Lesson:

Introduction: Students will watch, "The Science of a Bat's Sweet Spot." (1:48)

1. Ask the students to compare and contrast wood and aluminum bats (presumably they will point out that aluminum bats hit the ball further.)

2. The teacher will hand out the data sheet and explain that the class will be using a computer simulation to compare and contrast wood and composite bats to see if our preconceptions are correct.

3. Have the students get into groups of 2-3 (possibly bigger depending on the availability of computers.) If a lab or group of computers is not available the teacher could project his/her computer screen and do the activity as a group.

4. Log onto the stem simulation for comparing bats and select the wood bat.

5. Have the students select a length and weight that they will use for all of their trials. (Suggested 35in length, 31oz weight.) The length and weight should remain the same for all types of bats (wood and composite).

6. Place the length and weight selected into the appropriate spot on each data table. (make sure to do this for wood and composite bats).

7. Depending on length selected, place the location of contact into the data table going up by increments of 2. E.G. 25, 27, 29, 31, 33 if the length of the bat is 35. It is recommended that your last number come close to the length of the bat.

8. Have the students enter the number of swings they will use for their trial(s) (1-5). If students use one swing per location, the approximate time of the entire simulation will be 10 minutes. If students use the maximum five swings per location the approximate length of the entire simulation will be 25 minutes.

9. Have students run the simulation for the first location on the wood bat. Model how to record the data on the table. Have students fill in their table. (One student can run the simulation, one can read the results off screen, one can record data)

10. It is most efficient if the students keep the same location on the bat and switch to the composite bat. Run the simulation for the composite bat and record the data.

11. Move the location on the bat up two inches or by the increment you chose (e.g. 25 up to 27)

12. Run the simulation for the wood and composite bats. Record data.

13. Continue to change the location on the bat. Run the simulations and record the data until complete.

14. Have students find the average distance for each location and to place their data into a graph that compares each location side by side (see sample 1, use template 1) Ask the students whether their hypothesis about the metal/composite bats hitting the ball further was correct.

15. Having proven that aluminum/composite bats hit the ball further, pose the question, "If you were a marketing rep for a bat company, could you change something about the y-axis of the graph in order to make the wood bat appear better or worse?" (Ideally students will suggest changing minimum number to a larger number or changing the overall scale.)

16. Have the students re-plot their data on the second and third graph in the template.

17. Have the students answer the questions on the graph comparison sheet.

18. When the students complete their sheets discuss their answers.