paper.
    - Present the project.
- Help your child design a safe project that is not hazardous in any way.
- Provide transportation to such places as libraries, nature centers, universities, etc. that can help find project information. Several sources will take time to help your child find ideas and give suggestions for a successful project, among these are the Heard Museum, McKinney, 972-562-5566, and Science Projects, 13440 TI Blvd., 972-470-0395.
- Help your child write letters to people who can help on the science project and be sure the letters are mailed.

- Help the child develop the necessary technical skills and/or help the child do the technical work such as building the exhibit and doing the photography.
- Help your child understand that science is not just a subject, but a “way of looking at the world around us.”
- Be sure that the child states in the paper and/or exhibit the help he or she has received from you or others. This will help judges to make a fairer evaluation of the project.
- Look over the project to check for good grammar, neatness, spelling and accuracy. Make suggestions on how it can be corrected.
- Buy or help find the necessary materials to complete the project.
- Realize that a good project doesn’t have to cost a lot of money. Many times a simple project that is well displayed and explained is the best.
- Help the child understand that a weekend chore, or one or two posters, is not a project.
- Help the child keep a record (log book) of all he or she does and a list of references used.
- Find an area in the house where the child can work on the project and not have to worry about pets or brothers and sisters.
- Explain to the child that he or she should consult with you or the teacher when problems arise. Set aside time for help sessions. Make them short and constructive. Be an interested and enthusiastic listener.
- Have your child present his or her science project to you before he or she takes it to school.
- Help transport your child and the science fair project to and from the school/district/regional science fairs.
- Be positive and supportive if your child doesn’t win a prize at the science fair. The skills the child has gained are worth all the effort. Help your child to begin to plan for next year.
- Feel a sense of pride and satisfaction when the project and the science fair are finished. Share this with your child, you have both earned it!

Appendix A

1. Sample Project Display
    a. Engineering-based Project Display
    b. Experiment-based Project Display
2. Display Safety Rules
3. Safety Rules
4. Rules and Certifications for Biological Projects
5. Required Form for Biological Projects
6. Project Judging Form

A.1A Engineering-based Project Display Sample

Project displays for 2024-2025 can be in an electronic format for campus fairs. Constraints include no more than 10 slides/pages.

An **engineering-based project** starts with a problem. The project should state the engineering goals, the development process and the evaluation of improvements by following the engineering design process. This is a series of steps that engineers follow to come up with a solution to a problem. Many times the solution involves designing a product that meets certain criteria and/or accomplishes a certain task.

For example, a student has a problem of her snack being taken from her lunch box. In order to solve this problem, she could use the Engineering Design Process to design a lunch box alarm to protect her valuable snack items.

A.1B Experiment-based Project Display Sample

Project displays for 2024-2025 can be in an electronic format for campus fairs. Constraints include no more than 10 slides/pages.

Project backboards should include these components:

1. Title of project
2. Statement of problem and purpose of project
3. Hypothesis
4. Variables (manipulating variable, responding variable, variables held constant)
5. Procedure/Method
6. Results/Observations/Data
7. Conclusions
8. Research Book
9. Log Book/Lab Book
10. Display of material or a model

Slides Template for Virtual Science Fair

Projects advancing to the regional fair will need to be presented on a physical display

A.2 Display Rules for 2024-2025

It is essential for teachers to inform students and parents of these display rules.

Display Requirements

1. The display board must be self-supporting, single-sided and must NOT exceed the size requirements: **30 inches deep, 32 inches wide, and 80 inches high**. All components of the display must be on the table within the display space. Electronic Only, Max 10 Slides/Pages
2. Personal information including names, addresses, or phone numbers (student, teacher, parents, test or survey subjects), information identifying the student/school/district, accomplishments (previous awards), and acknowledgments may NOT be included on the display or in reports/journals.
3. Display materials are NOT encouraged due to space, security, and safety. However, any model/apparatus/prototype included with the display must fit within the dimensions of the display space provided. All materials are left at your own risk.
4. When possible photographs/drawings should be used instead of actual objects or apparatus.
5. Electronic exhibits are prohibited. The site does not accommodate the use of electricity for project displays.

Project displays may NOT include the following items

- Liquids, including water
- Food “stuff” (candy, gum, popcorn, etc.)
- Food or liquid containers, packages or wrappers
- Live animals (vertebrate or invertebrate) or animal tissues including eggs or egg shells
- Preserved animals or their parts including teeth and hair
- Living plants or plant materials, which are in their raw, unprocessed, unmanufactured or natural state such as leaves, seeds/nuts, bark, stems, or roots
- Soil, sand, clay, rocks, etc. or waste products
- Laboratory/household chemicals (including detergents)
- Dry ice or other sublimating solids
- Glass (test tubes, syringes, pipettes, or similar devices)
- Needles or other sharp/pointed objects
- Flames, open or concealed, or flammable display materials
- Lasers
- Inflated balloons
- Photographs showing the face of the student or subjects

A.3 Safety Rules for 2024-2025

It is essential for teachers to inform students and parents of these safety rules.

For safety reasons the Elementary Regional Science Fair DOES NOT ALLOW experimentation using dangerous equipment or substances that may be harmful to students or others. If you are uncertain about any safety rules, contact your District Science Coordinator. Determinations of safety are made by the Elementary Regional Science Fair Committee and are final.

Students MUST

1. Obtain approval of the District Science Coordinator BEFORE beginning any project involving vertebrate or invertebrate animals, human subjects, or any potentially dangerous substance, material or equipment.

2. Obtain approval of the District Science Coordinator for all investigations involving chemicals (including household chemicals).

3. Have adult supervision when using equipment, sharp objects or chemicals (including household chemicals).

4. Follow local city ordinances and be supervised by an adult for any experiment involving fire and/or burning objects although these types of experiments are discouraged.

5. Observe proper safety protocol at all times (this includes the use of gloves, goggles and aprons as appropriate).

Students MAY NOT conduct experiments that

1. Involve any **microbial cultures, mold, fungi or any possibly pathogenic substances**. The only exceptions are:
    a. experiments with baker's yeast so long as rDNA studies are NOT involved
    b. experiments using manure with composting to test variables
    c. experiments involving food preservation (***so long as when spoiling, rotting, or browning occurs the food is disposed of within 24 hours of the first sighting***)

2. Involve human parts, blood or other body fluids. (Experiments may include sterilized teeth that were naturally extracted by a dentist, primary teeth that were naturally removed, or hair clippings.)

3. Cause or may cause harm or injury to animals or human subjects including the ingestion or application of caffeine, over-the-counter medications or controlled substances.

4. Involve explosives including guns, ammunition and rocket propellants.

A.4 Rules and Certifications for Biological Projects

It is the responsibility of elementary school teachers to approve projects that involve vertebrate animals, human subjects, teeth, hair clippings, and composting prior to the research of the student. All such projects that are entered in the campus science fair require a district coordinator's certification. The "**Required Form for Biological Projects**" must be completed for all biological projects.

Research must be conducted with a respect for life and an appreciation of humane considerations, which must be afforded all animals.

1. The Federal regulations for the protection of human subjects in behavioral and biomedical research are becoming increasingly more rigid. Teachers and students should discuss proper methodology and humane concerns. Students may not start any such research unless adult supervision determines, in advance, that it will be in full compliance with safety guidelines. This includes research in which students are the subject of his/her own research. All projects using human subjects must have signed consent forms from each subject agreeing to their participation in the study and appearance in any photographs, which may be displayed. Remember, photographs may not show faces. These are turned in with a project.

2. To provide for humane treatment of animals, an animal supervisor, who is knowledgeable in the proper care and handling of laboratory animals, must assume primary responsibility for the condition under which animals are maintained. If the school faculty includes no one who is knowledgeable in the proper care and handling of laboratory animals, the services of such a person, on a consulting basis, must be obtained. The comfort of the animals used in any research will be a prime concern.

3. Experimental procedures that cause pain or discomfort are prohibited. No research using live animals shall be attempted unless the animals have been obtained from a reliable source and the following conditions can be assured: appropriate, comfortable quarters; adequate food and water; humane treatment; and gentle handling. Proper quarters and care must be provided at all times, including weekends and vacation periods. Pet store animals are inappropriate for experimentation. The genetic background, age, and past nutritional status are difficult to determine. Under no circumstances should the students be allowed to perform sacrifice.

4. Experimentation with composting may not include the use of manure. Microorganisms are a byproduct of composting and composting material should be handled using personal protective equipment. Investigation of the microorganisms found in composting is prohibited.

A.5 Required Form for Biological Projects

THIS FORM MUST BE COMPLETED by the campus coordinator for all research involving vertebrate animals, human subjects, (including surveys of human subjects), teeth, hair clippings, and composting PRIOR TO THE RESEARCH. Refer to Safety Rules for clarification on prohibited experiments. Email completed forms to cynthia.oneill@allenisd.org.

Student's name _____

School _____ Grade _____

Description of the project: Be specific about what materials will be tested and how they will be tested.

_____

_____

_____

_____

_____

_____

_____

_____

_____

I agree to sponsor the student named above and assume responsibility for compliance with existing Science Fair rules.

Teacher's signature _____ Date _____

Teacher's name _____

Teacher's position _____ Teacher's campus _____

District Coordinator's signature _____ Date: _____

A.6 Project Judging Form

Judges look for well thought-out research. They look at how significant your project is in its field as well as how thorough you were.

Before starting your project, read the Judging Form carefully. Make sure you understand each of the categories, because your project will be judged on these categories. If you have questions, please discuss them with your teacher or Science Fair coordinator.

Project Title: _____ Project #:_____

Experiment-Based Projects	Engineering Projects	
Research Question ● Clear and focused purpose ● Testable using scientific methods	Research Problem ● Description of a practical need or problem to be solved ● Definition of criteria for proposed solution ● Explanation of constraints	10 points
Design and Methodology ● Well-designed plan and data collection methods ● Variables and controls defined, appropriate and complete	Design and Methodology ● Exploration of alternatives to answer need or problem ● Identification of a solution ● Development of model/prototype	30 points
Execution: Data Collection, Analysis & Interpretation ● Systematic data collection and analysis ● Reproducibility of results ● Appropriate application of mathematical and statistical methods ● Sufficient data collected to support interpretation and conclusions	Execution: Data Collection, Analysis & Interpretation ● Prototype demonstrates intended design ● Prototype has been tested in multiple conditions/trials ● Prototype demonstrates engineering skill and completeness	30 points
Creativity ● Project demonstrates creativity/originality/innovativeness in one or more of the above criteria		10 points
Presentation ● Logical organization of material ● Clarity of graphics and legends ● Supporting documentation well-selected and displayed		20 points