Physics Lesson Plan

Background - The following is a two-day lesson plan for the 7th grade students at Carnell Elementary School. Since graphing is a vital part of the science program, the focus of these lessons is on interpreting and constructing distance vs. time graphs.

Day 1

Objectives
Students will
- observe various distance vs. time graphs
- construct distance vs. time graphs
- write detailed stories of their constructed distance vs. time graphs

Materials
Overhead projector, overhead transparencies, pens or pencils, paper (lined or graph)

Procedure

1. Place an overhead transparency on the projector of the four distance vs. time graphs. Review the first graph with the students and explain in detail what is happening with the graph and explain the correct answer. Have students then work out the remaining two graphs and have them match the graphs with the answers provided. Review the answers with the students after giving time for the work. Have students write their own story to the final graph on the overhead projector. Review the students stories by having them volunteer to share their stories with the class. Then correct any errors or misunderstandings the students might have.

2. The second part of the lesson involves more practice interpreting graphs. Place the second overhead transparency of four more graphs. Have students match the four graphs with the stories that are provided on the overhead transparency. After providing students time to complete the assignment, have them share their answers with the class.

3. The final part of the lesson is having the students create two of their own graphs and writing stories that go with their created graphs. Review their answers after giving time to complete the assignment.

4. Review concept questions to conclude the lesson.
Overhead Transparency 1

Which of the graphs best match the following three stories?

A. I had just left home when I realized I had forgotten my books, and so I went back to pick them up.
B. Things went fine until I had a flat tire.
C. I started out calmly but sped up when I realized I was going to be late
D. Write your own story for the remaining graph
Overhead Transparency 2

Which of these graphs best match the following stories?

A. I started out slow and then raced to work.
B. I traveled at a constant increasing speed to school
C. I was traveling to work and stopped for breakfast before I got there.
D. I was going to school when I got sick on the way and turned back and traveled home.

1. distance from home 2. distance from home

Concept Questions

1. Can you have a negative displacement? Yes No Why?
2. Which part of the graph shows Mr. Lenet going home? A B C or D
Physics Lesson Plan – Day 2

Objective
Students will:
- create distance vs. time graphs
- use, record and analyze data in a lab

Materials
Stopwatches, paper, pencils or pens, markers or colored pencils, areas for a 20 meter course (suggested area would be schoolyard), meter sticks

Procedure

1. Divide the class into groups of 5 or 6.
2. Have each group have students stand in a line at five meter intervals along a straight path.
3. Tell the students they will each travel one at a time in a straight path.
4. The meter sticks will help the students measure five meter intervals.
5. While one student walks, the other group members time the “runner” while standing at five meter intervals along the path. One person in the group will record data from the timers immediately after each run.
6. Have students practice starting and stopping their stopwatches so they can get a feel for the watches and how they work. Everyone should start timing when the runner starts, and then individually stop when the runner passes their plot along the path. The teacher can demonstrate this to the class before they begin the lab.
7. When students are ready, have them complete the lab several times, changing positions so that each person gets a chance to be the “runner” at least once.
8. Have each student make a distance vs. time graph—distance in meters on the vertical axis, and time in seconds on the horizontal axis—and graph their motions. Remind students to start at 0 seconds, 0 meters (the time they “passed” the starting line).
9. Have students add the motions of two other people from their group to their individual graph, using different colors to distinguish different students.
10. Some questions that might be conclusion questions:
    Who moved fastest?
    How did that person’s distance vs. time graph compare to the others in your group?
    What do you think your graph would look like if you traveled towards the starting point rather than away from it? What would this graph look like?
    What did you learn from the lab today?

Evaluation- Use the following rubric to evaluate students’ work
- **Three Points:** Students worked cooperatively during the lab, accurately created their graphs, and answered all conclusion questions correctly.
- **Two Points:** Students worked cooperatively during the lab, created graphs that were reasonably accurate, answered 2 of the four final questions correctly.
- **One point:** Students did not work cooperatively during the lab, created graphs that were inaccurate, and could not answer the final conclusion questions.