4-H Discover Science
Method Research Poster Contest

INTRODUCTION

The 4-H Discover Science Method Research Poster Contest allows youth the opportunity to apply the scientific method to the subject matter they have learned through their 4-H projects. It is framed in principles of science, engineering, and technology (S.E.T.). Participants will 1) construct a poster, 2) write a final written report, and 3) deliver a short oral presentation. Participants may enter in one of seven categories:

1. Biochemistry/microbiology/food science
2. Environmental science/chemistry/earth science
3. Animal science
4. Plant and soil science
5. Engineering/physics
6. Consumer product testing
7. Human behavior and social science

The scientific method is a process for experimentation that is used to explore observations and answer questions. Scientists use the scientific method to explore relationships in nature.

Steps of the Scientific Method

- Ask a question
- Investigate previous research on the topic
- Construct a hypothesis
- Test hypothesis by performing an experiment
- Analyze data and formulate results
- Interpret results and draw a conclusion
- Communicate results

OBJECTIVES

- To initiate a program based on science and the scientific method
- To increase awareness of science, engineering and technology among 4-H members
- To place science, engineering, and technology in the forefront of 4-H project work
    - **Science** abilities encompass the entirety of the cause and effect on the world
    - **Engineering** is recognized as a problem-solving and design process within science and technology
    - **Technology** is human innovation

NOTE: *The Scientific Method is not to be confused with the 'Engineering Design Process' which is applied by engineers to create original design of prototypes, processes, or solutions to engineering problems.*

CONTEST OVERVIEW

Eligibility – The contest is separated into Intermediate and Senior divisions. Only intermediates and seniors specified in the Texas 4-H Rules and Guidelines may compete.

Research projects may be an individual effort, or be conducted by a team of (2) 4-H members. Team members should keep separate research journals (notebooks) and then combine the notes and data to construct and submit (1) final project report. Topics for the Texas 4-H Research Poster Contest should be age appropriate. Research should be of a nature that the 4-H member can design, experiment, analyze and write a meaningful report on the age-appropriate topic. Sample projects are listed on page 12.

Research Categories – Individuals and teams can enter in one of seven categories. Topics may cover any field as long as it is research oriented, and may include humanities or social sciences that meet the research criteria.

1. **Biochemistry/Microbiology/Food Science**

   Biology of microorganisms – bacteriology, virology, protozoology, fungi bacterial genetics, yeast. The topic may also include chemistry of life processes such as molecular biology, molecular genetics, enzymes, photosynthesis, protein chemistry, food chemistry, hormones, etc. *Example: Compare different yeast fermentation techniques for converting sugar to alcohol.*

2. **Environmental Science/Chemistry/Earth Sciences**

   Study of pollution sources (air, water, and/or land) and their control. Study of nature and composition of matter and laws governing it – physical chemistry, organic chemistry, inorganic chemistry, geology, mineralogy, oceanography, geography. *Example: Examine the effects of cropping practices on wildlife population.*

3. **Animal Science**

   Study of animals – animal genetics, entomology, animal husbandry, animal physiology, studies of

invertebrates. *Example: Study the effects of growth hormones on meat or milk production.*

4. **Plant and Soil Science**

   Study of plant life – agriculture, agronomy, horticulture, forestry, plant taxonomy, plant genetics, etc. *Example: Study the effects of weather and soil conditions on plant growth.*

5. **Engineering/Physics**

   Technology projects that directly apply scientific principles to manufacturing and practical uses – mechanical, chemical, electrical, environmental engineering, etc. Theories, principles, and laws governing energy and the effect of energy on matter. *Examples: Compare the energy output and efficiency from different types of solar panels.*

6. **Consumer Product Testing**

   Comparison of product quality, effectiveness, usefulness, economy, cost, smell, environmental friendliness, etc. *Example: Compare the effectiveness of different household cleaning products on removing bacteria from kitchen surfaces.*

7. **Human Behavior and Social Science**

   Study of human thought processes and behavior in their interactions in the environment through observation and experimentation. *Examples: Triggers of fear, learned behavior, effect of color on choice, pecking order, and group size preference.*

Judging Criteria

Entries are judged based on their adherence to the steps and principles of the Scientific Method. The contest requires a **poster**, **final written report**, and **oral presentation and interview**. Intermediate and senior age divisions are judged separately. NEW: All category entries will be judged together with 4th – 10th place announced/awarded for each age division. The top three finalists will be announced during Roundup assembly to receive final placement and awards. The scoring rubric is provided on pages 13-14 of this document.

Research poster – The poster should summarize each step of the Scientific Method as it relates to the project. The poster should include an abstract, introduction, background, hypothesis, methodology, results, and conclusions. Following are suggestions for a good research poster:

- Good title – Your title is an attention getter. A good title should simply and accurately present your project and its nature. The title should be no longer than 10 words.
- Nice visuals – Include photographs, drawings, charts, and graphs as appropriate to effectively communicate your project. Visuals should be clear and easy to interpret.

Include headings and labels on graphs, charts, diagrams, and tables.

- Creative but logically organized – Your poster should be logically organized and easy to follow. A brief glance should permit anyone (especially the judges) to quickly locate the title, summary, experiments, results, and conclusions.
- Clearly presented – The font size should be large enough to read from 3 feet away. The poster should include the information the judges will need without being crowded.

Poster Guidelines: Poster should be no larger than 48'' wide by 30" deep (the distance from front to back) 108" high (from floor to top, includes table if project is on table top). Note that tables are generally 24" wide, but can vary with convention location. Items that do not adhere to the poster must fit on the tabletop within the dimension of the unfolded poster. Avoid lights, banners, shelves, etc. that are outside of the poster dimensions.

Final written report – The final written report should chronicle the 4-H member's or team's work on the chosen research topic. Content should be organized with the following headings:

- Title Page – Include title of entry, contestant name(s), category, age division, and county.
- Abstract – Brief and concise description of the purpose, hypothesis, research methods, results and conclusions. (Use no more than 5 to 6 sentences)
- Introduction – State the question or problem being studied and why it is important.
- Literature Review – Provide an overview of what research has already been done to address the problem or issue. Be sure to cite references.
- Materials and Methods – Describe the manner in which the study or experiment was conducted. After reading this section, readers should have sufficient information to replicate the study.
- Results – Summarize data and final results obtained from the study or experiment. It is helpful to present results using graphs and/or tables.
- Discussion & Conclusions – Discuss what conclusions you draw from the results. Answer whether your hypothesis was supported or rejected based upon the results. Suggest what further study is needed based on your results.
- References (APA Format) – List significant sources of information used in your final written report. Refer to the following document for help on citing references: http://writing.wisc.edu/Handbook/American_Psychological_Association_%28APA%29_Documentation_M.pdf
- Acknowledgements – Give credit to individuals or groups who assisted you with the project.

The final report may be typed or hand-written. It may be bound, or it may be submitted in a 3-ring binder. Research journal entries may be added as an appendix at the back of the

report. **The Final Written Report must be turn in upon check-in the day of the contest. It cannot be used as a prop during the oral poster presentation.**

Your Research Journal (notebook)

A research journal (or notebook) should be kept current throughout the duration of the project and used to complete the final written report. Your journal should chronical all research activity including meeting notes with County Extension Agents, details regarding your experiment, recorded raw data, and other information as appropriate. For project teams, each member should keep his/her personal journal and contribute to the final written report. The journal will not be judged, but you are encouraged to bring it to the competition.

Oral presentation and interview – The contestant(s) will give a 7-10 minute presentation and have a short interview by judges. If you enter as a team, both team members must have a speaking role during the presentation. Following are suggestions for presenting your poster:

- Be sure to state the title and purpose of your project. Provide a brief explanation of why you selected the topic and why it is important to you.
- Speak in a loud and clear voice.
- Use vocabulary which demonstrates knowledge of the subject matter.
- Stay relaxed and use good posture. Avoid fidgeting and maintain eye contact with judges.
- Practice your presentation and anticipate the types of questions a judge may ask.

Project Certification (by County Extension Agent or designee)

The County Extension Agent or their designee must approve all projects. The County Extension Agent, with special emphasis on research projects that involved human and animal subjects, must also review and certify compliance with the Human Vertebrate Endorsement or Non-Human Vertebrate Endorsement forms if applicable. These forms are located on pages 17-18 this document.

Entry Procedure and Deadline

Individuals or a team of (2) people may enter the contest in their appropriate age division (Intermediate or Senior) in one of the six topic categories previously listed.

To enter, complete the **Entry Form**, **County Extension Agent Approval Form**, **Human Vertebrate Endorsement** and **Non-Human Vertebrate Endorsement** forms located on pages 15-18.

Upload all forms when you register at 4-H Connect. *Entries received after this date may not be included in the contest.*

Suggested Project Activity

1. **Set meeting with County Extension Agent**
    a. Take information with you to outline your research project
    b. Discuss and narrow down topic
    c. Discuss your experiences related to this topic and why you are interested
    d. Review safety guidelines with County Extension Agent and parents
    e. Review articles or books on the topic that interest you
    f. Plan an initial project timeline of project activity
    g. Record meeting notes in your research journal and date it

2. **Generate Research Question and Hypothesis**
    a. Write your inquiry question
    b. Begin with what you know
    c. Write why you want to conduct an experiment on the subject
    d. Determine if you have sufficient resources to conduct the experiment
    e. Set meeting with County Extension Agent to discuss your question and hypothesis

3. **Design Research and Conduct Investigation**
    a. Write your hypothesis (what you think will happen)
    b. Research variables (what they are, and what type of variables) and what controls are needed for experiment
    c. List the materials and methods you will use and the experimental procedures you will follow
    d. Set meeting with County Extension Agent to discuss your experiment

4. **Perform Experiment**
    a. Gather all the materials you will need to begin your experiment
    b. Journal entries should be as complete as possible
    c. Notes are the way to put your observations down so later you can find answers
    d. Dates, times, and thoughts you have about the experiment should be written
    e. Plan data records that need to be collected
    f. Conduct experiment or research
    g. Collect and organize data
    h. Set regular meetings with your County Extension Agent to report the progress of your research
        i. Take your research journal each time so each of you sign and date the meeting notes page
        ii. Bring out any unique things you are recording in your journal
        iii. Write down ideas from other research projects that interest you from your work
        iv. Begin thinking of how to organize information to put on the poster display

5. **Analyze Data and Prepare Report**
    a. Identify any patterns in results
    b. Explicitly use results to answer the question and test the hypothesis
    c. Point out sources of errors or limitations
    d. Develop your presentation and sketch your poster display layout
    e. Set meeting with County Extension Agent to review your journal and to plan your final poster lay out and written report
    f. Draft your poster and final written report
    g. Practice your poster presentation among different groups
    h. Share results with others in your community and gather feedback
    i. Finalize your poster and written report based on feedback
    j. Now relax – the hard work is over. Now enjoy telling everyone about it at Roundup!

Research Safety

Safety should be a primary concern for every science experiment. Almost any tool or technique, no matter how safe, can be used in an unsafe manner. At the same time, many potentially dangerous tools are perfectly safe if they are used in the proper way. So how do you know if your project is within reasonable safety guidelines? Science Buddies (www.sciencebuddies.org) recommends you ask three simple questions to test your project's level of safety.

Is it safe for other people or animals that are involved? All projects involving humans as subjects must involve minimal risk. Unacceptable risks include ingestion of any substance or physical contact with any potentially hazardous materials, as well as unnecessary physical, psychological, or emotional stress, including invasion of privacy. Even if you are simply surveying other students, you should review your questions in advance and decide if the questions meet this test, and determine if a parent/guardian's consent is needed for any students that are participating. If you are not sure, do not hesitate to ask your County Extension Agent, parent, or mentor to help you decide.

Live animals (in particular vertebrate animals-those with a backbone) should be housed, cared for, and observed in a safe and humane manner.

If you are participating in another science fair at your classroom or school fair, does your project meet the safety rules for that higher-level fair? If you will be participating in a city or county-wide fair, make sure that the projects meet the rules of that fair. Science fairs affiliated with the Intel International Science and Engineering Fair (ISEF) must follow very strict and detailed safety rules, often including pre-approval before experimentation begins. The Science Buddies website has an overview of these rules on the Scientific Review Committee (SRC) page.

Finally, have you addressed safety concerns to your parents' and County Extension Agent's satisfaction? Make sure you address all safety issues in your project proposal so your adult supervisors are aware of any issues ahead of time. Your County Extension Agent will then

evaluate your project based on the following questions:

1. Where will the experiment be performed?
2. What safety gear will be used?
3. Who will be supervising the experiment?
4. Are you knowledgeable about or do you have training in the procedures being used?

If in doubt about the safety of the experiment, ask your County Extension Agent, parent, or mentor for advice. Be prepared to choose another project if your County Extension Agent decides that yours does not meet age appropriateness or the safety guidelines. Hopefully good common sense and the questions above will help you put together a fun, informative, and safe research project.

Poster Exhibit Safety

1. If an exhibit becomes unsafe or unsuitable for display, it will be removed and deemed ineligible for any awards.

2. Projects which involve vertebrate animal subjects must conform to the following statement: **Experiments on live animals involving surgery, the removal of parts, injection of harmful chemicals, and/or exposure to harmful environments, are not acceptable at the Discover Scientific Method Research Poster Contest.** Live vertebrates are not permitted at the Discover Scientific Method Research Poster Contest.

3. Toxic and hazardous chemicals are prohibited.

4. All necessary chemical glassware must be displayed in a stable manner. The items must be back from the edge of the table and may not be operational at any time.

5. 4-H Member should substitute colored water, photographs or drawings for chemicals.

6. Crystals, other than sucrose (sugar) and sodium chloride (salt), may not be displayed. Projects involving crystals can be represented by pictures or other three-dimensional models.

7. Hypodermic needles and syringes may not be displayed in any exhibit at the Discover Scientific Method Research Poster Contest.

8. It is critically important that no person be exposed to any bacteria that are considered pathogenic. Therefore, the following two rules are very important: **No wild cultures incubated above room temperature; no cultures taken from humans or other warm blooded animals may be used.** This includes, but is not limited to skin, throat and mouth.

9. Plastic petri dishes must be sealed.

10. Lasers may not be used in any exhibit.

11. Dangerous and combustible materials are prohibited.

12. No exhibit shall have open flames. Any part of an exhibit that can get hotter than 100 degrees Celsius (boiling water temperature) must be adequately protected from its surroundings.

13. If an exhibit includes electrical wiring or devices, they must be safe. For voltages above 20 volts, special precautions must be taken. All connections must be secure and provide suitable protection against short circuits, etc.

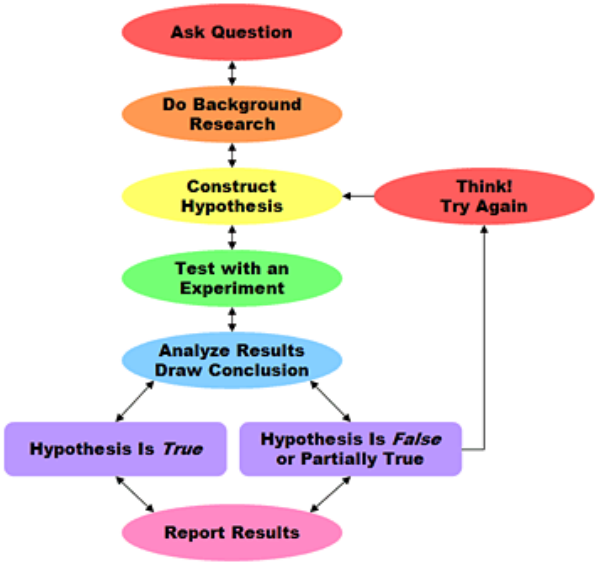
14. All wiring carrying more than 20 volts must be well insulated. Also, the connections must either be soldered or secured by UL approved fasteners. The wire used must be insulated adequately for the maximum voltage that will be present and the wire must be of sufficient size to carry the maximum current you anticipate. Open knife switches or doorbell-type push buttons in circuits using more than 20 volts may not be used.

15. If the exhibit will be connected to 120 volt AC power (plugged into a wall outlet) fuses or circuit breakers must be provided to protect not only the exhibit but also any others that may share the same sources of power. The power cord used must be UL approved for the voltage and current it will be carrying, and it must be at least 1.8 meters (6 feet) long. Discover Scientific Method Research Poster Contest staff must be notified of the need for power at the time of certification so power can be ordered in advance.

16. Exhibits requiring voltage in excess of 120 volts AC are not allowed.

THE SCIENTIFIC METHOD (excerpt from Science Buddies presentations for teachers)

Scientific method refers to techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge. To be termed scientific, a method of inquiry must be based on gathering observable, empirical and measurable evidence subject to specific principles of reasoning. A scientific method consists of the collection of data through observation and experimentation, and the formulation and testing of hypotheses.



Reasoning is the cognitive process of looking for reasons for beliefs, conclusions, actions or feelings. Although reasoning was once thought to be a uniquely human capability, other animals also engage in reasoning.

A hypothesis consists either of a suggested explanation for an observable phenomenon or of a reasoned proposal predicting a possible causal correlation among multiple phenomena. The term derives from the Greek, *"hypotithenai*" meaning "to put under" or "to suppose." The scientific method requires that one can test a scientific hypothesis.

The steps of the scientific method are:

- Ask a question

- Investigate previous research on the topic
- Construct a hypothesis - a prediction based on previous research
- Test hypothesis by performing an experiment
- Analyze data and formulate results
- Interpret results and draw a conclusion
- Communicate results

The scientific method is a process for experimentation used to explore observations and answer questions. Scientists use the scientific method to search for cause and effect relationships in nature. In other words, they design an experiment so that changes to one item cause something else to vary in a predictable way. Just as it does for a professional scientist, the scientific method will help you to focus your research poster project question, construct a hypothesis, design, execute, and evaluate your experiment.

Steps of the Scientific Method

- **Ask a Question:** The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where? And, in order for the scientific method to answer the question it must be about something that you can measure, preferably with a number.

- **Investigate previous research on the topic:** Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.

- **Construct a Hypothesis:** A hypothesis is an educated guess about how things work: "If _____[I do this] _____, then _____[this]_____ will happen." You must state your hypothesis in a way that you can easily measure, and of course, your hypothesis should be constructed in a way to help you answer your original question.

- **Test Your Hypothesis by Performing an Experiment:** Your experiment tests whether your hypothesis is true or false. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same. You should also repeat your experiments several times to make sure that the first results weren't just an accident.

- **Analyze Your Data and Formulate Results:** Once your experiment is complete, you collect your measurements and analyze them to see if your hypothesis is true or false. Scientists often find that their hypothesis was false, and in such cases they will construct a new hypothesis starting the entire process of the scientific method over

again. Even if they find that their hypothesis was true, they may want to test it again in a new way.

- **Interpret Results and Draw a Conclusion:** What do the results mean? How can results be in a manner to support your conclusion?

- **Communicate Your Results**: To complete your project you will communicate your results to others in a final report and display board. Professional scientists do almost exactly the same thing by publishing their final report in a scientific journal or by presenting their results on a poster at a scientific meeting.

  Even though we show the scientific method as a series of steps, keep in mind that new information or thinking might cause a scientist to back up and repeat steps at any point during the process. A process like the scientific method that involves such backing up and repeating is called an iterative process.

SUPPLEMENTAL RESOURCES

Science Projects for 4-H from Science Buddies

http://www.sciencebuddies.org/science-fair-projects/parents_4h.shtml

Making an Academic Poster Presentation

https://nau.edu/undergraduate-research/poster-presentation-tips/

Scientific Poster Design

http://hsp.berkeley.edu/sites/default/files/ScientificPosters.pdf

Tips on Making Presentations

https://www.kent.ac.uk/careers/presentationskills.htm

SAMPLE CONTEST ENTRIES

- *Tannins as a Gibberellin Antagonist – Phase 2.* "The purpose of this research project focused on identifying the potential relationship between juniper tannins and native grass seeds, …"

- *City Life and Water Pollution.* The purpose of this project was to test the hypothesis: "If a city has a higher population, then the pollution of the water will be greater."

- *Effects of Calcium Levels on Eggshell Strength.* "The purpose of this experiment was to compare the compressive strength of eggs, laid by hens fed lay pellets plus added protein and given plain tap water to drink, hens fed lay pellets plus added protein given plain tap water with a calcium supplement to drink and then hens fed lay pellets plus added protein and given plain tap water to drink to test the calcium withdrawal effects at the end of weeks one and two following the removal of the calcium from the tap water."

- *Effects of Different Hydroponic Systems on Plant Growth.* "The purpose of this project is to explore plant growth and output using three recommended hydroponic systems in a controlled inside location."

- *Effects of Different Water Types on Germination Rate.* "The objective of this experiment was to compare the germination rate among different cotton seed varieties with different water sources; H2O Clean, Alkali, and Salt."

- *The Ups and Downs of Kinetic Energy.* "The objective was to determine if the mass of a ball affected its kinetic energy."

- *Shocking! A Study of Electrocoagulation in River Water.* "Our project tested two hypothesis: 2) that an Elequa electrocoagulation system would improve measures of Total Dissolved Solids (TDS), coliform, and *Escherichia coli* bacteria when compared to a control; and 2) that improvement would be related to the type of electrodes used – 4-aluminum (4Al), 4-iron (4Fe), and a 2-aluminum /2-iron combination (2Al/2Fe)."

- *How does Caffeine affect Goldfish?* "The objective of this experiment was to see if caffeine that is dissolved in waste water has an effect on fish."

- *Here's the Scoop on Poop.* "This experimental project was conducted to test the effect of different animal manures (horse, cow, and chicken) as fertilizers when used on corn seeds and corn plants."

Texas 4-H Discover Science Method Research Poster Contest

4-Her's Name(s):
Category:
Project Title:

Part 1: Written Report		
Section:	**Possible Points:**	**Points Earned:**
Title Page Should include: 4-Her(s) Name, Category, Age Division, and County.	**2**	
Abstract Abstract should briefly and concisely describe the purpose, hypothesis, methods, results, and conclusions.	**5**	
Introduction Should answer the question, "why was the work done?" It should also clearly state the problem that justifies the research.	**5**	
Literature Review Should detail what information currently exists concerning the research project. Information listed should be materials used in the research.	**3**	
Materials and Methods The materials and methods section should enable others to reproduce the results by duplicating the study.	**10**	
Results Should list a summary of results the project produced.	**10**	
Discussion and Conclusions Should show the conclusions that were drawn from the results of the study and how they relate to the hypothesis.	**10**	
References & Acknowledgements List all significant sources and acknowledge anyone who helped with any aspect of the project.	**5**	
TOTAL (PART 1)	**50**	

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Part 2: Poster Display		
	Possible Points:	**Points Earned:**
Is the project original and creative?	**5**	
Is the display logical and organized?	**5**	
Are headings and photos appropriate for the project?	**5**	
Are graphs, charts, diagrams, and tables properly labeled?	**5**	
Are colors, fonts, and formats appealing and easy to read?	**5**	
TOTAL (PART 2)	**25**	

PART 3: Oral Presentation and Interview		
	Possible Points:	**Points Earned:**
Did the 4-Her(s) speak in a loud, clear voice?	**5**	
Did the 4-Her(s) use vocabulary which demonstrated an in-depth knowledge of the topic?	**5**	
Did the 4-Her(s) use appropriate posture, body language, and eye contact?	**5**	
Did the 4-Her(s) state the title and purpose of the project and explain the reason for the topic selection?	**5**	
Was the 4-Her(s) well prepared and knowledgeable on the project?	**5**	
TOTAL (PART 3)	**25**	

Total Score (with all three parts combined) _____/100

Judge's Comments:

Judge's Initials: _____

Texas 4-H Discover Scientific Method Research Poster Contest Entry Form

Scan and upload this form when you register at 4-H Connect.

Contest Name and Location:

4-H Member(s) Name:	
Project Title:	
Category:	
Age Division:	CEA Name:
County:	4-H Club Name:

Project Abstract: Write neatly below, or attach a typed copy with your name and problem on it. Be sure to include your research hypothesis and objective(s).

4-H Member(s) Signature(s): Date:	County Extension Agent Signature: Date:
Parent/Guardian Signature: Date:	Date Entry Received:

Texas 4-H Discover Science Method Research Poster Contest
County Extension Agent Approval Form

Member(s) Name(s) _____ **County/Club** _____

Adult Sponsor Approval: I have read the Research Plan prior to experimentation and agree to sponsor the member(s) and assume reasonable responsibility for compliance with all rules.

CEA Printed Name _____ **Signature** _____ **Date** _____

4-H Member Acknowledgement: I understand the risks and possible dangers to me in the Research Plan. I will adhere to all rules when conducting this research.

4-H Member Printed Name _____ **Signature** _____ **Date** _____

4-H Member Printed Name _____ **Signature** _____ **Date** _____

Parent/Guardian Approval: I have read and understand the risks and possible dangers involved in the Research Plan. I give my consent to my child prior to participating in this research.

Parent/Guardian Printed Name _____ **Signature** _____ **Date** _____

FORM REQUIRED FOR COMPETITION

Scan and upload this form when you register at 4-H Connect. Contact the Contest Superintendent – David Smith davidsmith@tamu.edu with questions or concerns.

Human Vertebrate Endorsement

Recognizing that human beings are vertebrate animals and yet need different criteria than Nonhuman vertebrates, the following policies will govern the use of human beings.

1. No projects involving human cultures of any type (mouth, throat, skin or otherwise) are allowed. However, tissue cultures purchased from reputable biological supply houses or research facilities are suitable for student use.
2. Projects that involve taste, color, texture or any other choice are allowed, but are limited to preference only. Quantities of normal food and non-alcoholic beverages are limited to normal serving amounts or less. No project may use drugs, food or beverages in order to measure their effect on a person.
3. The only human blood that may be used is that which is either obtained through a blood bank, hospital or laboratory. No blood may be drawn by any person or from any person specifically for a science project. This rule does not preclude a student making use of the data collected from blood tests not made exclusively for a science project.
4. Projects that involve exercise and its effect on pulse, respiration rate and blood pressure are approved, if valid, normal physical examination is on file and the exercise is not carried to extreme.
5. Projects that involve learning, ESP, motivation, hearing, vision and surveys are allowed. No project will be allowed that is in violation of these rules.
6. No person may perform any experiment for the student that violates any of the rules.

In this space, briefly describe the use of humans in your project. Use the back of this page if necessary.

The signatures of the student(s) and the CEA indicate this project conforms to the above rules.

CEA Printed Name	Signature	Date
4-H Member Printed Name	Signature	Date
4-H Member Printed Name	Signature	Date

FORM REQUIRED FOR COMPETITION

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Non-Human Vertebrate Endorsement

These rules are strictly enforced. Students and advisors using non-human vertebrates in their project must complete this form. The signature of the student and the advisor indicate the project was done within the rules and regulations of

1. Intrusive techniques used cannot exceed momentary pain and must comply with commonly accepted livestock management procedures.
2. Changing an organism's normal environment by using either aversive stimuli or predatory/prey conditions to study behavior/operant conditioning is prohibited.
3. Food and water cannot be used or withheld for more than 24 hours for maze running and other learning or conditioning activities.
4. The student and advisor have the responsibility to see that animals are properly cared for in a well-ventilated, lighted and warm location with adequate food, water and sanitary conditions. Care must be taken to see that organisms are properly cared for during weekends and vacation periods.
5. Chicken or other bird embryo projects must be terminated at or before ninety-six hours.
6. Projects that involve behavioral studies or newly hatched chickens or other birds will be allowed, provided no change has been made in the normal incubation and hatching of the organism and all vertebrate rules are followed.

In this space, briefly describe the use of vertebrate animals in your project. Use the back of this page if necessary.

The signatures of the student(s) and the CEA indicate this project conforms to the above rules.

CEA Printed Name	Signature	Date
4-H Member Printed Name	Signature	Date
4-H Member Printed Name	Signature	Date

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