**Motion and Design Unit Criteria**

Indiana 2016 Science Standards

4.PS.1 Investigate transportation systems and devices that operate on or in land, water, air, and space and recognize the forces (lift, drag, friction, thrust, and gravity) that affect their motion.

4.PS.2 Investigate the relationship of the speed of an object to the energy of that object.

3-5.E.1 Identify a simple problem with the design of an object that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost.

3-5.E.2 Construct and compare multiple plausible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5.E.2 Construct and perform fair investigations in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

**Criteria**

1. Understand and apply vocabulary relevant to this unit:

 gravity, speed, friction, kinetic energy, potential energy, force, lift, thrust, drag

2. Understand that forces can change the speed and direction of a moving object.

3. Identify the effect of friction on a moving object.

4. Understand that the more mass an object has, the more force is needed to move the

 object.

5. Construct a vehicle following given designs. Conduct investigations using the

 vehicle and recording findings of investigations.

6. Design and build a vehicle to meet given specifications. Evaluate and change the

 design to improve vehicle performance.

7. Clearly and concisely communicate findings of investigations both orally and in

 writing.