Unit 3 – Module 1

Representing net force activity

RATIONALE

The concept of net force is crucial to understanding forces. Objects typically have multiple forces acting on them – it is the net force (or the sum of the forces) that determines the acceleration of the object. In this activity a variety of forces are used – all the forces acting on an object need to be added together to find the net force. A force table may be very helpful in this situation. A free body diagram is a very helpful representation for understanding net force.

PRIOR KNOWLEDGE AND SKILLS

* adding vectors
* experiences with multiple forces acting on everyday objects

CE’s AND PE’s

2. Define force and introduce SI unit

*4. Separate a scenario into the system and surroundings*

*5. Designate a system and surroundings when solving problems*

6. Define net force

* The net force is the sum of all of the forces acting on an object. It is itself not a physical force but an abstract representation of the sum of all the forces. Net force is the left side of *F=ma*. The *F* in the equation is not a physical force, but the net force on an object of mass *m*.

9. Know that the acceleration of an object is directly proportional to the net force and inversely proportional to the mass

* This is a restatement of Newton’s Second Law

*10. Recognize that a net force will result in an accelerated motion*

* *This is also a restatement of Newton’s Second Law*

Representing Forces

11. Know that in a free body diagram that the object is represented by a point and the forces are represent by a vector arrow

*12. Translate the sketch of a scenario into a free body diagram*

*13. Analyze a free body diagram to find the net force*

*14. Use the problem solving steps outlined in this Unit for solving force problems*

* *All students are required to use all of these steps each time they solve a force problem for the rest of the course*

PHYSICS CONVENTIONS

* The system must be identified – there is no right or wrong way to identify the system, though some ways are more convenient than others.
* In free body diagrams the object is represented by a dot while forces are arrows