

Exploring the Extreme			
2007 Science			
Grade Expectations			
Vermont Science			
Grades PK-K			
Activity/Lesson	State	Standards	
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:1.1	Developing a question by completing the prompt, "I wonder...?"
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:1.2	Demonstrating a "questioning mind" through extended, intentional (purposeful) interactions with materials or people; Experimenting with possibilities.
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:3.1	Explaining the process of an investigation before and during the process (e.g., "on the job" planning, investigating, and explaining can happen simultaneously).
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:4.4.d	Using simple equipment and nonstandard measurement tools to gather data and extend the senses (e.g., balances, scales, counters, magnifiers).
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:4.4.e	Following teacher guidance to complete steps while investigating a question.
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:5.1	Including a piece of data (measurement or observation) on a group representation (e.g., pictograph, bar graph, or chart).
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:7.1	Communicating observations with the support of material props, photographs, drawings, or diagrams.
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:19.1	Manipulating objects and observing and describing the motion.
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:19.a	The position of an object can be described. (e.g., in front of or behind).
Finding the Center of Gravity Using Rulers	VT	SCI.PK-K.SPK-K:19.b	The motion of an object can be described as a direction (e.g., straight, zig zag, round and round, back and forth, up, down).
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2007 Science			
Grade Expectations			
Vermont Science			
Grades 1-2			
Activity/Lesson	State	Standards	
Finding the Center of Gravity Using Rulers	VT	SCI.1-2.S1-2:1.1	Posing observational questions that compare things in terms of number, shape, texture, size, weight, color, motion, etc. (e.g., How fast does a Lady Beetle move compared to a Bess Beetle?).

Finding the Center of Gravity Using Rulers	VT	SCI.1-2.S1-2:1.2	Investigating and completing questions to identify a variable that can be changed (e.g., What will happen if...? or I wonder if I change...?).
Finding the Center of Gravity Using Rulers	VT	SCI.1-2.S1-2:2.1	Predicting a logical outcome to a situation, using prior knowledge, experience and/or evidence.
Finding the Center of Gravity Using Rulers	VT	SCI.1-2.S1-2:2.2	Students demonstrate their understanding of predicting and hypothesizing by explaining reasons for that prediction.
Finding the Center of Gravity Using Rulers	VT	SCI.1-2.S1-2:3.1.b	What will be observed, measured, and/or compared.
Finding the Center of Gravity Using Rulers	VT	SCI.1-2.S1-2:4.1	Referring to and following a simple plan for an investigation.
Finding the Center of Gravity Using Rulers	VT	SCI.1-2.S1-2:19.1	Investigating and describing how objects move in different ways.
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Grade Expectations			
Vermont Science			
Grades 3-4			
Activity/Lesson	State	Standards	
Finding the Center of Gravity Using Rulers	VT	SCI.3-4.S3-4:19	Students demonstrate their understanding of Motion by
Finding the Center of Gravity Using Rulers	VT	SCI.3-4.S3-4:4.1	Referring to and following a detailed plan for an investigation.
Finding the Center of Gravity Using Rulers	VT	SCI.3-4.S3-4:4.2	Clearly describing evidence and quantifying observations with appropriate units.
Finding the Center of Gravity Using Rulers	VT	SCI.3-4.S3-4:4.3	Recording data at various points during an investigation by reporting what actually happens, even when data conflicts with expectations.
Finding the Center of Gravity Using Rulers	VT	SCI.3-4.S3-4:8.3	Connecting the investigation or model to a real world example.
Finding the Center of Gravity Using Rulers	VT	SCI.3-4.S3-4:21.1	Investigating and describing how different amounts of force can change the position or direction of motion of an object
Finding the Center of Gravity Using Rulers	VT	SCI.3-4.S3-4:21.a	Changes in position or direction of motion are caused by forces.
Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:19	Students demonstrate their understanding of motion by manipulating objects and observing and describing the motion

Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:1.1	Identifying at least one variable that affects a system and using that variable to generate an experimental question that includes a cause and effect relationship
Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:2.1	Identifying simple patterns of evidence used to develop a prediction and propose an explanation.
Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:4.1	Students demonstrate their ability to conduct experiments by referring to and following a detailed plan for an investigation.
Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:4.2	Clearly describing evidence and quantifying observations with appropriate units.
Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:8.3	Connecting the investigation or model to a real world example.
Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:21.1	Investigating and describing how different amounts of force can change the position or direction of motion of an object
Finding the Center of Gravity Using Plumb Lines	VT	SCI.3-4.S3-4:21.a	Changes in position or direction of motion are caused by forces.
Changing the Center of Gravity Using Moment Arms	VT	SCI.3-4.S3-4:19	Students demonstrate their understanding of motion by manipulating objects and observing and describing the motion
Changing the Center of Gravity Using Moment Arms	VT	SCI.3-4.S3-4:4.2	Clearly describing evidence and quantifying observations with appropriate units.
Changing the Center of Gravity Using Moment Arms	VT	SCI.3-4.S3-4:8.3	Connecting the investigation or model to a real world example.
Changing the Center of Gravity Using Moment Arms	VT	SCI.3-4.S3-4:21.1	Investigating and describing how different amounts of force can change the position or direction of motion of an object
Changing the Center of Gravity Using Moment Arms	VT	SCI.3-4.S3-4:21.a	Changes in position or direction of motion are caused by forces.
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Grade Expectations			
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Grades 5-6			
Activity/Lesson	State	Standards	
Jet Propulsion	VT	SCI.5-6.S5-6:1.1	Distinguishing between observational, experimental, and research questions (e.g., Observational—How does a cricket chirp? Experimental—Does the amount of light affect how a cricket chirps? Research—Do all crickets chirp? Why do crickets chirp?).

Jet Propulsion	VT	SCI.5-6.S5-6:4.2	Collecting data and recording accurate and complete data from multiple trials.
Jet Propulsion	VT	SCI.5-6.S5-6:6.1	Identifying relationships of variables based upon evidence.
Jet Propulsion	VT	SCI.5-6.S5-6:20.1	Design an investigation to collect evidence about an object's inertia and explaining their observation in terms of the object's tendency to resist a change in motion.
Jet Propulsion	VT	SCI.5-6.S5-6:21.1	Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.
Jet Propulsion	VT	SCI.5-6.S5-6:21.b	Friction is a force that often opposes motion.
Vectoring	VT	SCI.5-6.S5-6:1.1	Distinguishing between observational, experimental, and research questions (e.g., Observational—How does a cricket chirp? Experimental—Does the amount of light affect how a cricket chirps? Research—Do all crickets chirp? Why do crickets chirp?).
Vectoring	VT	SCI.5-6.S5-6:1.2	Identifying multiple variables that affect a system and using the variables to generate experimental questions that include cause and effect relationships.
Vectoring	VT	SCI.5-6.S5-6:2.1	Using logical inferences derived from evidence to predict what may happen or be observed in the future.
Vectoring	VT	SCI.5-6.S5-6:6.1	Identifying relationships of variables based upon evidence.
Vectoring	VT	SCI.5-6.S5-6:21.b	Friction is a force that often opposes motion.
Center of Gravity, Pitch, Yaw	VT	SCI.5-6.S5-6:4.1	Choosing appropriate measurements for the task and measuring accurately.
Center of Gravity, Pitch, Yaw	VT	SCI.5-6.S5-6:20.1	Design an investigation to collect evidence about an object's inertia and explaining their observation in terms of the object's tendency to resist a change in motion.
Center of Gravity, Pitch, Yaw	VT	SCI.5-6.S5-6:20.a	Inertia is the tendency of an object to resist a change in motion and depends upon the object's mass. Stationary objects tend to remain stationary; moving objects tend to continue moving (Newton's First Law).
Center of Gravity, Pitch, Yaw	VT	SCI.5-6.S5-6:21.1	Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.
Center of Gravity, Pitch, Yaw	VT	SCI.5-6.S5-6:21.b	Friction is a force that often opposes motion.

Exploring the Extreme

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Grade Expectations			
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Grades 7-8			
Activity/Lesson	State	Standards	
Jet Propulsion	VT	SCI.7-8.S7-8:3.1.b	A procedure that lists significant steps that identify manipulated (independent) and responding (dependent) variables.
Jet Propulsion	VT	SCI.7-8.S7-8:7.1	Using scientific concepts, models, and terminology to report results, discuss relationships, and propose new explanations.
Jet Propulsion	VT	SCI.7-8.S7-8:7.3	Documenting and explaining changes in experimental design.
Jet Propulsion	VT	SCI.7-8.S7-8:7.4	Sharing conclusion/summary with appropriate audience beyond the research group.
Jet Propulsion	VT	SCI.7-8.S7-8:8.1	Identifying additional data that would strengthen an investigation.
Jet Propulsion	VT	SCI.7-8.S7-8:19.b	Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.
Jet Propulsion	VT	SCI.7-8.S7-8:21.1	Diagramming or describing, after observing a moving object, the forces acting on the object before and after it is put into motion (Students include in their diagram or description, the effect of these forces on the motion of the object.)
Vectoring	VT	SCI.7-8.S7-8:1.1	Developing questions that reflect prior knowledge.
Vectoring	VT	SCI.7-8.S7-8:3.1.b	A procedure that lists significant steps that identify manipulated (independent) and responding (dependent) variables.
Vectoring	VT	SCI.7-8.S7-8:3.1.c	Students demonstrate their understanding of experimental design by a control for comparing data when appropriate.
Vectoring	VT	SCI.7-8.S7-8:7.1	Using scientific concepts, models, and terminology to report results, discuss relationships, and propose new explanations.
Vectoring	VT	SCI.7-8.S7-8:13.1	Using real world examples (tires, balloons, soda), predict and explain the effect that a change in one variable (pressure, temperature or volume) will have on the others.
Vectoring	VT	SCI.7-8.S7-8:19.b	Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.

Center of Gravity, Pitch, Yaw	VT	SCI.7-8.S7-8:4.1	Accurately quantifying observations using appropriate measurement tools.
Center of Gravity, Pitch, Yaw	VT	SCI.7-8.S7-8:7.1	Using scientific concepts, models, and terminology to report results, discuss relationships, and propose new explanations.
Center of Gravity, Pitch, Yaw	VT	SCI.7-8.S7-8:19.b	Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.
Center of Gravity, Pitch, Yaw	VT	SCI.7-8.S7-8:21.1	Diagramming or describing, after observing a moving object, the forces acting on the object before and after it is put into motion (Students include in their diagram or description, the effect of these forces on the motion of the object.)
Fuel Efficiency	VT	SCI.7-8.S7-8:4.1	Accurately quantifying observations using appropriate measurement tools.
Fuel Efficiency	VT	SCI.7-8.S7-8:5.1	Representing independent variable on the "X" axis and dependent variable on the "Y" axis.
Fuel Efficiency	VT	SCI.7-8.S7-8:5.4	Using color, texture, symbols and other graphic strategies to clarify trends/patterns within a representation.
Fuel Efficiency	VT	SCI.7-8.S7-8:7.1	Using scientific concepts, models, and terminology to report results, discuss relationships, and propose new explanations.
Fuel Efficiency	VT	SCI.7-8.S7-8:19.b	Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.