Science ISAT: General Science – Physical Science

Skills: Understand Concepts of Motion and Forces

Students:

RIT Above 240:
- Applies Newton's laws to examine action and reaction

Students:

RIT 231-240:
- Relates changes in speed or direction to unbalanced forces (2-D)

Students:

RIT 221-230:
- Applies F=ma to calculate the magnitude of a change in motion
- Analyzes examples of accelerated motion using Newton's laws
- Explains how frictional forces affect motion
- Gives examples to support the idea that an object will remain at rest or move in a straight line at constant speed if it is not subjected to an unbalanced force
- Explains how an object that is not being subjected to an outside force will move with constant velocity in a straight line
- Applies Newton's first law (inertia) to real world objects
- Defines inertia
- Understands that weight of an object may change due to a change in gravity, but the mass of this object will remain the same
- Applies Newton's laws of motion to explain movement due to gravity
- Calculates gravitational forces of objects in space

Students:

RIT 211-220:
- Calculates the distance an object has traveled, using geometry
- Compares the acceleration of falling objects
- Recognizes that for two interacting objects, the force that the first object applies to the second object is equal to the force the second object applies to the first (equal and opposite force)
- Explains how frictional forces affect motion
- Classifies forces as caused by friction
- Explains that gravitational force is hard to detect unless at least one of the objects has a lot of mass
- Explains how changes in mass and distance affect gravitational force
- Applies Newton's laws of motion to explain movement due to gravity

Students:

RIT 201-210:
- Describes how forces may create equilibrium for an object
- Analyzes how air resistance influences the relative motion of objects
- Explains how frictional forces affect motion
- Determines the relative gravitational attraction among planets based on mass and/or distance
- Relates weight to gravity (e.g., if the gravity acting on an object increases, due to a change in distance or a change in mass of the other object, the weight of an object of constant mass will also increase)
- Describes the effects of Earth's gravity on objects

Students:

RIT 191-200:
- Interprets graphs of motion
- Defines a force as a push or pull on an object
- Applies Newton's second law (the interrelationship between force, mass, and acceleration) to everyday objects, such as teeter-totters/see-saws
- Defines gravity
- Infers that there is a force that keeps us connected to Earth
- Explains that gravity pulls on all objects on or near Earth towards Earth's center

Students:

RIT 181-190:
- Relates movement of objects to the application of force
- Describes everyday situations in terms of forces
- Recognizes that the force of gravity acts at a distance, without touching, pulling all objects toward Earth
- Explains that gravity pulls on all objects on or near Earth towards Earth's center

Students:

RIT Below 180:
- Recognizes that pushing or pulling an object can cause a change in the object's position and motion