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Interactive Physics Lab on Kinematics

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Level 2 Lesson Plan - Interactive Physics

Standards Implemented

Standard 1, Key Idea 1, T1.2 and, T1.5

Standard 6, Key Idea 1 and 2

In this activity students will be utilizing an Interactive Physics interactive lab on kinematics. Students will observe how reaction rate is affected by temperature, concentration, surface area and a catalyst.

Students will move from station to station to reflect on and answer a series of questions related to each demonstration

The materials you need are-
a writing implement and this lab question sheet.

Setup- Four computers each with a mouse running Interactive Physics and demonstrations loaded. Computers should be located at separate parts of the room to reduce traffic congestion and promote independent thought.

Procedures- Students are assigned a starting station and will complete the lab question sheet. Students may work in pairs but each student will turn in their own sheet.

Station #1 Temperature

Questions-

1. Before clicking the RUN button, predict what will happen to reaction rate when temperature increases.
2. What happens to the kinetic energy of the molecules as the temperature increases?

3. When the temperature of the molecules increases what happens to the number of collisions between molecules?
4. How does increasing the temperature affect reaction rate?

Station #2 Concentration

Questions-

5. Before clicking the RUN button, predict what will happen to reaction rate when concentration increases.
6. What happens to the number of the molecules in the container as concentration increases?
7. What happens to the number of collisions between molecules as concentration increases?
8. How does increasing the concentration affect reaction rate?

Station #3 Surface Area

Questions-

9. Measure the surface area of the blue block at this station in cm^3 .

What is the surface area of the two red blocks at this station in cm^3 ?

How does the surface area of the single blue block compare to the combined surface area of the two red blocks?

10. Before clicking the RUN button, predict what will happen to reaction rate when surface area increases.
11. Which container has chemicals with greater surface area?

12. What happens to the number of collisions between molecules as surface area increases?
13. How does increasing the surface area affect reaction rate?

Station #4 Catalyst

Questions-

14. Before clicking the RUN button, predict what will happen to reaction rate when a catalyst is added.
15. What happens to the number of collisions between molecules when the catalyst is included?
16. Does the catalyst get changed as the reaction takes place?
17. How does adding a catalyst affect reaction rate?

Conclusion-

If you were challenged to design a chemical reaction with the fastest reaction rate what four conditions would you be sure to meet?

Reaction Rate Rubric

Informal Assessment:

A discussion held during the interactive lab will initially provide teacher with an idea of the level of understanding throughout the class. If there seem to be any weak groupings of students, the teacher may choose to re-organize the clusters such that all students are equally supported.

Formal Assessment:

This lab is worth 40 points. After students submit the assignment the following rubric will be used to grade their responses:

A's

- ~Work is neat and answers are written in complete sentences. All questions are answered completely.
- ~Examples are given to help explain each question.
- ~Pictures or diagrams are used to show examples (where applicable.)
- ~ All work and calculations are shown.

B's

- ~Work is neat and answers are written in complete sentences.
- ~All questions are answered completely.
- ~There are no examples given to support answers.
- ~There is some work shown.

C's

- ~All questions are answered, but are not in complete sentences.
- ~Few to no examples are used.
- ~Little work is shown

D's

- ~Some questions are answered.
- ~Responses are unclear or hard to read.
- ~No examples are used.
- ~Little to no work is shown.

F's

- ~Most questions are left unanswered or the lab was not turned in.

Point Distribution

A 36-40pts

B 32-35pts

C 28-34pts

D 24-27pts

F 23pts or less