OSSIAN ELEMENTARY

SCIENCE & ENGINEERING FAIR

Information Packet

and

Registration Form

OSSIAN ELEMENTARY SCIENCE & ENGINEERING FAIR

2021 Science Fair Timeline/Important Dates

Set up will be Wednesday, February 24

Judging will be Thursday, February 25

Recognition Ceremony will be Friday, February 26 at 9:30

Top two winners in the grade 4-5 division will attend the

Northeast Indiana Regional Science & Engineering Fair at IPFW

Saturday, March 20, 2020

Science Fair is an optional opportunity for students in grades K, 1, 2, 3, and 5. Grade 4 students are participating in Science Fair. If you want to participate, please complete the registration form.

2021 OSSIAN ELEMENTARY SCIENCE AND ENGINEERING FAIR

REGISTRATION FORM

Student Name: _____

Grade: _____ Teacher: _____

Science Experiment
(a project that asks a question, forms a hypothesis and test the hypothesis)

My question is:

Engineering Project
(a project that identifies a need/problem, designs a solution and tests the solution)

My problem/need is:

Please return to your teacher by January 29, 2021

Questions? Contact Mrs. Burnau (katy.burnau@nwcs.k12.in.us)or Miss Bales (kristen.bales@nwcs.12.in.us)

What's It All About

A science or engineering project is a chance for students to take the skills they have learned in various subjects and put them together in a real-world application. They will use their math skills, their science skills, their critical thinking skills, their writing skills, their speaking skills as well as their creativity.

A project is an experiment that answers a question or a design that solves a problem. The experiment follows the scientific process. The design follows the engineering process. Both processes can be applied to all types of situations throughout a student's life.

A project is not about having a fantastic board with cool lettering. <u>It is about students demonstrating what they learned.</u>

Getting Started

Begin by brainstorming with your student the things they like to do in their free time. Find areas of interests. Make "I wonder" statements. Select an "I wonder" statement and turn it into a question or a design need.

Then research science projects and engineering projects that are in those areas of interest. Either create a brand-new experiment or design or adapt existing ones. Follow the processes below to complete your project.

Scientific Method Projects

1. **Ask a Question:** Does the purity of water affect the surface tension? Do plants go better if they hear music? Can a person feel color?

2. **Do Some Research:** Research your topic. Learn as much as you can. See if anyone has asked your question before. What answer did they get? What factors should you consider?

3. **Make an Hypothesis:** What do you think the answer to your question is? "I think the cleaner the water, the less surface tension there is." I think plants grow better in music." "I think people cannot feel color."

4. **Design and Conduct an Experiment:** Create a materials list and design an experiment. Conduct the experiment. Be sure to do your experiment several times in the same way. Control as many variables as you can. For example, if you were measuring how far a paper airplane goes, be sure to do each trial in the same conditions with the same thrower. Write down what happens in each trial. This is your data.

5. **Analyze Your Data:** Put your data in charts and graphs so you can look at it and make some conclusions. What does your data show?

6. **Make a Conclusion:** Based on your data, was your hypothesis correct? Make a conclusion statement. "Plants grow taller when there is music playing.

7. **Prepare Your Presentation:** Make a visual display for each of the steps above. Show what you did for each section.

8. **Practice Your Presentation:** Practice telling what you did and what you found out in each step. Include the things you thought about and the things you might do differently the next time. Tell about what you learned.

Engineering Design Projects

1. **Identify a Need/Problem:** I need a bridge for my cat to walk on. I need a grabber that can reach things on a high shelf. I need a robotic hand for someone to use. There are a lot of STEM engineering projects out there. Try to create a real life need and make the design better.

2. **Do Some Research:** Research your topic. Learn as much as you can. See if anyone has designed something before. What factors should you consider?

3. **Brainstorm:** Write down all your ideas. Write down all the things you need to think about. For example, brainstorm ideas about durability, movement, materials. You may not use all of your ideas. Try get as many as you can think of. (You may need them later when it doesn't work!)

4. **Design:** Make a blueprint. What is going to look like? How is it going to fit together? Create a materials list. Then create your design.

5. **Test and Change:** Try it out. Did it work? If not make one small change. Try it out. Did it work? If not make one small change? Keep track of what happens for each trial and what change you made in an engineering notebook. If it does work, do it for several trials. Does it work in all conditions? Does it work for different users? Record this information in your notebook.

6. **Present Your Design:** Use the information from your engineering notebook to create charts that show how your design worked. Create a visual display for each of the steps above. Even if it didn't work, display what you did and what happened for each test.

7. **Practice Your Presentation:** Practice talking about what you did in each step. Talk about what you were thinking when you made changes. Talk about what you learned even when it didn't work. Talk about what you would do differently.

Resources

	Science Bob	https://sciencebob.com/science-fair-ideas/science-fair-resources/
	Science Buddies	https://www.sciencebuddies.org/science-fair-projects/science-projects
	Education.com	https://www.education.com/science-fair/
	Education.com	https://www.education.com/science-fair/engineering/
	The STEM Laboratory	https://thestemlaboratory.com/20-science-fair-projects/
	Science Project	https://www.scienceproject.com/search/search.asp
	Science Fair Central	https://www.sciencefaircentral.com/

Please check out our Science Fair Website for other resources and videos.

http://oessciencefair.weebly.com/

If you want a printed list of project ideas, please contact Mrs. Burnau and Miss Bales

FAQ

1. **Can students work in groups?**
   Yes. Students may work in groups. Design projects are often done best in groups. The more ideas, the better. In fact, in the future, it is likely most students will be working in groups in their careers.
2. **Can parents or other adults help?**
   Yes. There is often a lot of talk about students doing the project themselves. We want this to be a learning experience. It is okay to guide your student. In fact, we encourage you to think of yourself as a coach. Give your child things to think about. Discuss results together. Ask them to analyze. Practice the presentation together. In the end, your child will be judged what he has learned and how he talks about the project.
3. **Where do we get the materials?**
   Try to do projects that use items easily found around your house. Contact us if you need certain equipment. We just might have something in the STEAM room. Science presentation boards can be purchased through the office.
4. **What if our experiment/design doesn't work?**
   That's okay! Scientists and engineers experience a lot of things don't work before they find the solution. Try making a change. When you present your findings, it is okay to say it did not work. You can give your reasons and what you would do differently. There is so much to be learned when things do not work!
5. **What does the project have to include?**
   It needs to include either the steps of the scientific process or the steps of the engineering design process. For each step, the student must explain what they did and what they found. It needs to have documentation of the testing phase and an analysis of the testing. Please check out our final project and presentation resources.
6. **Is there anything we are not allowed to do?**
   The list below contains items that cannot be brought into the fair. If you do a project with one of the items, take pictures, but leave the item at home. We strongly recommend that you consider ethical consequences before doing experiments with animals especially if they could endanger their health.

- living creatures, including plants and microbes
- organisms, fungi, cultured growths, spoiled food, or mold
- chemicals
- human or animal parts (except teeth, hair, nails, animal bones, histological sections and wet-mount tissue slides… these are allowed)
- poisons, drugs, or controlled substances
- flames or highly flammable materials
- projects with moving parts that have unprotected bolts & pulleys
- taxidermy specimens of parts
- soil or waste samples
- containers filled with ANY liquid
- human or animal food
- sharp items (or items that may become sharp if broken)

Criteria for Judging

Criteria	Beginning (1)	Progressing (2)	Mastered (3)	Above (4)
Project Purpose	The project does not ask a question or state a need.	The project asks a question or states a need. However, the design does not follow the question	The project asks a question or states a need. The project design ties in clearly with the question/need	The project asks an original or creative question or states a creative need/problem
Project Design	The project is missing two or more steps or does not follow the scientific or design process	The project is missing a step of the scientific or design process or the steps are lacking depth	The project follows the scientific/design process. Each step is clearly defined.	The project follows the scientific/design process. Each step shows a depth of understanding such as controlling variables
Project Execution	The project does not follow the design process. There is little evidence of testing and documentation	The project is executed following the scientific/design process. However, there is only evidence of one trial of testing and/or poor documentation of results	The project is executed following the scientific/design process. There is evidence of more than one trial of testing. Documentation of trial results is present	The project is executed following the scientific/design process. There is evidence of more than one trial of testing. The student demonstrates good use of variable control
Project Analysis	The student is not able to analyze or discuss his results and their implications	The student is able to discuss the results, but struggles to draw conclusions	The student is able to discuss results and is able to relate them to the projects' purpose. The student discusses changes he/she would make.	The student is able to discuss results and is able to relate them to the projects' purpose. The student discusses changes he/she would make. The student gives a real-world application to his findings
Presentation	The student is not able to discuss the project following the scientific or design process.	The student is able to discuss the project by reading off his visuals. Answers to further questions are vague and lack depth.	The student is able to discuss each step of the progress without reliance on visuals. The student is able to answer questions about his project with complete answers.	The student is able to discuss each step of the progress without reliance on visuals. Answers to further questions are complete and show depth of understanding.

Engineering Project Plan for Action

What is your problem/need?
What did you learn by researching?
What ideas did you have while brainstorming?
Create a blueprint of your design What materials do you need?
How will you test your design?

Science Project Plan for Action

What question are you asking?	
What did you learn by researching?	
What is your hypothesis	
How will you conduct your experiment? (Don't forget to do more than 1 trial)	
Materials Needed:	Variables to Control
What data are you collecting? How will you record it?	

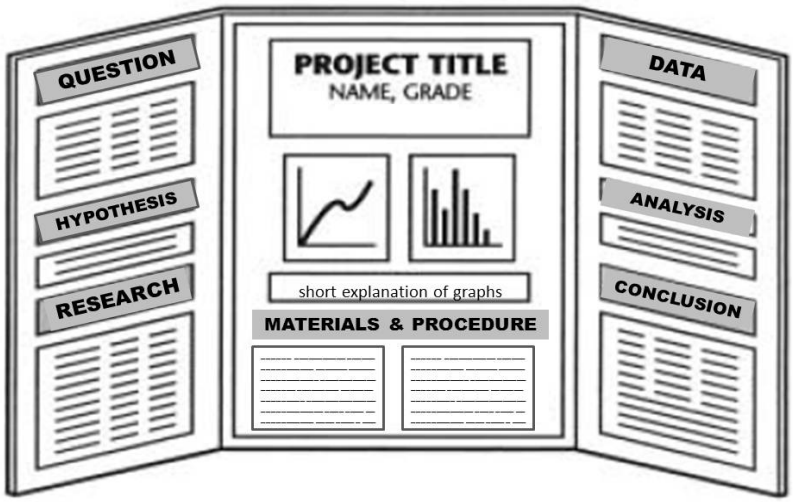
Presenting Your Project

Both engineering and science projects need to have a visual and oral presentation.

VISUAL PRESENTATION

You can choose to visually display your project however you want. Just remember to include all the steps on your display. Science fair boards can be purchased in the office. Remember the visual display is only one part of your presentation. The judging will be more interested in what you can tell them about your project.

1. Be sure that your visual display clearly states your question or problem need. Think of this as the title of your project.
2. Be sure that every other step of the process is represented in visual display. Make sure your display goes in a logical order.
3. Photos or pictures of your process are very helpful in helping others understand what you did.
4. When you explain what you did
5. Data and analysis of data are two different things. Data Is simply what happened when you tested. Please show your data in a chart so that viewers of project can easily see what happened. Analysis is what the data shows. It is your explanation of the data. This is usually a paragraph.
6. Make sure you have a conclusion. Was your hypothesis correct? Did you find a solution to the problem?



ORAL PRESENTATION

You will be presenting your project to one or more judges. This is your chance to talk about what you did and what you learned. It always helps to practice. Gather up your parents, your grandparents, your friends and even your pets. Practice your oral presentation with them.

1. Begin by introducing yourself. "My name is _____ and this is my project.
2. Start by explaining what question you asked or what problem/need you saw. Explain why you picked this project.
3. Talk about any research you did.
4. State your hypothesis. Tell why you chose that hypothesis. If you are doing an engineering project, talk about your brainstorming. Discuss all the ideas you had.
5. Go through all your steps and explain what you did. It always helps to talk about why you did what you did or what you were thinking.
6. It is okay to say something didn't work. Explain why you think it didn't work and what you would do differently. Talk about what you learned from it not working.
7. Show them your results from your trials. Talk about what you think the results show. This is your analysis.
8. Finish with your conclusion. Was your hypothesis correct? Did you find a solution to your problem?
9. Do not read from your board or your notes. Look at them and just tell them what you did and what you learned.
10. As you practice, try to think of what questions they might ask.