

Investigating Investigations: Building a Parachute

Content Standards:

CA- California K-12 Academic Content Standards

- **Subject** : Science
- **Grade** : Grade Six
- **Area** : Investigation and Experimentation
 - **Sub-Strand 7**: Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
 - **Standard a**: Develop a hypothesis.
 - **Standard b**: Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
 - **Standard c**: Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
 - **Standard d**: Communicate the steps and results from an investigation in written reports and oral presentations.
 - **Standard e**: Recognize whether evidence is consistent with a proposed explanation.

Learning Objectives:

Conceptual Understanding:

- The students will be able to identify, isolate, and measure variables in an experiment. The students will learn how to pose a question that can be answered by a scientific investigation. The students will be able to identify independent and dependent variables. The students will be able to record

data in charts and graphs from their observations. The students will be able to come to a conclusion about their findings in an experiment.

Science Process Skills:

- Students will be discovering the world of scientific investigation through a inquiry into the creation and performance of a parachute. The overall goal is to have students discover how the scientific process works through asking questions, playing with ideas, creating a prototype, creating dependent and independent variables, creating a hypothesis, collecting data, organizing data, and concluding the experiment with organization of findings.

Informal Assessments:

- What is the definition of science?
- What is an investigation?
- What is a scientific investigation?
- Name the key elements of a scientific experiment.
- What is the difference between a dependent and independent variable?
- What is an "experimental error"?
- What are characteristics of a question that make it testable in an experiment?

Instructional Procedures:

Hook:

- We will engage the children in the idea of scientific inquiry through a quick investigation of unknown objects. By feeling these objects without looking at them the students will create questions about what is in the bag. Students will play detective by figuring out what is in the bag. In small groups the students will be investigating different objects intuitively. Students will use their hands to touch the object and create questions based on their observation. Through these investigations students will be introduced to the

notion of scientific inquiry. We will discuss the life cycle of a scientific experiment using academic as well as social language.

Background Information:

- We will discuss the life cycle of investigation by visual diagram on the board. We will highlight key vocabulary and focus on the idea of variables both independent and dependent.

Key Terms:

- Hypothesis
- Dependent Variable
- Independent Variable
- Controlled Variable
- Tangible Evidence
- Investigation
- Data
- Experimental Error

Materials:

- 25 X 50 cm plastic sheet
- Two 100 cm lengths of string
- Scissors
- Washer
- Stop watch
- Data worksheet
- Pencil

Procedures:

- Using the idea of scientific inquiry the students will build a toy parachute. They will begin by making a prototype parachute by using the materials we provide to them. The prototype parachute is the control part of the experiment.
 1. Cut a 50 cm X 25 cm rectangle from the plastic sheet.
 2. Cut two 100 cm lengths of string.

3. Tie one side of each string to the neighboring corners of the rectangle.
4. Place both strings through the washer.
5. Tie the free ends of each string to the diagonal corner of the rectangle, so that the strings cross to form an "x".

Day 2

Hook:

- We will start off by looking at the parachute from the week before. Ask the students questions about the parachute. What did they like about it? What did they not like about it? We will look at the independent variables as well as the dependent. We will ask the students to show what we are keeping constant in our parachute and what is it that is changing from the last weeks parachute. Then we will talk about what they think will happen to the new parachute. How will it float this time with the change in the material? Do we think it will be more accurate? What do they think? Then will talk about making a team name for our competition. So we will ask the students to come up with ideas for a good name so we can be entered into the competition.

Background Information:

- We will discuss the life cycle of investigation by visual diagram on the board. We will highlight key vocabulary and focus on the idea of variables both independent and dependent. We will identify the new parachute's independent and dependent variables. We will discuss the data we gathered from our new parachute and create a data table as well as a bar graph and plotting the points.

Key Terms:

- Hypothesis
- Dependent Variable
- Independent Variable
- Controlled Variable
- Tangible Evidence
- Investigation
- Data

- Experimental Error

Materials:

- 25 X 50 cm **new material**
- Two 100 cm lengths of string
- Scissors
- Washer
- Stop watch
- Data worksheet
- Pencil

Procedures:

- Using the idea of scientific inquiry the students will build a new toy parachute. They will begin by making the new parachute by using the materials we provide to them with the variable that they decided to change.
- First in order to get into the final contest each group will have to complete a completed data table, a graph how the descent time changed with the variable they changed and a 3-sentence report of their report in the worksheets we provided under "Summarize your Findings".
- This time instead of only making 1 parachute we will make 2 parachutes of different material so they can decide which one floats better to use in the competition.

For each parachute they will need to:

1. Cut a 50 cm X 25 cm rectangle from the **new material**.
2. Cut two 100 cm lengths of string.
3. Tie one side of each string to the neighboring corners of the rectangle.
4. Place both strings through the washer.
5. Tie the free ends of each string to the diagonal corner of the rectangle, so that the strings cross to form an "x".

Differentiated Instruction:

In order to differentiate our instruction we will provide several levels of learning in our activity. We will have hands on activities, word bank, higher thinking questions, visuals and group work. Students with IEP's can participate in all elements of this activity.