AE PHILLIPS LABORATORY SCHOOL

7th Grade Science Fair

HANDBOOK

2019-2020

"The significant problems we face cannot be solved at the same level of thinking we were at when we created them". ~ Albert Einstein

AE Phillips 7th Grade Science Fair Handbook

Introduction

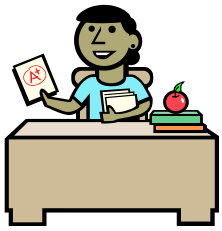
The AE Phillips Science Fair is a school-sponsored activity that supplements the regular curriculum of classroom instruction. The classroom teacher and school principal have the responsibility to regulate the content and presentation of all student projects to assure that they are consistent with the interests of the school community. The purpose of the Science Fair is to encourage students' interest in science, to develop their inquiry and investigation skills, and to enhance children's pride in completing research projects. Junior-division science fairs:

- Enable students to exhibit their projects and share ideas with other students and community members;
- Provide opportunities for students to receive feedback from professional scientists and community members;
- Provide students with exciting opportunities to work with science process skills and the scientific method on a topic of their own choosing that relates to the science curriculum as it connects to real life.

What is a Science Project?

A science fair project is a unique way for students to pose questions for which they must seek out answers and to satisfy their own curiosity about the world around them. A science fair project is an experiment, a research effort, a collection of scientific items, or display of scientific apparatus presented for viewing. It represents the efforts of a student's investigation into some area of interest and provides a way for the student to share the results of those investigations. Through the development of a science fair project, students gain a first-hand appreciation of the work of scientists and the value of their discoveries.

Science Fair Rules and Guidelines



1. Only individual projects are allowed.
2. Only two types of projects may be entered into the District Fair. They are a scientific investigation or an invention that solves a problem.
3. Projects must fit in one of the science fair project category criteria listed in this handbook.
4. No mold growth, or bacteria projects are allowed.
5. Use of vertebrate animals is allowed but must be humane.
6. No use of prescription drugs, harmful, or illegal substances are allowed. Grocery items (i.e., baking soda, vinegar, salt, lemon juice, etc.) are appropriate.
7. Project display boards must follow safety guidelines listed in this handbook.
8. Projects must be approved by the classroom teacher.

Project Selection and Approval

All project ideas must be submitted to the classroom teacher on a Project Proposal form (see example on page 17). The proposal should contain a topic and problem statement for the project. Projects will be approved by the classroom teacher. Projects without prior approval, projects inconsistent with the prior approved proposal, or projects that have been substantially changed from what was previously approved will only be displayed at the teacher's discretion and cannot be submitted to the District science fair.

Science Fair Categories

Animal Sciences: Projects that observe and record the growth or behavior of animals**. (ADDITIONAL Pre-approval forms are required: Vertebrate Animal Form (5A) by a veterinarian & Qualified Scientist Form (2)**

Behavioral & Social Science: Projects that observe the behavior of HUMANS**. (ADDITIONAL REGIONAL Pre-approval forms are required: Human Participants Form (4), Human Informed Consent Form, & Qualified Scientist Form (2)**

Biomedical and Health Sciences: The project's emphasis will be on human health. **(ADDITIONAL REGIONAL Pre-approval forms are required: Human Participants Form (4), Human Informed Consent Form, & Qualified Scientist Form (2)**

Chemistry: Projects that examine chemical reactions, the chemistry of living things, solubility, heat capacity, etc.
No prescription drugs, dangerous or illegal substances should be used in the experiments.

Earth & Environmental Science: These are projects investigating principles of geology (for example, weathering and erosion). Projects that deal with global change, issues related to Earth, such as water, air, climate, waste and pollution, green living, human health, ecosystems and related fields.

Engineering: Projects can develop technological devices, which are useful to the global society within an engineering-related field, such as electricity, mechanical, chemical, aeronautical, and geological.

Physics: Projects that study the nature and properties of nonliving matter, energy and/or force and motion.

Plant Science: Projects that use subjects such as plants (mosses, seed plants), agriculture, conservation, and forestry. **NO LIVE PLANTS** may be displayed. Experiments using **mold or fungi** are **NOT** allowed.

Please Note:

Failure to meet the category criteria and safety guidelines will be grounds for exclusion from the school and/or District Science Fair.

In addition it will also affect the final project grade.

Scientific Investigation Project Guidelines

THE SCIENTIFIC METHOD:

1. Notice a PROBLEM. / Ask a QUESTION.
2. Form a HYPOTHESIS.
3. Design an EXPERIMENT.
    a. Identify variables

        (IV= what you choose to change/test)

        (DV= what you measure, observe, or count)

        (CV's= what you control or keep constant)

    b. Describe procedures

    c. Gather materials and equipment
4. Collect data (Record measurements, counts, etc & take pictures!)
5. Analyze the data. (Graphs, tables, charts, etc)
6. Form conclusions. (It's ok if your experiment proved your hypothesis incorrect. Just explain WHY!)

Step 1 – Choose a Topic and Problem Statement

Begin by exploring a scientific concept that you are interested in. This can be something that was read about or was introduced in the classroom. Go to the library or internet to learn more about your topic. Write a brief summary of the background information you gather for your science fair topic. Keep a record of where the background information came from.

- At this point, your brain will start asking "What **if**...." questions. One of these questions is what you will use to design your experiment. It is called the "**TESTABLE QUESTION**". This will become your problem statement. Make sure that this has been approved by your teacher.
- Anything to do with your project should be recorded in your lab notebook.

Step 2 – Research

- In the last quarter of 6th grade, students will be allowed class time to research and take notes on their topics/questions of interest. They may continue research at home during the summer before 7th grade.

Step 3 – Form a Hypothesis

- A HYPOTHESIS is an educated guess.
- Think about what might happen in your experiment. This is called a **HYPOTHESIS**. Write down what you think will happen BEFORE actually doing the experiment.
- Be specific.
- I hypothesize that if _____, then _____will result.

Step 4 – A) Experimental Design & Procedure

The experimental design is a plan to test your hypothesis. Write a detailed description of how to do your experiment. As you work through it, you may find that you have to change it. Make notes and change your procedure afterwards, to show the changes. Remember, any scientist should be able to take your procedure and repeat your experiment following your instructions.

- How do you design the experiment to answer your question?
- What supplies will you need BEFORE you begin your tests?
- How will you record data in metric units?
- It is easier to use a numbered list, like in a cookbook rather than write a paragraph.
- Start each sentence with an action verb: mix, stir, get, measure, etc.
- Include quantities or amounts that you will measure using metric units.

B) – ID Variables and Control Group

- Identify the **independent variable**. This is the one variable that you are purposely changing in your experiment to observe what will happen. For example; the temperature of the water or the battery strength.
- Identify the **dependent variable**. This is the one that reacts or changes in response to the **independent** variable, i.e., amount of salt that dissolves or number of paper clips held by a magnet.

- Identify the **control variables** in your experiment. These are the variables in your experiment that you do not change so that you can compare the effects from only one **independent variable**. Control variables are quantities that a scientist wants to remain the same or be held constant. Most experiments have more than one constant variable. Some people refer to controlled variables as "constant variables."
- Use a **control group** if applicable in your experiment. A control group is the group that does not receive the experimental variable. Both it and the experimental group have what is usually considered normal conditions, i.e., room temperature, normal amount of water, normal amount of sunlight (constants). A control group helps you to be sure that what YOU DO in your experiment is effecting the test results.

C) – Experiment

- Design a data table to keep track of your results.
- Carry out your experiment following your written procedures.
- Observe and record the results in a data table using metric units i.e., centimeters (cm); grams (g); or degrees Celsius (˚C).
- If qualitative observations are made, a numbered scale must be developed to quantify the observations.
- Use photographs whenever possible to record observations. Pictures can be shown on the display board. **(NO FACES IN PHOTOS).** Faces must be covered or pixelated.

Then, ***REPEAT THE EXPERIMENT*** at least two more times. Record your results as carefully as you did the first time. ALL scientists repeat their experiments; you must repeat yours as well. All experiments must have a minimum of **THREE TRIALS to record sufficient data**.

Step 5 – Results (the measured DATA in metric units)

- When you have all of your results, you need to design the way that you will report the data.
- Many students use graphs, charts and written summaries of what happened in the experiment.
- Determine averages or the mean when appropriate.
- Use photographs whenever possible to show changes **(NO FACES IN PHOTOS).**
- Display all your data in charts, graphs, and/or pictures even if it does not match what you thought was going to happen under the heading **"DATA"** on your display board.
- Explain your results in words and display this narrative under the heading **"RESULTS"** on the display board.

Look again at your **HYPOTHESIS** and at the results of your experiment. Think about what happened and why it happened that way. Determine if your hypothesis was supported or not supported. You will use your observations to help you write your **CONCLUSION** in the next step.

Step 6 – Make Conclusions (Scientifically EXPLAIN WHY it ended that way)

Answer the following questions to summarize what you have learned from the experiment.

- What was the purpose of the investigation?
- Was your hypothesis supported/proven by the data? (Indicate evidence and reasoning that supports your conclusion. This is called Conclusion Evidence Reasoning (CER).
- What were the major findings? What are possible reasons for the results?
- How can you use the findings from this investigation in your day-to-day life? How can the investigation be improved?
- What new question(s) has your experiment lead you to ask that could be tested in a new investigation.

Step 7 – Communicate Results (Abstract & Bibliography) (Research Plan=Regional)

The abstract is a complete summary of the investigation and must consist of **three to five paragraphs** with a total of approximately **250 TYPED words & MUST FIT ON ONE PAGE** that includes the following:

- Describe your purpose & hypothesis.
- Describe procedures & data collection methods.
- Describe and explain your results and state if your hypothesis was supported or not by the results. Suggest a reason why it was or was not supported.
- Explain your conclusion and application(s).

It's important to cite your sources for a science fair project. Put your bibliography of at least 3 different sources on the same page. Here are some examples of how to cite books, online references, and conversations.

1. Here is an example for a book or magazine -- Jones, Jenny R., "Science Experiments to Try" *Science Time*, New York: Sterling Pub. Co., May 2004, Vol. 3:12-15.
2. Here is an example for a Web site -- Helmenstine, Anne, About Chemistry Website, http://chemistry.about.com, Oct. 4, 2005.
3. Here is an example for a conversation -- Smith, John, Telephone Conversation, Mar.5, 2013.

Completed Project Abstract/Bibliography form will be due in October. This must be submitted to the teacher for final approval **BEFORE** working on your science fair display board.

AE PHILLIPS 7TH GRADE SCIENCE FAIR

ANSWER THIS PAGE, THEN TYPE IT UP IN THIS FORMAT & PRINT IT.

Investigation Project Abstract / Bibliography

Student's Name_______

Project Title:_____

Typed Abstract GRADE DUE 10/9/19

Be sure to include the following in the abstract of a project:

1. The purpose of the project: What problem will this solve?

2. State briefly what you thought would happen. Also, describe how you conducted your project. I hypothesized that….

3. What happened? Tell the results of your experiment. Just the FACTS & DATA.

4. What was the conclusion? Was your hypothesis correct? EXPLAIN WHY IT RESULTED THAT WAY. USE SCIENCE TERMS.

5. What are the real life applications of your project? How can what you learned be used to help or entertain someone?

6. How could your project be improved if you were to repeat it? If you were to continue your project, what would you do?

Bibliography

There should be at least three (3) references. If the project concerns an animal, there should be one reference concerning the care of that type of animal.

Science Project Abstract / Bibliography

AE PHILLIPS 7TH GRADE SCIENCE FAIR

SAMPLE

Student's Name: Heinz Doofenshmirtz

Project Title: Wrap It Up!

Abstract

The purpose of this project is to determine if increasing the number of wraps around an electromagnet will increase the magnet's strength. It is hypothesized that increasing the number of wraps around the nail will increase the strength of the electromagnet.

Wire, a nail, a D battery, and a battery holder were the materials used to build an electromagnet. The wire was cut 90 cm long so that 10, 20, and 30 wraps could be wrapped around the nail. An electromagnet with 10 wraps was used to pick up paper clips three times. Then using the same steps the electromagnet was built using 20 wraps of wire, tested three times, and then tested with 30 wraps. The number of paper clips collected was recorded in a data table for all the trials.

Results showed that in all three trials, the average number of paper clips picked up by the electromagnet increased as the number of wraps increased from 10 wraps to 20 wraps to 30 wraps. The hypothesis was correct.

This experiment shows that the number of wraps of wire on an electromagnet affects its strength, so that in real life if a stronger electromagnet is needed to separate metal from nonmetal objects, its strength can be increased by increasing the number of wraps.

The project may have been improved and had better data if a new battery was used for each trial.

Bibliography

Brain, Marshall. How Electromagnets Work. 2000. URL: http://science.howstuffworks.com/electromagnet.htm/printable

ScienceSaurus: A Student Handbook. United States of America: Great Source Education Group. 2005. p. 306

Van Cleave, Janice. *Help My Science Project is Due Tomorrow*. Scholastic. 2002

Science Project EXHIBIT GUIDELINES

1. Keep the exhibit neat, uncluttered and to the point.
2. All posters, charts, etc. must be attached to the science fair board.
3. No part of an exhibit may be attached to walls or tables.
4. The science fair board must be self-supporting (FREE STANDING).
5. Be sure to make everything sturdy so it can be safely transported. Fasten everything well.
6. The science fair board displays your project. Use attractive lettering.
7. Spell correctly. Your name and school name should go on the back of the board.
8. Main points should be large and simple. Details must be clear and legible from three feet away.
9. The **abstract and bibliography** must be placed on the board's lower left-hand corner (as you face the board).

EXHIBIT SPACE: Maximum size is: Width: (side to side) 3 ft (36.in) Depth: (front to back) 76 cm (30 in.) Height: Table Exhibit 3ft (36 in.) Your display MAY BE SMALLER! **OFFICE DEPOT boards are ALL approved. Wal-Mart boards are ok, but might be smaller.**

Safety Display Guidelines

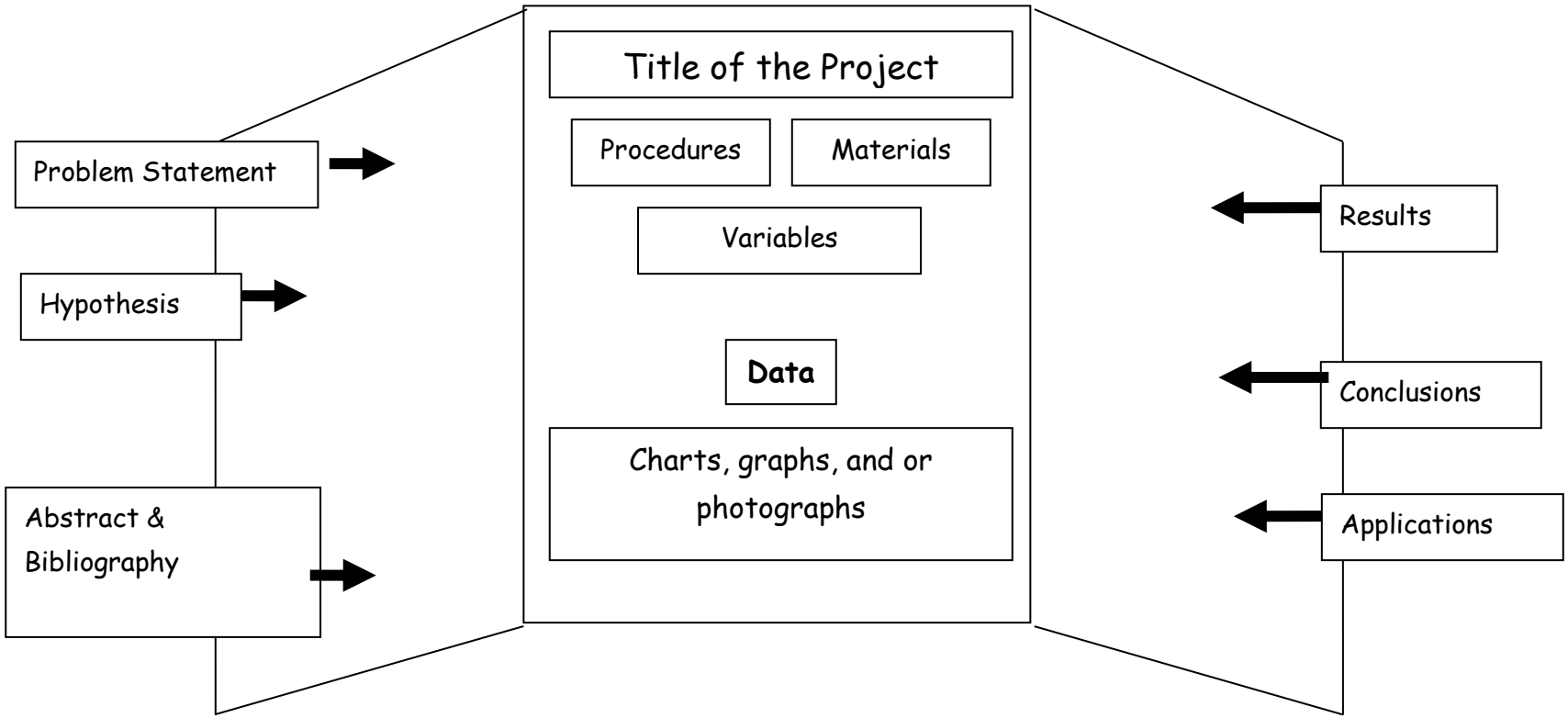
1. Anything which could be hazardous to the public, the exhibitor, or other exhibitors is **PROHIBITED**.
2. Nothing sharp or pointed.
3. Organisms: **No invertebrate organisms** live or dead or plants may be displayed (Display pictures instead).
4. No chemicals of any kind may be displayed. (**No** prescription drugs, dangerous and illegal substances are allowed as part of the experiment.)
   For example:
   - No acids, dilute or strong (i.e., vinegar, lemon juice)
   - No bases, dilute or strong (i.e., baking soda)
   - No salt solutions
5. No flammable substances may be displayed.

An alternative solution to displaying any of the above items that were allowed as part of the project is to take photographs of the substances that were used. You may display on your board & make a separate booklet of data pictures to show judges.

<u>All projects will be inspected for adherence to Science Fair Safety Guidelines by the classroom teacher.</u> Failure to follow these guidelines will be grounds for exclusion from the school and/or District Science Fair. In addition it will also effect the final project grade.

AE Phillips 7th Grade Science Fair

Board FORMAT RUBRIC (Correct topic & position) GRADE DUE 12/2/19



AE Phillips 7th Grade Science Fair 2019

Project #: _____

Judge Number: _____

Directions:
Darken circles completely.
Tally total points.
Total Points: _____

RUBRIC FOR JUDGING INVESTIGATION PROJECTS

1. Abstract & Bibliography To what degree does the abstract and bibliography describe the project and support the research?	0 = No Abstract/No documentation of research 1 = Poorly written and one documentation 2 = Poorly written and two documentations of research 3 = Well-written but does not describe all components of the project 4 = Well-written and completely describes the project	⓪ ① ② ③ ④
2. Problem Statement To what degree is the problem statement new and/or different for a student at this grade level and how well is it written?	0 = No Problem Statement 1 = Incomplete Problem Statement 2 = Poorly written or not in a question form 3 = Complete well-written Problem Statement in question form 4 = Above expectations – detailed, well-written in question form	⓪ ① ② ③ ④
3. Hypothesis To what degree is this a testable prediction?	0 = No hypothesis 1 = Incomplete hypothesis 2 = Complete hypothesis, but not completely testable 3 = Hypothesis is well-written and testable 4 = Hypothesis is above expectations – detailed, well-written, testable	⓪ ① ② ③ ④
4. Procedures - Numbered step by step - Sentences begin with verbs - Quantities to measure are listed in metric units	0 = No overall procedural plan to confirm hypothesis 1 = Partial procedural plan to confirm hypothesis 2 = Sufficient procedural plan to confirm hypothesis 3 = Well-written plan, numbered step by step, sentences beginning with verbs 4 = Well-written as above and detailed including repeatability and specified measurements of materials used in experiment	⓪ ① ② ③ ④
5. How well are all variables recognized? -Test (independent/manipulated) -Outcome (dependent/responding) -Control (if applicable) -Constants	0 = No variables or constants are recognized 1 = Some variables or some constants are recognized 2 = All variables are recognized, but not all constants and controls (if applicable) or vice versa 3 = All variables & constants and controls (if applicable) are recognized 4 = All variables & constants and controls (if applicable) are clearly and appropriately recognized	⓪ ① ② ③ ④
6. Materials and Equipment Were the items: - listed in column form - equipment specifically named - metric units are used	0 = No materials identified or used 1 = Materials not specifically identified and/or used properly 2 = Materials specifically identified but used improperly 3 = Materials specifically identified in column form and used properly 4 = Materials specifically identified in column form & metric units used properly	⓪ ① ② ③ ④
7. Results To what degree have the results been interpreted?	0 = No written narrative interpretation of data 1 = Partial written narrative interpretation of data 2 = Correct written narrative interpretation of data 3 = Comprehensive narrative interpretation of data including averaging 4 = Comprehensive and significant interpretation of data above expectations	⓪ ① ② ③ ④
8. Conclusion To what degree are the conclusions recognized and interpreted? Including: - the purpose of the investigation - hypothesis supported/not supported - the major findings	0 = No problem statement or interpretation of data support for hypothesis identified 1 = Incomplete problem statement or interpretation of data support for hypothesis 2 = Correct/complete conclusion/interpretation of data support for hypothesis 3 = Well-written conclusion/interpretation of data support for hypothesis 4 = Well-written conclusion/interpretation of data support for hypothesis with major findings and possible explanations for them	⓪ ① ② ③ ④
9. Application To what degree are the applications recognized and interpreted? Including: -Improvements to the investigation - Use of the findings - New question(s) to be investigated	0 = No recommendations, applications, or new question recognized 1 = Incomplete or vague recommendations, applications, or new question recognized 2 = Apparent recommendations, applications, or new question recognized 3 = Recommendations, applications, and new question clearly recognized 4 = Significant well-written recommendations, applications, and new question recognized	⓪ ① ② ③ ④
10. Display Attributes: - free standing - correct grammar/ spelling - clear and legible - attractive visual display	0 = Unsatisfactory quality of display - more than three attributes are missing 1 = Poor quality of display - only two or three attributes are missing 2 = Average quality- only one attribute missing with minor errors and of fair quality 3 = Good quality – all attributes present and with few if any minor errors 4= Superior display – all attributes present and of exemplary quality	⓪ ① ② ③ ④
11. Oral Presentation or Interview -How clear, well prepared and organized is the presentation? -How complete is the student's understanding of the experimental work?	0 = Poor presentation; cannot answer questions 1 = Poor presentation; partially answers questions 2 = Fair presentation; adequately answers most questions 3 = Good presentation; precisely answers most questions 4 = Exemplary presentation and knowledge; precisely answers all questions	⓪ ① ② ③ ④

AE Phillips 2019 7th Grade Science Fair Contract

Student #:____

FORM A

GRADE DUE MAY 2019!!!

I, _____, will submit a Project Proposal for the 2019 AEP 7Th Grade Science Fair due _____. I understand that my student must participate in AEP 7th grade Science fair & grades will be taken in the FALL of 2019.

I further understand that failure to comply with the rules set forth in the project guide will affect my final project grade.

Date _____ Homeroom Teacher (6th grade) - _____

Student's Name _____

Student's Signature _____

Parent's Name _____

Parent's Signature _____

AEP 7th Grade 2019 Science Fair **GRADE DUE MAY 2019!!!! FORM B**

Science Project Proposal Form

Name _____ **6th Grade HR Teacher:** _____Student #:____

Problem Statement (The question I plan to investigate in my experiment.)

I hypothesize that…..

ID VARIABLES ON THE BACK! IV, DV, CV's

Science Fair Project Question Checklist	
1. Is the topic interesting to me? If not, pick ANOTHER topic!	Yes / No
2. Can you find at least 3 sources of written information on the subject?	Yes / No
3. Can you design an experiment to test your question (problem statement)? In other words can you change only one variable (test 1 independent variable) at a time, and control other factors that might influence your experiment to reduce error?	Yes / No
4. Can you measure the outcome/dependent variable, which are the changes in response to the independent variable using a number that represents a quantity such as a count, length, width, weight, percentage, time, etc.? UNITS IN METRIC?	Yes / No
5. Did you read the science fair rules and guidelines? Is your experiment safe to perform?	Yes / No
6. Will you be able to obtain all the materials and equipment you need for your science fair project ?	Yes / No
7. Do you have enough time to do your experiment and repeat it at least 2 more times before the school science fair? MINIMUM of 3 REPEATED EXPERIMENTS to collect data.	Yes / No

I have discussed the project problem statement and the checklist with my parent(s) and I am willing to commit to following through on this project.

_____

Student Signature **Date**

I have discussed the project idea and the checklist with my child and I believe he or she can follow through with this project.

_____

Parent Name & Signature **Date**

AE Phillips Science Fair 2019-2020 **FORM C**

Registration Checklist

(Please keep for your records)

The following forms should be completed and submitted in the following order.

Due DATES for GRADES:

☐ May 2019 - Science Fair Contract **FORM A** (p. 15) **GRADE**

☐ May 2019 - Project Proposal Form – **FORM B** (p. 17) **ID variables on back! GRADE**

☐ you keep - Registration Checklist – **FORM C** (p. 19) KEEP on FRIDGE!!!

☐ 8/30/19 - Safety Approval/Entry Form – **FORM D** (p. 21) **GRADE**

☐ 9/9/19 – Stop/end experiments to analyze data (1 month until abstract is due)

☐ 10/9/19 – Project Abstract/Bibliography - **GRADE** (Use p. 8, 9, 10) (**TYPED**)

☐ 12/2/19 - Project Display Board - **GRADE** (see p. 11-13) **NAME ON BACK!**

☐ 12/3/19 - AEP Science Fair (Blount's room)

☐ 12/11/19 Regional 2 Forms & $15 Entry Fees due

☐ 1/29/20 - Region 2 Science & Eng. Fair JUNIOR DIVISION
(LA Tech Student Center) TONK

Student Participation: Students are expected to attend the Science Fair and stand next to their project and provide information about their project to judges.

AE Phillips **GRADE DUE (8/30!!!)** **Student #: ___**

SAFETY-APPROVAL/ENTRY FORM **FORM D**

7th Grade Science Fair

STUDENT'S NAME: _____
(Last Name) (First Name)

SCHOOL: A. E. Phillips **CATEGORY: leave BLANK** _____

PROJECT TITLE/Description: _____

_____

HYPOTHESIS: I predict that …_____

_____

PROCEDURE

(Steps to test the hypothesis : A STEP BY STEP RECIPE)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____Continue on back if needed

MATERIALS USED TO TEST THE HYPOTHESIS (METRIC)

(include quantities)

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

ID VARIABLES:

IV (1 variable changed) = _____
DV (measured & units) = _____
CV's (kept same) = _____

I am aware that my child is doing/has done a Science Fair Project. My child had supervision during the development of the project.

Parent's Name _____ Date: _____

Parent Signature: _____ Date: _____

The student followed the rules of the Science, Mathematics, Engineering, and Invention Fair and, to the best of my knowledge, was supervised during the development of the project.

Teacher's Signature: _____

Websites That May Be Helpful for Projects and Inventions:

http://www.sciencebob.com/sciencefair/index.php

http://www.invention-help.com/invention-help-books.htm

http://pbskids.org/designsquad/pdf/parentseducators/DS_Invent_Guide_Full.pdf (for teachers)

http://www.inventivekids.com/2010/10/05/step-by-step-guide-to-inventing/

http://www.sciencebuddies.org

http://www.showboard.com

http://science.dadeschools.net/

http://www.proteacher.com/110031.shtml

http://www.sciedunet.org

http://sciencepage.org/scifair.htm

http://my.integritynet.com.au/purdic/science-fair-projects-ideas.htm

http://www.ipl.org/div/kidspace/projectguide/

http://www.super-science-fair-projects.com/elementary-science-fair-projects.html

www.kidsinvent.org

www.howstuffworks.com

http://edweb.sdsu.edu/courses/EDTEC596/Project1/Inventors.html (teachers only)

http://ctinventionconvention.org/

http://library.thinkquest.org/J002783/InvCon.htm

http://all-science-fair-projects.com/

Books

Bardhan-Quallen, Sudipta. 2006. *Last-minute Science Fair Projects: When your Bunsen's not Burning but the Clock's Really Ticking.* Sterling Publisher.

Bochinski, Julianne Blair. 2005. *The Complete Workbook for Science Fair Projects.* Wiley Publisher

Brooks, Philip. 2002. *Questions and Answers: How Things Work.* New York: Kingfisher.

Egan, Lorraine Hopping. 1997. *Inventor and Inventing Grades 4-8.* New York: Scholastic Professional Books

Erlbach, Arlene. 1997. *The Kid's Invention Book.* Minneapolis: Lerner Publication Company.

Friedhoffer, Bob. 2006. *Everything You Need for Simple Science Fair Projects*. Chelsea Clubhouse

Gardner, Robert. 2004. *Electricity and Magnetism Science Fair Projects: using batteries, balloons, and other Hair-raising Stuff.* Enslow Publishers.

Gates, Phil. 1995. *Wild Technology: Inventions Inspired by Nature.* New York: Larousse Kingfisher Chambers, Inc.

Harper, Charise Mericle. 2001. *Imaginative Inventions.* Boston: Little, Brown and Company.

Karnes, Frances A. Ph.D and Suzanne M. Bean, Ph.D. 1995. *Girls and Young Women Inventing: Twenty True Stories about Inventors plus How You Can Be One Yourself.* Minneapolis: Free Spirit Publishing.

Rubin, Joel. 2008. *Weather*. Heinemann Library

Sobey, Ed. 2002. *Inventing Toys: Kids Having Fun Learning Science.* Tucson, Arizona: Zephyr Press.

Spangenburg, Ray and Diane K. Mosher. 1997. *American Historic Places: Science and Invention.* New York: Facts On File.

Sullivan, Otha Richard. 2002. *Black Stars: African American Women Scientists and Inventors.* New York: John Wiley and Sons. Inc.

Thimmesh, Catherine. 2000. *Girls Think of Everything: Stories of Ingenious Inventions by Women.* Boston: Houghton Mifflin Books.

Tocci, Salvatore. 2006. *More Simple Science Fair Projects,* Chelsea ClubHouse Publisher.

Van Cleave, Janice. 2002. *Help My Science Project is Due Tomorrow*. Scholastic.