COMPUTATIONAL MODELING

PHYSICS FIRST STORYLINE

UNIT 1: QUALITATIVE ENERGY STORAGE AND TRANSFER

Intentional language is needed to communicate information precisely and to ensure shared meaning. Conditions and changes in systems can be represented in multiple ways, including system schemas, state diagrams, and energy bar charts. Information is communicated using a variety of data types. Functions can be written and used to represent physical phenomena.

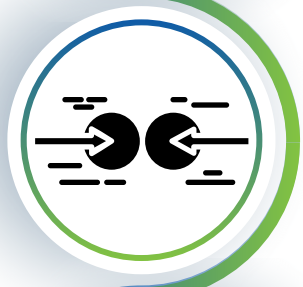
UNIT 2: CONSTANT VELOCITY

An object moving with a constant velocity experiences a fixed change in position for every unit of time. Motion maps, graphs, equations, verbal or written descriptions, and state diagrams can represent the motion of an object.
A function can be used to simulate motion and Booleans are introduced to alter functions when conditions change.

UNIT 3: UNIFORM ACCELERATION

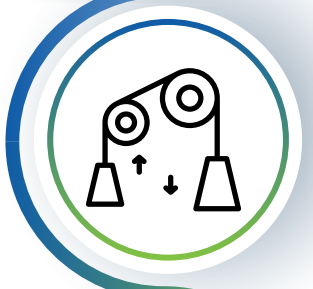
An object moving with a uniform acceleration experiences a fixed rate of change in velocity for every unit of time. Simulating the motion of an accelerating object requires functions to change both position and velocity. Previous representations look different with this new representation of motion and deeper understanding is explored.
Functions become more complex, including custom and nested functions.

UNIT 4: BALANCED FORCES



When the sum of forces acting on an object is zero, the object moves with a constant velocity. Forces can be represented using system schemas, force diagrams, and sum of forces equations.
Conditional statements use Boolean expressions to represent motion as a piecewise function.

UNIT 5: MORE ABOUT FORCES



An object accelerates when the forces acting on it are unbalanced. Air resistance is explored as a velocity-dependent function.
Functions that use key bindings as inputs can be used to make a simulation interactive.