

STEMPilot Curriculum Alignment: New York City Science Scope and Sequence

Description	STEMPilot Lesson	STEMPilot Worksheet
<p>Water is recycled by natural processes on Earth</p> <ul style="list-style-type: none"> Evaporation: changing of water (liquid) into water vapor (gas) Condensation: changing of water vapor (gas) into water (liquid) Precipitation: rain, sleet, snow, hail 	Weather Pgs 64-76	10.1: Pgs 146
Objects have properties that can be observed, described, and/or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness or light	Anatomy of a Cessna 172 Pg 18	11.2: Pg 150
Measurements can be made with standard metric units and non-standard units		7.2: Pg 136
Objects and/or materials can be sorted or classified according to their properties	Engine Types Pgs 20-22	
<p>Some properties of an object are dependent on the conditions of the present surroundings in which the object exists</p> <ul style="list-style-type: none"> Temperature: hot or cold Lighting: shadows, color Moisture: wet or dry 	Weather Pgs 64-76	10.1-10.2: Pgs 146-147
Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser	Weight & Balance Pgs 77-79; Density Altitude Pg 77	11.1: Pgs 148-149
<p>Matter exists in three states: solid, liquid, gas</p> <ul style="list-style-type: none"> Solids have a definite shape & volume Liquids do not have a definite shape but have definite volume Gases do not hold their shape or volume 	Weather Pg 64	10.1: Pgs 146
Changes in the properties or materials of objects can be observed and described	Weather Pgs 64-76	10.1: Pgs 146
Energy can be transferred from one place to another	Making Thrust: Engines Pg 21	
Most activities in everyday life involve at least one form of energy being transformed into another. For example, the chemical energy in gasoline is transformed into mechanical energy in an automobile engine. Energy, in the form of heat, is almost always one of the products of energy transformations	Four Forces of Flight: Making Thrust. Engine drives the propeller Pg 21	
Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces	Four Forces of Flight Pgs 20-23	3 Pg 125
The position of an object can be described by locating it relative to another object or the background	GPS Pg 26; Sectional Chart Navigation Pg 49-52	
The position or direction of motion of an object can be changed by pushing or pulling	Drag & Lift Pgs 21-22	

The force of gravity pulls objects toward the center of Earth	Gravity Pgs 20-22	
The amount of change in the motion of an object is affected by friction	Drag Pg 20-21	
Force is directly related to an object's mass and acceleration. The greater the force, the greater the change in motion	Weight & Balance Pgs 77-79; Thrust Pg 21	11.1: Pgs 148-149
Mechanical energy may cause change in motion through the application of force and through the use of simple machines such as pulleys, levers, and inclined planes	Engine Types Pgs 21-22; Flight Controls Pg 9	
Machines transfer mechanical energy from one object to another	Four Forces of Flight: Making Thrust Pgs 21	
Friction is a force that opposes motion	Four Forces of Flight: Drag Pg 20-21; Weather Pg 69, 77	
A machine can be made more efficient by reducing friction; some common ways of reducing friction include lubricating or waxing surfaces	Four Forces of Flight: Drag Pgs 20-21	
A complex machine uses a combination of interacting simple machines	Four Forces of Flight: Making Thrust Pgs 21; Flight Controls Pg 9	
Convert among different sized standard measurement units within a given measurement system (e.g. convert 5 cm to 0.05m), and use these conversions in solving multi-step, real world problems		4.2: MPH to Knots Pg 127
Represent and Interpret Data: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this Grade to solve problems involving information presented in line plots		7.1B: Ratios: Fractions Pgs 133-135
Perform operations with multi-digit whole numbers and with decimals to hundredths	Aviation Math & Science Pg 42	7.1B: Ratios: Fractions Pgs 133-135
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes"		7.1B: Ratios: Fractions Pgs 133-135
Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger"	Aviation Math & Science Pg 42	7.1B: Ratios: Fractions Pgs 133-135

Use ratio and rate reasoning to solve real-world and mathematical problems, e.g. by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations	Aviation Math & Science Pg 42	7.1B: Ratios: Fractions Pgs 133-135
Recognize and represent proportional relationships between two quantities. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships	Proportional Relationships Pg 42	7.1B: Ratios: Fractions Pgs 133-135; 5.1 Altitude vs Speed Pgs 146-147
Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has a greater speed		7.1B: Ratios: Fractions Pgs 133-135; 6: Altitude vs Speed Pgs 129-130
Describe measurable attributes of objects, such as length or weight. Describe several measures of a single object	Weight & Balance Pgs 77-79	11.1: Pgs 148-149
Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference	Anatomy of a Cessna 172 Pg 18	
Model with mathematics		7.3B: Check Your Understanding: Angles Pg 138
As altitude increases, air pressure decreases	The Altimeter Pg 25; Density Pg 71	
Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g. in a flowchart, diagram, model, graph, or table)	Mission 2 Pg 32	6: Altitude vs Speed Pgs 129-130
Translate quantitative or technical information expressed in words in a text into visual for (e.g. a table or chart) and translate information expressed visually or mathematically (e.g. in an equation) into words	Mission 2 Pg 32; Mission 3 Pg 37	7.1B: Ratios: Fractions Pgs 133-135
Use technology, including the internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently	Aviation History Pg 34	8: Informational Writing Pg 141
Conduct short research projects to answer a question (including a self-generated question) drawing on several sources and generating additional related, focused questions	Aviation History Pg 34	8: Informational Writing Pg 141