Lesson Title – Ready for Take Off (Activity Adapted from Aircraft Carrier STEM Activities)

Grade Level – 4/5

Standards –

4.PS3.1- Use evidence to explain the cause and effect relationship between the speed of an object and the energy of an object.

4.PS3.2-Observe and explain the relationship between potential energy and kinetic energy.

Materials – masking tape, oblong-shaped balloon, 2 inch section of plastic drinking straw, 6 ft. piece of string, scissors, stopwatch, ruler, desk or table, partner

Phenomenon: Show students a video of an F-35 jet launching from an aircraft carrier.

Question: How can you generate enough energy to launch an F-35 jet plane that goes from 0 to 170 miles/hour in just 2 seconds?

Procedure:

1. Tape one end of the string to your desk.
2. Thread the other end of the string through the straw.
3. On the string, measure 4 ft. and mark on the string.
4. Blow up the balloon and hold it closed so that the air doesn't escape.
5. Tape the straw to the other side of the inflated balloon with the opening of the balloon pointing towards the desk.

6. Have your partner hold the other end of the string above your desk, at any angle.
7. Pull the balloon down to the desk and release your hold on the balloon's opening, allowing air it escape. Use a stopwatch to record the time it took your balloon to travel 4 feet. Record your time on the recording chart.
8. Did your balloon travel from your desk up towards your partner? If not, what adjustments do you need to make?
9. Continue to adjust your experiment until you get the fastest launch.

Reflection:

- How does the angle of the string affect the launch of the balloon?
- What happens if you make the string tighter?
- Does the balloon go farther when it's blown up more?
- When is the potential energy the greatest?
- Where is the potential energy stored?
- When you changed the amount of potential energy, what did you observe about the motion of the object?

Extension:

- Could you change the amount of potential energy? If so, how?