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Literacy Connections – Common Core State Standards and NGSS

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The Sacramento Area Science Project (SASP) is an education partnership between the University of California, Davis, and California State University, Sacramento. SASP is a regional site of the California Science Project.

SASP conducts research in teaching and learning, provides science educators with useful, high quality professional development and encourages and supports teachers in being reflective practitioners focused on student understanding.

**Anticipatory Set
Newton’s First Law – Inertia**

For each statement decide whether you agree or disagree with it. Put an “A” in front of the ones you agree with and a “D” in front of the ones you disagree with.

1. ___ Large objects require more force to move than small objects.
2. ___ Newton discovered inertia.
3. ___ Something moving can only be slowed down by an unbalanced force.
4. ___ Applying grease or oil to a sliding object decreases its inertia.
5. ___ Mass and inertia are pretty much the same thing.
6. ___ Without inertia a glider would not be able to fly.
7. ___ Friction slows everything down.
8. ___ Gravity influences the inertia of objects.

THINK – PAIR - SHARE

My name: _____ Partner's name: _____

Think – my thoughts or understanding at this time.

Pair – what I understand my partner is telling me.

Share – our common understanding after talking, what we can share with others or what was most important from our dialogue.

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Newton's First Law

An object at rest remains at rest, and an object in motion remains in motion at a constant speed and in a straight line unless acted on by an unbalanced force.

An object that is moving is said to be in **motion**. An object that is not moving is said to be at rest. A chair on the floor and a golf ball on a tee are examples of objects at rest. Newton's first law states that objects at rest will stay at rest unless an unbalanced force acts on them. So, objects will not start moving until a push or pull is exerted on them. A chair will not slide across the room unless you push the chair. A golf ball won't move off the tee unless the ball is struck by a golf club.

Because an object in motion will stay in motion unless it is acted on by an unbalanced force, you should be able to give your desk a push and send it across the floor. However, if you push the desk it quickly stops. Why does this happen? It happens because an unbalanced force changes the motion. That unbalanced force is friction. **Friction** slows down the motion of objects. Friction between the desk and the floor slows the motion of the desk. The same thing happens with a rolling ball, friction will cause it to slow down and stop.

Newton's first law of motion is often summed up in one sentence: Matter resists any change in motion. This tendency of all objects to resist any change in motion is called **inertia**. Because of inertia an object at rest will remain at rest until a force makes it move. For example, because of inertia groceries will stay in one place in a car that is moving, however, when the car goes around a corner they slide toward the side of the car. Inertia is also the reason it takes a force to stop something that is moving, whether it is groceries, a ball or a car. Because Newton's first law can be explained in terms of inertia, it is sometimes called the Law of Inertia.

Mass is a measure of inertia. An object with a small mass has less inertia than an object with a large mass. So, changing the motion of an object with a small mass is easier than changing the motion of an object with a large mass. For example, a softball has less mass and therefore less inertia than a bowling ball. Because the softball has a small amount of inertia, its motion can be changed dramatically by hitting it with a bat. Imagine how difficult it would be to make a base hit with a bowling ball.

Excerpted from Physical Science; Holt, Reinhart & Winston

Odd One Out

Science Formative Assessment (page Keeley)

Which is the Odd One?	Why is it the Odd One?
Force	
Inertia	
Object	
Friction	

Which is the Odd One?	Why is it the Odd One?
Motion	
Inertia	
Mass	
At rest	

Potential Writing Tasks

You have been studying inertia and are showing your mother the penny on the card on the cup activity. Your little brother who is 10 comes into the room just as you flick the card. He thinks it is magic. Write a note to him explaining the science behind the phenomenon (why the penny did what it did).

At a birthday party a friend shows you a trick. She puts a glass of water on a towel on the table. Then she quickly pulls the towel out from under the glass without tipping it over or spilling any water. She claims she can do this because of friction. Write an email to her either agreeing or disagreeing with her (include claims and evidence you might use to make your point).

What do Common Core and NGSS ask for?

Common Core	Next Generation Science Standards
<p><u>Speaking and Listening:</u></p> <ul style="list-style-type: none"> Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on topics and texts, building on others' ideas and expressing their own clearly. <p><u>Reading:</u></p> <ul style="list-style-type: none"> Ask and answer questions to demonstrate understanding of text, referring explicitly to the text as the basis for the answers. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. <p><u>Writing:</u></p> <ul style="list-style-type: none"> Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section. Write opinion pieces on topics or texts, supporting a point of view with reasons. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence. 	<ul style="list-style-type: none"> Ask Questions and Define Problems Design, conduct, and evaluate an investigation Plan and Carry Out Investigations Make observations and collect data Ask questions about data Analyzing and Interpreting Data Conduct short as well as more sustained research projects to answer a question Use information from texts and diagrams Interpret information presented visually, orally, or quantitatively Construct an argument using evidence Engaging in Argument from Evidence Support an argument Obtaining, Evaluating, and Communicating Information Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas Produce technical writing and/or oral presentations
	<ul style="list-style-type: none"> Investigate the motion of objects Design an investigation to produce empirical evidence supporting the claim that the change in the motion of an object depends on the sum of the forces on the object and the mass of the object.

