Student Workbook: Lesson 3.1 Properties of Matter



Warm Up

Can you write the opposite (antonym) of the words below?

Word		Antonym
НОТ	→	
SOFT	→	
SMOOTH	→	
SHORT	→	
THIN	→	
SMALL	→	

Student Workbook: Lesson 3.1 Properties of Matter



Mini-lesson

Keyword Review

Draw a line between the keyword and its correct description.

Keyword		
Solid		
Liquid		
Gas		
State of Matter		
Matter		

Description
That which occupies space and possesses mass
An air-like fluid substance which expands freely to fill any space available
Firm and stable in shape
A distinct form in which matter can exist
A substance that flows freely but is of constant volume

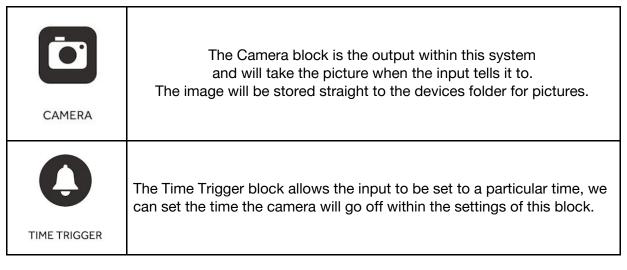
In your workbook or with a partner, record, discuss, or share two objects that can change material properties and whether the change is reversible or irreversible?

	Object 1:	Object 2:
How can the material properties change?		
Is the change reversible or irreversible?		



Challenge 1

Plan your system. What blocks do you need?



Sketch your plan: Think about the SAM system you want to create and use the space below to draw it out.

- → Which are your inputs and outputs?
- → How will they be connected together?
- → What settings do you need to edit?

Student Workbook: Lesson 3.1 Properties of Matter



We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
next	equally	however	so
after	likewise	otherwise	therefore
then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to



Warm Up

Can you put these methods of communication in order from 1-6? (Oldest = 1, Newest = 5). The first one is completed for you.

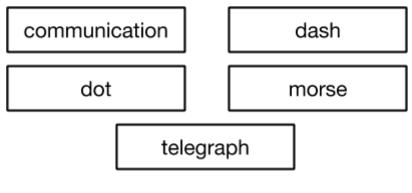
Order	Communication Method
1	TOVISCO SERVIS CRIMIN TO THE SERVIS CRIMIN THE SERVIS CRIMIN TO THE SERVIS CRIMIN TO THE SERVIS CRIMIN THE SERVIS



Mini-lesson

Keyword Review

Fill in the blanks with the appropriate keyword using the word bank below.



1.	Until the telegraph, transport.	was limited by the speed of physical
2.	Theinstantaneous.	revolutionised communication by making it
3.	code	was an efficient system of representing letters and short buzzes.
4.	A long buzz is called	a and a short one a

Let's Discuss

In your workbook or with a partner, record, discuss, or share one reason Morse Code was innovative.



Challenge 2

Look at the pictures and read the steps that describe Challenge 2. What happens first? Second? Third? Write the number of the step to match each picture. Step 1 has been completed for you.

Steps	Instructions	Workspace
	Add the RGB LED to the output of the Morse Code block.	
Step 1	Turn on and pair: ● RGB LED	
	Change the color of the RGB LED	PALADE AND PARA
	Test your system and code another message	

Student Workbook: Lesson 3.2 Morse Code



We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
next	equally	however	so
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then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to



Warm Up

Look at the images below and identify what they show. Can you name any of the instruments? Choose 2 instruments. Compare and contrast how they produce music in the space below.



_				
	201	0	$C \wedge V \wedge A$	Labs
	/U I	\circ	SAIVI	1 205



Mini-lesson

Keyword Review

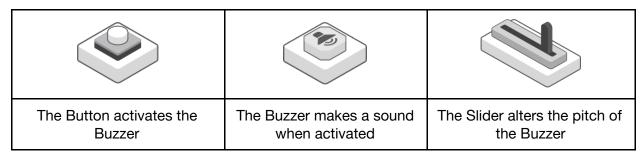
Using the word bank below, fill in the blanks with the appropriate keyword. You may need to change the root word (eg. 'pluck' - 'plucking')

strings	plucking	frequency	pitch
On a guitar, the	are made	to sound by	or strumming
them with the fingers.			
The left hand is used	to change the length	of the string and the	refore the
	·		
A shorter string produ	uces a sound with hig	her pitch because th	e of
the string has been in	creased.		
Let's Discuss			
In your workbook of example of how stand of music.	,	· · · · · ·	



Challenge 1

Plan your system: What blocks do you need?



Sketch your plan: Think about the SAM system you want to create and use the space below to draw it out.

- Which are your inputs and outputs?
- How will they be connected together?
- What settings do you need to edit?

Student Workbook: Lesson 3.3 **Guitar**



We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
next	equally	however	so
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then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to



Warm Up

Review these images and decide if you think they will shake. How much? How do you know?

Object / Structure	Will it shake? How do you know?

Student Workbook: Lesson 3.4 Earthquake Simulator



Mini-lesson

Keyword Review

Complete the sentences below with the correct keyword.

earthquake	tectonic	isolation	structure	crust	Richter		
There are many natural disasters in the world. One that makes the earth shake is							
called an	called an We can measure an earthquake on the						
	_ scale which	tells us how s	trong it was. A	n earthquake	is caused by		
the outer layer	of the earth c	alled the	, W	hich is broken	into pieces		
called	plate	es and when t	hese move, co	llide and get s	stuck on one		
another they ca	ause an earth	quake to happ	en. When we	build on some	where where		
earthquakes ha	appen we nee	ed to think abo	ut the		_ of the		
building and or	ne way is to u	se base		·			
Let's Discuss	;						
In your workbook or with a partner, record, discuss, or share how an earthquake's strength is measured and recorded.							

Student Workbook: Lesson 3.4 Earthquake Simulator



Challenge 1

Partner up with a classmate. Use the table below to review their straw structure.

- Record what you liked about the design.
- Note any improvements he or she could make.

What you liked	Improvements
	What you liked

We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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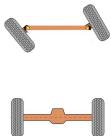
Warm Up

It seems that all vehicles use the same system to steer - turning the front wheel. Is this really the only way or the best way?









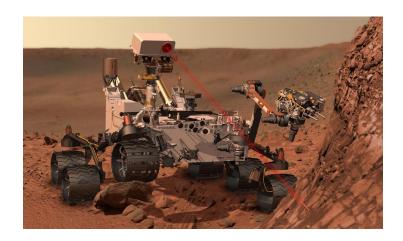
Can you think of any reasons why we might need a different system? Think about what happens if you try to steer a bike or a car very abruptly. What happens?

What about hoverboards and skates?





What about the Mars Rovers?





Mini-lesson

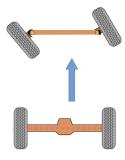
Many specialized vehicles, especially those that use tracks, cannot turn like a bike a scooter or car, since they have no wheels. These vehicles cannot use normal wheels as they have to travel over snow or very uneven ground. Often these vehicle are used in extreme conditions where people's lives or survival depend on them, so their steering mechanism must also be robust.





So how do they turn? These vehicles have two tracks, one on each side. There are motors attached to each track. If we make one track go faster than the other, then the vehicle will turn.

If you think about it, this makes a lot of sense. When we turn the wheels on a car or a bike, the motion of the vehicle is pushing the wheels **forward**... but the wheels are facing **sideways**.



This makes it relatively easy for the vehicle to skid or to lose grip. So it makes a lot of sense to have independent steering for each wheel, or at least for the wheels at the front and the back.

Student Workbook: Lesson 3.5 Mars Rover



Let's Discuss

In your workbooks or with a partner, describe the steering system in ar versus that of the Mars Rover.			m in a		

Keyword Review

Match the keyword with the appropriate definitions.

Design technology
Rocker-bogie
Tracked vehicle
Exploration

A system of vehicle propulsion in which a continuous band of treads or track plates is driven by two or more wheels.

The activity of searching and finding out about something.

A specialized suspension system used in Mars Rover that allows it to travel effectively over uneven terrain.

The use of computer and non-computer technologies to create specific products.



Worked Example

Look at the pictures and read the sentences that describe the Worked Example. In what order do they occur? Note the number of steps in the spaces below.

Steps	Instructions	Workspace
	Test your system	
	Drag the blocks onto the workspace. Connect each Button to one Motor.	
	Turn on and pair: • 2 DC Motors • 2 Button blocks	

Student Workbook: Lesson 3.5 Mars Rover



Challenge 1 - Debug it

Both systems can be used to move	
the effectiveness of each system. W	•
suited for the purpose of the Mars F	
I think the system better suited to co	ontrol the Mars Rover is:
This is because:	



Challenge 2

Sketch your plan. How can you improve the design of your SAM Mars Rover? Use the space below to plan it out.

- What other specialized features are included in Mars Rover design? Which ones can you replicate?
- Which are your inputs and outputs?
- How will they be connected together?
- What settings do you need to edit?

-		

Student Workbook: Lesson 3.5 **Mars Rover**



We can use transitional phrases to talk about the order events or actions that take place. Practice by using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to



Warm Up

Draw a line matching the object below to the correct category: Absorb / Unsure / Reflect - Are there any you are unsure about?









Absorb

Reflect

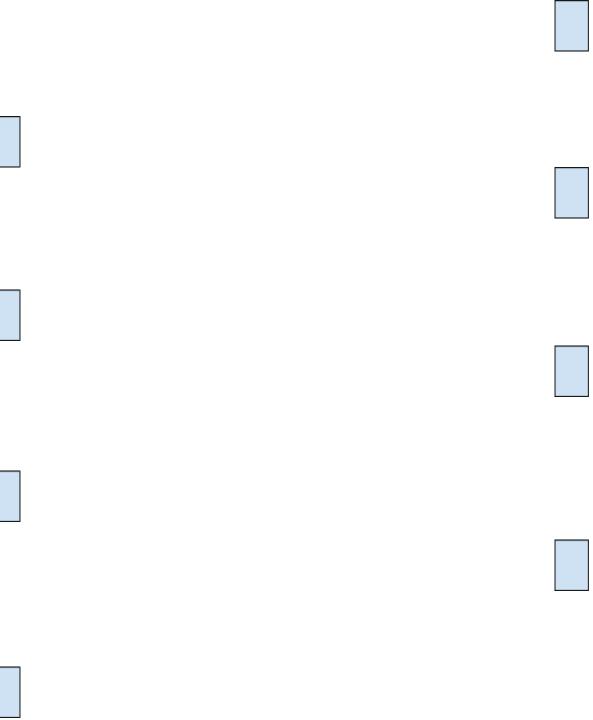
Unsure

Student Workbook: Lesson 3.6 The Lighthouse



Mini-lesson

Draw light waves onto the diagram to demonstrate how the light travelled across the room. The small rectangles represent the mirrors.



Student Workbook: Lesson 3.6 The Lighthouse



Keyword Review

Fill in the blanks with the appropriate keyword using the work bank below. You may need to use a word more than once.

	Light wave	Smooth
	Absorb	Shiny
	Reflect	Dark
	Dul	I
Light travels in straigh	nt lines. When a l	ight hits an object, it
and enters into our ey	/e,	surfaces such as mirrors
and polished metals r	eflect light well.	, surface such as
dark fabricst	he light.	
You are going to be debugged below sketch your de	-	ilding a Lighthouse. In the space



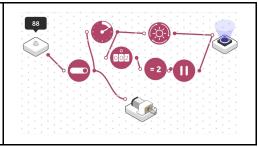
Challenge 1 - Debug

Look at the pictures and read the steps that describe Challenge 1 - Debug. What happens first? Second? Third? Write the number of the step to match each picture. Step 1 has been completed for you.

Steps	Instructions	Workspace
	Delete the Key Press block from the system.	
	Place the Light Sensor block into the space at the front of the Car Controller.	SAM :
Step 1	Turn on and pair: • Light Sensor block	
	Drag an Inverse block onto the workspace and connect it between the Light Sensor and the Toggle blocks.	



Connect the Light Sensor block to the Toggle block.



We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to

SAM Spider



Warm Up

Can you label the senses below:



Scenario:



You have been given this new food and now need to decide what you think about it, how would you use your senses to make a judgment if you liked it or not?



Sight

Mini-lesson

Senses

Keyword Review

Fill in the blanks with the appropriate keyword using the word bank below.

Brain

React

	Touch	Smell	Taste	Hearing	
١	When you come across a new food you need to use your				
t	to make a judgment about whether you like it or not. You have 5 senses				
ć	and these are using your eyes,				
ι	using your nose, using your skin,				
ι	using your tongue	and	using yo	ur ears.	
١	Whenever you use one of your senses it sends a message to your				

_ and you will then _____ based on that message.

Let's Discuss

In your workbook or with a partner, record, discuss, or share an example of how you would sense a change in the weather and how you would react to it.



Challenge 1

Look at the pictures and read the steps that describe Challenge 1. What happens first? Second? Third? Write the number of the step to match each picture. Step 1 has been completed for you.

Steps	Instructions	Workspace
	Attach the DC Motor block to the Wheel.	CO 100 o minus
Step 1	Cut 4 x pipe cleaners in half	
	Test your system.	



Attach the pipe cleaners to the Wheel.	*
Bend the legs towards the table like a spider.	AS.

We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to



Warm Up

What will happen if we mix Vinegar + Baking Powder?



Prediction	Observation	Outcome

Student Workbook: Lesson 3.8 Lava Lamp



Mini-lesson

Keyword Review

Pilo

Fill in the blanks with the appropriate keyword using the work bank below.

Solid	Liquid	Gas	Substance	IIILEI aCtion
Substances ca	an come in thre	e different forr	ns	
	or		Wher	n two or more
	are n	nixed together	an	
takes place an	d a new substa	ance can some	etimes be creat	ed.
Let's Discuss				
In your workbo of other substa substance.	•	•	•	•



Challenge 1

Look at the pictures and read the steps that describe Challenge 1. What happens first? Second? Third? Write the number of the step to match each picture.

Step 1 has been completed for you.

Steps	Instructions	Workspace
	Push the DC Motor through the hole and attach the wheel	
Step 1.	Using a plastic tub make a small hole in the end	
	Add a lump of glitter to the water	
	Add about an inch of water	0
	Start the DC Motor by the Slider block	

Student Workbook: Lesson 3.8 Lava Lamp



We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to

Student Workbook: Lesson 3.9 Describing Expressions



Warm Up

Use the space below to draw your solutions.

Michelle has 6 lego blocks. You have 4 more blocks than her. How many blocks do you have? Show your work.			
Sarah has 5 erasers in a gift bag. Dan has 4 times as many in his gift bag. How many more erasers does Dan have? Show your work.			
Steven has 7 paper clips and Sarah has 4 paper clips. Jane has 3 times as many as Steven and Sarah. How many paper clips Jane has? Show your work.			



Michael has 5 elastic bands. Tracy has 7 more than 2 times as much as Michael. How many elastic bands does Tracy have? Show your work.
Mini-lesson
Use the space below to write your solutions.
William has 5 lego blocks and John has 6 lego blocks. Kate has 8 more than William and John. Write an expression to show how many blocks Kate has.
Nancy has 1 eraser and Susan has twice as many as Nancy. Trevor has twice as many as Susan. Write an expression to show how many erasers Trevor has.

Simplified



Ben spent 15 minutes playing in his room and Tammy spent 18 minutes playing in her room. It took their dad three times as long to clean up the mess. Write an expression to show how long it took for their dad to cleatheir rooms.	eir
John earned 12 dollars last month. You earned 6 dollars more than 2 tir as much as him. Write an expression to show how much you earned.	nes
Seyword Review	
Write a one-word synonym for each of the keywords below.	
Expression	
Associative	
Distributive	



Let's Discuss

In your workbook or with a partner, record, discuss, or share one example of when parentheses are needed in mathematical expressions and when they are not.			ns	

Challenge 1

Look at the pictures and read the steps that describe Challenge 1. What happens first? Second? Third? Write the number of the step to match each picture. Step 1 has been completed for you.

Steps	Instructions	Workspace
	Repeat the process, but this time make it the sum of Joanna x Stephen and Joanna x John.	
	Drag 2 further '1+1' blocks onto the workspace and connect as shown.	[[1++(1]++(1]++(1]
	Insert a second '1+1' block into the second space. Modify the expression to become Joanna x (Stephen + John).	



	From the 'Math' tab, drag a '1+1' block and connect into the 'Print' block.	print 1 + 1
	From the 'Math' tab, drag a '1+1' block and connect into the new 'Print' block.	print 1 + 1
	Modify the numerals to become an addition of two expressions: Stephen and John's pets.	
	Discuss how these two expressions show the same scenario in a different way. Is there a way that we can use our knowledge of the distributive property to simplify?	
Step 1.	From the 'General' tab drag a 'Print' block onto the workspace.	print (* 66 (8 3)
	From the 'General' tab drag a new 'Print' block onto the workspace.	print (26 1 20 20 20 20 20 20 20 20 20 20 20 20 20

We can use transitional phrases to talk about the order events or actions that take place. Practice by using transitional phrases when presenting your system.



Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to

bones Spot had.

Comparing Expressions



Warm Up - "Match up Expressions"

Match up 'Statement + Expression = Result' by drawing arrows between each match. One has been started for you.

The state of the s		
Statement	Expression	Result
Louie has 3 bananas, Ralph has 4 more than 2 times as much as Louie. Write an expression for the number of bananas Louie has.	2 x (4 + 3)	10
	/	
Sheila has 3 blue medals and 4 green medals. Betty has 2 times as many medals as this. Write an expression for how many medals Betty has.	2 x (3 + 2)	11
David had 3 pieces of pizza, Megan had 2 pieces of pizza. Their uncle ate twice as many pieces of pizza. Write an expression to show how many pieces the uncle ate.	(2 x 3) + 2	8
Rover had 3 bones in his dish. Spot had 2 more than twice as many bones as Rover. Write an expression for the number of	2 x 4 + 3	14

Student Workbook: Lesson 3.10 Comparing Expressions



Mini-lesson

Complete the expression and calculate the result.

Statement	Expression	Result
A cat strolled 3 km. A dog ran twice as far. A horse galloped twice as far as the dog. How far did the horse gallop?		
James earns \$5 at one job and \$7 at another for each hour he works. If he works for three hours, at each job, what does he earn.		
	6 + (3 + 9)	
	5 x 3 + 7	

Student Workbook: Lesson 3.10 Comparing Expressions



Keyword Review

Write a one-word	I synonym for each of the k	eywords below.
Equivalent		
Evaluate		-
Operand		-
Expression		-
Operator		-
Let's Discuss		
Why are parenthe	or share the effect parenthe	workbook or with a partner, ses can have on
Why are parenthe record, discuss, o	or share the effect parenthe	
Why are parenthe record, discuss, o	or share the effect parenthe	
Why are parenthe record, discuss, o	or share the effect parenthe	
Why are parenthe record, discuss, o	or share the effect parenthe	
Why are parenthe record, discuss, o	or share the effect parenthe	

Comparing Expressions



Challenge 1

Look at the pictures and read the steps that describe Challenge 1. What happens first? Second? Third? Write the number of the step to match each picture.

Step 1 has been completed for you.

Steps	Instructions	Workspace
	Change the expressions (numerals) from step 5 of the worked example to reflect the new statements (text).	
Step 1.	Enter text into the 1st and 3rd of 4 'Print' blocks. Use the same numerals for different sentences.	program start print of 30 John has 2 cats and 1 dog. Jane has twice as many. 39 print of 30 John has 2 cats. Jane has 1 more than twice as m_ 30 print of 30 John has 2 cats. Jane has 1 more than twice as m_ 30 print of 30 John has 2 cats. Jane has 1 more than twice as m_ 30 print of 30 John has 2 cats. Jane has 1 more than twice as m_ 30 John has 30 John has 2 cats. Jane has 1 more than twice as m_ 30 John has 30 John has 2 cats. Jane has 1 more than twice as m_ 30 John has 2 cats. Jane has 1 more than twice as m_ 30 John has 2 cats and 2 John has 2 cats and 3 John has 4 John
	Press "RUN" to see the results of the expressions.	John has 2 cats and 1 dog. Jane has twice as many. 6 John has 2 cats. Jane has 1 more than twice as many cats.
	Snap in the expressions to the appropriate 'Print' block.	program start print () John has 2 cats and 1 dog. Jar print () 2 x x (2 + x (1)) print () John has 2 cats. Jane has 1 mc print () 2 x x (2 + x (1))
	Click "RUN" to see results of the text entry in the console.	John has 2 cats and 1 dog. Jane has twice as many. John has 2 cats. Jane has 1 more than twice as many cats.

We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Student Workbook: Lesson 3.10 Comparing Expressions

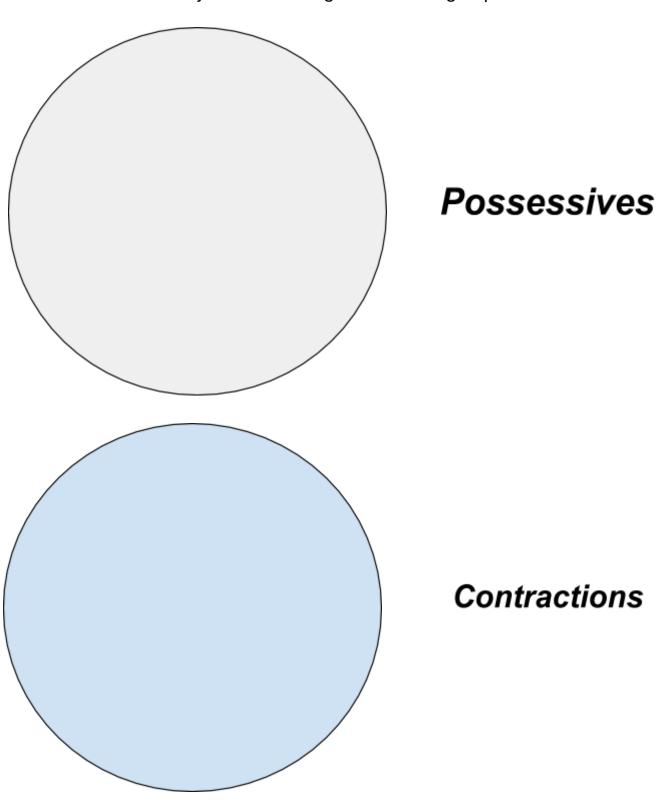


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Warm Up

Sort the words you have been given into two groups.





Mini-lesson

Match the words to their contraction.

we will	should've



Keyword Review

What do you think the keywords for this lesson should be?

Unjumble the three words below to see if you are correct!

These are called anagrams. Create some of your own anagrams in the space below using the words you sorted at the start of the lesson. Can your partner work them out?

004	0	$\bigcirc \land \land \land \land$	1
2U I	Ö	SAM	Labs



Challenge 1

Why does the Sound Player button need to be attached separately from the Light?
Challenge 2
Use the following excerpt to play the Apostrophe Game with.
Mocha's Tail
My dog is called Mocha. She's a very small, very fluffy toy poodle. Mocha's fur is light brown and she'll always run towards me for a cuddle. She jumps all over the sofa, even though she shouldn't. It's not hard for people fall in love with Mocha. Even when I'm just walking her down the street people come over and stroke her. Mocha's tail wags so hard it looks like it'll fall off, but it never does. I wouldn't want her to behave in any other way. She isn't actually my dog, if I'm completely honest, she's my Mum's, but I think of her as mine anyway.
Can you write your own paragraph containing examples of each type of apostrophe? Once you are done, use it to play the game.



We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
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Warm Up - Where would the fossil be found?

Think about the three era's and decide where the fossils would be found in the ground.

T-Rex	Humans	Reptiles	Birds	Elephant
First Flowers	Monkey	Fish	Amphibian	Diplodocus

Cenozoic era	
Mesozoic era	
Paleozoic era	

Rocks and Wind



Mini-lesson

Keyword Review

Fill in the blanks with the appropriate keyword using the word bank

Hydrosphere	Biosphere	Chemical weathering
Geosphere	Atmosphere	Formation

The Earth is made up of 4 x Spheres and those spheres encompass all

aspects on Earth; 1. _____, covers all water forms on Earth. 2. _____, covers all land/rock on Earth. 3. , covers all living things on Earth. 4. , covers all gases on Earth. The interaction between two spheres, like the Geosphere and the atmosphere, is known as _____ and can have an impact on landscapes and any rock . Let's Discuss In your workbook or with a partner, record, discuss, or share a way each of the four spheres can be remembered.

Rocks and Wind



Challenge 1

Look at the pictures and read the steps that describe Challenge 1. What happens first? Second? Third? Write the number of the step to match each picture. Step 1 has been completed for you.

Steps	Instructions	Workspace
	Access the Sound Player settings and set them to: Top Sound Player block to 'Weather' and 'Wind(normal)' Bottom Sound Player block to 'Weather' and 'Wind(hurricane)'	Select a sound Category Sound File Weather Wind (hurricane)
Step 1.	Turn on and pair: Slider block DC Motor block Drag onto workspace.	
	Test your system.	510 — D 574 — D
	Drag onto the workspace: • 2 x Compare blocks • 2 x Interval blocks • 2 x Sound Player blocks.	=60

Rocks and Wind



Connect: • The Compare block to the Interval Block • The Interval block to the Sound Player block. Repeat for both Compare blocks.	= 60
Connect the blocks in the following order: Slider blocks to DC Motor block Slider block to both Compare blocks 	= 60
Access the Compare block settings and set them to: Top Compare block to '>10' Bottom Compare block to '>74'	Select values to compare against

We can use transitional phrases to talk about the order events or actions that take place. Practice by using transitional phrases in order to present your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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after	likewise	otherwise	therefore
then	in addition	on one hand on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to

