DRAFT Lesson: Fraction Racing

Grade 4 Standards CS Science Math	*5.AP.PD.03 - The Proficient student independently tests and debugs a program or algorithm to ensure it runs as intended. *5.CS.HS.01 - The Proficient student creates a simple example of how a computing device takes input, stores information, processes input and information, and provides output (e.g., click the volume button and the sound level increases). *5.AP.V.01 - The Proficient student creates programs that use variables to: 1) store data and 2) modify data. 4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. 4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. 4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide. 4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. CCSS.MATH.CONTENT.4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.
Unplugged	Origami without instructions Materials: square origami paper 1. Take a square piece of paper and fold it into the shape of a fish – no cutting, gluing, or looking at references! 2. When done, reflect on the process – How did it go? What was easy? What was difficult? How long did it take? 3. Then, take another piece of paper and fold it into a fish again, but this time, refer to these step-by-step instructions. 4. Reflect again – How do the two fish compare? Which process was easier or faster? Which process would you choose if you had to do it again? Coding Connection: When creating paper animals, a clear sequence of instructions will help save time and minimize mistakes. This is also true for computer code, because a computer needs step-by-step instructions written in code to perform tasks.

Computer Science	Timing Gates: Two gates are connected to the micro:bit so it can detect a car passing through them. ● Timing Gates are set up ● Mint Mobiles are created by students as a STEAM project ● One class line plot is created on giant paper ● Each student plots their car data ● Students create math problems from the line plot ● Students solve each other's questions using the data
Integration	CCSS.MATH.CONTENT.4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. Engineering: Create a mint mobile with the following supplies: 4 mints, 3 straws, 2 index cards, and one yard of masking tape You do NOT get any more supplies. Plan and use your supplies wisely.
Discussion Questions	Discussion Questions for Students: How did the design of your mint mobile affect the speed? Use evidence to construct an explanation relating the speed of an object to the energy of that object. Was your prediction of outcomes about the changes in energy that occur when objects collide accurate? Why or Why not? What debugging had to take place? How did you solve these problems? What would you do differently next time?