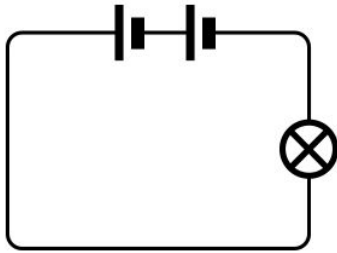
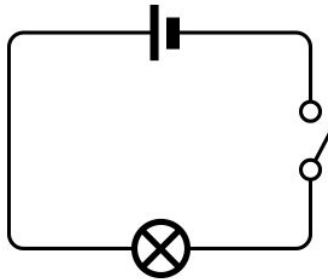
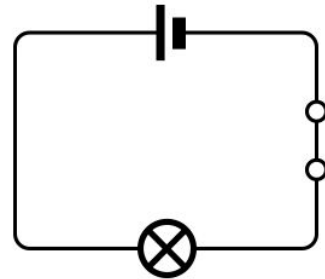


Warm Up – ‘Spot the difference’

Are these circuits **on** or **off**? Write your answer under each circuit.







How do you know? Write in complete sentences.

Mini-lesson

Keyword Review

Match the keyword to its definition:

Keyword
Circuit
Battery
Switch
Electricity

Description
the complete path of an electric current
an electric cell or connected electric cells for providing electric current
a form of energy that is found in nature but can be produced by rubbing together two unlike things (such as glass and silk) by the action of chemicals or by a generator
a device for making, breaking or changing the connections in an electrical circuit


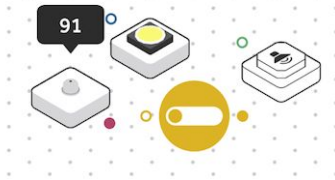
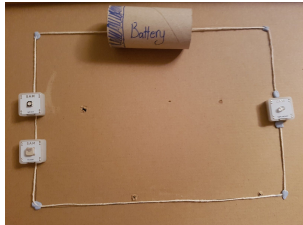

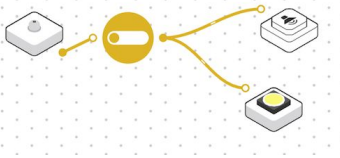
Let's Discuss

Why do we use symbols instead of images for circuits? In your workbook or with a partner, record, discuss, or share one 'real world' example of an open and closed circuit.

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 Light Sensor to be a Button within the settings.	
Step 1.	Using cardboard, draw a square to represent the wire.	
	Fix the string or draw a line in the shape of a rectangle.	
	Turn on and pair the Light Sensor and RGB LED.	

	<p>Use a cylinder shape (like a paper roll) to create a battery. Label it.</p>	
	<p>Add the following blocks to the Workspace:</p> <ul style="list-style-type: none"> • Light Sensor block • RGB LED • Toggle block • Buzzer block (/Sound Player block) 	
	<p>Fix the RGB LED, Light Sensor and, if it's available to you, the Buzzer block onto the string circuit.</p>	
	<p>Test your system</p>	
	<p>Connect the blocks in this order:</p> <ul style="list-style-type: none"> • Light Sensor block to the Toggle block • Toggle block to the RGB LED and Buzzer (or Sound Player). 	

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 – Scientific Investigation

This is called a ‘mnemonic’ a way to help us remember the order of the planets. Can you come up with your own?

Planet	Mnemonic	Your Mnemonic
Mercury	My	
Venus	Very	
Earth	Excited	
Mars	Mother	
Jupiter	Just	
Saturn	Served	
Uranus	Us	
Neptune	Noodles	

Mini-lesson

Keyword Review

Can you fill in the gaps using the keyword bank?

Orbit	Elliptical	Earth	Space	Low Level Orbit	Planets
--------------	-------------------	--------------	--------------	------------------------	----------------

1. The path the Earth or planet makes around the sun is called an _____.
2. The orbit is not circular it is _____.
3. There are 8 _____ in _____ all orbiting the sun.
4. We launch many rockets and satellites that will orbit _____ and it will be within the first 100 and 200 miles from the earth and is called _____ (LEO).

Let's Discuss

In your workbook or with a partner, record, discuss, or share what a low level orbit is.

Challenge 1

Look at the pictures, then read the sentences that describe Challenge 1. What happens First? Second? Third? Write the number of the step below each picture. Step 1 has been completed for you.

	<p>Wind the two ends together to have one piece of wire going up and secure down with blue tack.</p>	
	<p>Cut a piece of wire and attach to the DC Motor Wheel.</p>	
	<p>Secure the Wheel to DC Motor and the Car Chassis.</p>	
	<p>Turn on and pair:</p> <ul style="list-style-type: none"> ● 1 Slider/Virtual Slider ● 1 DC Motor block 	
<p>Step 1.</p>	<p>Collect materials:</p> <ul style="list-style-type: none"> ● Wire - floral ● Blu Tack ● 2 x different sized styrofoam balls 	
	<p>Attach the Styrofoam balls to the top of the wires.</p>	

	<p>Connect the Slider block to the DC Motor block.</p>	
	<p>Cut a second piece of wire and secure to wheel edge.</p>	

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
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 – True or False

Look at the statements below and 'X' if they are TRUE or FALSE

Statement	TRUE	FALSE
The Earth spins tilted on an axis.		
The Earth rotates westward.		
The South Pole is always lit by the sun.		
The North Pole is always lit by the sun.		
It takes the Earth 1 day (24hrs) to do a full rotation.		
When the Sun shines light on the Earth all of the Earth is lit.		
The Sun cannot reach all of the Earth. Half of the Earth is always dark, experiencing nighttime.		
The South pole is located at the top of the Earth where the tilted axis is located.		
The North pole is located at the bottom of the Earth where the tilted axis is located.		

Mini-lesson

Keyword Review

Fill in the gaps using the keyword bank.

Light	Tilted	Axis	Sun	Day	Earth	Dark
--------------	---------------	-------------	------------	------------	--------------	-------------

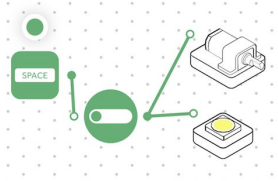

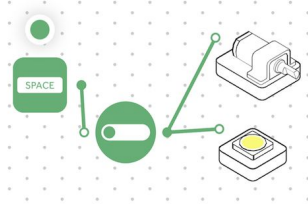
- The Earth is _____ from the North and South poles on an _____.
- The _____ spins one full circle in 1 day (24 hours) around the sun.
- The _____ shines on the Earth, where the _____ hits the Earth is _____ time and where it is _____ is night time.


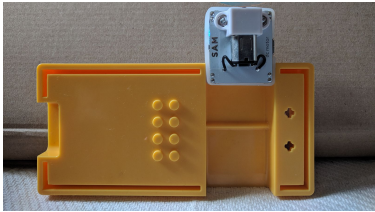
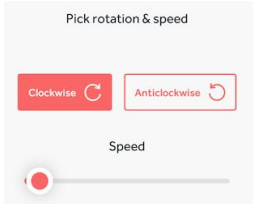
Let's Discuss

In your workbook or with a partner, record, discuss, or share how the position of the sun indicates the time.

Challenge 1

Look at the pictures, then read the sentences that describe Challenge 1. What happens First? Second? Third? Write the number of the step below each picture. Step 1 has been completed for you.

	Turn on and pair: <ul style="list-style-type: none"> • Toggle block • DC Motor block 	
	Mount the stick onto the wheel with the Earth on top again	
	Test your system	

	Add a 2nd wheel to the motor and stick together	
Step 1.	Place the DC Motor block secured sideways on the Car Chassis	
	Open the settings of the DC Motor to make the motor as slow as possible without stopping.	

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 - “Decode the message”

Can you decipher the hidden message from the Morse code below.

A ●-	J ●---	S ●●●
B -●●●	K -●-	T -
C -●-●	L ●-●●	U ●●-
D -●●	M --	V ●●●-
E ●	N -●	W ●--
F ●●-●	O ---	X -●●-
G --●	P ●--●	Y -●--
H ●●●●	Q --●-	Z --●●
I ●●	R ●-●	

...	.-	--	/		
.-..	.-	-...	...	/	
--	---	.-.	/
-.-.	---	-..	.	/	
.-	.-..	.	.-. .	-	

Mini-lesson

Keyword Review

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

American Civil War	Morse Code	Decipher	Telegraph	Messages	Encrypted
---------------------------	-------------------	-----------------	------------------	-----------------	------------------

During the _____ there was one secure way to send _____ and that was using dots and dashes to represent letters and numbers and this was called _____.

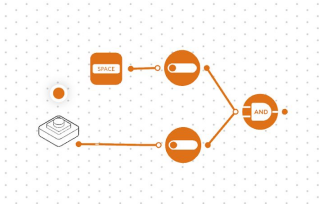
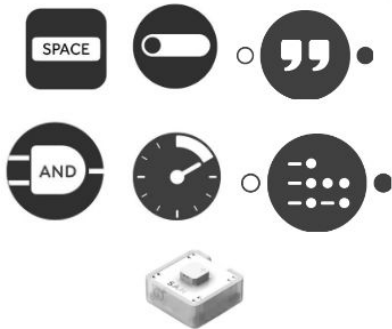
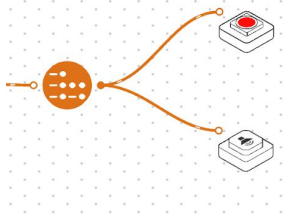
Morse Code was the first way to send _____ messages and the machine developed to send them was the _____ and the person who received the messages would receive the message and _____ it.


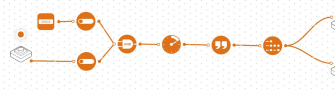


Let's Discuss

In your workbook or with a partner, record, discuss, or share how Morse Code helped Lincoln win the American Civil War.

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
	Connect the Button Block to the other Toggle block and into the AND gate block	
<p style="text-align: center;">Step 1.</p>	Turn on and pair: <ul style="list-style-type: none"> ● Buzzer/Virtual Buzzer block Drag onto the workspace: <ul style="list-style-type: none"> ● 2 Toggle blocks ● Key Press block ● AND gate block ● Interval block ● Text block ● Morse Code block ● Buzzer block 	
	Connect the output of the Morse Code block to the RGB LED block and the Buzzer block	

	Connect the output of the AND gate block to the other blocks in this order; Interval block, Text block, Morse Code block	
	Test your system	
	Connect the Key Press block to a Toggle block and into the AND gate block	
	Pair the Button block, RGB LED block and the Buzzer block with the system	

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 - “Which is the strongest?”

Look at the possible passwords below and order them with the strongest at [1] and the weakest at [4]

Password	Order (1-4)	Explanation
qwertyz1		
P8ss>ord		
12345678		
tser67!#		

Mini-lesson

Keyword Review

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

Cyberbullying	E-Safety	Hack	Grooming
----------------------	-----------------	-------------	-----------------

1. When you are online you need to consider how you stay safe and this is called _____.
2. _____ is when you bully someone online and this is a prosecutable offence and should be reported to a teacher, parent or police officer to help stop the abuse.
3. When you meet someone online, how do you know they are who they say they are? You cannot see the person and because of this, someone could pretend to be a friend the same age as you and use this to get closer to you, this is called _____. It is important to make sure you keep your information secure when online as any information not protected could be used to _____ into your accounts.

Let's Discuss

In your workbook or with a partner, record, discuss, or share what you can do to make sure you stay safe online and not fall victim to cyberbullying.

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
	Edit the Key Press blocks to A, B and C	
Step 1.	Turn on and pair: <ul style="list-style-type: none"> 1 RGB LED block 	
	Connect the output of A and B Compare blocks to an AND gate block	
	Connect the output of the AND gate to the RGB LED	
	Test your system	
	Drag on to the workspace <ul style="list-style-type: none"> 3 x Key Press blocks 3 x Counter blocks 3 x Compare blocks 2 x AND gate block 	

	<p>Connect each Key Press block to its own Counter block and then into a Compare block</p>	
	<p>Connect the output of C Compare block to an AND gate block</p>	
	<p>Each Compare block needs to be edited within the settings to:</p> <ul style="list-style-type: none"> • A = 2 • B = 1 • C = 1 	
	<p>Connect the output of the first AND gate block to the input of the second AND gate block</p>	

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 - “Let it go”

You all have a balloon and, using the table below, predict what will happen when you blow it up and let it go, then think about why that happened:

Prediction	Outcome	Why did this happen?

Mini-lesson

Keyword Review

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

Newton's Third Law	Motion	Action
Reaction	Opposite	Equal

To push an object, that object will push back in the opposite direction equally hard. This is called _____ of _____ where every _____ has an _____ and _____.

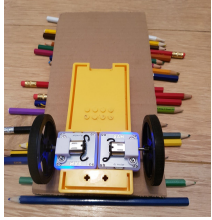
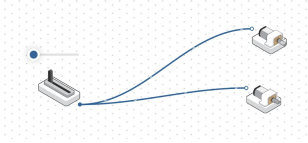



Let's Discuss

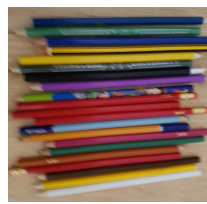
In your workbook or with a partner, record, discuss, or share an example of how Newton's Third Law of Motion can be seen.

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
	Place the car on top of the cardboard	
Step 1.	Start with the system created in the worked example	
	Test it!	
	Place a cardboard on top of the pencils	
	Experiment with speed	

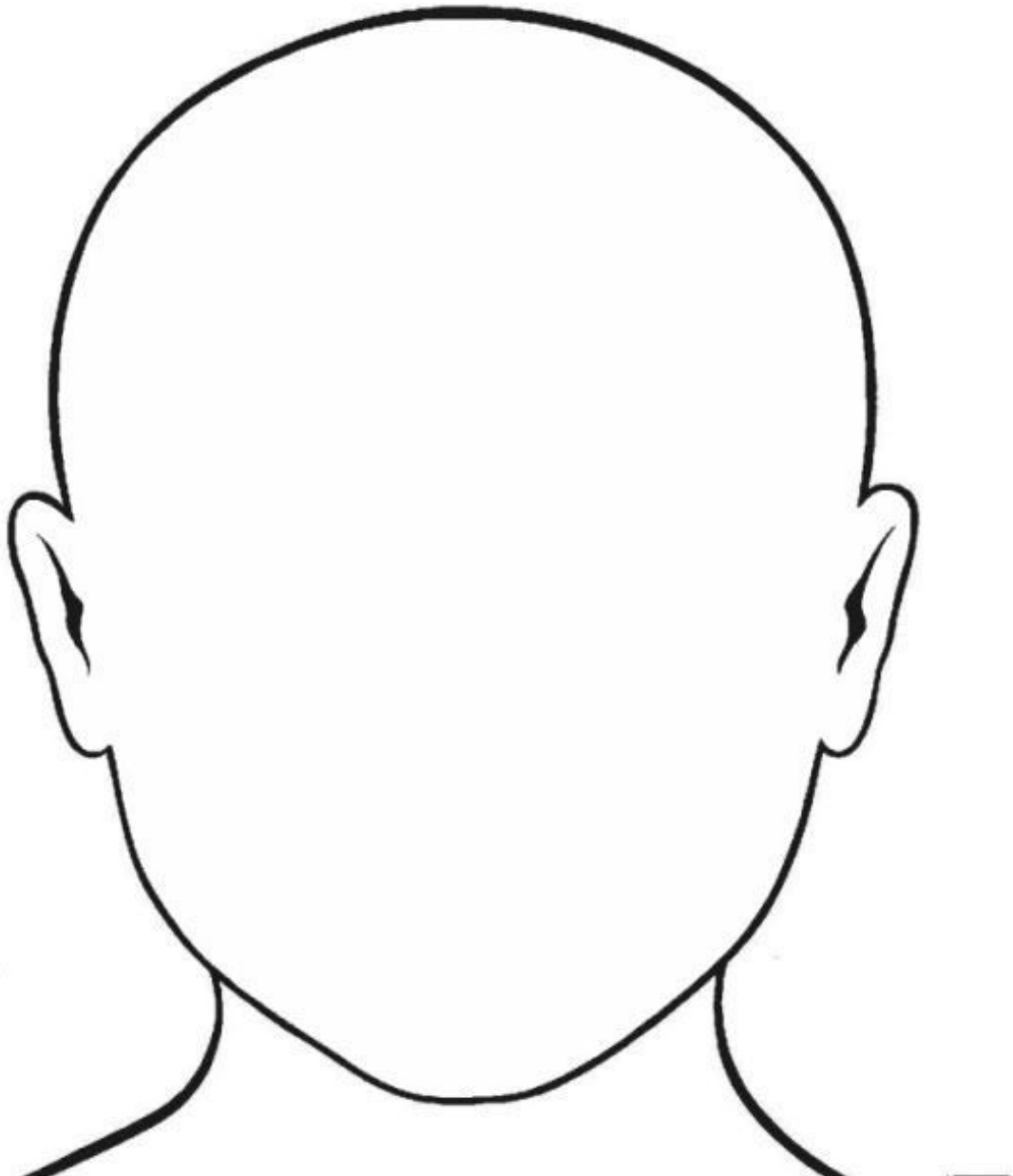
	Place pencils on the surface	
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We can use transitional phrases to talk about the order events or actions that take place. Practice by using transitional phrases in order to present your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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 - “What have you inherited from your family?”

On the diagram below identify your traits (e.g. eye color, hair color, skin tone, freckles) and state who you think they are inherited from.



Mini-lesson

Keyword Review

Match the Keywords with their definition.

Allele

The bossy allele which takes control

DNA

The genetic code which determines the characteristics of a living thing

Gene

Different forms of the same gene e.g. blue eyes or green eyes.

Recessive

The characteristics you inherit from your parents.

Dominant

The allele which only shows up if two parents have it.

Punnett Squares

Complete the following Punnett Squares to show potential eye color of offspring.

1. What is the ratio of brown eyed to blue eyed offspring if both parents have brown eyes with the allele Bb?

	B	b
B		
b		

2. What is the ratio of brown eyed to blue eyed offspring if one parent has brown eyes (Bb) and one parent has blue eyes (bb)?

3. What is the ratio of brown eyed to blue eyed offspring if one parent has brown eyes with the allele BB and one parent has blue eyes (bb)?

Let's Discuss

In your workbook or with a partner, record, discuss, or share how understanding our genes could help us in the future.

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
<p>Step 1</p>	<p>Delete one Key Press block from the workspace. Access the settings of the remaining Key Press and change the label to P.</p>	
	<p>Access the settings of the first compare block and set it to =1. Access the settings of the second Compare block and set it to ≥ 2.</p>	
	<p>Delete the connection between the remaining Key Press and Color block.</p>	
	<p>Connect the output of each Color block to the RGB LED. Test your system.</p>	
	<p>Drag a Counter block and 2 x Compare blocks to the workspace.</p>	

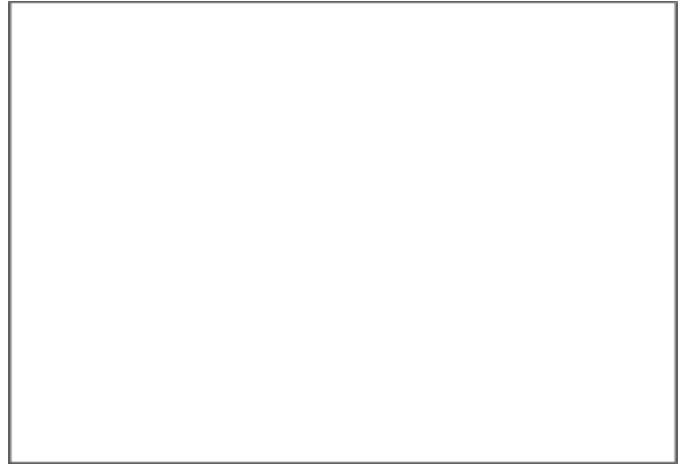
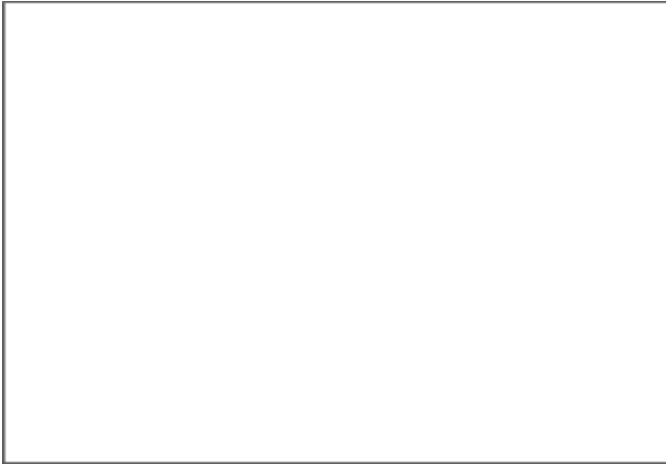
	<p>Connect the Counter block to the Key Press. Connect the Counter block to both Compare blocks, then connect each Compare block to its corresponding Color block.</p>	
--	--	--

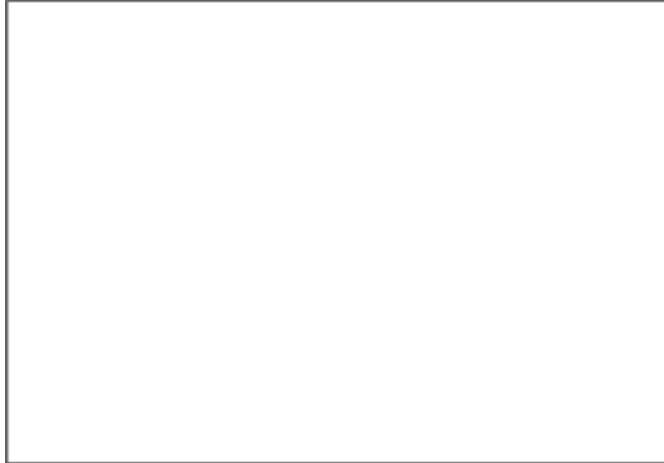
We can use transitional phrases to talk about the order events or actions that take place. Practice using transitional phrases when presenting your system.

Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
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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 - “Genetic Variation”

Sketch and label three examples of animals who need to move quickly in order to survive.







Mini-lesson - “We are the Survivors”

How has each animal adapted specific traits in order to survive in its habitat?

Animal	Specific traits
	<hr/> <hr/> <hr/> <hr/> <hr/>
	<hr/> <hr/> <hr/> <hr/> <hr/>
	<hr/> <hr/> <hr/> <hr/> <hr/>
	<hr/> <hr/> <hr/> <hr/> <hr/>

Grey or Ginger Kittens

List your arguments for the advantages of each fur color.

	
<hr/> <hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/> <hr/>

Keyword Review

Draw a line between each keyword and its definition.

Evolution

Part of a cell in a living thing which controls its physical characteristics, growth and development.

Allele

A complex chemical which carries genetic information.

Genetic Variation

Different forms of the same gene.

Gene

Different features of the same species.

DNA

The process by which different kinds of living organisms have developed over time.




Let's Discuss

In your workbook or with a partner, record, discuss, or share how a giraffe has adapted specific traits to aid its survival.



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
	Drag on 'Set RGB Light Color' from the 'RGB Light', 'Actions' tab. Snap into 'When Button is Pressed'.	
Step 1.	Drag 'When Button is Pressed' from the 'Button' tab onto the workspace.	
	Drag on the 'Random Integer' block from the 'Math' tab and snap into 'In List Get #'.	

	<p>Test the system.</p>	
	<p>Drag on 'In List Get #' from the 'List' tab. Snap this into the color section of the 'Set RGB Light Color' block.</p>	

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 - “Positive or Negative?”

Many of the activities that humans do in the world can greatly impact upon the environment. Think about each of the human actions below and join a line to either the word ‘positive’ or ‘negative’.



Positive

Negative

Mini-lesson

Keyword Review

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

Fossil Fuels	Renewable	Non-renewable
Solar	Wind	Water

About three quarters of the electricity generated in the UK comes from fossil fuels which is a _____ energy.

_____ cause pollution and we are depleting the Earth's resources, resulting in the need to utilize a sustainable form of energy.

The World needs to research more ways for

_____ energy like; _____,

_____ and _____.

Let's Discuss

In your workbook or with a partner, record, discuss, or share one example of how renewable energy could be used to improve the environment.

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
	<p>Drag the following blocks onto the workspace:</p> <ul style="list-style-type: none"> • Cycle Colors block • Compare block x2 • Inverse block 	
<p>Step 1.</p>	<p>Secure 4 x pieces of tissue paper to the Wheel.</p>	
	<p>Test your system.</p>	

	<p>Connect the Compare blocks to the Light Sensor Block. Open the settings and set them to:</p> <ul style="list-style-type: none"> • < 20 • > 21 	
	<p>Connect the Wheel to the DC Motor block.</p>	
	<p>Connect:</p> <ul style="list-style-type: none"> • < 20 Compare block to the Inverse block and the Inverse block to the DC Motor block • > 20 Compare block to the DC Motor block. 	
	<p>Drag on and Pair:</p> <ul style="list-style-type: none"> • Light Sensor block • RGB LED block • DC Motor block 	
	<p>Secure the Car Controller to the Car Chassis with blu tack and place the blocks in the slots.</p>	

	<p>Connect:</p> <ul style="list-style-type: none"> • The output of both Compare blocks to the Cycle Colors block • The Cycle Colors block to the RGB LED block 	
--	--	--

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
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

Random Numbers

Warm Up - "What can you roll?"

In the chart below, fill in the possible results of rolling 2 dice. Two examples have been done for you.

first die	1						
	2						
	3				7		
	4			7			
	5						
	6						
		1	2	3	4	5	6
	2nd die						

Mini-lesson

Keyword Review

Define the following, in your own words:

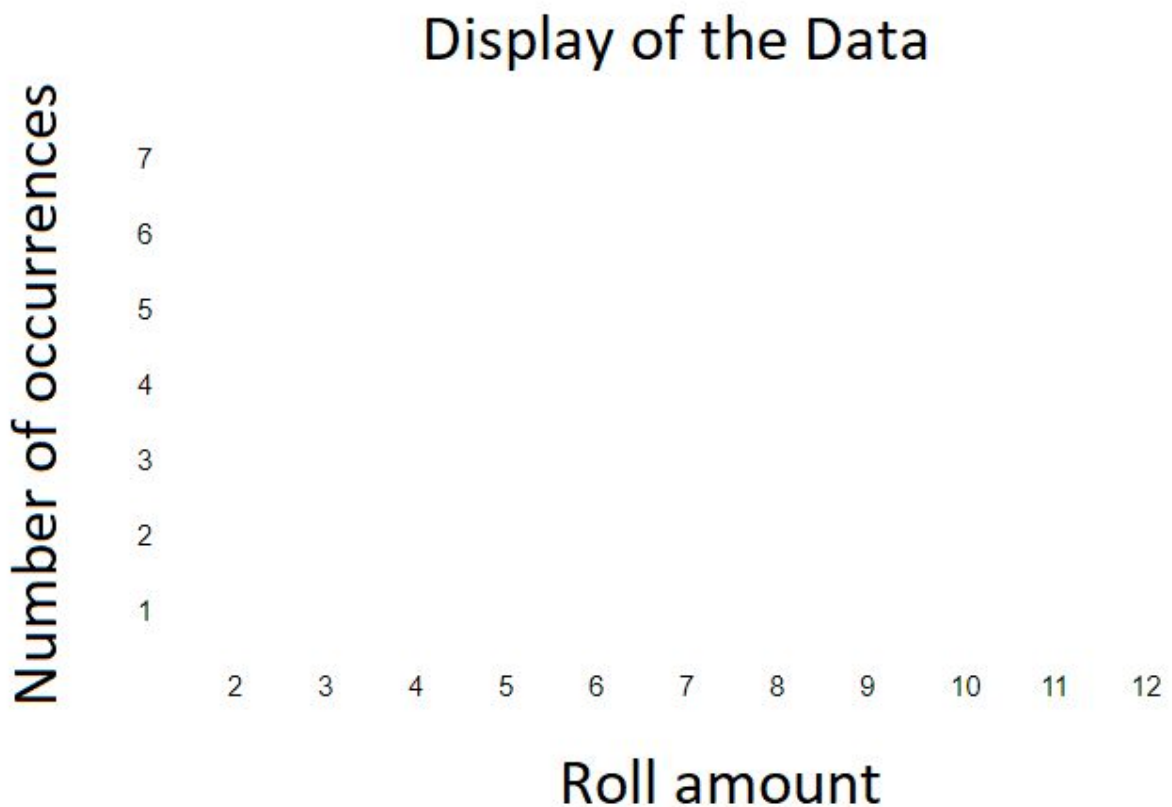
Mean - _____

Median - _____

Mode - _____

Dot Plot - _____

Graph the Data



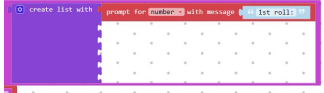

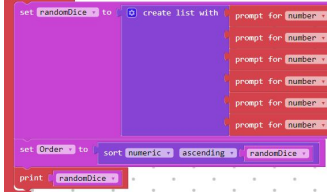

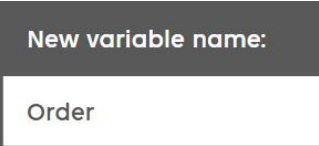
Let's Discuss

In your workbook or with a partner, record, discuss, or share one example of another time when graphical data might be easier to analyze than a list of data.

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
	<ul style="list-style-type: none"> Connect the 'Prompt For Number' block to the first slot for the Create list block. Change the text to "1st roll:" 	
Step 1.	<p>Remove the 'Prompt for Number' block from the 'Set Variable' block. Keep it on the workspace.</p>	
	<ul style="list-style-type: none"> From the 'List' tab, drag a 'Sort Numeric Ascending' block to the workspace. From the 'Variables' tab, drag a 'Variable' block to the workspace. Ensure the 'Variable' block to 'randomDice'. Connect the Sort block to the 2nd Set variable block. 	
	<p>Click "RUN" to input the 6 values, one after each roll of the dice.</p>	
	<p>From the 'Variable' tab, select 'Create Variable' and name it 'Order'.</p>	

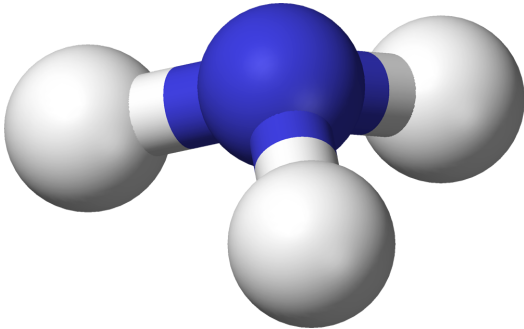
	<ul style="list-style-type: none"> Click the gear icon on the 'Create List' block. Drag 4 additional 'Item' blocks within the 'List' block. <p>There will be 6 'Item' blocks altogether.</p>	
	<ul style="list-style-type: none"> From the 'Variables' tab, drag a 'Set Variable to' block onto the workspace. Choose 'Order' as the variable. Attach it between the 'Print' block and the 1st 'Set Variable' block. 	
	<ul style="list-style-type: none"> From the 'List' tab, drag a 'Create List With' block onto the workspace. Connect it to the 'Set Variable' block. 	
	<ul style="list-style-type: none"> Duplicate the 'Prompt For Number' block and fill the other slots. Change the text to "2nd roll:" up to, "6th roll:" 	
	<p>Change the 'Print' block 'Variable' to 'Order'.</p>	

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.

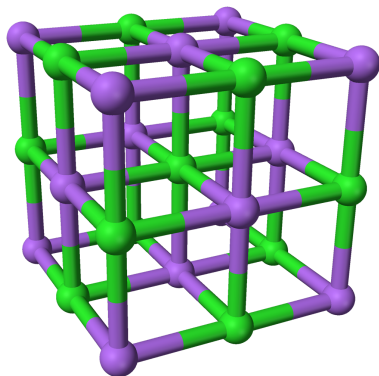
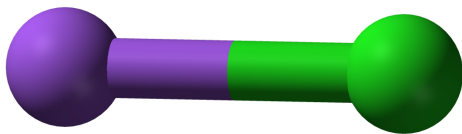
Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
first/second/third	also	but	because
next	equally	however	so
after	likewise	otherwise	therefore
then	in addition	on one hand... ...on the other hand	as a result
finally/overall/to sum up	similarly	opposite	due to

Warm Up - Build the Molecule

All objects are made of materials and all materials made up of the molecules/elements. Can you use the objects given to create these two structures?



**Simple Molecule =
Ammonia**



**Complex Molecule =
Sodium Chloride**

Mini-lesson

Keyword Review

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

Kinetic energy	Mass	Joules
Potential energy	Speed	Velocity

All objects that are moving contain _____. If energy is stored for later use it is called _____.

Kinetic energy can be calculated by the following formula:

$$\text{kinetic energy} = 0.5 \times \text{_____} \times \text{_____}^2.$$

Kinetic energy is measured in _____, Mass is measured in kilograms and speed is measured in metres per second squared. Speed can be referred to as _____ too.

Let's Discuss

In your workbook or with a partner, record, discuss, or share a range of objects that possess kinetic energy.

Kinetic Energy and Mass

Challenge 2

Experiments need to gather data and using this table you can collect the data generated from your kinetic energy experiment. An example has been entered.

Hair Dryer setting	Object Mass	Number of objects	Duration of test (seconds)	Distance travelled
<i>High</i>	<i>0.05 kilograms</i>	<i>1</i>	<i>1</i>	<i>27cm</i>

Kinetic Energy and Mass

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Time & Sequence	Compare (+)	Contrast (-)	Cause and Effect
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