

Lesson Outline

Teacher Name ___Susan Marino_____

School ___Chartiers Valley High School_____

Course Title ___Integrated Science (9th grade)_____

Topic/Unit ___Newton's Second Law Calculations_____

Model Topic ___Balanced and Unbalanced Forces_____

Modeling Tool ___Excel_____

Please provide a brief description for each section.

1. Describe the preparation you will do with the students prior to the model.

The students will have knowledge of Newton's second law. The students will have done calculations using $F=ma$. I will introduce frictional force and discuss how F in the equation represents a sum of all forces acting on the object (in the same direction as motion for grade 9). We will then discuss the difference of balanced and unbalanced forces.

2. Describe the learning objectives related to the model and how you will achieve them.

The students will describe balanced and unbalanced forces. The students will describe how friction, applied force and mass affect the acceleration of an object. The students will be able to calculate net force and then acceleration of an object.

The students will answer questions as they vary one of the variables at a time. The questions will guide the students to develop an understanding of the relationship between the variables.

3. Describe the discussion questions you will use after the model.

I am planning on reviewing the worksheet questions. In addition to reviewing the answers, I will also ask the students to explain **why** they are getting the results seen. The students should see a pattern and be able to explain these patterns based upon direct and inverse relationships between variables.

4. Describe the type of student assessment you will use.

I will give a balanced and unbalanced force worksheet and possibly a quiz following the activity.