Myra S. Barnes – Intermediate School 24
Mr. Lenny Santamaria – Principal

Science_____Mr. Cottrell_____Science Project / Research Paper

RESEARCH PAPER

1. Papers are to be typed and double-spaced. The paper is to be typed on regular white stock paper with black ink; font Times New Roman at size 14; double spaced. Handwritten papers will **not** be accepted. Accommodations will be made for those students that do not have access to a computer or typewriter. The **responsibility lies with the student** to pursue these arrangements in a timely fashion. Requesting accommodations a day or two before the paper is due to be submitted, is unacceptable.
2. There is no set length for the paper rather than it should cover all aspects relevant to the science project and the scientific method.
3. In addition to the typed report, an emailed final copy is required as well. The paper should be emailed to **rcottrell@sir-ray.com**. Please insure that the emailed copy is **the final draft** as I will be using the emailed copy as part of the overall grade for the paper. Failure to submit an emailed copy of the paper will result in a **one-grade drop on the paper**. **Emailed paper must be in a PDF format to avoid problems.**
4. The cover sheet should contain the **title of the paper; your name; and class**. Simply staple the paper, in the top left corner; **do not** submit in any type of folder, plastic sleeve, etc. There are no pictures; drawings; or other artwork to appear on the cover. You are encouraged to include pictures; drawings; charts; etc.; within the body of your paper.
5. As the research paper reflects research, more than one resource **must** be used in the paper's development. Any resource may be used in the preparation of the paper – books; scientific journal articles; internet; etc. Each resource must be listed on a page titled "Reference List" which is placed at the end of the research paper, and is alphabetized according to author. Refer to the format notes at the end. **A minimum of three (3) resources must be used with at least two (2) of these resources an internet website**. You may use any multimedia encyclopedia ***with the exception of Wikipedia***; the textbook; the Glencoe and class websites as a resource. All of your resources may come from the internet. I encourage you to use only the internet for your research as you will find the most up-to-date information online.
6. **BE FOREWARNED**: references are checked for accuracy and the paper for plagiarism. I am a member of ***www.turnitin.com*** which is an internet based term-paper marking system that checks for plagiarism.
7. Remember that the paper is to be handed in on time – failure to turn in paper on or before the due date will subject the paper to a one-grade drop per day late penalty. **Absence on the due date is not an excuse for a late paper**. Student must arrange to have paper in on the due date either by

having a fellow student submit the paper or having a parent/guardian dropping the paper off in the school office. **BE FOREWARNED**: **NO EXCUSE IS ACCEPTABLE FOR LATE PAPERS.**

8. The topic of your research paper should be based on what you are choosing to do for your science project. For example: you decided your project was to determine the effect of different amounts of sunlight exposure on cacti. Your research paper would then be based on information about the cacti you are using in your study (where found; environmental concerns; type of soil; ideal growing conditions; etc.)

Format for reference list:

Reference List

Book:

Freds, L. (2007) **Finding the way back to Earth.** Washington, DC. Smith Press

Williams, L. & Harvey, P. (2009) **Life in Outer Space.** New York, N.Y. Falmer Press.

Newspaper/Journal/Magazine Article:

Handel K. (2006) **The International Space Station – Mans Biggest Leap into the Future, or Man's Biggest Mistake?** Mars Society Quarterly, v. 36, p. 63-78.

Website:

Website: **http://www.nasa.gov** September 3, 2009

SCIENCE PROJECT

SCIENCE PROJECT TASK DESCRIPTIONS - you may choose one (1) of the following types of projects. Remember that not all research is going to fall nicely into one (1) of the following four (4) categories. Therefore a single project may draw on more than one (1) type of investigation.

- Controlled experiment
- Field work
- Design Project

CONTROLLED EXPERIMENT – manipulate the environment being studied.

- Design a procedure, including identifying what factors are going to be varied and what is going to be controlled. You must ensure that the precision of the tools you are using are appropriate and determine how, when and where measurements will be taken. Sources of error must be addressed at every step of the project.
- The procedure should be implemented multiple times and data collected; evidence of procedure must be presented within the research portion of the project. All experiments must be conducted a minimum of ten (10) trials with all data – pictures, charts, etc. presented in a binder in addition to what is used on the visual display.
- Data must be analyzed and represented appropriately using charts and graphs. The data should be compared with existing data sets obtained through background research.
- The hypothesis must be evaluated in terms of the data.
- Conclusion should be drawn, asking new questions based on the results of the investigation.

Examples:

1. How does a substance, such as road salt or compost affect the growth of a plant?
2. How do various coatings affect the corrosion of a metal?
3. How does the pH of water affect the growth of elodea?

FIELDWORK – a study of a natural or man-made environment to gain practical experience and knowledge through firsthand observation.

- Design a data collection procedure that includes a number of field observations, frequency of visits and other appropriate information. Each visit must be documented with imprinted dated pictures and/or signatures of institutional personnel. A minimum of five (5) visits is required.
- Test the design for data collection.
- Revise the procedure after an initial trial. Revise hypothesis if necessary based on new observations and continue to carry out the revised procedure.

- Record and organize data using tables, charts or graphs. A binder filled with data, pictures, etc. is required in addition to what is used on the visual display.
- Analyze the data looking for patterns.
- Develop a conclusion based on the available data.

Examples:

1. What is the date that "green down" occurs or budburst happens for different species of trees in Great Kills Park?
2. What are the behaviors of the Prairie Dogs that are most often observed in their enclosure at the Staten Island Zoo?
3. How does the salinity of the ocean water change as we move south from Midland Beach to the Conference House Park?
4. What is the correlation between day length and the direction of the sun's shadow?

DESIGN PROJECT – identify a need and develop a design that meets that need.

- Determine the criteria for success (testing/optimization/relevant parameters.)
- Create a design that satisfies the criteria developed.
- Test design and gather data, or in the case of projects in which it is not possible to test the design due to time constraints, develop a plan on how the design is to be evaluated over time to see if it does meet the identified need.
- Analyze data, revisit the design and revise if necessary.
- Retest design as necessary until it meets the established criteria.
- Generate conclusions and develop new questions to explore.

Examples:

1. Design and construct a hydroponic greenhouse for growing vegetables without soil. (Can vegetables be grown without soil?)
2. Design and construct a container that will prevent a frozen object from melting when shipped from one place to another. (Can frozen materials be shipped over long distances?)
3. Design and construct a solar powered racing car that can travel the greatest possible speed over a chosen distance. (How fast can a solar-powered racing car travel?)
4. Design a zoo exhibit that is both aesthetically pleasing and meets the needs of the animal exhibited. (How can you design a better exhibit for the prairie dogs?)

Note: for all projects, the conclusion should refer to the hypothesis and there should be strong connections between the research question, the analysis of the data, and the conclusion. Does the data support the hypothesis? How does it do

this? How are you sure of your results? The discussion should include error analysis and suggestions for further inquiry, as well as future improvements to the investigation procedure or design. If you cannot determine a definitive conclusion, discuss why you were not able to do so.

HELPFUL GUIDELINES FOR COMPLETING YOUR SCIENCE PROJECT

SELECTING A TOPIC - This is the most important step in preparing a good science project. Choosing the right project is often the difference between passing or failing. First, make sure you pick a topic that interests you and is not complicated. Often, students will pick a project that becomes very complicated and become frustrated. This leads to either not fully understanding the topic, or doing the project wrong. Using any search website can assist you in finding an interesting topic. All you need do is type in "science project" and a rather exhaustive list will appear. If you still need help, please email me at rcottrell@sir-ray.com. Your project ***must be pre-approved before you begin work. Not having your project pre-approved could result in receiving a failing grade or the maximum grade of "D" for the project.*** You will receive a written notification once your project is approved. This written notification must be attached to your presentation. Remember - this is an individual project – there are no groups.

SPECIAL CONSIDERATIONS - The science project is a research and/or experimental based project that is to focus on some topic related to the various fields of Science, including Math and Computers. You are free to do any project/experiment that you wish within the following guidelines:

- ***There is no product testing***. In other words, you may not do a project that involves comparing the abilities or capabilities of one product versus another. These are not science projects, they are procedures used in consumer testing.
- ***There are no lemon/potato/fruit/vegetable energy projects***. These are projects done in elementary school science and are unacceptable for 6th grade students.
- ***There are no salt/sugar/other substances in water experiments***. These are not science projects, they are cooking techniques.
- ***There are no "battery testing" experiments***. These are projects done in elementary school science and are unacceptable for 6th grade students.
- ***There are no Stroop Effect/Music Effect/Light Effect/Sound Effect/Energy Drink/Exercise/Video Game comparison projects without a substantial amount of test subjects***. While these are controlled environmental projects that take place over long periods of time, you may conduct these type of experiments with a ***minimum of 25 subjects*** (individual release forms (available online) are required from each participant and are placed in the binder.)
- ***Science Institute Visitations***: Should you make use of the various places such as the Zoo or the Aquarium for part of your research/science

project, you must have the signature of one of the people working at that particular place as verification that you visited. The signature, date and time of visit is required and must be submitted with your project. Design projects that involve the re-design of various animal/fish exhibits are also required to have the signature of official personnel. Failure to provide this information will result in a ***two-grade drop*** for the project. A minimum of five (5) visits is required to ensure proper study and analysis of the object under study. Imprinted dated pictures of each visit must be part of your visual presentation and data binder.

There are no environmental projects. No global warming/hurricane frequency or intensity projects. In addition, there are no natural disaster projects (volcano/earthquake/tornado/tsunami/other.) There are other environmental projects that are permitted dependent on what you are studying – for example: building a shake table to test building design.

Living subject projects: These types of projects require ***the minimum use of 25 subjects***. Dependent on your study, participants should be across all age groups and must include male and female subjects. A signed release form (available online) is required of each person participating in the science investigation. These forms must be included in the binder as required.

There are no mentos/soda projects. Wow – it makes foam! Been there, done that – not such a big deal.

There are no preservative projects. The use of natural substances such as salt/sugar/vinegar/etc. to preserve food is over-rated and impractical (due to its expensive nature.)

There are no "meat in soda" projects. Why would anyone want to decompose meat in a carbonated beverage? Impractical and a waste of time.

There are no evaporation projects. It is not Earth-shattering information to learn (it's actually common knowledge) that different liquids evaporate at different times. In addition, these are elementary school projects and are unacceptable for 6^{th} grade students.

RESEARCH YOUR TOPIC - Once you have selected your topic, proper research is paramount to fully developing and understanding the various nuances of your topic. Books and science journals can be found in the classroom, your local library or bookstore. However, the best source for information is the internet as you will find that the most up-to-date information is online. There are many search engines available to find information or try my research links page.

MAKE A PLAN - Once you have completed your research, and you are now an expert on your topic, you need to develop a plan as to how you will conduct your project. A proper plan will include the following: the ***purpose*** of your project; the ***variable*** that you are going to change in the project; the ***hypothesis*** (outcome) of what the project will be; a well detailed ***procedure*** outlining how you conducted

the project; a listing of all ***materials*** used; and a neatly presented ***data*** section including charts, diagrams, etc.

COMPLETE THE PROJECT - Follow the plan that you have written. While you complete the project, be sure to keep detailed notes on everything that you do and observe. If possible, you should take pictures or make sketches of your observations, plans, etc. These are an important part of your project. You will need to refer to them during your presentation and when making your display/binder.

ANALYZE YOUR RESULTS - Now that you have completed your project, you will need to gather your notes, pictures, sketches, etc., so that they are organized and can be easily understood. Finally, look at them and analyze them. Ask yourself questions using the handout as a guide – make believe that I am interviewing you during the presentation. You may question yourself by asking what happened; did the results agree with your hypothesis; etc. You may wish to make graphs and charts to represent that data – this will also help you to analyze your data and may also be used for the display board or power point presentation, and your binder.

MAKE YOUR DISPLAY/POWER POINT PRESENTATION - Your display is crucial to your success because it visually tells the audience about your project. It is tantamount that the display be neat and well organized. It should include background information; problem; hypothesis; procedure; results; conclusion; report summary; graphs; charts; photos or drawings. If you are using a display board (no oak-tag presentations), be sure to use the identification tag that was given to you upon approval of your science project. The identification tag is to be placed on the back of your display board. If you are using Power Point, be sure that the identification tag is taped or placed on the CD/DVD case of your presentation, or if you are using a flash drive for storage, the flash drive should be in a clear plastic bag with the identification tag placed inside the bag. A one-grade penalty will be given for improper identification of project. If you choose to do a Power Point presentation, do not clutter the slides with too much information or add over-powering animations and sounds. Keep the presentation professional looking. See website for further information on display boards and Power Point.

REHEARSE YOUR PRESENTATION - It is important that you are prepared and know what you are going to say before you present your project. **All students will be presenting their science projects - there are no exceptions**. By rehearsing your presentation, you get an opportunity to 'work the bugs out' and will become comfortable talking about your project. You should start out rehearsing by yourself and then ask members of your family to be judges and present your project to them. By doing so, you will be more composed on the day you present your project. Remember, try to be as calm and professional as possible. Know what you are talking about and be confident. You may use index cards to help you remember what to say. You will be expected to be able to cover/answer the following:

1. **<u>Concept</u>**
   a. Does the presenter understand the relationship of his/her problem to the world?
   b. Why did he/she do this experiment?

2. **<u>Scientific Method</u>** (parts will vary dependent on project)
   a. Is the ***problem*** stated in form of a question?
   b. Was a ***hypothesis*** made before the experiment was done?
   c. Are the ***materials*** listed?
   d. Does the ***procedure*** explain the steps in the experiment?
   e. Was there a ***variable***?
   f. Were there ***controls***?
   g. Is the ***data*** organized in a neat fashion with pictures, graphs, etc.?
   h. Is the ***conclusion*** supported by the data collected?

3. **<u>Technique</u>**
   a. Were books or people consulted?
   b. Is there evidence of research?
   c. Are there records of the original data collected?
   d. Are the findings reliable?

4. **<u>Format</u>**
   a. Is the exhibit presented in a neat manner?
   b. Is a general plan of organization evident?
   c. Has care been taken in arranging and presenting the material?

5. **<u>Interview</u>**
   a. Does the presenter demonstrate an understanding of what he/she is presenting?
   b. Can the presenter give evidence of the validity of the experiment's conclusion?
   c. What problems did the presenter encounter?
   d. What would he/she do differently if the experiment needed to be redone?
   e. Is there further investigation that needs to be done or the presenter would like to do?

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Three (3) people will present each day. The order of presentation and the date of your project will be selected by lottery. The lottery system is used as it provides each person an equal opportunity at the various dates beginning with the last day of presentations. Once your ticket has been drawn, there can be no changes; no extensions; and no trading spaces with any other student without teacher approval. Failure to have your project in on the date that you have been assigned will result in one grade drop per missed day. Absence on date of presentation is not an excuse – a note from parent/guardian is required to be submitted and will be verified through parental/guardian contact.

You are presenter number: _____

The date of your presentation: _____

Science Project/Research Paper Parent Signature Sheet - Homework #_____

This attachment must be signed and returned no later than **_____**. Failure to return notice by this date shall result in a "0" for a homework grade and a one-grade drop in both the research paper and science project grade.

We have reviewed the research paper notice and understand that the due date for both papers (typed and emailed) is **_____.** We are aware that the paper must be typed. We are further aware that failure to turn in paper on or before the due date will subject the paper to a one-grade drop per day late penalty. Absence on the due date is not an excuse for a late paper. If the student is going to be absent, the student must arrange to have paper in on the due date either by having a fellow student submit the paper or the parent/guardian dropping the paper off in the school office.

We have reviewed the science project notice and understand the following:

The presentation date of my project has been selected fairly and justly by lottery.

There can be no changes; no extensions; and no trading spaces with any other student without teacher approval.

Failure to have the project in on the date that has been assigned will result in a one grade drop per day that project is late.

I further understand that if I am absent on the day of presentation, a signed note from a parent/guardian must be submitted and that this note will be verified through parental/guardian contact.

_____ _____

Student Signature Parent Signature