March 4, 2008
EDTE 316
Day 2 Teaching at Bryte

Scientific Inquiry: Investigating Parachutes Day #2

Content standards:

CA- California K-12 Academic Content Standards

- **Subject :** Science
  - **Grade :** Grade Five
    - **Area :** Investigation and Experimentation
      - **Sub-Strand 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:
        - **Standard c:** Plan and conduct a simple investigation based on a student-developed question and write instructions others can follow to carry out the procedure.
        - **Standard d:** Identify the dependent and controlled variables in an investigation.
        - **Standard 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.
        - **Standard f:** Select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.
        - **Standard g:** Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.
        - **Standard h:** Draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.

Learning objectives:

The student will be able to design and lead an investigation, identify controlled variables in an experiment, record their collected data in a chart, graph their collected data, and draw conclusions using the data they collected.

Formal and Informal Assessments:

Informal assessment: check for understanding as the lesson continues by asking questions of the students before continuing with the lesson. Based on the student's responses, I will adjust the pacing of the lesson. My questions will encourage students to use a higher-order thinking skills, and I will give an adequate amount of wait time before asking for an answer.

Student worksheets will be also be used as an assessment to see if they are able to identify controlled variables in an experiment, record data they collect in a chart, graph the average of their data in a bar graph, and draw conclusions based on their data.

Instructional Procedures:

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Hook:
The hook for this lesson will be connected to what was presented on day #1 of this lesson. I will ask the students if they remember Mrs. Markey's experience parachuting. Then I will inform them that we are going to have a competition between all of the groups of 5th grade students to see if they can come up with a new parachute design that will allow for the parachute to stay in the air the longest, and also have the parachute be more accurate in relation to a target. I will tell them that their design and data collection will be "top secret", with a brief presentation at the end of the day to reveal their results. Prizes will be awarded to the "winner" of this contest. (Pencils, stickers, school supplies etc. Prizes will be given to all students who participate)

Lesson Opener:

I will begin this lesson by returning the student's previous work to them, and having a brief student-directed review of what has been learned so far. I will tell the students that today we will be changing the canopy of the parachute, specifically by changing its materials. We will talk about what will not be changed (canopy size, strings, weight etc) and why we can only change one variable at a time in an experiment. I will pass out samples of new canopy materials that we have available for the students to use, so that all students have a chance to think about what material might be best to reach our goal of a slow, accurate parachute. (Worksheet #1)

Practice:
Students will be placed into two groups, and asked to come to an agreement about what material they would like to use for their canopy. In their group, students will follow the directions for constructing one new parachute using their agreed upon material (day#1 worksheet). Once both groups have done this, we will briefly talk about how to release the parachute in a consistent manner (from the same height, in the same way etc.), and why it would be important to do that if we want to compare two different parachutes. Each group will then identify one student as their "releaser", their "timer", and their "recorder". All members of the group must have a job, and other jobs include "instructor" (says "1, 2, 3, go!" for releaser) and "materials manager" who carries the parachute and holds it while it is not in use.

Students will conduct 3 trials, and record their data in their charts. Back inside the classroom, I will review with them how to average a set of data, and they will average the data from day #1 and day #2 (worksheet 2).

When each group has their averages, we will talk about graphing the data. I will ask students about their graphing experience to evaluate their ability levels. Since their testable question is "How does canopy material change how long will the parachute stay in the air" I will guide the students in setting up the graph for their data. We will label and mark the axis on the graph and then graph our data. (Worksheet 3).I will demonstrate how to graph the data on the whiteboard.

After students have graphed their data, I will put all of their data on my graph on the whiteboard. We will discuss our findings. If time permits, the students will be asked to present their findings

to each other. Students will discuss what it means to use good presentation skills, and give a brief presentation to all 5th grade students using a "fill in the blank sentence" for guidance. (Fill in the blank sentence found on worksheet #3.)

Closure: For closure, we will have a wrap-up discussion about what our experimental results mean. We will talk about how scientists need to test an experiment many different times to make sure that their results are accurate. We will talk about what variables could have been controlled better, if any, to give our results better accuracy. I will award the group who created the parachute that won the contest at the same time that I award the rest of the students for all of their great efforts!

Differentiated instruction/ Accommodation strategies:

The following are instructional strategies that I plan to implement for students who have additional identified educational needs:

Diverse learner elements:

Visual Learners:

I will use several visual aids during this lesson. These include an example prototype of the parachute, canopy materials, written directions that they will be able to examine and use while constructing their own parachute. I will also be modeling graphing on the whiteboard.

Auditory learners:

I will make sure that I speak clearly and with a loud enough voice so that all students are able to hear me.

Visual impairments:

Students with visual impairments will be provided with a worksheet that has a larger font. These students will also be seated near the front of the room so that they are able to see the visual aids most clearly. I will walk around the room so that any students with trouble seeing will be able to see visual aides clearly.

ADD/ADHD:

Students with ADD/ADHD will be seated near the instructor. The lesson will also be dynamic and interesting, which will make it easier for these students to focus and stay on task. I will also ensure that students with ADD or ADHD are closely supervised and given any extra attention they may require by either myself or my instructional aid.

March 4, 2008
EDTE 316
Day 2 Teaching at Bryte

Kinesthetic learners:

This lesson includes many "hands-on" aspects for kinesthetic learners. I will pass out materials for the canopy as we talk about them, and the students will also be able to feel a prototype parachute and physically construct a new parachute using new canopy materials.

Cooperative learning:
Students will work in groups of 4-5 students to design and test their parachutes in order to get the best understanding out of the activity as possible.

SDAIE Strategies:
Active Learning:
Throughout the lesson students will be predicting, observing, recognizing, collecting data, creating and planning their own experiment, and constructing their own conclusions.

Assessing/Tapping Prior Knowledge:
The students will be able to relate their prior knowledge about flying devices to this activity. They will also relate any prior knowledge about conducting an experiment and graphing data.

Building New Knowledge:
Students will come to new conclusions or revise their previous conclusions of the factors that make an object fly successfully. Students will also use information gained from day #1 about collecting data, charting data, and controlling variables to build on for this lesson.

Collaborative Problem- Solving:
To encourage work proficiency, students will be placed in groups of 4-5.

Demonstrating and Modeling:
While I am teaching the lesson, I will demonstrate how the parachutes should be constructed using the example of a prototype parachute. I will also model for the students how they should release the parachute safely, and consistently to get the best results. I will also model how to graph data.

Questioning Techniques:
I will pose different types of questions to the students in order to assess prior knowledge, and monitor student learning.

Resources and Materials:

For Each group of (4-5) students

- Copy of worksheets (3) for each student

-parachute building materials (see list below)

-one pencil for each student

Materials for building the parachutes (per each group):

-enough for the group's choice of one 25 cm X 50 cm canopy of: Aluminum foil, tissue Paper, Kleenex tissue, and plain white paper

-ruler with cm markers

-clear tape

- enough string to cut (3) 100 cm length strings

-1 washer/nut to be used as payload for the "test parachute"

-1 stop watch