1. What is our purpose?

1a) To inquire into the following:

- **transdisciplinary theme:** How the World Works

An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.

- **central idea**

Humans use their scientific understanding of the forces of motion to create inventions that impact everyday life.

Class/grade: 3rd Grade Age group: 8 years

School: Willard School code: 7202

Title: (May the Forces Be With You) How the World Works

Teacher(s): Nhem, Novelo, DeGroof, Beaumont

Date: 4/9/18-5/31/18

Proposed duration: number of hours:90 over number of weeks: 6 weeks

1b) Summative assessment task(s):

What are the possible ways of assessing students' understanding of the central idea? What evidence, including student-initiated actions, will we look for?

The students will demonstrate their understanding of the central idea by making a project/presentation describing something: in nature, a product or invention, how it works, and its impact on our daily lives. Teachers will assess students' ability to: identify the balanced and unbalanced forces within that invention, how that design solved a problem, and how that invention impacted the world.

Through the study of this unit we would expect that students would demonstrate action by:

- Demonstrating an awareness of one's impact upon the world with regard to experiment / invention selection
- Use their understanding of forces to design something helpful for others
- Becoming aware of how forces such as electricity can be wasted and devising ways to avoid energy waste.
- Devising more efficient ways to do work using simple machines

2. What do we want to learn?

What are the key concepts (form, function, causation, change, connection, perspective, responsibility, reflection) to be emphasized within this inquiry?
Key concepts: Form, function, and causation
Related concepts: force, motion, balance, patterns, magnetism, electricity

What lines of inquiry will define the scope of the inquiry into the central idea?

- balanced and unbalanced forces.
- Solving simple design problems
- How forces, tools, and machines impact our world

1. What are forces and how do they work?
2. How can we solve problems using our understanding of how forces work?
3. How do objects attract or repel from each other?
4. How can you use observations to predict patterns of motion?
5. How do forces, tools, and machines impact our world?

Provocations
Explore tools and / or pictures related to forces OTQ – Try to figure out what the objects have in common OR explore with different movable objects and various realia

3. How might we know what we have learned?

This column should be used in conjunction with "How best might we learn?"
What are the possible ways of assessing students' prior knowledge and skills? What evidence will we look for?

Teachers may use KWL charts to record what students already know about balanced and unbalanced forces and magnets.

Pre-assessment tests will show if students know what a force is and whether they possess knowledge of the concepts that will be taught.

Teachers may survey students to find out who has had prior experience with magnets and have students share their experience and hypothesis of how magnets work.

What are the possible ways of assessing student learning in the context of the lines of inquiry? What evidence will we look for?

Through the use of science journals, where they will record their inquiries, procedures, diagrams, and results, teachers will assess their students' ability to follow the scientific method.

Students will analyze the invention of a specific design using their understanding of forces. Students will also examine the positive and negative impact of that invention upon the world.
Though various experiments students will describe how various forces work.

4. How best might we learn?

What are the learning experiences suggested by the teacher and/or students to encourage the students to engage with the inquiries and address the driving questions?

1. Teacher/students will apply the components of the scientific method.
2. Students/Teacher will explore balanced / unbalanced forces and magnetism through hands on activitie
3. Students/Teacher will research the types of forces that exist within the world.
4. Students will investigate magnetism (polarity, shapes, strength, fields and what it travels through, natu
5. Students will make predictions based on observations.
6. Students will experiment, identify, and explain how simple machines (incline planes, wedges, ramps, l complex machines (scissors, can opener, clippers) make work easier.
7. Students will experiment with balls, ramps, cars, shapes and textured surfaces to design experiments in which they will be able to determine how the weight of objects affect the distance they can travel on inclined planes.
8. Student/teacher will explore tools and machines and how they impacted the world over time.
9. Students will create a hypothesis based on observation of the effects of gravity on two objects falling.
10. Students will apply their knowledge of forces to solve a design problem.
11. Students will create a structure using different materials and shapes to withstand an increasing amount of force (truss bridges, dams, walls, towers, etc.)
12. Create a GAME DAY as a culminating event where students create games using simple machines.
13. Students may choose to research, build, and/or present an invention of interest to analyze its impact upon the world.

What opportunities will occur for transdisciplinary skills development and for the development of the attributes of the learner profile?

- **Research skills:** formulate questions, plan, observe, collect, record and interpret data as students design and conduct experiments.
- **Self-management skills:** fine motor skills, organization, safety, codes of behavior as students work cooperatively and responsibly use science materials.
- **Thinking Skills:** Application, Analysis, Synthesis, Evaluation as students draw conclusions from their experiments.
- **Attitudes and Learner Profile:** Inquirer, thinker, knowledgeable as students work together to run tests. Attitudes: Commitment, Independence, Curiosity

5. What resources need to be gathered?

What people, places, audio-visual materials, related literature, music, art, computer software, etc, will be available?

SEED kit materials (magnets and balls and ramps), books related to magnets, Harcourt science text unit 1, internet, videos (i.e. The Way Things Work: Magnets), and teacher made science kits.
Magnetism video (in school library), BrainPopJr Internet videos, Mikids.com website about simple machines, LA County Library Videos, On The Mark Books Force & Motion and Simple Machines.
Newton's Cradle. Peep and the Big Wide World; Magnificent Machines.

How will the classroom environment, local environment, and/or the community be used to facilitate the inquiry?

The classroom environment will be set up in a manner conducive for cooperative groups and scientific investigation.
Simple machine -cards and interactive tools
Anti-friction moving disks. Forces and Motion Kit
Science books
Check Amazon for different books related to simple machines.