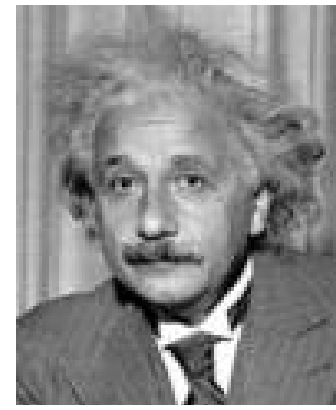




Sir Isaac Newton



Louis Pasteur



Albert Einstein

A
SCIENCE
Winter
Inquiry Land
Answer Key

Grade 8

Winter 2011-2012



Miami-Dade County Public Schools
Curriculum & Instruction

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ANSWERS

Sinking and Floating Soda Cans

The cans of soda have exactly the same volume, or size. But their densities differ due to what is dissolved in the soda.

Experimental Design

Title:	An Experimental Diagram summarizes the problem statement, hypothesis, manipulated variable(s), responding variable(s), constant variables, number of tests and trials, and the control.
Type of Experiment	Describe the design of the experiment as a Descriptive, a Comparative, or an Experimental type of experiment.
Problem Statement	A problem statement is a question about possible relationships between manipulated and responding variables in a situation that implies something to do or try.
Hypothesis	A hypothesis is the investigator's prediction of a possible specific relationship between a manipulated variable (cause) and a responding variable (effect) that provides a testable answer to the problem.
Test/Independent Variable	Manipulated variables are the factors that can be changed by the investigator (causes). Manipulated variables are also called the independent variables.
Outcome/Dependent Variable	Responding variables are the observable factors of an investigation the result or happen (effects) when a manipulated variable is changed by the investigator. Responding variables are also be called the dependent variables.
Variables Held Constant	Constant variables are the other identified manipulated variables in the situation that are kept or remain the same during the investigation.
Experimental Tests	Apply the experimental procedure to a specific aspect of the manipulated variable.
Control Test	A control test is the separate experiment that serves as the standard for comparison to identify experimental effects, changes of the responding variable resulting from changes made on the manipulated variable.
Number of Trials per Test	The trials are the number of experimental repetitions, objects, or organisms tested during each test of a manipulated variable.

Conclusion Writing

1. Introductory Paragraph:

State the purpose of the experiment, and explain the reasoning behind the experiment. This is where the problem statement and the hypothesis are introduced. The problem statement introduces the problem you are trying to solve and the hypothesis describes the solution that you hope to obtain after the experimentation. (***This section answers question 1: "What was investigated?" (Density of different sodas)***). Continue by providing relevant information supporting or not supporting the hypothesis (***This section answers question 2: "Was the hypothesis supported or not supported by the data?" (answers will vary)***). This is how the rest of the sentences in the introductory paragraph are linked.

Describe the data that was collected and the major findings of the investigation (**question 3**) that supported or did not support the hypothesis as the solution to the restated problem.

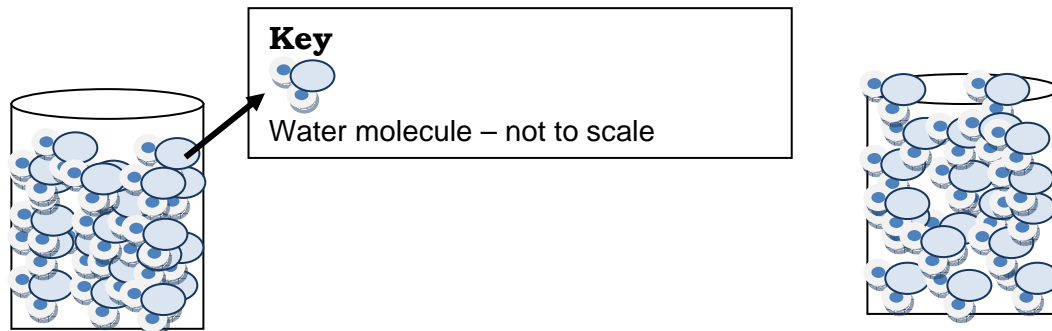
2. Body Paragraphs:

The body paragraphs support the introductory paragraph by elaborating on the different pieces of information that were collected as data that either supported or did not support the original hypothesis. Using terms such as “as a matter of fact” or “for example” and “not only but also” for successive sentences is useful. Each finding needs its own sentence and relates back to supporting or not supporting the hypothesis. The body paragraphs may include **Question 4**, which describes how the findings compared with other researchers or groups investigating the same problem (**soda contents/ingredients changed the density of the soda**). The number of body paragraphs you have will depend on how many different types of data were collected. They will always refer back to the findings in the first paragraph. The concluding sentence can begin with a term such as “clearly” which would be followed by the statement that is true (support or non support) for the entire paragraph as it relates to the hypothesis. The commentary can include some inferences (opinions) although the major inferences should be reserved for the concluding paragraph.

3. Concluding Paragraph:

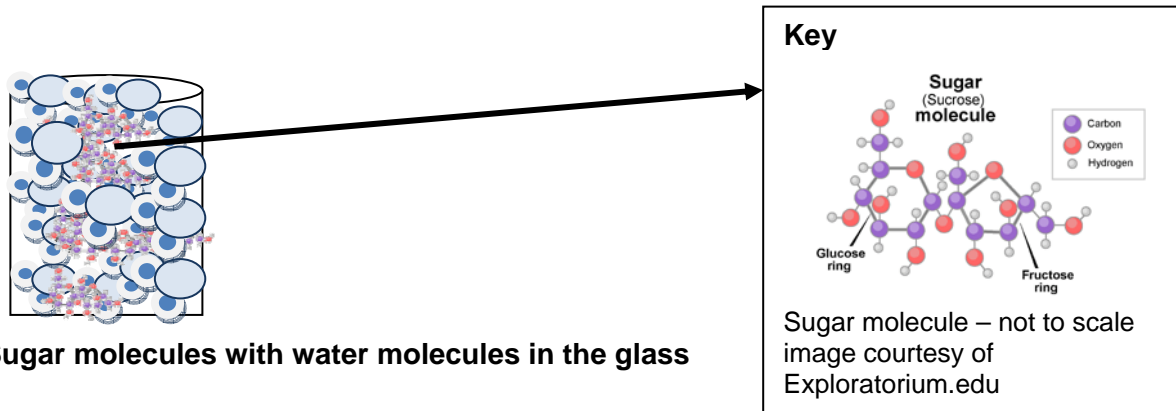
The concluding paragraph contains the major commentary about the problem statement and the hypothesis in the first paragraph of the conclusion. This is where **question 5, what possible explanations can you offer for your findings? (there may also be less volume than indicated on label, therefore changing the mass and affecting the density. Density = mass/volume.)** can be answered. The paragraph should also include answers to **questions 6 and 7 that include what recommendations do you have for further study and for improving the experiment and some possible applications of the experiment? (Answers may vary)** At the end of the paragraph the problem statement and hypothesis (introduction and thesis) is restated more specifically with an abbreviated version of the explanation of the findings to summarize the conclusion.

Hole-y Water



Water molecules in glass before heating

Water molecules in glass after heating



Sugar molecules with water molecules in the glass

Explain what happened to the water molecules when they were heated.
(Think about what heat does to the movement of atoms and molecules)

Molecules moved faster and spread apart

Repeat the experiment with cold water. Were you able to add more or less sugar to the glass?

Less sugar

Explain your results

Water molecules are closer together; therefore, there is less space between the water molecules to fit the sugar molecules.

Energy – It's Flowing All Around Us

- ❖ **Nuclear energy – Potential Energy** stored in the nucleus of an atom — the energy that holds the nucleus together. Very large amounts of energy can be released when the nuclei are combined or split apart. Nuclear power plants split the nuclei of uranium atoms in a process called fission. The sun combines the nuclei of hydrogen atoms in a process called fusion. (Type: Potential energy)
- ❖ **Chemical energy – Potential Energy** stored in the bonds of atoms and molecules. Batteries, biomass, petroleum, natural gas, and coal are examples of stored chemical energy. Chemical energy is converted to thermal energy when we burn wood in a fireplace or burn gasoline in a car's engine. (Type: Potential energy)
- ❖ **Radiant energy** - electromagnetic energy that travels in transverse waves. Radiant energy includes visible light, x-rays, gamma rays and radio waves. Light is one type of radiant energy. Sunshine is radiant energy, which provides the fuel and warmth that make life on Earth possible. (Type: Kinetic energy)
- ❖ **Thermal energy** - or heat, is the vibration and movement of the atoms and molecules within substances. As an object is heated up, its atoms and molecules move and collide faster. Geothermal energy is the thermal energy in the Earth. (Type: Kinetic Energy)
- ❖ **Electrical energy** - delivered by tiny charged particles called electrons, typically moving through a wire. Lightning is an example of electrical energy in nature, so powerful that it is not confined to a wire. (Type: Kinetic Energy)

Sources answers may vary depending on source of electricity/power plant

- ❖ Solar
- ❖ Hydroelectric energy
- ❖ Wind energy
- ❖ Oil
- ❖ Coal
- ❖ Natural gas
- ❖ Uranium

FPL uses a diverse mix of fuels at our power plants to generate reliable electricity. Because of our fuel mix, FPL is recognized as a clean energy company, with one of the lowest emissions profiles among U.S. utilities. FPL's carbon dioxide emissions rate, for example, is 35 percent better than the industry average. FPL currently obtains most of our electricity from clean-burning natural gas. Nuclear power, which produces no greenhouse gas emissions, is responsible for another significant portion of power production. In addition, FPL has begun operation of three commercial-scale, emissions-free solar energy facilities in the Sunshine State.

Seen on the Science Fair Scene

FAIR DREAMS

U B V E T E R A N S T P I S R
 Y T E F A S X Y R O V E R S E
 E T G P T C H A L L E N G E S
 N E D I X O I D N O B R A C E
 O A J H U M Q P E F A V C C A
 M M O S A M E E U X T O S U R
 O W N R I U X D O I M L Y S C
 O O S A L N P E R P O C C C H
 I R O L D I E S E P S A D E U
 F K U O A C R T U D P N B A G
 Z C N H E A I R Q A H O C L I
 F S S C Z T E I U I E E A U J
 E A Z S I I N A B C R C J M X
 S B I O R O C N L U E R P N K
 I V N R P N E S A L O H C I N

ALBUQUERQUE	MONEY
ALUMNI	NICHOLAS
ATMOSPHERE	PEDESTRIAN
CARBON DIOXIDE	PRIZE
CHALLENGES	RESEARCH
COMMUNICATION	ROVERS
COMPETITION	SAFETY
DCYSC	SASHA
EXPERIENCE	SCHOLARSHIP
FAIR	SUCCESS
ISEF	TEAMWORK
LUCIA	VETERANS
MARS	VOLCANO

Seen on the Science Fair Scene

Before reading:

1. What kinds of people like to participate in science fairs? **Answers may vary**
2. How might a science fair change a student's life? **Answers may vary**
3. Have you competed in science fairs? If so, what did you enjoy most about the experience? What was challenging about it? **Answers may vary**

During reading, find the answers to the following:

1. Name two types of opportunities mentioned in this article that science fair participants might get to experience. **Answers may vary – trips, fun, meet people, national competition, patent inventions/ideas, etc.**
2. How did Sasha become interested in growing plants on Mars? **From a television program**
3. What are some of the obstacles to growing plants on Mars? **Extra radiation from thin atmosphere, the relatively large proportion of carbon dioxide (CO₂) in the Martian atmosphere**
4. How have computers helped Nick with his project? **to develop a design for car hoods that would be less harmful to pedestrians struck in traffic accidents**
5. What do all of Nick's projects have in common? **Safety**
6. What has Nick discovered through his science fair projects? **How to impact society in a positive way**
7. This article describes a number of young scientists. Their projects tackle a variety of subjects. What do they all have in common? **They attempt to solve real-world problems**

After reading:

1. Does this article help you think in new ways about your own science fair projects? Why or why not? **Answers may vary**
2. Veterans of DCYSC and ISEF recommend that you "find a topic you're passionate about." Make a list of 10 subjects or ideas that you are passionate about. Choose one item on the list and explain how you could turn it into a science project. **Answers may vary**
3. Compare Nick's projects with Sasha's project. Which do you think is more important or more interesting? Which do you think is better? Explain your reasoning. **Answers may vary**
4. Nick likes to study topics "that will impact society in a positive way." What is another safety issue that he could look at for his next project? How might he design a project to study this issue? **Answers may vary**
5. Based on their current interests, what kinds of careers might Sasha and Nick want to pursue in the future? **Answers may vary: Sasha – any career dealing with plants, ex., botanist, plant scientist Nick - engineering**
6. Do you think science fairs can be negative experiences for some people? If so, how? **Answers may vary**
7. Sasha says, "I [also] got a lot of experience [from science fairs] with the scientific method." What does Sasha mean by the "scientific method?" **The particular steps a scientist uses to answer a scientific question or problem**

ANTI-DISCRIMINATION POLICY

Federal and State Laws

The School Board of Miami-Dade County, Florida adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by law:

Title VI of the Civil Rights Act of 1964 - prohibits discrimination on the basis of race, color, religion, or national origin.

Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Educational Amendments of 1972 - prohibits discrimination on the basis of gender.

Age Discrimination in Employment Act of 1967 (ADEA), as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40.

The Equal Pay Act of 1963, as amended - prohibits gender discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

Americans with Disabilities Act of 1990 (ADA) - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations and telecommunications.

The Family and Medical Leave Act of 1993 (FMLA) - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons.

The Pregnancy Discrimination Act of 1978 - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

Florida Educational Equity Act (FEEA) - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

Florida Civil Rights Act of 1992 - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulates categorical preferences for employment.

Revised 9/2008