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| Desired Results for:  Measuring Motion and Newton’s Laws  **DRAFT** | |
| Essential Understanding: Unbalanced forces cause changes in motion that can be predicted and described.  Established Goals:  • Given opportunities students will be able to experience, observe and describe in words  and pictures motion, including factors of pushing and pulling that create and affect  motion.  • Given opportunities students will be able to experience, observe and describe in words  and pictures motion, Newton’s three laws of motion.  • Make qualitative descriptions of the relationship between forces and motion will  provide the foundation for quantitative applications of Newton’s laws.  **State Standards:**  Observe, explain, and predict natural phenomena governed by Newton's laws of motion, acknowledging the limitations of their application to very small or very fast objects  **Inquiry Questions:**   1. What relationships exists among force, mass, speed, and acceleration? 2. What evidence indicates a force has acted on a system? Is it possible for a force to act on a system without having an effect? | |
| Understandings:  Students will understand . . .  • How to represent and describe motion  in a variety of ways.  • The strength of the gravitational force  between objects is proportional to the  mass of the objects the difference  between balanced and unbalanced  forces.  • the application of Newton’s laws in  various situations. | Essential Questions:  1. What are the relationships between  forces and motion?  2. What are the variables that affect  motion and force?  3. How does Newton’s three laws  describe the motion of a moving  object?  4. How does gravity impact objects? |
| Essential Vocabulary:   1. • motion 2. • speed 3. • velocity 4. • acceleration 5. • force (Newton) 6. • net force 7. • friction 8. • gravity 9. • free fall 10. • projectile motion 11. • inertia 12. • momentum | |
| Resultant Knowledge:  Students will know…   1. The relationship between speed and velocity 2. The impact of gravity and friction on motion 3. Each of the three Newton Laws the impact of the law of conservation of momentum on the movement of objects. | Resultant Skills:  Students will be able to . . .  1. Measure and calculate their speed and  acceleration in a variety of situations  2. Assess the impact of force, gravity and  friction on objects  3. Site examples of net force and balance  forces.  4. Design and conduct investigations  involving the motion of objects  5. Justify which of Newton’s Laws is  evidenced in a variety of examples. |
| Stage 2 – Assessment Evidence | |
| Performance tasks.   * Compute speed and acceleration of * moving objects(MT CAR) * Create graphs of moving objects speed and acceleration. (MT CAR) * AS WELL AS CONSTANT MOTION CARTS * Identify the presence of forces in real * life scenarios: speed, acceleration, (MT CAR) * friction, air resistance and gravity. (MT CAR) * Demonstrate the involvement of * Newton’s Laws in everyday situations. (MT CAR) | Other Evidence.   * Multiple Choice assessment on key * formulas and terms * Completion of math computations * Presentation of Newton Law Project with evidence cartoon images demonstrating each of the laws. |
| Stage 3 Learning Plan | |
| Activities | |
| W: beginning with vocabulary, students will learn to set up experiments and report results in accurate data charts. This will lead to conclusions that will be communicated. H: Experiments with multiple materials to answer intriguing questions.(speed/acceleration lab) E: Balls, Legos, rulers, tape, and science notebooks will be used to explore the rate of fall, mass, and various scenarios of experimentation.((5 minute activities) R: Plenty of theories will arise requiring the re-thinking of knowledge and prediction. There are plenty of common misconceptions about gravity, and the 3 laws of motion.(group and small group discussions) E: feedback from teacher, peers, and data collection will drive the evaluation. T: teacher will assist with pace, re-direction, and understanding of the tasks. O: One concept will be covered each day, or multiple days (but NO MORE than 1 per day) in order to allow for scaffolding of previous learning, appropriate reflection on experimentation, data collection/organization in science notebooks, and group reflection. | |