

## Parachute Lesson Plan

### **Content standards: (TPE 1)**

6. 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:
  - b. Develop a testable question.
  - c. Plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.
  - d. Identify the dependent and controlled variables in an investigation.
  - e. Identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.
  - f. Select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.
  - g. Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.
  - h. Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.
  - i. Write a report of an investigation that includes conducting tests, collecting data or examining evidence, and drawing conclusions.

### **Learning objectives:**

*Conceptual understanding* (Use Bloom's taxonomy to write specific Objectives)

- Students will be able to develop a testable question, plan and conduct an investigation, collect and graph data, and answer questions using the data.

*Science process skills* (could be taken from CA content standards, investigation & experimentation)

- Students will be able to collect and graph data, using appropriate tools and units.
- Students will be able to identify the dependent and controlled variable in an investigation.

### **Formal and Informal Assessments: (TPE 2, 3)**

- The students will create a prototype to test. Students will use the prototype to test, collect data to record on the provided worksheet. Data should be measured and recorded using the correct tools and measurements.
- Students should orally demonstrate an understanding of dependent and controlled variables.

### **Instructional Procedures**

- Whole class intro by Norma Schoen
- Students will then break into groups to build two prototypes.
  - Our goal is to create a parachute that is safe. Today we are going to build a prototype. Does everyone know what a prototype is? A prototype is the original model which has already been built or designed. We are going to

build our prototype, test to see if it flies well, and then brainstorm to see how we can improve it. Our goal will be to design a parachute which will spend the longest time in the air, and have the straightest fall path.

- Provide students with the worksheet page which has directions to create a parachute.
  - Let's read over the directions together on how to create the parachute. (Show to students where the step is visible in the completed prototype).
  - Work as a group to create your parachute. Share the jobs. Two people can measure and cut out the canopy out of the sheet, two people can measure the string.
- Students test their prototype, recording data acquired onto the data table.
  - Now that you have all created excellent parachute, we are going to test how well they fly. First begin with a few test flights. Choose someone to use the stopwatch to record the fall of the parachute. Choose someone to drop the parachute. Choose someone to measure how far the parachute fell from the target. After everyone has practiced, and is ready, record three trials on the worksheet.
- Summarize what we did as a class. Ask students what they would change to improve the parachute.
  - So, after having a chance to build and test a parachute, any ideas on how the parachute can be improved? If you could change only one thing, what would you change?
  - We can change many variables about our parachute. A variable is any factor or trait we can change. For example I could change the washer for a penny. I would be changing one variable.
  - It is very important that we only change one variable at a time. If we change more than one variable we will not know which changes affected the results of our experiment.
  - The variables we do not change are the controlled variables. They are in our control; we make sure they do not change. We choose one variable to change, for our example the washer, and keep all other variables the same, in our example the string and canopy.
  - The time the parachute take to fall, is dependent on the changes we make to the parachute. The time it takes for the parachute to fall is the dependent variable in our experiment.

#### **Differentiated instruction/ Accommodation strategies**

- Directions are given clearly and words are enunciated
- Group work- students will be able to assist each other.
- Vocabulary- new words are defined in context, and repeated.
- Visual example of a prototype for students to see. Demonstrations on how to create. Worksheets for students to follow along with.
- Kinesthetic learners- hands-on building of the parachutes.

#### **Resources and Materials: (TPEs 4,9)**

For Each group of (4-5) students:

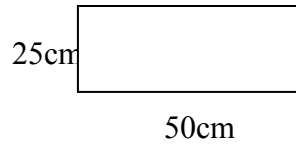
- Copy of worksheets
- Parachute building materials
- Pencils
- Target

Materials for building the parachutes:

- Plastic table cloths (enough for (2) 25 cm X 50 cm canopies)
- Ruler with cm markers
- Scissors
- Enough string to cut (4) 100 cm length strings
- 2 washers
- 2 stop watches

### Building the Parachute

1. Cut out a 50 cm  $\times$  25 cm rectangle from the plastic table cloths.



2. Cut two 100 cm lengths of string.
3. Tie one side of each string to 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.

### **Testing the Prototype**

Trial #	Time (s)	Distance (in)
1		
2		
3		
4		
5		