Grade: 3rd **Subject: Physical Science** **Unit: Energy, Force, and Matter (Simple Machines Fall Expedition)** **Time: 33 days**

Instructional Goals: TLW identify several different forms of energy.
TLW discover that energy is needed to get things done.
TLW explain how forces help to change the motion of objects.
TLW describe how simple machines decrease the amount of effort it takes to move various objects.

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2 3 4 8	PS3A SYSA SYSD SYSE	**TLW use the word *energy* to *explain* everyday activities (e.g. food gives people energy to play games.) TLW give examples of different forms of *energy* as observed in everyday life: light, sound, and motion.TLW *explain how* light, sound, and *motion* are all *energy*. (E)** **TLW give examples of simple living and physical *systems* (e.g. a whole animal of plant, a car, a doll, a table and a chair set). For each example, *explain how* different parts make up the whole. (D)** **TLW *explain* why the parts in a *system* need to be connected in a specific way for the system to *function* as a whole (e.g. batteries must be inserted correctly in a flashlight if it is to produce light). (D)** **TLW identify ways that similar parts can play different roles in different systems (e.g. birds may use their beaks to crack seeds while other birds use their beaks to catch fish). (D)**	5 days	**Reading and Response:** read "Do you have the energy?" pgs. C30-33. Have students write, in science journal, their own definitions of what *energy* is, then share. **Game:** Adapted from "Simon says." Teacher will call out "Energy of motion" or "Stored energy." Students will display said energy or sit down. **Critical thinking:** list things in the classroom that are in motion and things that are not in motion. **Hands on activity:** make windmills (pg. C30 in Discovery Works).	Discovery Works Unit C, Chapter 2 Materials to make windmills (paper, straight pins, scissors, drinking straws)	Poster of Energy: students will use pgs. C32-33 to make a poster that shows "Forms of Energy" to be displayed in the classroom.	

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3 4 8	PS 1A INQA	**TLW give an example to illustrate *motion* as a change in position over a period of time (e.g. if a student stands near the door and then moves to his/her seat, the student is "in motion" during that time). (M)** **TLW *explain how observations* can lead to new knowledge and new *questions* about the *natural world.* (D)**	2 day	**Learning Centers:** Different centers with various objects can be moved (i.e. marble on track, model door, poppers, model cars) **Peer Sharing:** Talk about experiences and define *motion.*	Materials for Centers	Create a classroom reference poster about *motion.* (how do we know when something moves?) Check science journals (chart)	

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2 3 4 8	PS1C	**TLW give examples to illustrate that a greater *force* can make an object move faster than a lesser *force* (e.g. throwing a ball harder or hitting it harder with a bat will make it go faster). (D)**	3 days	**Hands-on activity** "Gravity Roll p. 62-3." Example: Students will experiment with ramps of various heights. Measure the distance the object travels in relation to the height. Record observations on chart. Modify the object being moved by applying more force to show that giving it a greater force changes how fast the object moves	Discovery Works Unit C. Chapter 3 Materials for ramp and objects to roll down the ramp (e.g. toy car, marble, ball etc) Recording observations/times chart	Observations and times chart. Must include conclusion of *why* objects reacted the way they did. Also, include the comparison of the distances.	
	PS1D	**TLW measure and *compare* the distances moved by an object (e.g. toy car) when given a small push and given a big push. (D)**					
	INQB	**TLW work with other students to make and follow a plan to carry out a scientific *investigation.* Actions may include accurately observing and describing objects, events and *organisms*; measuring and recording data; and predicting outcomes. (D)**					
	INQD	**TLW use simple instruments (e.g. metric scales or balances, *thermometers*, and rulers) to observe and make measurements, and record and display data in a table, bar graph, line plot or pictograph. (D)**					
	INQF	**TLW accurately describe results, referring to the graph or other data as evidence. Draw a conclusion about question that motivated the study using the results of the investigation as evidence. (D)**					
	APPA	**TLW design a solution to a simple problem using a *technological design***					

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		process **that includes: defining a problem, gathering information, exploring ideas, making a plan, testing possible *solutions* to see which is best, and communicating the results. (D)**					
	APPB	**TLW give an example in which the application of scientific knowledge helps solve a problem (e.g. use electric lights to see at night). (D)**					

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1 2 3 4 8	PS1B	**TLW identify the *force* that starts something moving or changes its *speed* or direction of *motion* (e.g. when a ball is thrown or when a rock is dropped). (D)**	3 days	**Hands-on activity:** "Roll On!" (pg. C60) Example: Students will experiment with model cars and rubber bands. They will identify the *force* causing *motion*.	Discovery Works Unit C. Chapter 3 Simple machine magazines	Science journal of observations	**BI:** Genesis6:13-22 --Did God just tell Noah the NEED then tell him want to do then leave it up to Noah to figure out the Ark part? --What details were given to Noah to help him? --What is a Cubit? --How does the size of the ark compare to the biggest building on the Doulos campus? --could be an activity to measure the building, do a scale drawing of the ark? Biblical Tools: Axe—Deut. 19:5; 20:19, 1 Kings 6:7, Is. 10:15-34 Planer—Is.44:13 Hammer—1st Kings 6:7 Compass—Is. 44:13 Saw—Is.10:15
	SYSD	**TLW *explain* why the parts in a *system* need to be connected in a specific way for the system to *function* as a whole (e.g. batteries must be inserted correctly in a flashlight if it is to produce light). (D)**		**Brainstorming:** What other *forces* could cause changes in *speed* and direction?		Brainstorming list	
	INQC	**TLW distinguish between direct *observations* and simple *inferences*. (D)**					
	INQD	**TLW use simple instruments (e.g. metric scales or balances, *thermometers*, and rulers) to observe and make measurements, and record and display data in a table, bar graph, line plot or pictograph. (D)**					
	INQG	**TLW communicate honestly about their *investigations*, describing how *observations* were made and summarizing results. (D)**					
	APPA	**TLW design a solution to a simple problem using a *technological design process* that includes: defining a problem, gathering information, exploring ideas, making a plan, testing possible *solutions* to see which is best, and communicating the results.**					

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	APPD	**TLW select appropriate *tools* and materials to meet a goal or solve a specific problem (e.g. build the tallest tower with wooden blocks or the longest bridge span) and *explain* the reason for those choices.**					*See expedition guide for further activities **BI**: We are all simple machines (the people) that make up a compound machine (body of Christ) 1 Corinthians 12:12-27

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1 2 3 4 8		**TLW identify *simple machines* that make "work" easier (by redirecting force). (E)** ***not a WA Standard**	20 days	**Journal entries:** How could you make an object move faster or slower? (Peer sharing to show and identify which ideas involve increasing *force*). How could you use less *force*, but move the object the same amount of distance? (Peer sharing to show and identify which ideas involve less *force*) **Demonstration and Discussion:** Bring in a bicycle. Students to identify different simple machines that make up the compound machine (the bicycle). Discuss what would happen if we took different parts off (i.e. would the bike work if we took off one of the wheels?) **Learning Centers:** Focus on HOW simple machines make work easier 1. bag of beans—attach a cut rubber band to a bag of beans (or any other heavy object). Stack books. Students lift the bag by the rubber band to the top of the stack. Measure the length that the rubber band stretched. Record. Create an inclined plane and pull the bag of beans. Measure how far the rubber band stretched. The students will discuss how the inclined plane made work easier by comparing the length the rubber band stretched. 2. Wood and nails—students hammer nails into wood. They will see how the hammer (lever) makes putting the nail into the wood easier, and how the nail (wedge) works. 3. Nuts and bolts—experiment with nuts	Journals/Notebook Bag of beans, rubber band, stack of books, ruler Hammer, nails, scrap wood Nuts and bolts Pulley, jar, balance scale, can opener, rolling pin	Mystery bags: students identify various simple machines in a individual brown bags by touch. Identify simple machines in different complex machines around campus (i.e. motorcycles, bicycles, cars).	
	SYSA	**TLW give examples of simple living and physical *systems* (e.g. a whole animal of plant, a car, a doll, a table and a chair set). For each example, *explain how* different parts make up the whole. (D)**					
	SYSB	**TLW *explain how* the parts of a system depend on one another for the *system* to *function*. (D)**					
	SYSC	**TLW contrast the *function* of a whole object, plant, or animal with the *function* of one of its parts. (D)**					
	INQE	**TLW use a simple *model* to study a *system*. *Explain how* the *model* can be used to understand the *system*. (D)**					
	INQG	**TLW communicate honestly about their *investigations*, describing how *observations* were made and summarizing results. (D)**					
	APPA-E	**Evaluate how well a selected tool solved a problem and discuss what might be done differently to solve a similar problem. (D)**					

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				and bolts to see how levers and screws 4. various simple machines—pulley, screw lid on a jar, a balance scale (lever), can opener, rolling pin etc.			

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