

Tech Tools Mini Lesson #1

Kevin Knodl

Benchmark

9P.2.1.1.1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. (P: 4, CC: 2, CI: PS2)

Science Practice

Practice 4 - Analyzing and interpreting data

Tech Tool

<https://www.physicsclassroom.com/Physics-Interactives/Newtons-Laws/Falling-Bodies-1D/Falling-Bodies-1D-Interactive>

Students will use the tool to simulate various falling objects and then analyze the data produced.

PICRAT

This tool would land on IA in the PICRAT matrix. The students would be interacting with it by inputting different variable values and seeing what effect they have on the data. It would amplify the teacher's practice by providing data to be analyzed (the volume and varied nature of the data that can be generated greatly surpasses any examples the teacher could produce.)

Essential Questions

What forces are on falling objects? What factors of the object affect those forces?
How do the forces combine to change acceleration rates?

Benchmark Connection

The benchmark is about analyzing data involving objects accelerating and the forces involved. This tool lets students create data given a specific set of forces. The tool gives students data where they can manipulate the variables and then analyze the results to understand the concept of net forces and Newton's 2nd.

Tech Tools Mini Lesson #1

Kevin Knodl

Lesson Procedure

1. Class Discussion of Newton's 2nd law and $F=ma$
2. A short reminder of force diagrams and balanced and unbalanced forces.
3. Explain the tool and show an example
4. Explain project
5. Students work in pairs on projects for the rest of the class
 - a. Students will determine a set of variables to test
 - b. Students will run simulator to gather data
 - c. Students will use Excel to analyze data
 - d. Students will write up results and conclusions

Assessment

Formative assessment - students will be observed as they work together and run the simulation. (Students will get stamps for effective teamwork and creativity as teacher surveys students)

Summative Assessment - the report generated will be used as a summative assessment for the lesson (how well the analysis was performed and how well they explained their process and results)