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| Science 7/9 Unit Overview – Science Fair | | |
| Unit Name: | Science Fair | |
| Duration: | 6 Weeks | |
| Project Idea: | Students will participate in a School Science Fair | |
| IRP Standards: | -perform experiments using the scientific method  - demonstrate scientific literacy | |
| 21st Centuary Skills Assessed and taught  (will be used for effort assessment) | - Collaboration  - Communication (0ral Presentation)  - Critical Thinking  - Use computers to create webpages | |
| Driving Question: | What are you interested in science and what would you like to explore further | |
| Major Products and Performances | Group or individual: If the student wishes to work in partnership for the science fair, they may do so. However, each student must hand in an individual report and reflection.  For a successful science fair, student will need to  a) poster board with title of the completed project  b) a written report with references about your research that you did for the project  c) a webpage outlining the information that you present on the poster board and the written report | |
| Entry Events/Lessons | Day 1 | Introduce the science fair and show examples of projects from over the year  Outline to students where they can find videos of lessons on how to conduct a scientific inquiry (part of a flipped classroom approach)  Help students pick out ideas on what they would like to research  Hand out Appendix A |
| Week 2 Day 1 | Hand out Appendix B take home quiz. Students need to complete the quiz by the end of the week. Appendix B is to ensure that students are on track and will allow the teacher an opportunity |
| Week 3 | Give notes on how and why volcanic eruptions happen  -If time permits, ask students if they would like to change their earthquake and vocano guesses on the map  - Reveal project and learning questions that must be answered |
| Project time line  (note: by the end of each week the teacher will have conferenced with all students at least once on progress and problems) | Week 1 | Students will research their topic and outline the information they find. They will then add the research to the webpage you create with all the references. |
| Week 2 | Students will complete their project. The teacher will provide supervision and feedback and inquire where their project is at |
| End of Week 2 | Students will demonstrate their project to a group of their peers. Each demonstration will be video recorded for self reflection purposes |
| Reflection methods | - Self and peer evaluation  - After watching the video of themselves, There will be a whole class discussion. | |

### Appendix A – Science Fair Expectations as Given in a Handout

Each student is required to complete a Science Fair project. The deliverables of which include:

a) poster board with title of the completed project

b) a written report with references about your research that you did for the project

c) a webpage outlining the information that you present on the poster board and the written report

This year, if you wish to do a project that models or demonstrates a scientific idea, you may do so. However, you may not have a partner and the demonstration must be reproducible a few times during science fair. Please note, that your poster board will look different from the example on the bottom. Depending on the quality, the demonstration may be marked lower

For those of you using the scientific method, you will need:

Problem/Purpose

Background Research

Hypothesis

Experiment

Analysis

Conclusion

Using this method as a guide, students will complete research, conduct an experiment, design a poster, and prepare a presentation about his or her chosen topic.

Important Due Dates!

By the end of week one – Research your topic and outline the information that you found on the topic. Please add your research to the webpage you create with all the references. Conference with Mr. Arca to show progress

By the end of week two – Your background research should be done and you’ve created your problem, hypothesis and designed (although not started) your experiment. Please hand in the take home quiz.

By the end of week three – You must have started your experiment and have your poster board ready.

Please show evidence to Mr. Arca

By the end of week four – Continue your experiment and get started on working on your poster board (title, headings) and the webpage

By the end of week five – Have your experiment finished. Create your graphs, finish your analysis and conclusion

By the end of week six – practice what you are going to say for the science fair and get ready with what you are going to show during the fair

April 24, 2013 – Science Fair Day

Judging Criteria

At the Science Fair, Judges will rate projects based on these areas:

Creativity ~ How the project shows creative ability and originality in terms of the question, the approach to solving the problem, and the analysis and interpretation of data and results.

Scientific Thought ~ The judges will evaluate your use of the scientific method and how well you follow it.

Thoroughness ~ Judges will rate how completely you do your research, conduct your experiment and take notes.

Skill ~ The judges will evaluate how available resources are used.

Clarity ~ This will evaluate how well you write and speak about your project. The judge wants to completely understand your project.

As a result of the judging process, students may be selected to earn prizes as well as compete at the regional and even state level.

Topics

Before you pick a topic for this big project, think about what interests you! Each student can choose any question or problem in a subject such as everyday science, plants, small animals, or household products. Creativity is key, just make sure you check it with your teacher! Find out everything you can!

\* Consumer Products Testing

\*Note: projects cannot harm or injure animals! We must get animal or testing projects approved and file proper paperwork.

Background Research

Do some research on your topic. Find out what has been done before, how you could test your question, and what results have been shown before. This can help you test and write your hypothesis.

Question

Pick a question that you have about your topic that you can test.

Write your question here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hypothesis

Once you are an expert in your topic, you must choose a potential answer or solution to the question, known as your hypothesis. Do not worry if your hypothesis turns out to be wrong! You will still have a great project!

Write your Hypothesis here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Experiment

To test your hypothesis, you will research, plan and develop an experiment. The experiment will either prove that your answer IS correct or that it IS NOT correct. You should make a plan of what you hope to do in your experiment.

~ First you list the materials you will need.

~ Second you write out the procedures that you will go through to test your hypothesis. Be Specific ☺

~ As a part of your procedures you need to include three things:

constants: (what stays the same in your experiment)\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

independent variable (the factor you will change):\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dependent variable (the factor that you are measuring):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

To have a great project and enough time to do your experiment, start early and stay on task!!!

Analysis

Your experiment will have many trials or tests, which means you will do the experiment many times. As you perform and plan the experiment, you should record observations and data in a visual. If the experiment does not work the first time, try again!

What type of visual (table, chart, line graph, bar graph, circle graph, pictures, etc) will you use?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Conclusion

In your conclusion, you must state whether your hypothesis was correct or incorrect. Make sure to answer your question!

To be a superscientist you could discuss any problems that you had doing your experiment and what could have been better.

Poster

To present your Science Fair project, you will need to design a poster. This poster will serve as a visual representation of your project. It is wise to get your board early as many stores run out. Here is a possible way to create your board:



Here are some tips for making your poster stand out:

Words and Graphs poster should be large and very easy to read.

You may want to use 2-3 bright, bold colors as backgrounds for each section and in your graphs

Add photos or drawings of your experiment, your set-up, and your results

### Appendix B: Scientific Process Quiz

1. What is your testable question?
2. What is your independent and dependent variables?
   1. Independent variable:
   2. Dependent variable:
3. What is your hypothesis (state clearly with reasoning)?
4. What are all the controlled variables?
5. What are all the materials you will need?
6. What is your procedure?
7. Create a blank table to record data
8. Anything else that I should know?

**Appendix C – Rubric**

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|  | **Attempted**  **1** | **Meeting expectations**  **3** | **Exceeding Expectations**  **5** |
| **Background Research** | - Uses limited resources from only one type of information resource (ex: only textbook)  - May use resources that are not reputable sources  - Fails to connect the research to the problem  - Material is not fully written in the student’s own words | - Uses three or more reputable sources  - Sources are cited correctly  - Uses more then one type of information resource (ex: textbook, websites etc.)  - Makes a general connection between the research and problem  - Written in student’s own words | - Uses five or more reputable sources  - Sources are cited correctly  - Uses at least 4 types of information resources  - Makes a clear connection between the research and the problem  - Written in student’s own words |
| **Scientific Content** | - Missing or incomplete parts of the scientific method (problem, hypothesis, variables etc.)  - Hypothesis is either not testable or does not connect to the stated problem  - Experiment is not related to the hypothesis or only completed once  - Chart for recording data is incorrect or not present | - Has all parts of scientific method  - Hypothesis is testable and addresses the stated problem  - Experiment is adequate to test the hypothesis but may leave some unanswered questions  - Adequate chart for recording information | - All parts of scientific method well detailed  - Hypothesis is testable and clearly addresses the stated problem. It also shows a direct connection to background research  - Experiment is a well constructed test of hypothesis and is performed accurately several times  - Well designed chart for recording info. |
| **Creativity** | -Approaches solving their problem in a scripted way  -Experiment is not original  - Project design and use of equipment is standard | - Approaches solving their problem in a standard or slightly original way  - Some originality in experiment design  - Some originality in design of project or use of equipment | - Approaches solving the problem in a unique way  - Originality in approach and experiment design  - Originality in design of project or use of equipment |
| **Analysis & Conclusion** | - Does not summarize the data clearly  - Does not include graphs or visuals to explain data  - Conclusion does not answer the problem or refer to the hypothesis | - Summarizes the data & attempts to analyze trends & patterns  - Includes some graphs or visuals  - Conclusion addresses the problem and states if the hypothesis was supported or rejected (gives some reasons why) | - Summarizes the data clearly in addition to discussing relationships and analyzing trends/patterns (graphs & visuals)  - Conclusion completely answers all aspects of the problem  - Clearly cites evidence to explain whether or not their hypothesis is supported |
| **Presentation & Visual Quality** | - Project has little visual appeal  - Limited organization and confusing information  - Few to no supporting images  - Language and spelling errors are frequent | - Project is visually appealing  - Organized  - Most visuals and images aid in understanding  - May contain some language and spelling errors | - Project is visually appealing  - Well organized and clear  - Striking or innovative use of models/visuals  - Uses language and spelling flawlessly |

**Appendix D –Self Reflection Used at the End of the Unit**

Please remember I will be basing my assessment based on what you write here. **One word answers or simple answers that don’t answer all the questions will not help you when I mark the project.**

What did you learn doing the science fair?

What are three things that you think could have been improved and if you have another science fair in the future, how would you make the CHANGES to ensure you have a better project?

If you had a partner, please tell me what you did and what your partner did then tell me what percentage of the work you did.

Who created the best project in your grade? Why do you believe this?

What advice would you give to students who are doing the science fair next year?