WAUCONDA SCHOOL DISTRICT 118
UNIT PLANNING ORGANIZER

Subject: Science

Grade Level or Course: 6th

Unit 3: Force and Motion (Newton's 3 Laws of Motion)

Pacing: 5 weeks

STAGE 1 – DESIRED RESULTS

Essential Questions: (What will students take away from this unit, not necessarily on an assessment)

1. What are the forces associated with moving objects?
2. What are some ways that we can measure moving objects?
3. What are all of the ways that the motion of objects can be described?
4. What are the 3 main laws of Newtonian Motion?
5. How are energy and forces interrelated?
6. NGSS:"How can one describe physical interactions between objects and within systems of objects?"
7. NGSS:"How can energy be transferred from one object or system to another?

Big Ideas:(Discipline specific goals that help to answer the essential question, will be tested)

1. Newton's 1st Law of Motion: The law of inertia. The motion of any object requires an outside force to move the object, speed it up or slow it down.
2. Newton's 2nd Law of Motion: F=ma. Force equals mass times acceleration. The amount of force added to an object will affect the overall result of the motion of the object and it's acceleration or deceleration.
3. Newton's 3rd Law: The law of action and reaction. Whenever there is an action force that is exerted on an object there will be an opposite and equal reaction that occurs.
4. There are various types of forces that can act on moving and stationary objects. (sliding friction, static friction, rolling friction friction, gravity, pushing force, pulling force)
5. There various ways that we can measure moving objects. (average speed, instantaneous speed, velocity, acceleration, and deceleration)
6. We measure the relative motion of an object by measuring the distance and the displacement of the object that has moved.
7. Acceleration of an object can mean speeding up, slowing down, and changing direction.
8. Mass, momentum, and inertia are all directly related to the amount of force that is needed to move or accelerate an object.
9. The "Law of Conservation of Momentum" accounts for all of the forces that occur when the motion of one object affects or is affected by another object after a collision.
10. Energy is constantly being transferred between potential (non-moving) objects and kinetic (moving) objects.

NGCCSS (Priority Standards):

MS-PS2-1 Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.

MS-PS2-2 Plan an investigation to provide evidence that a change in an objects motion depends on the sum of the forces on the object and the mass of the object.

MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

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CCSS (Supporting Standards):

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STAGE 2 – EVIDENCE

Concepts **(What students need to know)**	**Performance Tasks** **(What students will be able to do)**	**DOK** **Blooms**
1. Newton's 3 Laws of Motion. 2. Frictional forces and their effect on objects that are stationary or in motion. 3. Forces that affect the motion of objects. (gravity, pulling force, pushing force, centripetal force and friction) 4. The types of measurement that are utilized in measuring objects that are in motion. (average speed, instantaneous speed, constant speed, and velocity) 5. The relative motion of an object can be determined	1. Students need to know how they can relate each of to each of Newton's 3 Laws of motion 2. Students should be able to identify the type of friction that is involved in various real world examples. (static, rolling and sliding) 3. Students should be able to identify the various forces that may be involved in the motion of objects. (gravity, centripetal force, pulling force, pushing force, or friction) 4. Students should be able to	

through a reference point, a measurement of distance or displacement. 6. Acceleration of an object can mean speeding up, slowing down, or changing direction. 7. Acceleration of an object can be calculated by using the formula of (final speed - initial speed divided by the total time of the motion. $a=(s_f-s_i)/t$ 8. Momentum is a relationship of mass and velocity. $p=mv$ 9. The “Law of Conservation of Momentum” accounts for all forces that are transferred and exchanged in a collision.	identify the type of speed that is being measured in various situational examples. 5. Students should be able to measure the displacement and the distance that an object has traveled from the beginning if it’s path to the end of it’s path. 6. Students should be able to determine the type of acceleration that is occurring in various situations. 7. Students should be able to determine the relative momentum of a moving object based on it’s mass and it’s speed. 8. Students should be able to explain how the Law of Conservation of Momentum can be related to objects before and after a collision. 9. Students should be able to cite examples of Law of Conservation of Momentum.	

Common Formative/Summative Assessments:

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Interim Assessments (Informal Progress Monitoring checks):

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Modified Common Assessments:

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Modified Interim Assessments:

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STAGE 3 – LEARNING PLAN
(INSTRUCTIONAL PLANNING)

Suggested Resources/Materials/Informational Texts

- Glencoe Science: *Introduction to Physical Science*

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Suggested Research-based Effective Instructional Strategies

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Academic Vocabulary/ Word Wall	Enrichment/Extensions/ Modifications	Interdisciplinary Connection
Essential Vocabulary: speed Average Speed instantaneous speed· inertia Newton's 1st Law Newton's 2nd Law Newton's 3rd Law friction potential energy kinetic energy Newton balanced forces unbalanced forces motion reference point velocity net force acceleration positive acceleration negative acceleration friction mass weight meters gravity momentum . .		

Worth-knowing Vocabulary: instantaneous speed· sliding friction rolling friction static friction air resistance aerodynamic terminal velocity angular momentum		