KATE WICKHAM PTO SCIENCE (AND ENGINEERING) FAIR INFORMATION PACKET

Wednesday, Feb 8, 2023
6:00PM to 7:30PM
Set up: 5:30 p.m.
Register before 8 p.m. on Monday, January 30
Concessions will be available for sale: Pizza $2 per slice, Bottled Water $1, and cookies $1.

Wickham students! Do you love science or engineering? Do you have questions about the world around you or problems in need of a solution? Then the Science Fair is for you!

All Wickham students in grades K-6 are invited to participate! All you have to do is find a question you want to answer or problem you want to solve and follow the directions below!

If you're answering a question, you should follow the directions for Science Projects. If you're designing a solution to a problem, you should follow the directions for Engineering Projects.

Science Projects
1. **Find a question** you can answer by collecting data, making observations, or doing research. Examples: ● *How does ____work?* ● *What causes ____ to happen?* ● *What would happen if I did ____ to ____?*
2. Identify which type of science you will use to answer your question: ○ **Life sciences** (biology) - the study of life and living things ○ **Physical sciences** (chemistry and physics) - the study of matter, energy and how they interact ○ **Earth sciences** (geology, paleontology, meteorology, and oceanography) - the study of Earth's structures, properties, and processes
3. **Form a Hypothesis -** predict what you think the answer to your question will be based on what you know now.
4. **Gather Data -** what information do you need to find a real answer to your question? Make observations, conduct an experiment, or do research to find the answer.
5. **Draw Conclusions -** organize your data and figure out what it tells you about the answer to your question. Was your hypothesis right or wrong? (If it was wrong, don't worry! Scientists guess wrong all the time. That's why we collect data to find a better answer!)
6. Document and Present your Findings - create a poster using trifold poster board. Include the following information on your poster: ● **Name, Grade, Teacher** ● The words "**Science Project**" and the **type of science** from list above (for example Life Sciences) ● **Research Question** - What question were you trying to answer? ● **Hypothesis** - What did you expect the answer would be? ● **Method -** What type of data did you collect and how? (you might include pictures here) ● **Findings** - What did the data show? On the poster, you might include a graph or pictures. In addition to the poster, you might present a collection of objects, an apparatus or model built to answer a question, or the physical results of an experiment (e.g., plants grown under different conditions) ● **Conclusions -** What did we learn from the data you collected? What was the answer to your question? Was your hypothesis right or wrong?

- **References -** If you used any sources like books, movies, news articles, or the internet to find information for your project, please cite your sources. For rules and examples of how to cite sources, see the following: https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/index.html

Engineering Projects

1. **Find a problem** for which you can design a solution.
   Examples:
   - How can I make ___ to do ___?
   - How can I do ___ better?

2. Identify which type of engineering you will use to solve your problem:
   - **Electrical engineering -** design tools or products using electricity and electric circuits (like radios, clocks, wind turbines, or light displays)
   - **Mechanical engineering -** design tools or products with moving parts that interact with one another (like robots, rockets, or roller coasters)
   - **Software engineering** - design a computer program (like a game or simulation)
   - **Civil engineering -** design physical structures used by the public (like dams, bridges, roads)
   - **Chemical engineering** - design materials and products using chemicals (like food, medicine, fuel or the materials used to build things)

3. **Brainstorm** several possible designs that would solve your problem.

4. **Build -** pick the design that you think will best solve your problem and build a prototype (a first draft version of your solution).

5. **Test -** test your design to see if it works the way you thought it would and whether it actually solves your problem. (If it doesn't work, don't worry! Engineers fail all the time, especially on the first try! You can go back and improve your design and test it again to see if it works better. That's called iterating!)

6. **Document and Present your Findings -** create a poster using trifold poster board. Include the following information on your poster:
   - **Name, Grade, Teacher**
   - The words "**Engineering Project**" and **type of engineering** from list above (for example Electrical Engineering)
   - **Design Problem** - What problem were you trying to solve?
   - **Brainstorm** - What were some of the solutions you considered? (Include descriptions or sketches.)
   - **Design Solution -** What design did you decide was best to build and test? (On the poster, you might include a description, sketch, or picture. In addition to the poster, you might present your design prototype.)
   - **Test Results -** What happened when you tested the design? (On the poster, you might include a description or pictures. In addition to the poster, you might present a demonstration of your design solving your problem. If your initial design failed and you changed it and tested it again, share that here.)
   - **Conclusions -** Did your design work or not? Why or why not? Is there anything you would still want to do to improve your design?
   - **References -** If you used any sources like books, movies, news articles, or the internet to find information for your project, please cite your sources. For rules and examples of how to cite sources, see the following: https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/index.html

Project Guidelines

1. **You may work on your own or on a team** (with 1 or 2 friends or siblings from Wickham)**.** If working in a team, make sure each team member helps with the project. (No teams larger than 3 people please.) *EACH STUDENT MUST REGISTER SEPARATELY AND LIST ADDITIONAL TEAM MEMBERS ON THEIR REGISTRATION FORM.*
2. **Do your best work, and do it yourself!** It is alright to get help from a grown up as long as you do most of the work yourself. Remember that you will be presenting your project to science fair visitors and participants, so be sure you understand what you have done. (Also, great scientists and engineers don't become great scientists and engineers by letting their parents do their work for them 😀)
3. **Be safe!** Be sure to check with your parents/guardians that your project is safe! **Review the safety rules and guidelines below before planning your project.**
4. **Be prepared!** Be ready to give a short presentation (about 1 min.) to those who visit your poster/display during the Science Fair and answer questions they might have about your project.
5. **You will have a 2 ½ ft by 4 ft table space on which to display your project.** For displaying pictures and data, you may want to use a 3-fold poster board, available at office supply stores, Target, and Walmart.
    - Posters are a quick way to summarize your project or share basic information for collections – a good resource for planning your poster can be found here: http://chemistry.about.com/od/sciencefairprojects/ss/scienceposter.htm
    - Here also are some examples of how you *might* lay out your poster, based on how *real scientists and engineers* present their work at conferences:
        - Science Poster Layout Example.pdf
        - Engineering Poster Layout Example.pdf
    - Please note that yours **doesn't have to look like this**. Add artistic touches to make it your own! You can cut and paste pictures or text onto your board or write or draw directly on it.
    - *If you need more space or other accommodations, please indicate on your EventBrite registration form.*
6. **A few electrical outlets are available on a first come, first serve basis.** If you need one, please indicate so on your registration form, and we will make arrangements on a first come, first serve basis. Please bring your own extension cord (review Safety Rules and Guidelines).

Safety Guidelines

1. **NO live animals can be used in your display.** Photographs are a great and safe way to show work involving live animals. An adult must assume primary responsibility for the purpose and conditions of any project using live animals. The comfort, care, and humane handling of animals (including people) used in any study shall be the primary concern of the student scientist and supervising adult.
2. **Projects requiring switches and cords for 110-volt operation must have an Underwriters Laboratories-approved (UL) cord**, which is at least 12 feet long and equipped with a standard (GFI) grounded (three prong) plug.
3. **Anything hazardous to the public cannot be included in your display.** Remember that people of all ages will attend the Science Fair. Some (but not all) hazardous ITEMS TO AVOID include:
    a. Live, disease-causing organisms that are pathogenic to human/other vertebrates
    b. MOLD, microbial cultures, fungi, live or dead, especially unknown specimens
    c. Any flame, open or concealed
    d. Highly flammable or explosive solids, fluids, or gases
    e. Dangerous chemicals, including caustic acids or bases
    f. Pressurized tanks containing combustible gases
    g. Human or animal blood or other bodily fluids
    h. Anything containing food allergens should be labeled and contained (peanuts, tree nuts, dairy, etc)
    i. Batteries with open top cells
    j. High-voltage equipment
    k. Vacuum tubes or ray-generating devices

4. **Students should wear safety goggles and follow standard safety practices** when working with glassware, fire, hot liquids, or household chemicals
5. **Parental approval and supervision should be obtained** before working on these projects and as needed to ensure safety throughout the project.

TO PARENTS AND GUARDIANS…

- **This is a *voluntary, extracurricular* activity.** Students should only participate if they're interested.
- **The goal of the science fair is to spark students' interests** in science, engineering, and the world around them and to allow them to build skills and confidence to investigate and solve problems for themselves and share their knowledge with others.
- **This is a non-competitive event.** Prizes will not be awarded, but each child will be recognized for their contribution.
- Projects should be completed at home with parent/guardian support, but **please encourage your child to take the lead on their project**, exploring a question or problem that is interesting to them and doing most of the work themselves.
- **All projects are subject to approval.** Projects that pose a potential safety risk to participants or may cause harm to animals will not be approved. Please also avoid projects likely to cause an excessive mess.
- **Please share an email address that you use regularly.** This address will be used to send a registration confirmation and any Science Fair updates.
- **You must attend this event with your child.** The school or PTO will not provide student supervision during the event.

EXAMPLES OF SCIENCE QUESTIONS:

1. *Does the shape of an ice cube affect how quickly it melts?*
2. *How do crystals grown from un-iodized salt compare with those grown from iodized salt?*
3. *What factors affect plant growth and how?*
4. *What ratio of vinegar to baking soda produces the best "volcanic" eruption?*
5. *How is blood pumped throughout the body?*
6. *What types of rocks are found in Coralville?*
7. *How does a telescope work?*

EXAMPLES OF ENGINEERING PROBLEMS:

1. *How can I make sure to get up on time for school every morning?*
2. *How can I feed my dog treats while I'm at school?*
3. *How can I clean my room more quickly?*
4. *How can I reach things on a high shelf?*
5. *How can I make sure my drinking water is clean?*

Questions? Please email kstriggow@gmail.com.