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Google Slides Lessons Preview

Alberta Science Curriculum Energy Force Unit – Grade 3

3-Part Lesson Format

Part 1 – Minds On!

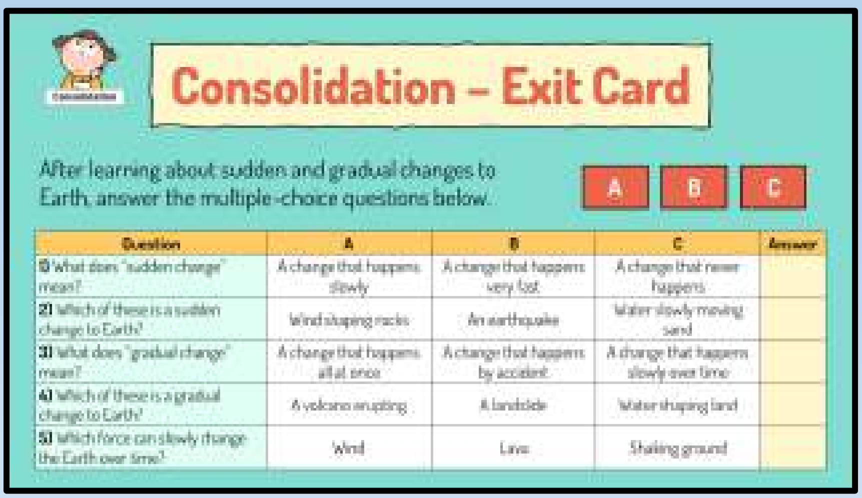
- Learning Goals
- Discussion Questions
- Quotes
- And More!

Part 2 – Action!

- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!

- Exit Cards
- Quizzes
- Reflection
- And More!



Alberta Science Curriculum Energy Force Unit – Grade 3

SUPER Simple SHEETS

Alberta Science Curriculum Energy Force Unit – Grade 3

Workbook Preview

Grade 3 – Science Unit

Organizing Idea Matter: Energy: Understandings of the physical world are deepened by investigating matter and energy.

Guiding Question: How can forces relate to changes in movement?

	Learning Outcome – Students investigate and explain how forces affect the movement of objects.	**Pages**
E3.1	A force is a push or pull on an object resulting from an interaction with another object.	6-9
E3.2	An object that is not moving will stay still until a force makes it move, and an object that is moving will keep moving until a force stops it. (Newton's First Law)	27-35
E3.3	Contact forces occur between objects that touch each other. Contact forces include … pulling, squeezing, pushing	…26
E3.4	The strength of forces applied to objects can be described as strong, weak, large, small	46-51
E3.5	The direction of forces applied to objects can be described as upward, downward, from the left, from the right, from both sides, from all directions Changes to an object's movement when a force is applied include changing speed, starting stopping, changing direction	36-45
E3.6	The effort needed to move objects is reduced by simple machines, such as levers, wheels, inclined planes	54-87
E3.7	Many First Nations, Métis, and Inuit designed, tested, and continue to use simple machines, such as an antler wedge, a paddle, Inuit scraping tools; e.g., ulu	88-97
Computer Science:		
CS.1	Students apply creativity when designing instructions to achieve a desired outcome.	52-53, 93-102

NAME: ______________________

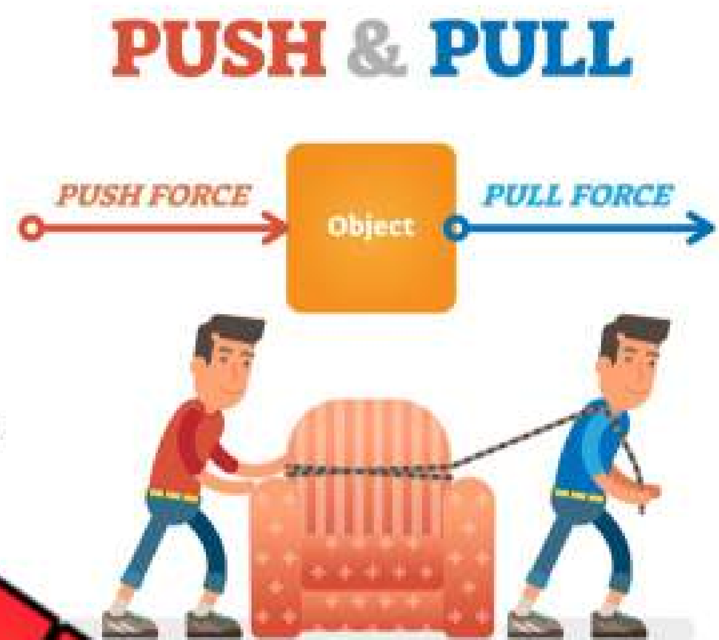
Forces

Name: ___________________________

Curriculum Connection
E3.1

Forces - Push and Pull

What is a Force?



A **force** is any push or pull that causes an object to move. Think about it, if an object moves, a force must have acted on the ob

A ... ve pushed a book acro... esk to s... you, or maybe they pulled a ... yo... nds. These are two ex... s of ... pull forces that caused ... mov

Pushing Forc

A **push** is when we mov... objec... from us. The child on this swing is the ob... ein... an is pushing the child using a pushing fo... man ...'t apply enough pushing force, the child w... ha... hey won't swing very far!

Pulling Force

A **pull** is when we move an object closer to us. A fun game of tug of war is an example of two teams using pulling forces. The team that uses the most pulling force will win. Check out more examples below:

- Lifting a bag – we pull the object closer to us
- Opening a drawer – we pull the drawer open

Name: ______________________ 7

Curriculum Connection
E3.1

Push or Pull | Is the example a push or pull force?

1) Shooting a basketball into the net	Push	Pull
2) Plugging in a cord to an outlet	Push	Pull
3) A tow-truck towing a car behind them	Push	Pull
4) Kicking a ball	Push	Pull
5) Climbin	Push	Pull

Think | ve an e f a push and a pull force

Push	
Pull	

Visualizing | Draw what you were picturing while you were readi ture

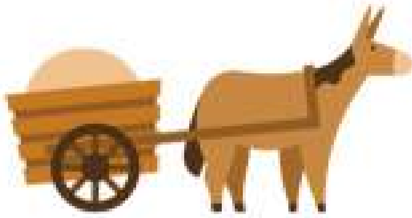
Name: ______________________ 8

Curriculum Connection
E3.1

Push or Pull?

Directions Is the picture a push or pull?

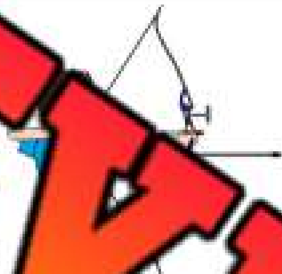
Push | Pull



Push | Pull

Push | Pull

Push | Pull

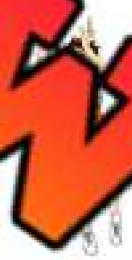


Push | Pull

Push | Pull

Push | Pull

Push | Pull



Push | Pull

Push | Pull

Push | Pull

Push | Pull

Contact Force - Applied Force

What is a Contact Force?

Contact forces are the pushes or pulls that happen when two things touch each other. Imagine you are pushing a toy car. Your hand is applying a force to the car. This is a [illegible] force.

Appl[illegible]rces

Applied forc[illegible] of [illegible]t force. This happens when a person or an object pushes o[illegible] on a[illegible]t. For example, when you kick a ball, you're using an applied force. [illegible] a book i[illegible]ble, the table is using an applied force to keep the book from [illegible]ng t[illegible]

Examples of Contact Forces

☑ <u>Playing Tug of War</u>: When you pull on the r[illegible] war, you're using a contact force. Your hands have to touch [illegible] to [illegible]

☑ <u>Pushing a Swing</u>: When you push someone on a swing, you[illegible]ntact force. Your hands push the swing to make it move.

☑ <u>Pulling a Wagon</u>: If you pull a wagon full of toys, you're using a contact force. Your hand pulls the handle of the wagon to make it move.

So remember, a contact force happens when two things touch each other and one pushes or pulls on the other.

Name: ______________________

Curriculum Connection
E3.3

True or False | Is the statement true or false?

1) Throwing a ball is an applied force	True	False
2) A ball rolling down a hill with no one touching it is an applied force	True	False
3) Pulling a wagon is an applied force	True	False
4) An apple falls from a tree because of an applied force	True	False
5) Pushing [illegible] is an applied force	True	False

Making Connections | What applied forces have you used today?

____

____

____

____

Questions | Answer the questions below

1) What is a contact force?

____

____

____

2) What is an applied force?

____

____

____

Curriculum Connection
E3.3

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ____________________ | Mark

Is this a contact force? Yes or No?

Swing moves by pushing	Yes	No
Pulling rope in tug war	Yes	No
Wind blowing a leaf	Yes	No
Pushing door open	Yes	No
Pulling a Wagon	Yes	No
Book stays on table	Yes	No
Magnet pulling an object	Yes	No
Balloon floating in air	Yes	No
Kicking a ball	Yes	No
Sitting on a chair	Yes	No

Name: ____________________ | Mark

Is this a contact force? Yes or No?

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Pulling rope in tug war	Yes	No
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Name: ____________________ | Mark

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Pushing door open	Yes	No
Pulling a Wagon	Yes	No
Book stays on table	Yes	No
Magnet pulling an object	Yes	No
Balloon floating in air	Yes	No
Kicking a ball	Yes	No
Sitting on a chair	Yes	No

Curriculum Connection
E3.3

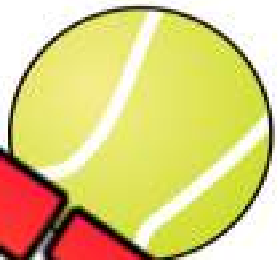
Experiment - Applied Force

Research Question | What are we learning more about?

How much applied force can I make?

Materials | [illegible]t do we need?

- ✓ 1 [illegible]
- ✓ 1 [illegible]ty ba[illegible]
- ✓ 1 tennis [illegible]
- ✓ 1 golf ba[illegible]
- ✓ 1 hula-hoop



Method | How do we complete [illegible]e ex[illegible]

1) Which ball do you think you will be [illegible] to throw the furthest? Which ball wi[illegible] you throw the least far? Write your hypothesis on the back of the page.

2) Stand in the hula-hoop

3) Throw one ball at a time as far as you can. Leave the balls where they land so you can compare how far you threw them

4) Fill in your observation page

5) Answer the questions on the back of the page

Name: ____________________ 14

Curriculum Connection
E3.3

Hypothesis Rank how far you think you will be able to throw the ball

Furthest	←	→	Shortest

Observations What happened?

1) We... which ball you could throw the furthest? Explain.

____

____

2) Could you throw a heavie... furt... ...er ball?

Heavier	Lighter

3) Could you throw a smaller ball further or ...er b...

Smaller	Bigg...

4) Which force are you using to move the ball?

Friction	Gravity	Magnetism	...pplied

5) What muscles do you think you are using to move the ball with the applied force? Where are the muscles in your body?

____

____

____

____

Curriculum Connection
E3.3

Contact Force - Frictional Force

Frictional Force

Friction is a force that makes it harder to slide objects across each other. For example, if you tried to slide a box on ice, there isn't much friction to slow the box down. But, if you slide the same box on paveme[illegible] there is a lot of friction to slow down the box. Friction is that force that make[illegible]jects stick together.

[illegible]n[illegible]t because it allows us to walk on the ground without slipping[illegible]me m[illegible]ve surfaces that create more friction, like rubber, which is why [illegible]rubb[illegible]s on the bottom.

Questions Use infor[illegible]m the[illegible]e support your answer

1) What is friction?

____

____

____

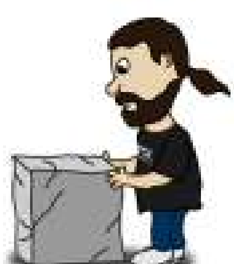
2) Why is it better to wear basketball shoes while playin[illegible]sket[illegible] socks?

____

____

____

Explain Why is friction making it hard to move the stone?



____

____

____

Name: ______________________

Curriculum Connection
E3.3

Experiment - Friction Car Ramp

Research Question | Does more friction slow down a moving car?

If we roll a car down a smooth ramp, will it go further than a bumpy ramp?

Materials | What do we need?

- ✓ Car[illegible]ke the ramps
- ✓ B[illegible]e [illegible]to rest on
- ✓ O[illegible]y car [illegible]
- ✓ Glue

- ✓ Textured mat[illegible]
  - ➢ Bubble wra[illegible]
  - ➢ Bread tabs
  - ➢ Rubber bands
  - ➢ Rice
  - ➢ Staples

Method | How do we complete the experiment[illegible]

1) Each group will make one ramp. The teacher can be [illegible] co[illegible] a ramp that is smooth

2) Groups will need cardboard cut into a rectangle that will act as [illegible] ramp

3) Students can use some of the textured materials listed above to make a textured ramp. They can glue rice to the ramp, put staples in it, glue bubble wrap down, or wrap rubber bands around the ramp. Be creative!

4) Have each group test their ramps with their toy car

5) When all groups are finished, they can demonstrate their car going down the smooth ramp versus the textured ramp.

6) Mark how far the toy car travelled on the smooth ramp versus the textured ramp. Record your results on the back of the page.

Name: ______________________ 17

Curriculum Connection
E3.3

Observations | What happened?

1) How did you make your textured ramp? Which materials did you use?
____
____
____

2) Did the car travel further on the smooth or textured ramp?	
Smooth Ramp	Textured Ramp

Results | Answer the questions below

1) Which ramp did the car have more friction when it travelled down it?	
Smooth Ramp	Textured Ramp

2) Why did the car travel further on the smooth ramp?
____
____
____

3) If the car raced on ice, would the ice give more or less friction?	
More	Less

4) Would the car travel further if it travelled on ice? What do you think?
____
____
____
____

Curriculum Connection
E3.3

Experiment - Friction Force Power

Research Question What are we learning about?

Can we make a model that uses friction to lift an object?

Materials ...hat do we need?

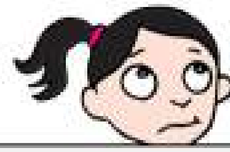
- ✓
- ✓ Wat... bottl... r m...dium sized
- ✓ Paintbrus... ...cil
- ✓ Optional - Funn...

Method How do we complete ...e ex...

1) Fill the water bottle with rice using the funnel
2) Bang the bottle gently on the table to settle the rice
3) Ensure the bottle is mostly full
4) Place the pencil in the bottle
5) Bang the bottle on the table while you push the pencil to the bottom. This will ensure the rice settles around the pencil
6) Try to lift the bottle by pulling up on the pencil
7) Record your observations on the back of this page

Name: ______________________

Curriculum Connection
E3.3



Observations | What happened?

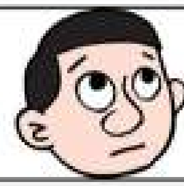
Were you able to lift the bottle using the pencil? Explain what happened.

____

____

____

____



Results | An[illegible] qu[illegible]ions below

1) What force allow[illegible] bottle?

____

2) How did friction allow the pencil t[illegible]e bot[illegible]

____

____

____

3) Draw a picture of the experiment.

Contact Force - Tension

What is Tension?

Tension is a type of contact force. It happens when you pull on a string, a rope, or anything else that's stretchy. When you [illegible] you make the string or rope ti[illegible] [illegible]s is called tensi[illegible]

Tension [illegible] that [illegible] [illegible]ve objects. A tow tru[illegible] [illegible]n us[illegible] wire under tension to p[illegible] [illegible] If the wire is pulled tight, the tow tr[illegible] wil[illegible] pull the car. But if the wire is loose, the car will not move.

Tension in Action

Imagine you are playing with a toy on a string. When you pull the string, the toy comes towards you [illegible] working! The force you used to pull the string made the toy move.

Examples of Tension

☑ Flying a Kite: When you fly a kite, you hold onto the string and pull. The tension in the string helps the kite to fly high in the sky.

☑ Playing Tug of War: In a game of tug of war, when you pull on the rope, you create tension. This tension helps you to try and pull the other team over the line.

Name: ______________________ 21

Draw | Draw a tow truck using tension to pull a car

Questions | Answe[illegible] n[illegible]nsw[illegible]

1) What is tension force?

____

____

____

2) Write 3 examples of tension force in action.

1	
2	
3	

Curriculum Connection
E3.3

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ____________________

Check only the facts that describe tension.

☐ Tension happens when you pull on a string, rope, or anything stretchy.

☐ Tension can help move objects, like when a tow truck pulls a car.

☐ Tension works only when the rope or string is loose.

☐ When you pull a toy on a string and it moves toward you, that is tension.

☐ Tension is a force that pushes objects apart.

☐ In tug of war, pulling the rope creates tension.

Name: ____________________ Mark

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☐ When you pull a toy on a string and it moves toward you, that is tension.

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☐ In tug of war, pulling the rope creates tension.

Name: ____________________ Mark

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☐ When you pull a toy on a string and it moves toward you, that is tension.

☐ Tension is a force that pushes objects apart.

☐ In tug of war, pulling the rope creates tension.

Name: ____________________ Mark

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☐ When you pull a toy on a string and it moves toward you, that is tension.

☐ Tension is a force that pushes objects apart.

☐ In tug of war, pulling the rope creates tension.

Name: ____________________

Curriculum Connection
E3.2

Newton's First Law of Motion

What is Newton's First Law of Motion?

Newton's first law of motion, also called the "law of inertia," tells us about how things move or stay still. It says that if an object is not moving, it will stay that way until something makes it move.

On th[illegible]other hand, if an object is already moving, it will keep moving in a straight li[illegible]t the same speed, unless something makes it stop. Here on Earth, there [illegible]hat change the motion of objects.

- **Fric[illegible]** is a f[illegible]lows down the movement of objects sliding past each other.
- **Air resistance** h[illegible]ns[illegible] moves through air. The air pushes back on the object, slowing [illegible]
- **Gravity** is the force that pu[illegible] eve[illegible]wa[illegible]he Earth's center.

Examples of Newton's First Law

✓ If you roll a ball on a smooth floor, it will [illegible]roll[illegible] something or until the floor's roughness, or friction, stops it.

✓ When you throw a ball in the air, gravity pulls it back down. [illegible] to push through the air, so air resistance slows it down. Once it hits [illegible]ound, friction makes it stop rolling.

✓ But if you were in outer space, where there is no gravity or air, and you threw a ball, it would keep moving in the same direction and speed until it hit something.

An object at rest stays at rest

An object acted upon by an unbalanced force changes speed and direction

An object in motion stays in motion

An object acted upon by an unbalanced force changes speed and direction

Questions
Answer the questions below using evidence from the text

1) What is Newton's First Law of Motion?

____

____

____

2) Provide [illegible]wn example of the First Law of Motion. Explain a force that might stop the object fro[illegible]

____

____

____

True or False
Is the sta[illegible]ue[illegible]

1) In space, there is no air or gravity to [illegible]otion	True	False
2) Gravity is the only force that stops motion on [illegible]	True	False
3) When you throw a ball into the air, gravity and ai[illegible]	True	False
4) When you roll a ball, air resistance is the strongest forc[illegible]it d[illegible]	Tr[illegible]	False
5) Friction is the force that slows down objects that slide again[illegible] eac[illegible] other	[illegible]	False

Making Connections
What does this remind you of in your life?

____

____

____

____

____

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ____________________

Circle the correct force.

1) Which force pulls things to Earth?	Friction
	Gravity
2) Which force slows objects moving through air?	Air resistance
	Friction
3) Which force keeps a ball from rolling forever?	Gravity
	Friction
4) Which force slows objects sliding on floor?	Air resistance
	Friction
5) Which force keeps us from floating into space?	Gravity
	Friction

Name: ____________________

Circle the correct force.

1) Which force pulls things to Earth?	Friction
	Gravity
2) Which force slows objects moving through air?	Air resistance
	Friction
3) Which force keeps a ball from rolling forever?	Gravity
	Friction
4) Which force slows objects sliding on floor?	Air resistance
	Friction
5) Which force keeps us from floating into space?	Gravity
	Friction

Name: ____________________

Circle the correct force.

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4) Which force slows objects sliding on floor?	Air resistance
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	Friction

Name: ____________________

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	Friction
3) Which force keeps a ball from rolling forever?	Gravity
	Friction
4) Which force slows objects sliding on floor?	Air resistance
	Friction
5) Which force keeps us from floating into space?	Gravity
	Friction

Name: ______________________ 30

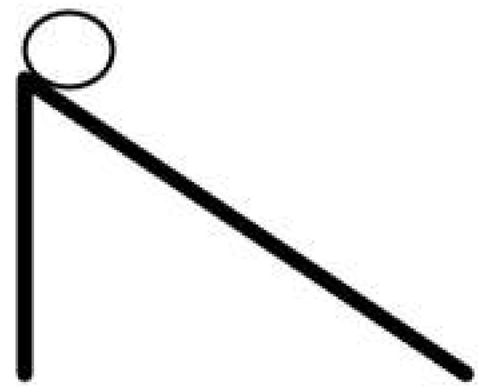
Curriculum Connection
E3.2

Experiment - First Law of Motion

Research Question | What are we learning about?

Will a marble or ball travel at the same speed down a ramp if you perform the experiment 5 times?

Materials | [illegible]hat do we need?



- ✓ A m[illegible]at will fit the ramp.
- ✓ A [illegible] ramp [illegible] surface. You could use a slide out[illegible] boar[illegible] stack of books
- ✓ A stopwatch [illegible]

Method | How do we co[illegible]he[illegible]?

1) Place the ramp on a flat surface [illegible] ensure [illegible]
2) Place the marble or ball at the top of th[illegible]p. M[illegible]t to push the ball down the ramp. Instead, let it go at the exa[illegible]
3) Use the stopwatch or timer to measure the time [illegible]or[illegible] ball to reach the bottom of the ramp.
4) Measure the distance from the top of the ramp to the bottom.
5) Repeat the experiment several times to ensure accuracy and to average out any minor differences.

Hypothesis | Will it take the same amount of time for the object to roll to the end of the ramp? Explain your opinion.

____

____

____

Curriculum Connection
E3.2

Observations What happened?

Trial	Time	Speed = Distance/Time	Speed = Distance/Second
1			
2			
3			
4			
5			

Results An[illegible]estio[illegible]low

1) Explain your resul[illegible]e time[illegible]ar or very different?

____

____

____

____

2) Why would the results be the same or very similar? [illegible]he [illegible]tion in your answer.

____

____

____

____

3) What forces acted on your rolling object?

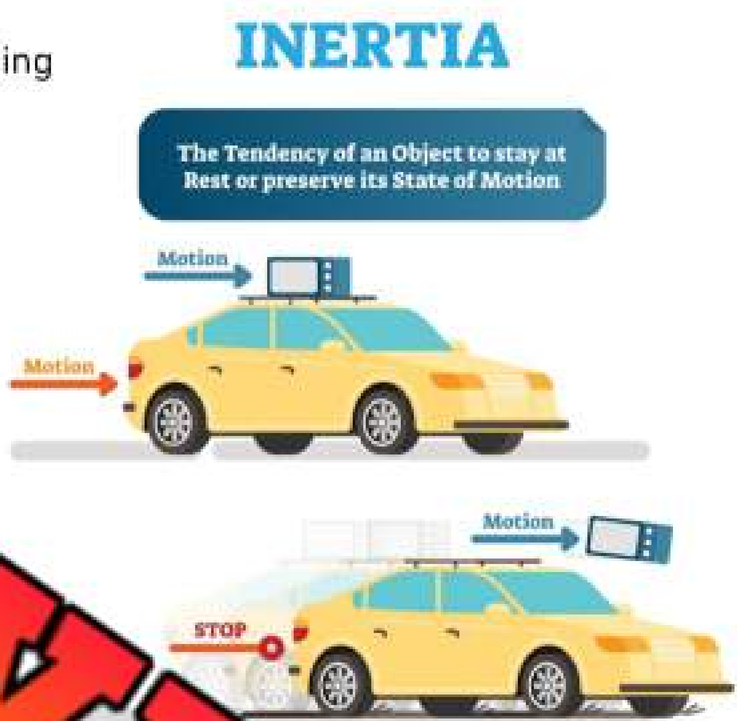
____

____

Curriculum Connection
E3.2

Inertia - First Law of Motion

What is Inertia?



Inertia means an object wants to keep doing what it's already doing. For example, if a toy car is rolling on the floor, it wants to keep rolli[illegible]'s sitting still, it wants to stay s[illegible] it[illegible] moving in a circl[illegible] to [illegible]ing in a circle.

Imagine yo[illegible]tting [illegible] and the car suddenly [illegible] will feel like you're being pushe[illegible]rd. This is because your body wants to keep moving forward, because of inertia.

It's like a toy train that is moving on a t[illegible] w[illegible]ing until something makes it stop. Like a wall or a barrier, o[illegible]ke it [illegible] tracks.

More Examples of Inertia

☑ A roller coaster at a theme park uses inertia to keep the cars mo[illegible] along the tracks. The cars have a lot of inertia, so they can keep moving even when they go over hills and through loops.

☑ A person trying to stop a bike that is moving at high speed, they have to overcome the inertia of the bike to stop it.

☑ A person trying to push a heavy object, they have to overcome the inertia of the object to make it move.

Questions Answer the questions below using evidence from the text

1) What is inertia?

____

____

____

2) Give an ... e of how inertia keeps objects still and how it keeps objects moving.

Objects Stay At...	
Objects Keep Moving	

Visualizing Draw what you were picturing while you we... in... picture

	______________ ______________ ______________ ______________ ______________ ______________ ______________

Curriculum Connection
E3.2

Inertia - Experiment

Research Question What are we learning about?

This experiment demonstrates the concept of inertia, where objects at rest resist motion.

Materials What do we need?

- ✓ Cu
- ✓
- ✓ g card

Method How d mplet riment?

1) Put the cup right side up on a flat surface
2) Place the card on top of the cup
3) Place the coin flat on top of the card
4) Flick the card using a strong force in a horizontal direction. Be careful not to flick upwards. Do multiple trials.
5) Did the coin move with the card? Record what happened to the coin on the back of the page
6) Answer the questions

Observations — What happened when you completed the experiment? Did the coin move or did it fall straight down?

____

____

____

____

Results — Answer the questions below

1) Why would the coin fall straight down?

____

____

____

2) Explain why this experiment demonstrates the concept of inertia.

____

____

____

____

3) What does friction have to do with this experiment? If the card was rubber, what would happen? How is this a force that changes the outcome?

____

____

____

____

Curriculum Connection
E3.5

Balanced and Unbalanced Forces

Balanced Forces

A **balanced force** happens when 2 equal forces act on an object in opposite directions. An example would be a book resting on a table.

There[illegible]re two forces acting on the book. One force is the Earth's gravitati[illegible]ownward on the book. The second force is the push of the[illegible] on the[illegible]ich pushes upward on the book. The forces on the book are balanced,[illegible]k wil[illegible]ve.

Unbalanced Force

An **unbalanced force** is a force[illegible]at c[illegible]p[illegible]on, speed, or direction of an object. When the sa[illegible] book a[illegible]ve[illegible] from right to left across the table, the forces a[illegible]nba[illegible] it to move.

The upward and downward forces are balanced ([illegible] bu[illegible]side forces are unbalanced. The force on the right side of the book i[illegible]on the left side because no one or nothing is blocking the left side.

Try This!

Stand across from your partner with your arms straight ahead of you. Put your palms facing them and line them up with your partners palms. Now with both partners pushing equally, take a step back (so that you would fall without your partners force). How does this represent balanced and unbalanced forces?

Name: ______________________ 37

Curriculum Connection
E3.5

Questions
Answer the questions below using evidence from the text

1) What is a balanced force?

____

____

____

2) What is [illegible] balanced force?

____

____

____

True or False
Is the sta[illegible]ue o[illegible]

1. A balanced force will cause move[illegible]	True	False
2. An unbalanced force means the object has m[illegible] force[illegible]ides	True	False
3. A balanced force is when there is a tie in tug[illegible]	True	False
4. Your pencil resting on your desk has balanced forc[illegible] o[illegible]	Tr[illegible]	False
5. Shooting a basketball means it has unbalanced forces acting[illegible]	[illegible]	[illegible]alse

Word Search
Find the words in the wordsearch

Balanced	Unbalanced
Force	Object
Acceleration	Equilibrium
Movement	Direction
Push	Pull

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

Forces From Different Directions

Forces From Different Directions

Forces can come from all different directions. Just like when we hit a ball with a bat, we can swing up, down, to the left, or to the right.

Up a[illegible]

When [illegible] throw[illegible] [illegible]n the air, you are applying an upward force. The ball goes up beca[illegible] [illegible]orce [illegible]sed. But there is also a force that pulls the ball down. That's calle[illegible] [illegible]vity [illegible] [illegible]rce that pulls things down.

Left and Right Forces

Think about playing tug-of-war. You [illegible] the rope to your side and your friend pulls to th[illegible] side. You're applying a force to the right, and your friend is applying a force to the left.

From Both Sides

Imagine you have a squishy ball and you squeeze it in your hand. You're applying force from both sides. The ball squishes because of the force from your hand.

From All Directions

Now think about being in a pool. When you're underwater, you can feel the water pushing on you from all directions. This is because the water is applying a force from all around you.

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Curriculum Connection
E3.5

Direction of Force — Which direction is the force moving?

A ball being thrown upwards	Up/Down	Left/Right	Both Ends	All Directions
A book falling off a table	Up/Down	Left/Right	Both Ends	All Directions
A car moving forward	Up/Down	Left/Right	Both Ends	All Directions
Pulling a sled to the left	Up/Down	Left/Right	Both Ends	All Directions
Squeezing [illegible] ball	Up/Down	Left/Right	Both Ends	All Directions
Wate[illegible] diver	Up/Down	Left/Right	Both Ends	All Directions
Pushing [illegible]door o[illegible]	Up/Down	Left/Right	Both Ends	All Directions
Pulling open a ba[illegible]bs	[illegible]own	Left/Right	Both Ends	All Directions
A game of tug of war	Up/[illegible]	[illegible]eft/Right	Both Ends	All Directions
The air all around you	Up[illegible]	[illegible]ht	Both Ends	All Directions

Questions — Answer the questions below

1) When you throw a ball into the air, how do forc[illegible] the ba[illegible]

____

____

____

2) Write about a force you used today. Describe the direction of the force or forces.

____

____

____

____

Curriculum Connection
E3.5

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ______________ | Mark | |

Check only the true statements.

Statement	✓
Squeezing a toy ball is using force.	
Water only pushes your legs when you swim.	
Gravity is the force that pushes up.	
Upward force makes a ball rise into the air.	
A ball rolls without needing any push at all.	
Balanced forces can keep an object still.	
A bat can swing in many directions.	
Tug-of-war is a game of pushing.	
Gravity works even when you are underwater.	

Name: ______________ | Mark | |

Check only the true statements.

Statement	✓
Squeezing a toy ball is using force.	
Water only pushes your legs when you swim.	
Gravity is the force that pushes up.	
Upward force makes a ball rise into the air.	
A ball rolls without needing any push at all.	
Balanced forces can keep an object still.	
A bat can swing in many directions.	
Tug-of-war is a game of pushing.	
Gravity works even when you are underwater.	

Name: ______________ | Mark | |

Check only the true statements.

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A ball rolls without needing any push at all.	
Balanced forces can keep an object still.	
A bat can swing in many directions.	
Tug-of-war is a game of pushing.	
Gravity works even when you are underwater.	

Name: ______________ | Mark | |

Check only the true statements.

Statement	✓
Squeezing a toy ball is using force.	
Water only pushes your legs when you swim.	
Gravity is the force that pushes up.	
Upward force makes a ball rise into the air.	
A ball rolls without needing any push at all.	
Balanced forces can keep an object still.	
A bat can swing in many directions.	
Tug-of-war is a game of pushing.	
Gravity works even when you are underwater.	

Curriculum Connection
E3.5

Objects Changing Direction

Changing Directions

When an object is in motion, it is travelling in one direction. We can change the direction of the object in motion by applying a force to it.

In sports, this is common using applied forces.

Examples [illegible]ts

Hock[illegible] [illegible] hockey is an example of the pu[illegible]anging [illegible]. A one-timer is when a teamm[illegible]s the [illegible] one direction to a team[illegible] wh[illegible]ss directly into the net. They don't slow the pass down, they chan[illegible]recti[illegible] pass by aiming it towards the net.

Baseball – When a pitcher throws the ball to [illegible]ter, the ball is changing direction. The pitcher uses [illegible] muscular force to throw the ball as fast as they can [illegible] the hitter.

The hitter swings the bat as hard as they can to change the dir[illegible]f the ball towards the outfield and hopefully over the fence. Homerun!

Tennis – In tennis, the ball starts with the server hitting it to the returning player. The returning player hits the ball back by changing the direction of the ball. They swing their arm while holding a racquet to strike the ball.

Tennis players use muscular force to swing the racquet. The stronger the player, the more muscular force they can make.

Name: ______________________

Curriculum Connection
E3.5

Questions Answer the questions below using evidence from the text

1) How does an object change directions?

____

____

____

2) What is [illegible]ample of an object changing direction?

____

____

____

Draw Draw a picture of [illegible]at[illegible]n wh[illegible]ject changes direction.
Label the object using [illegible]s t[illegible]es acting on the object.

Making Connections What does this remind you of in your life?

____

____

____

____

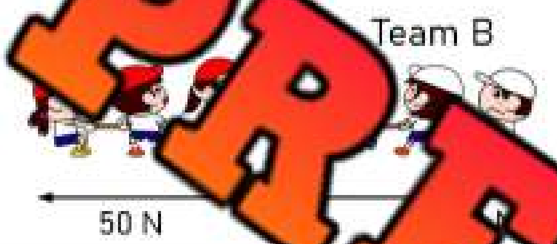
Curriculum Connection
E3.5

Force Diagram - Changing Directions

Force Diagram
A **force diagram** can be drawn to show the forces acting on objects. If the object has unbalanced forces acting on it, the object will move. In a game of tug of war, the rope will move towards the stronger pulling force.

Questions Examine the force diagrams and answer the questions

1)



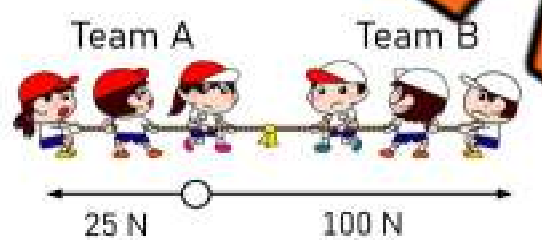
Who will win? Will it be a long/short match?

____

____

____

2)



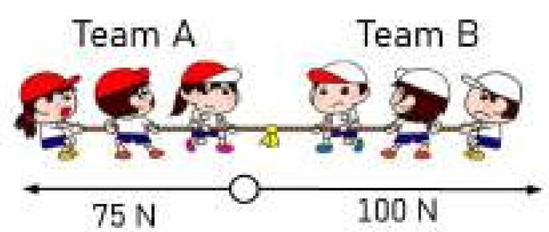
Who will win? Will it be a long/short match?

____

____

____

3)



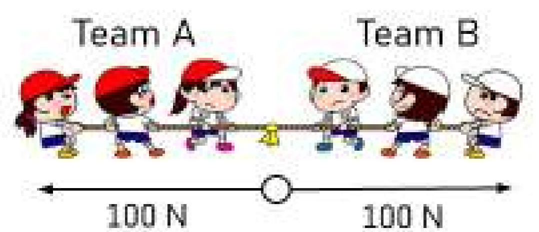
Who will win? Will it be a long/short match?

____

____

____

4)



Who will win? Will it be a long/short match?

____

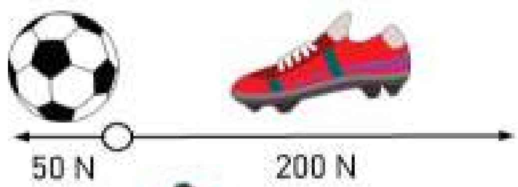
____

____

Name: ______________________ 45

Questions Examine the force diagrams and answer the questions

1)



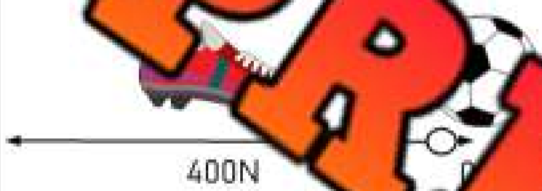
Is the ball moving? What will happen when the cleat hits it?

____

____

____

2)



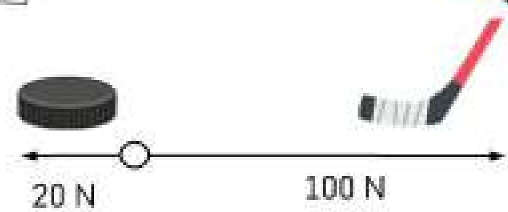
Is the ball moving? What will happen when the cleat hits it?

____

____

____

3)



Is th [illegible] at will happen when the stick hits it?

____

____

____

4)

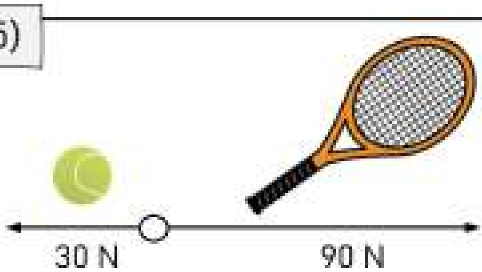
Is the puck moving? What will hap [illegible] its it?

____

____

____

5)



Is the ball moving? What will happen when the racquet hits it?

____

____

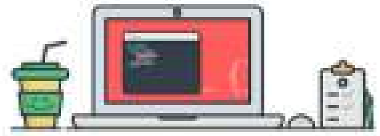
____

Name: ______________________

Curriculum Connection
E3.4

Introduction to If/Then Statements

An if/then statement is a *conditional* that is an action that could occur if something specific happens.
For example – If the bell goes at school, then the students go to class.



Questions Circle which then statement makes the most sense

1)	If t[illegible]ed	then	The bike stops	The bike goes faster
2)	If the ba[illegible] the[illegible]	then	Team gets a goal	Team loses a goal
3)	If the force is stron[illegible]	[illegible]	The object won't [illegible]ove much	The object will move a lot
4)	If you pull an object	[illegible]	It [illegible]	It moves further away
5)	If you push an object	then	It [illegible]	It[illegible] further away
6)	If the ball is thrown in the air	then	It will keep go[illegible]g up forever	[illegible] it
7)	If you wear safety equipment	then	You'll get hurt less	You'll get hurt more
8)	If an object is not moving and no force acts on it	then	It will not move	It will start moving
9)	If a ball rolls on the ground	then	It will never stop	It will stop because of friction and air resistance
10)	If a strong force squeezes a ball	then	The ball will move inward	The ball will move outward

Name: ______________________

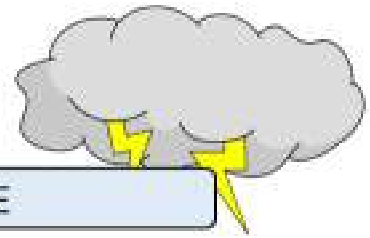
Curriculum Connection
CS.1

Coding - Else Statements

An **else** statement works like an if statement. When an if statement is false, we can have another command, instead of nothing happening.

Is there a storm coming?

- IF there is a storm coming → THEN stay inside
- ELSE → Keep playing wherever



Directions Fill i[illegible] commands below with your own ideas

Is a teammate open in hockey

- [illegible]ea[illegible]en → THEN ______ ______ ______
- ELSE → ______ ______ ______ ______

Is it too icy on my step?

- If it too icy on my step → THEN ______ ______ ______
- ELSE → ______ ______ ______ ______

Name: ____________________

Curriculum Connection
CS.1

Directions | Fill in the ELSE commands below with your own ideas

Is the other team pulling harder than us?

IF the other team pulling harder than us? | ELSE

THEN

____

____

____

...e ba... ...trike zone?

IF the baseball in the strike... | ...E

THEN

____

____

____

Could I get hit on the head in th... ...me?

IF I get hit on the head in this game? | ELSE

THEN

____

____

____

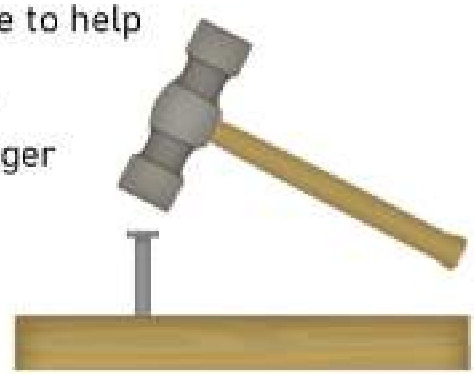
Machines

What is a Machine?

To move an object, we need to use a pulling or pushing force. This means when we lift a box, push a car, stand up out of bed, or jump up in the air, we are using force.

Sometimes our muscles cannot make enough force to push or pull somethin[illegible]en this is the case, we can use a machine to help us. A **ma**[illegible]ything that makes a force stronger.

[illegible] is [illegible]ine because it makes a stronger force on a nail[illegible] fo[illegible] are also machines because they m[illegible] force[illegible] so we can eat our food.



For example, if you t[illegible]ut [illegible] your hands, you would struggle. If you use a knife, the force you make [illegible] knife [illegible]nger on the steak. When we hit a nail with a hammer, the handle of the h[illegible]er [illegible]es the force you apply. The longer the hammer, the stronger [illegible]rce. [illegible]edge hammers have long handles.

Simple Machines

Simple machines are the basic machines that allow us to make more force. There are 6 types of simple machines:

1) Levers
2) Wheels and axles
3) Pulleys
4) Wedges
5) Screws
6) Inclined planes.

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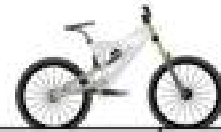
Curriculum Connection
E3.6

True or False | Is the statement true or false?



1) A machine allows us to make more force	True	False
2) There are 6 basic simple machines	True	False
3) An axe uses a wedge	True	False
4) A ramp [illegible] an example of a pulley	True	False
5) A bicy[illegible] a wheel and axle	True	False

Question[illegible] | Ans[illegible]stions below

1) What is a mach[illegible]y do [illegible]m?

____

____

____

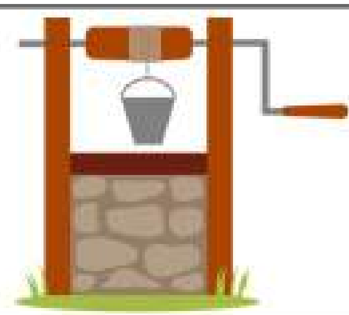
2) When have you used a simple machine?

____

____

____

Label | Which simple machine is in the picture?



Wheel and Axel

Wheel and Axle

The wheel and axle is a simple machine that was invented around 5,500 years ago. It changed the world by making it easier to move objects. Wagons use wheels and axles to pull people and things. It uses a wheel with a rod attached through the middle th[illegible] spin if it is pushed or pulled. This machine can help move loads and also lift [illegible]

[illegible]ycle an[illegible]e examples of machines that use a wheel and axle to move objects. [illegible] us[illegible]heel and axle to lift objects. A winch is an example of a wh[illegible] axle [illegible]t a heavy object.

Example – A Well

A well often uses a wheel and axle to [illegible] the ground. In this example, turning t[illegible] wheel w[illegible] the [illegible] rope around the rod which lifts the bucket. W[illegible]ly a [illegible] movement to the crank which lifts the load straig[illegible]

Stronger Force

If we dragged a cart across the ground, the friction would make [illegible] di[illegible]o move anything heavy. **Friction** is a force that makes it hard to slide an object by another material.

Wheels make the friction force weaker. This is because only a small part of the wheel is touching the ground. That is why wheels roll well.

Sliding a cart without wheels would be hard. Pushing a cart on wheels is much easier. This is because there is less friction. A cart with wheels is called a wagon.

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Curriculum Connection
E3.6

True or False | Is the statement true or false?

1) Rolling is easier than sliding	True	False
2) Friction is a force that makes sliding easier	True	False
3) Using a wheel makes less friction	True	False
4) A bicycle uses wheels and axles	True	False
5) The inv[illegible] of the wheel didn't change much	True	False

Questi[illegible] | [illegible]sw[illegible] questions below

1) What is a w[illegible]e?

____

____

____

2) When have you used a wheel and axle?

____

____

____

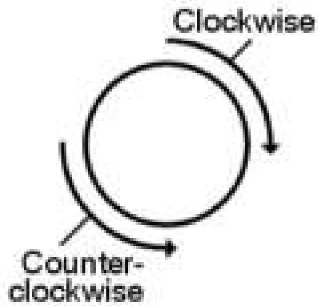
Visualizing | Draw what you were picturing while you were reading. Exp[illegible]in the picture

	______________________ ______________________ ______________________ ______________________ ______________________

Curriculum Connection
E3.6

Wheel and Axle - Clockwise/Counter-Clockwise

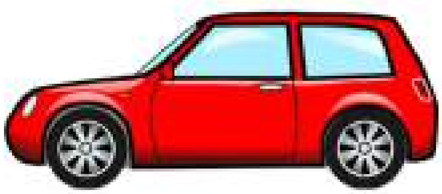
Clockwise and Counter-Clockwise Turns



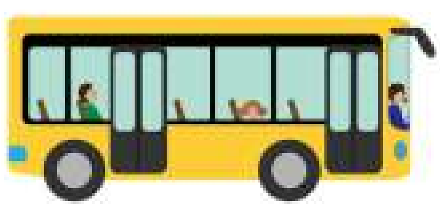
When something moves in a circle, it can move either clockwise or counter-clockwise. **Clockwise** means the object moves in the same direction as the hands on a clock. **Counterclockwise** means th[illegible]ct moves in the opposite direction of a clock.

W[illegible]e[illegible]urns, it moves either clockwise or counter-clockwise. If you are [illegible] right si[illegible]ar when looking at the front, the wheels will move counter-cloc[illegible]car[illegible] backwards, these wheels will move counter-clockwise.

Questions Which directio[illegible] w[illegible]s[illegible]e turn?



1)	If the [illegible]ar move[illegible]war[illegible]	
2)	If the car moves [illegible]	



3)	If the car moves forwards	
4)	If the car moves backwards	

5)	If the car moves forwards	
6)	If the car moves backwards	

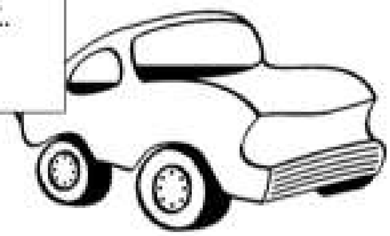
Name: ______________________

Curriculum Connection
E3.6

Wheel and Axle - My Car

Bring a toy car from home or borrow one to take a closer look.

Answer the questions below about the car.



Questions Answer the questions below

1) Draw a [illegible]e of the car from the bottom.		
2) Can each wheel spin on i[illegible]n?	Yes	No
3) What materials are the wheel an[illegible] made o[illegible]		
Wheels		
Axles		
4) Draw a picture of the car from the side view.		
5) Point the car so it is facing you and you are seeing the front. Then turn the car so you are looking at the left side of the car.		
If the car moves forwards, the wheels will spin which direction?	Clockwise	Counter-Clockwise
If the car moves backwards, the wheels will spin which direction?	Clockwise	Counter-Clockwise

Curriculum Connection
E3.6

Activity - Balloon Car

Research Question | What are we learning about?

We will be creating a car that is able to move without us pushing it. To do this, we will use the force of moving air. Our car's wheels will attach to a rotating axle.

Materials | [illegible]hat you will need for the experiment

- ❑ Plast[illegible]
- ❑ F[illegible] with holes po[illegible]rough[illegible] that are large enough[illegible] through
- ❑ 2 wooden ske[illegible]ng e[illegible] span over the wid[illegible])
- ❑ Balloon
- ❑ Two straws
- ❑ Tape
- ❑ Scissors

Method | How you will complete the experi[illegible]

1) Cut one of the straws in half
2) Tape both pieces of the straw to one side of the water bo[illegible]e
3) Put the wooden skewers through the straws
4) Press each bottle cap onto the ends of the wooden skewers. These [illegible] the wheels and axles
5) Give your car a push to see if it will roll properly. If it gets stuck or if the wheels don't roll, make sure your axles are parallel to each other.
6) Tape the neck of the balloon around one end of the other straw. Wrap the tape very tightly so the connection is airtight.
7) Cut a small hole in the top of the water bottle so that it is just big enough to push a straw through. Ask your teacher for help on this step!
8) Push the free end of the straw through the hole and out the mouth of the bottle
9) Tape the straw to the bottle so it is secured to the bottle
10) Blow up the balloon by blowing air into the straw. Keep your finger over the end of the straw until you are ready for the car to move!

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Curriculum Connection
E3.6

Diagram Draw a picture of your balloon car. Label the wheels, axles, and power source. Use arrows to show which way the wind is blowing

Results What h[...] with your car? Answer the questions below.

1) How did your car [...]? E[...]

____

____

____

2) How could you improve the design of your car so [...] trave[...]er? Think about the following in your answer: weight, straw size, [...]e of [...]n.

____

____

____

3) Newton's third law of motion states that for every action, there is an equal and opposite reaction. Why is this experiment an example of this law?

____

____

____

Inclined Plane

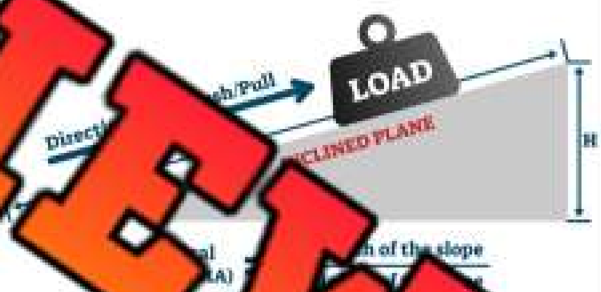
Inclined Plane

An inclined plane is a simple machine with no moving parts. It is just a ramp with one end higher than the other. Using an inclined plane allows gravity to pull objects down. It also helps us lift objects up high.

Whe[illegible] need to lift an object upwards, we can carry it or slide it along a ramp. Th[illegible] easier than picking up big objects. The Egyptians used inclined plan[illegible] when they built the pyramids.

Tradeoff

An inclined plane a[illegible]s h[illegible] length and a vertical height. **Horizo**[illegible]s sid[illegible]
Vertical means up and down.



If we make a shorter horizonta[illegible]gth, the inclined plane will be steeper. This will make the distance we need to push shorter but we need more force to move the object.

If we make the horizontal length longer, we are creating [illegible]at needs less force to push. The problem is that we need to push the o[illegible]urther.

Example

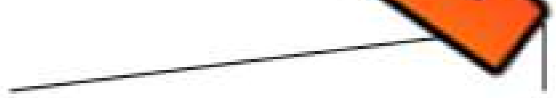
You are standing at the edge of a moving truck that is 2 m tall. You want to move a box up to the opening of the truck. You would only need to lift it 2 m if you lifted it straight up.

If the box is too heavy to lift, you could use an inclined plane. If you make the ramp 4 m long (twice as long as the height), you have made the object twice as light. But, you will need to move twice as far!

Describe Circle the descriptions of the inclined planes below

Slope	Steep	Gentle
Effort	Light	Heavy
Distance	Far	Short

Slope	Steep	Gentle
Effort	Light	Heavy
Distance	Far	Short



Slope	Steep	Gentle
Effort	Light	Heavy
Distance	Far	Short

Slope	Steep	Gentle
Effort	Light	Heavy
Distance	Far	Short

Multiple Choice Circle the best answer

1) Horizontal means...	Side-to-side	Up-and-Down
2) Vertical means...	Side-to-side	Up-and-Down
3) A ________ ramp makes the load feel lighter	Longer	Shorter
4) Using a longer ramp makes the distance	Closer	Further
5) Using a shorter ramp makes the load feel	Lighter	Heavier

Curriculum Connection
E3.6

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: ____________________ Mark | |

Is the statement true or false?

1) An inclined plane is a ramp with one end higher.	True False
2) Egyptians used inclined planes to lift heavy stones.	True False
3) An inclined plane helps us lift objects up high.	True False
4) A longer horizontal length needs less force to push.	True False
5) Vertical means side-to-side.	True False

Name: ____________________ Mark | |

Is the statement true or false?

1) An inclined plane is a ramp with one end higher.	True False
2) Egyptians used inclined planes to lift heavy stones.	True False
3) An inclined plane helps us lift objects up high.	True False
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Name: ____________________ Mark | |

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Name: ____________________ Mark | |

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2) Egyptians used inclined planes to lift heavy stones.	True False
3) An inclined plane helps us lift objects up high.	True False
4) A longer horizontal length needs less force to push.	True False
5) Vertical means side-to-side.	True False

Name: ______________________ 72

Curriculum Connection
E3.6

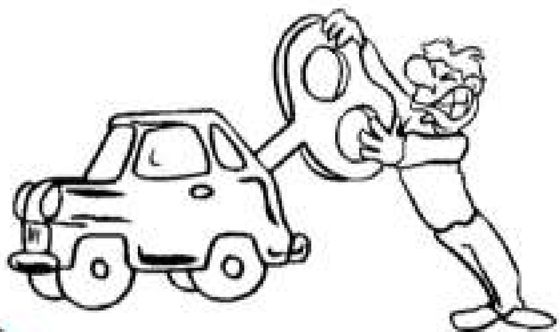
Experiment - Inclined Plane

Research Question | What are we learning about?

How does the height and angle of an inclined plane affect the movement of an object at the top coming down?

Materials | What you will need for the experiment

1. To[illegible]
2. Cardboard
3. Books
4. Meter stick
5. Tape



Method | How you will complete the experiment

1. Stack three books on top of each other. Tape one edge of the cardboard to the edge of the top book. Tape the bottom edge of the cardboard to the floor. You should now have an inclined plane that looks like a ram[illegible]

2. Place the car at the top of the inclined plane and let go.

3. Measure how far the car travels using the meter stick. Record your measurements on this paper.

4. Change the height of the inclined plane by adding a 4th, 5th, and 6th book.

5. Repeat steps 2 and 3 with the different heights of inclined planes.

Name: ____________________

Curriculum Connection
E3.6

Observations | How far did your car do?

Height in Books	Distance in CM
3 Books	
4 Books	
[illegible]ooks	
[illegible]s	

Results | Ans[illegible]tion[illegible]low

1) What happened to [illegible] the [illegible]oved as you made the inclined plane steeper?

____

____

____

2) Does it get easier or harder to move something up a[illegible]ne[illegible]ake it steeper?

____

____

3) Is it easier to move things downhill or uphill?

4) Do you need more or less force to push an object down a hill that is steeper?

Levers

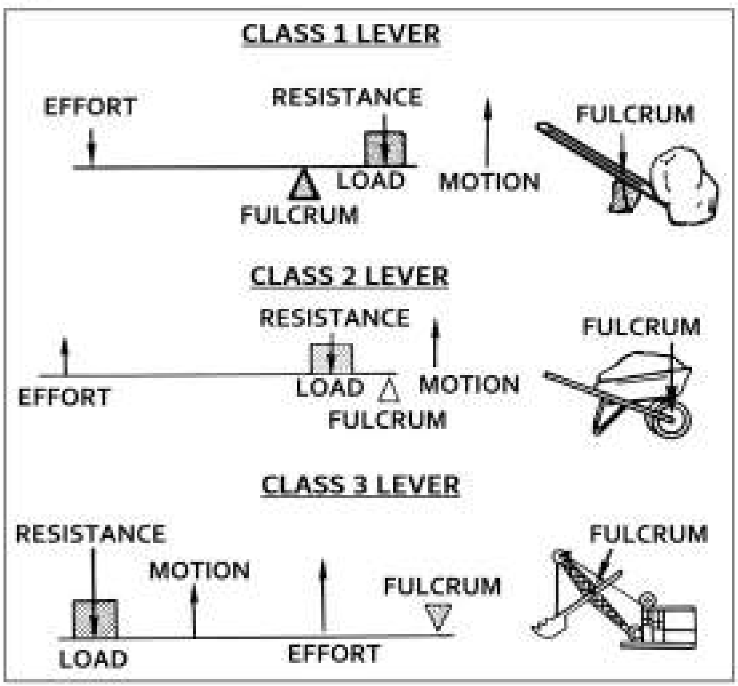
What is a lever?

A lever is a simple machine that is used to make work easier by using leverage which multiplies the force. Let's say you needed to move a box of heavy treats up t[illegible]e top floor of your treehouse. You could ca[illegible]x, but that would be difficult. You c[illegible]thi[illegible]asier by using a lever.

To [illegible]ake a [illegible]ee[illegible] a long flat board, a fulcrum, and someone to apply a force. You cou[illegible]arge f[illegible]s a fulcrum and rest the long board over top of it so that the rock [illegible]uld place the box of treats on one end and push down on the oth[illegible]his [illegible]x into the air.

This is an example of a type 1 le[illegible]e f[illegible] is in the middle of the load and the force. Levers not only multipl[illegible] force, [illegible]ey [illegible]e the direction of a force.

Types of Levers



Class 1 Lever	The[illegible]n the[illegible]ved and whe[illegible]effort is being app[illegible]d
Class 2 Lever	The load is between the fulcrum and the effort
Class 3 Lever	The effort is between the fulcrum and the load

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Curriculum Connection
E3.6

Questions | Answer the questions below using evidence from the text

1) What is a lever?

____

____

____

2) When h[illegible] used a lever? What class of lever was it?

____

____

____

Examples | What type of l[illegible]e e[illegible]wing?

Class of Lever	

Class of Lever	

Class of Lever	

Class of Lever	

Class of Lever	

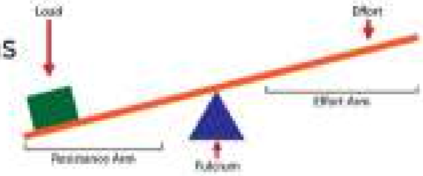
Class of Lever	

Name: ______________________

Curriculum Connection
E3.6

Calculating Mechanical Advantage - Lever

Calculating Mechanical Advantage Using a Lever
To calculate the MA of a lever, you will need to know the lengths of the effort arm and the load arm. The formula is:



$$\frac{Effort\ Arm\ (length)}{Resistance\ Arm\ (length)}$$

This will give you the MA, which you can use to find how much force will be made by the lever.

Calculate [illegible] MA and output force in the examples below

	Effort Arm [illegible]	[illegible] Arm Length	MA	Input Force	Output Force
1)	10 cm	[illegible]	2	10 N	
2)	4 m	[illegible]	[illegible]	5 N	
3)	2 m	1 m	[illegible]	[illegible]	
4)	3 m	3 m	[illegible]	[illegible]	
5)	10 cm	2 cm	5	[illegible]	
6)	30 cm	10 cm		10 N	
7)	6 m	2 m		25 N	
8)	12 m	3 m		100 N	
9)	15 cm	5 cm		20 N	
10)	12 m	6 m		50 N	

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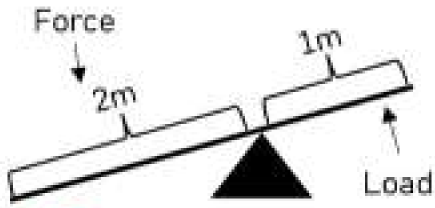
Curriculum Connection
E3.6

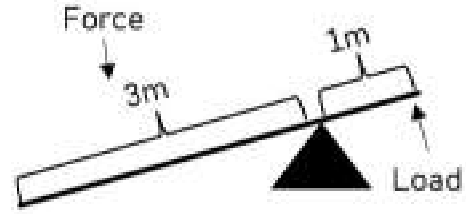
Calculate Calculate the MA and output force in the examples below

1)



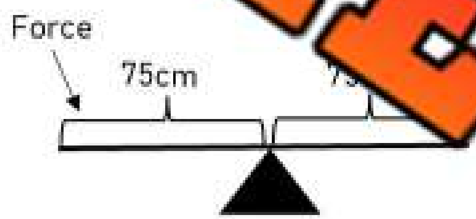
[illegible]	
[illegible]	100 N
[illegible]	

2)



MA	
Input Force	25 N
Output Force	

3)

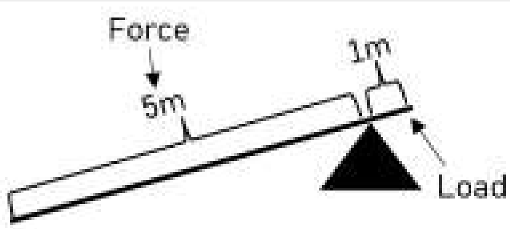


MA	
Input Force	200 N
Output Force	

4)

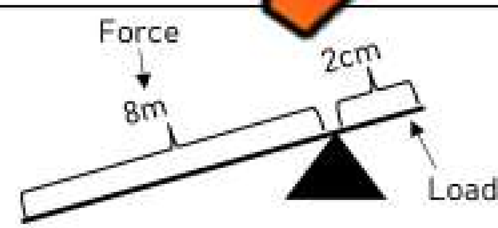
[illegible]	
[illegible]	50 N
[illegible]	

5)



MA	
Input Force	10 N
Output Force	

6)



MA	
Input Force	20 N
Output Force	

Curriculum Connection
E3.6

Experiment - Testing Different Levers

Research Question | What will you be testing?

How does moving the fulcrum affect the force needed to lift a load?

Materials | What you will need for the experiment

- ❑ Rule[illegible]
- ❑ T[illegible] [illegible]s
- ❑ Tape
- ❑ Weights – ob[illegible] [illegible]hat al[illegible] [illegible] same weight (marbles, paper clips, etc.)
- ❑ Fulcrum – metal bin[illegible] [illegible] pencil[illegible] [illegible]d together, eraser

Procedure | How you will complete th[illegible] [illegible]men[illegible]

1) Tape the cups to the ends of the ruler.

2) Decide which side will be the load. Put a reasonable amount of weight into the cup that will be the load.

3) Put the fulcrum in the centre of the ruler. Add weights into the cup on the effort side of the lever until the lever is balanced. Record the weight you added (number of marbles/weights).

4) Empty the effort cup but leave the same weight in the resistance cup. Put the fulcrum closer to the effort side of the ruler. Complete the same steps as above and record how much effort was needed to balance the lever.

5) Lastly, empty the effort cup again and repeat the same steps as above, but move the fulcrum closer to the resistance cup. Record your results.

6) Answer the questions on the backside of the page.

Name: ______________________________

Curriculum Connection
E3.6

Observations — What did you notice as you completed the experiment

Fulcrum Position	Fulcrum Position on Ruler – cm or mm	Weight in Load Cup	Weight in Effort Cup
In the Middle			
Close to Effort Cup			
Close to R[illegible]ce C[illegible]			

Diagra[illegible] — [illegible] diagram of the 3 levers you made

In the Middle	
Close to Effort Cup	
Close to Resistance Cup	

Results — Answer the questions below

What position allowed the least amount of force to move the load? Explain why this was the case.

____

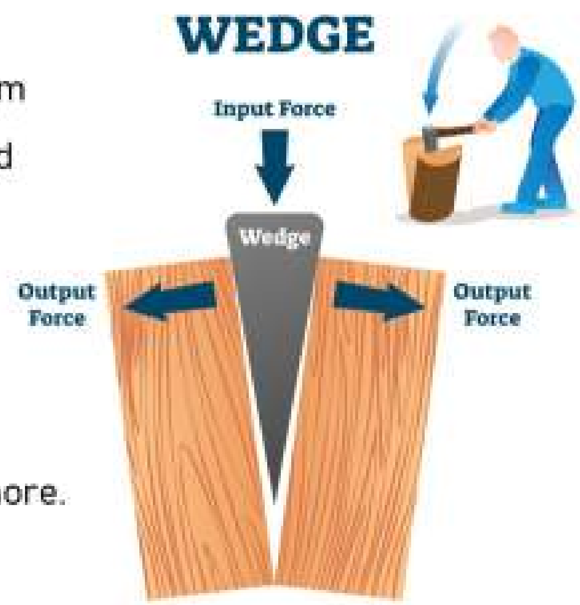
____

____

Wedge

Wedge

A wedge is a triangular tool that is often made from metal, wood, plastic, or stone. It is thick on one end and narrow on the other to form a sharp edge.



A w[illegible] a type of an inclined plane (or two incli[illegible]s) that is often attached to a hand[illegible] used for millions of years to [illegible]unt w[illegible] tri[illegible]ees, and much more.

How do they work[illegible]

When we apply a force t[illegible] side [illegible]dge, the sharp edge goes further into the object. In the diagram abo[illegible] we [illegible]ge into a piece of wood to split the wood.

When we apply a downward pushing fo[illegible] the [illegible] the wedge creates a side to side force into the [illegible] it to split. An example of a **single wedge** is a chisel, w[illegible] example of a **double wedge** is an axe.

Tradeoff

When we use a longer and thinner wedge, it is easier to force it into the object. The only issue is that this may not cause enough side to side force. If the wedge is shorter and has a wider angle at the tip (not as sharp), we will need to apply more force to do the work.

Examples of wedges

A wedge can be used in the following different ways: to cut (knife), to split (axe), to tighten, to hold back (door stop), to scrape (blades), and to hold together (nail).

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Curriculum Connection
E3.6

True or False | Circle whether the statement is true or false

1) A chisel is a single wedge	True	False
2) A double sided axe is a single wedge	True	False
3) A downward input force makes outward forces	True	False
4) Longer and thinner wedges are not as sharp	True	False
5) Longer [illegible]ner wedges are sharper allowing it to travel further	True	False

Questi[illegible] | [illegible]Answe[illegible]stions below using evidence from the text

1) What is a we[illegible]do the[illegible]

____

____

____

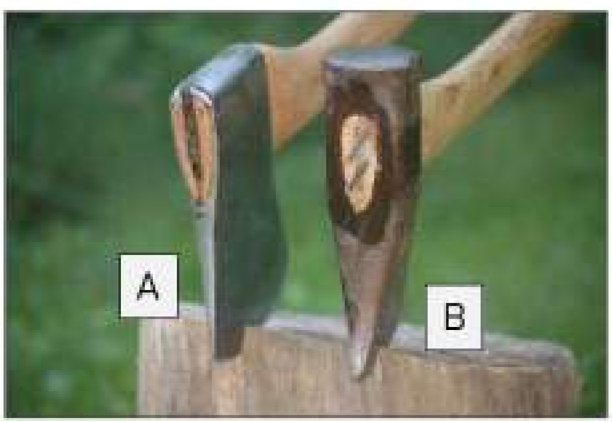
2) When have you ever used a wedge?

____

____

____

Explain | Which axe is a wood splitting axe and which is used to cut down trees. Explain



____

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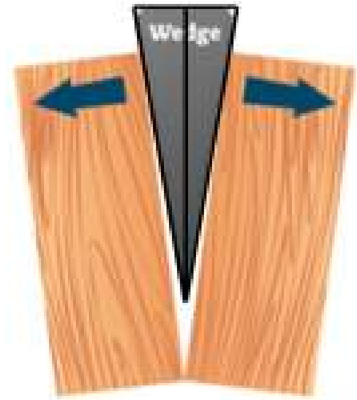
____

____

Experiment - Wedges

Research Question How does a wedge work?



A **wedge** has two inclined planes put together. A wedge is used for many reasons. One of them is to cut thing[illegible]n half. How well does a wedge cut playdou[illegible]

Mater[illegible] [illegible] need for the experiment

- ❑ Playdough
- ❑ Wedge (triangula[illegible]n blo[illegible]
- ❑ Plastic knifes (optiona[illegible]

Procedure How you will complete the [illegible]imen[illegible]

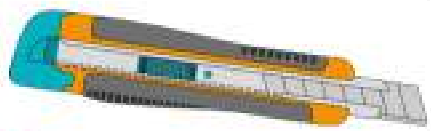
1) Take out a ball of playdough
2) First have students try to cut the playdough in half [illegible]m of their hand
3) Next have the students use the side of their hand to cut the playdough in half
4) Next have the students use the wedge to cut the playdough in half
5) Lastly, have the students use a plastic knife to cut the playdough in half.
6) Record your observations on the back of the page.

Curriculum Connection
E3.6

Observations What happened when you cut the playdough

Cutting Tool	What Happened? Did It Cut It Well? Did It Cut It Clean?
Palm	
Side of Hand	
[illegible]	
Knife	

Results Answer the questions below



1) What is a wedge good at doing?
____
____

2) Name 2 wedges that are good at cutting. Draw them.	

3) What would life be like without wedges?
____
____

Indigenous Groups Using Simple Machines

Indigenous Groups Using Simple Machines

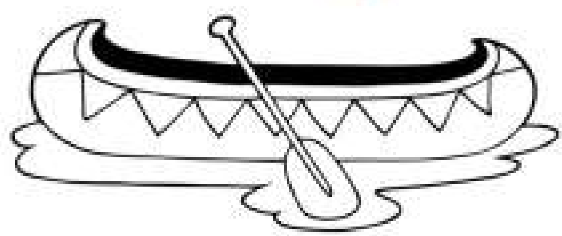
First Nations, Métis, and Inuit people have been clever and imaginative for a long time. They have used simple machines, like an antler wedge and a paddle, to help them with their work.

Antler [illegible]

An a[illegible] wedge i[illegible]hat comes from the antler of [illegible] oth[illegible]imal. It has a 'V' shape a[illegible]ery s[illegible] First Nations, Métis, and Inu[illegible] used [illegible] split things like wood or bo[illegible]ey [illegible] push or hit it into something they w[illegible] split [illegible]aller pieces. It helped them to make homes, tools, and food.

Paddle

A paddle is another simple machine used by the First N[illegible]s, [illegible] people. They used it to move their boats through the water. By [illegible] paddle against the water, they could make their boat move forward. The pa[illegible] made it easier to travel across rivers and lakes.



Using Them Today

These simple machines, the antler wedge and the paddle, are still in use today. They are perfect examples of how simple machines can make work easier. The First Nations, Métis, and Inuit people continue to use these tools, showing us their cleverness and skill.

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Curriculum Connection
E3.7

True or False | Is the statement true or false?

1) Antlers are made from plastic	True	False
2) A paddle is used to move a boat	True	False
3) Using a paddle makes it easier to move a boat	True	False
4) Antlers have a W shape	True	False
5) Antler[illegible]s are used to cut things	True	False

Questi[illegible] | [illegible]we[illegible]uestions below

1) How is a p[illegible]n a [illegible]

____

____

____

2) How is an antler wedge used?

____

____

____

Draw | Draw a paddle and an antler wedge

Inuit Scraping Tools: The Ulu

Inuit Scraping Tools: The Ulu

The Inuit people, who live in the cold, snowy regions of Canada, are very smart. They have been using a special tool, called an ulu, for thousands of years.

What is a[illegible]u?

An ulu is [illegible]ng tool. It looks like a knife but has [illegible]d[illegible]andle is usually made of bone [illegible] antl[illegible] c[illegible] be made of bone, antler, or eve[illegible]

Making an Ulu

1) <u>Find Materials</u>: You need [illegible]ron[illegible] for the handle. You need a strong, flat piece for the blade. [illegible] is bes[illegible]o[illegible] or antler can work too.

2) <u>Shape the Blade</u>: Cut the blade into a h[illegible]cle [illegible] half of a pizza!

3) <u>Make the Handle</u>: Cut the bone or antler into a s[illegible] fits [illegible] It should be easy to hold.

4) <u>Connect the Blade and Handle</u>: Make a hole in the handle and t[illegible]ade. Then, tie them together with strong string or leather.

5) <u>Sharpen the Blade</u>: Use a stone to rub the edge of the blade until it's sharp.

Using an Ulu

The Inuit people use ulus for many things. It's like their super-tool! They use it to scrape animal skins to clean them. This makes the skins soft so they can be used to make clothes and tents. Ulus are also used to cut food like meat and fish.

Name: ______________________

Curriculum Connection
E3.7

Questions Answer the questions below

1) What is an ulu?

____

____

____

2) How is [illegible] made?

____

____

____

____

____

____

____

Draw Draw an ulu below

Curriculum Connection
E3.7

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class

Name: ____________________

Mark

2 Truths and a Lie – Can you find the one that's not true?

	The Inuit people use ulus to scrape animal skins to clean them.
	An ulu is a scraping tool. It looks like a knife but has a curved blade.
	An ulu is used mostly to help Inuit people mark important places.

Name: ____________________

Mark

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Name: ____________________

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	An ulu is a scraping tool. It looks like a knife but has a curved blade.
	An ulu is used mostly to help Inuit people mark important places.

Name: ______________________

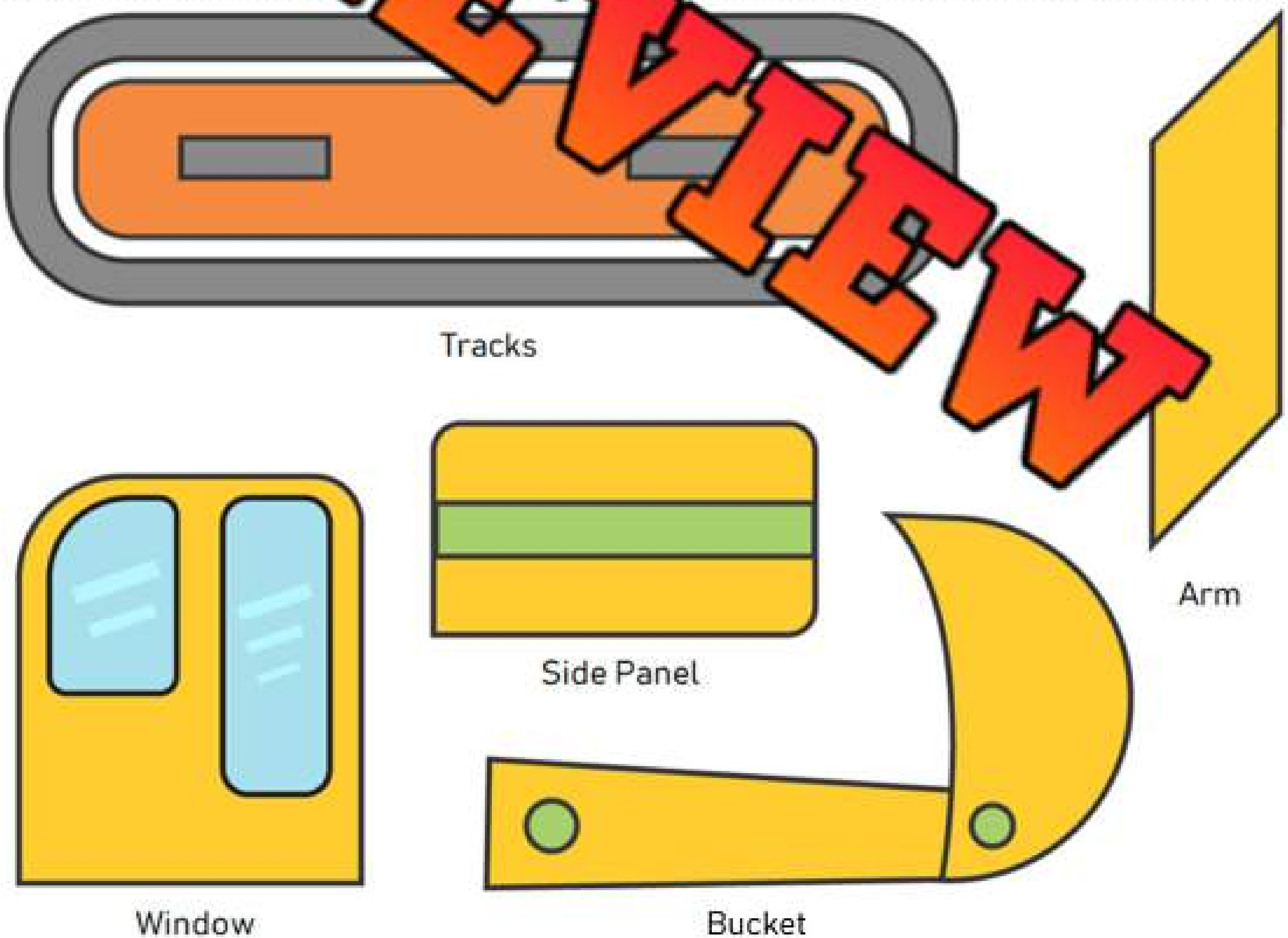
Curriculum Connection
CS.1

Coding - Making Compound Machines

Directions Follow the code to design an excavator

run program

- cut out all the shapes
- p[illegible] the tracks on the bottom
- [illegible]e window on the front of the tracks
- [illegible]he [illegible]anel behind the window
- paste t[illegible] th[illegible] front of the window
- paste [illegible]ket [illegible]



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Curriculum Connection
CS.1

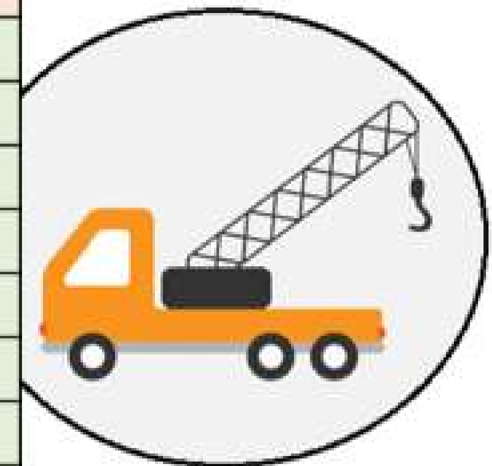
Directions Follow the code and paste the parts to make the excavator

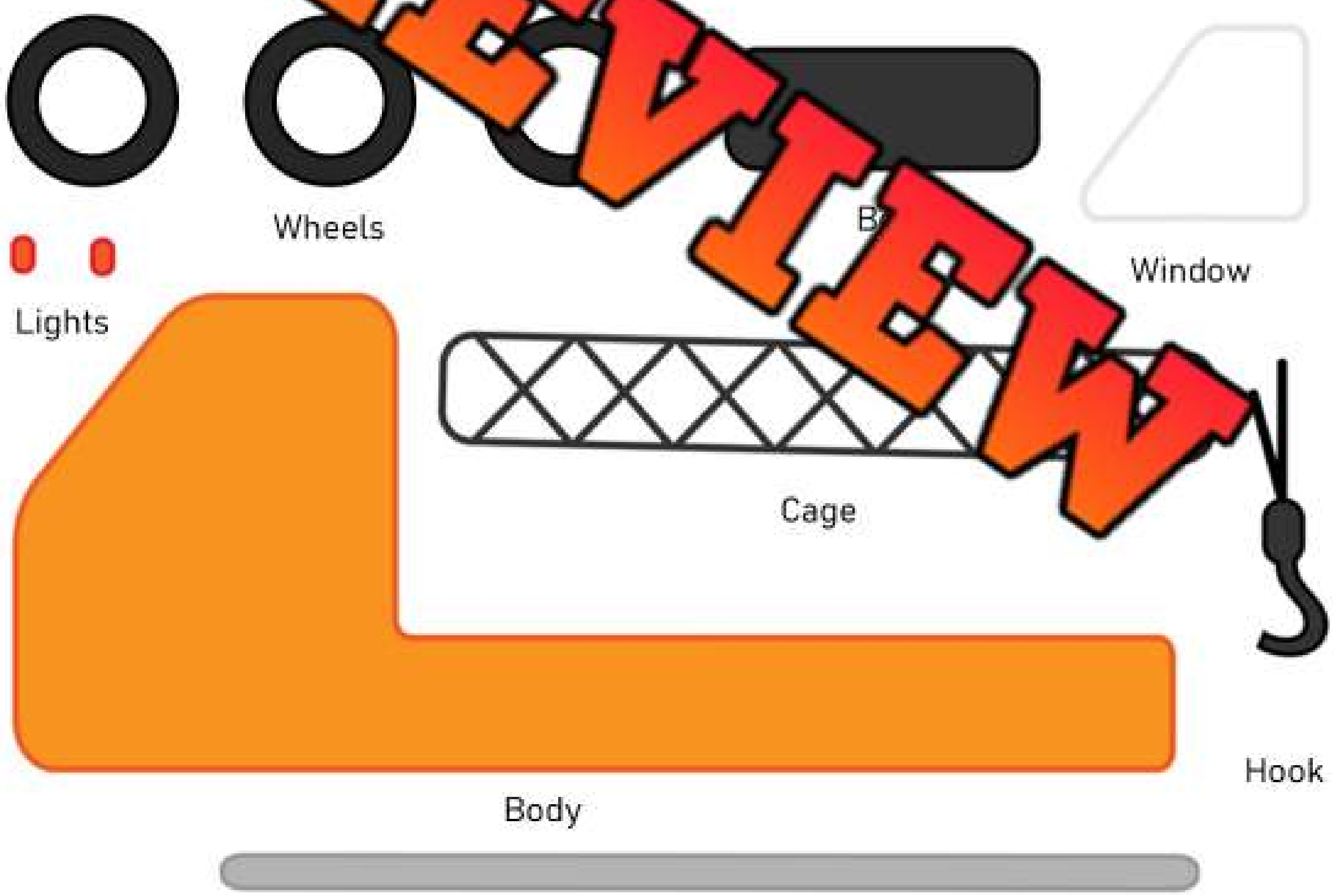
Name: ______________________ 95

Curriculum Connection
CS.1

Directions Follow the code to design a crane truck

run program
cut out all the shapes
paste the underbody on the bottom of the body
paste the wheels on the bottom of the body
paste t[illegible] lights on the front and back of the body
paste [illegible]dow on the front of the body
p[illegible] of the back of the body
pa[illegible]he ho[illegible]nd of the cage
paste the [illegible] bo[illegible]



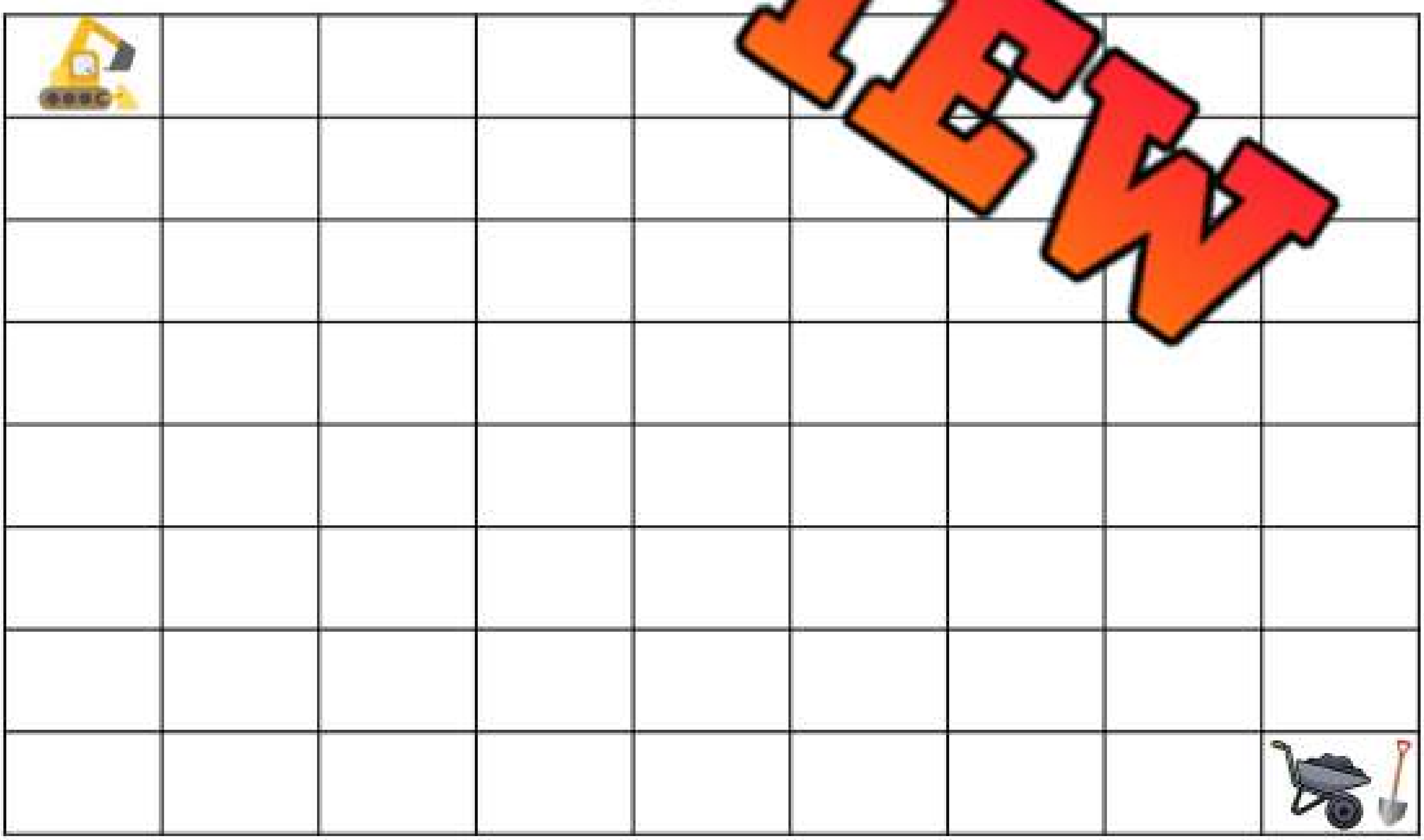


Name: ______________________ 96 Curriculum Connection CS.1

If Then Conditional Statements - Activity

Directions Follow the if/then statements to move the backhoe to the job site

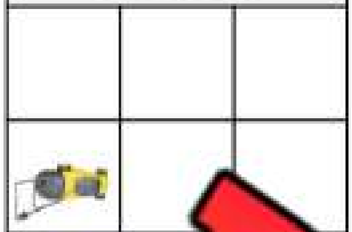
1)	If a lever has a fulcrum	then	Move ↓ 3 spots
2)	If a wedge is an inclined plane	then	Move → 4 spots
3)	If a ladder is a lever	then	Move ↓ 3 spots
4)	If [illegible] f a jar is a screw	then	Move → 4 spots
5)	[illegible] s [illegible] ge	then	Move ↓ 3 spots
6)	[illegible] pulle[illegible] igh feel lighter	then	Move ← 5 spots
7)	If a slid[illegible] ley	then	Move → 4 spots
8)	If a wheelbarr[illegible] r	then	Move ↓ 1 spots
9)	If a gravity is a pushi[illegible] ce	[illegible]hen	Move ↑ 3 spots
10)	If throwing a ball is a pushing [illegible]	[illegible]	Move → 5 spots



Name: ______________________ Curriculum Connection CS.1

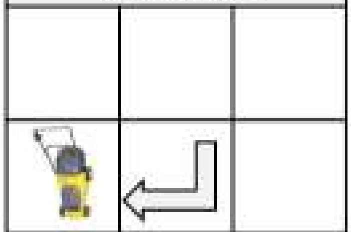
Coding - Robot Lawn Mower

This is a self-driving lawn mower



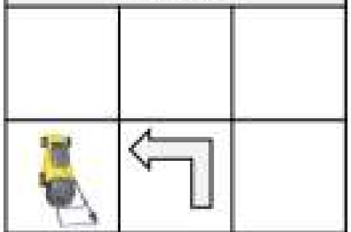
It under[illegible] co[illegible]

Right makes it turn right



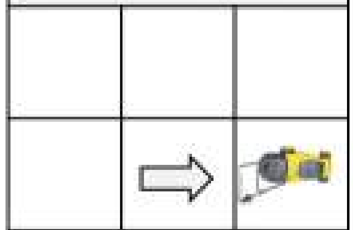
Right

Left makes it turn right



Left

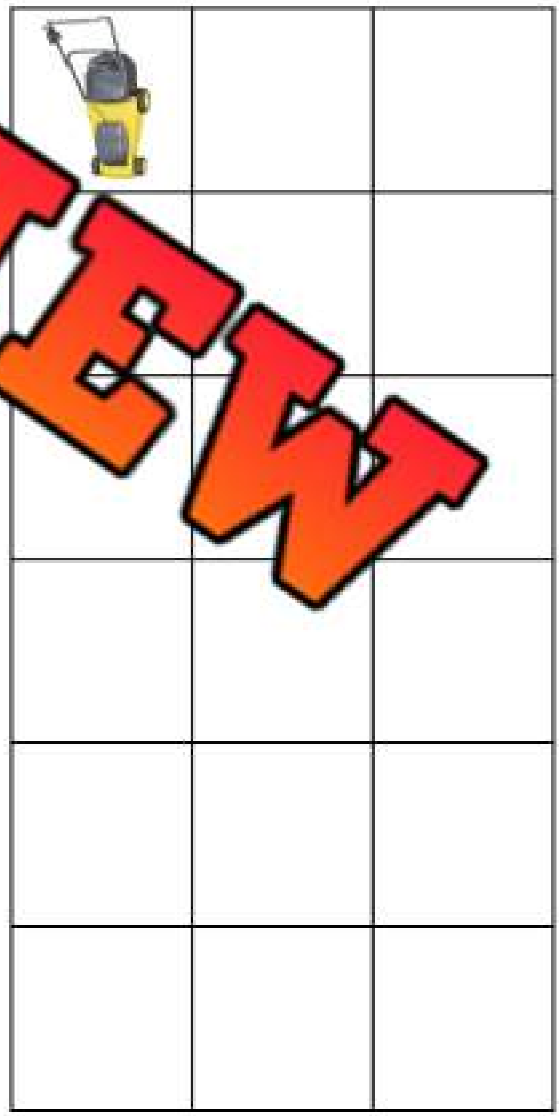
Forward makes the car move forward by the number shown



Forward 2

Directions [illegible] to [illegible] the lawn mower to cut the field of grass

Codes – Forward, [illegible]t, [illegible]ht	
Line 1	
Line 2	
Line 3	
Line 4	
Line 5	
Line 6	
Line 7	
Line 8	
Line 9	



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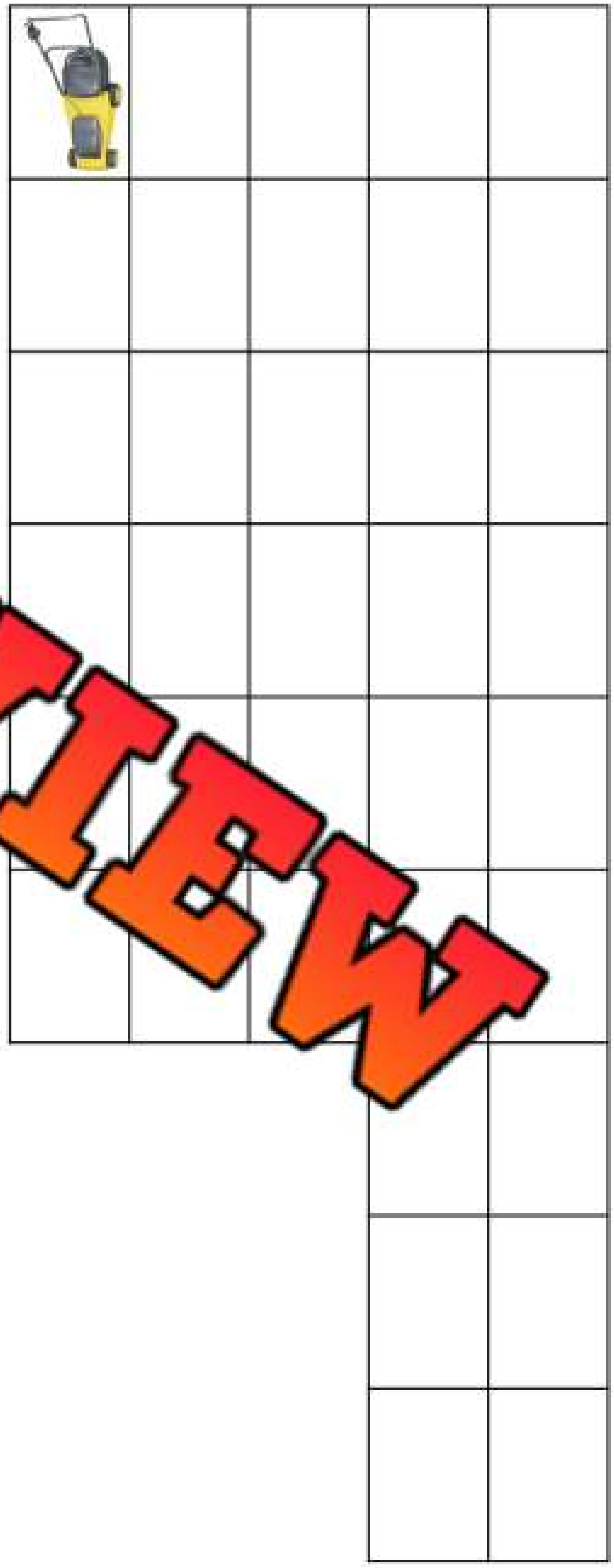
Curriculum Connection
CS.1

Directions Write code to get the lawn mower to cut the field of grass

Codes – Forward, Turn Left, Turn Right	
Line 1	
Line 2	
Line 3	
Line 4	
Line 5	
Line 6	
Line 7	
Line 8	
Line 9	
Line 10	
Line 11	
Line 12	
Line 13	
Line 14	
Line 15	
Line 16	
Line 17	
Line 18	
Line 19	
Line 20	
Line 21	



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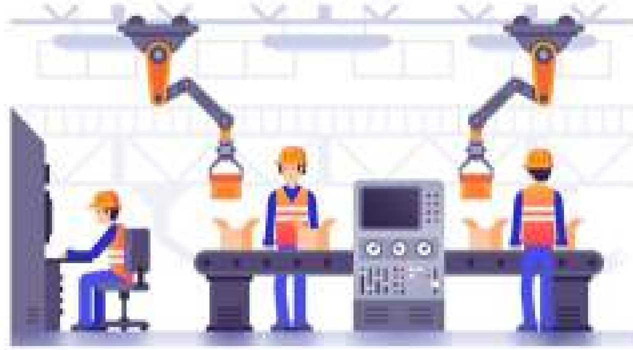
Coding - Robot Assembly Lines

Today, code is used to program robots to do work. Assembly lines use robots to do boring, unskilled work. Robots are good at:



- ✓ Working hard – they do not get tired
- ✓ Lifting heavy
- ✓ Working all day and night
- ✓ Doing dangerous work

We s[illegible]ed peop[illegible]e the robots. When a robot breaks, a human fixes the robot. People [illegible]e [illegible]ts to make sure they are working.

Fill in the Blanks [illegible] th[illegible]rds to fill in the blanks

W[illegible]					
night	hurt	cod[illegible]	rob[illegible]	hard	heavy

1) ______________ is written so robot[illegible]w wh[illegible]
2) Robots are good at working ______________.
3) Robots can work all day and all ______________
4) Robots don't get ______________ so they can do dangerous w[illegible]
5) Robots can lift ______________ things.
6) We need humans to fix ______________.

Question What would life be like without coding or robots?

____

____

____

Curriculum Connection
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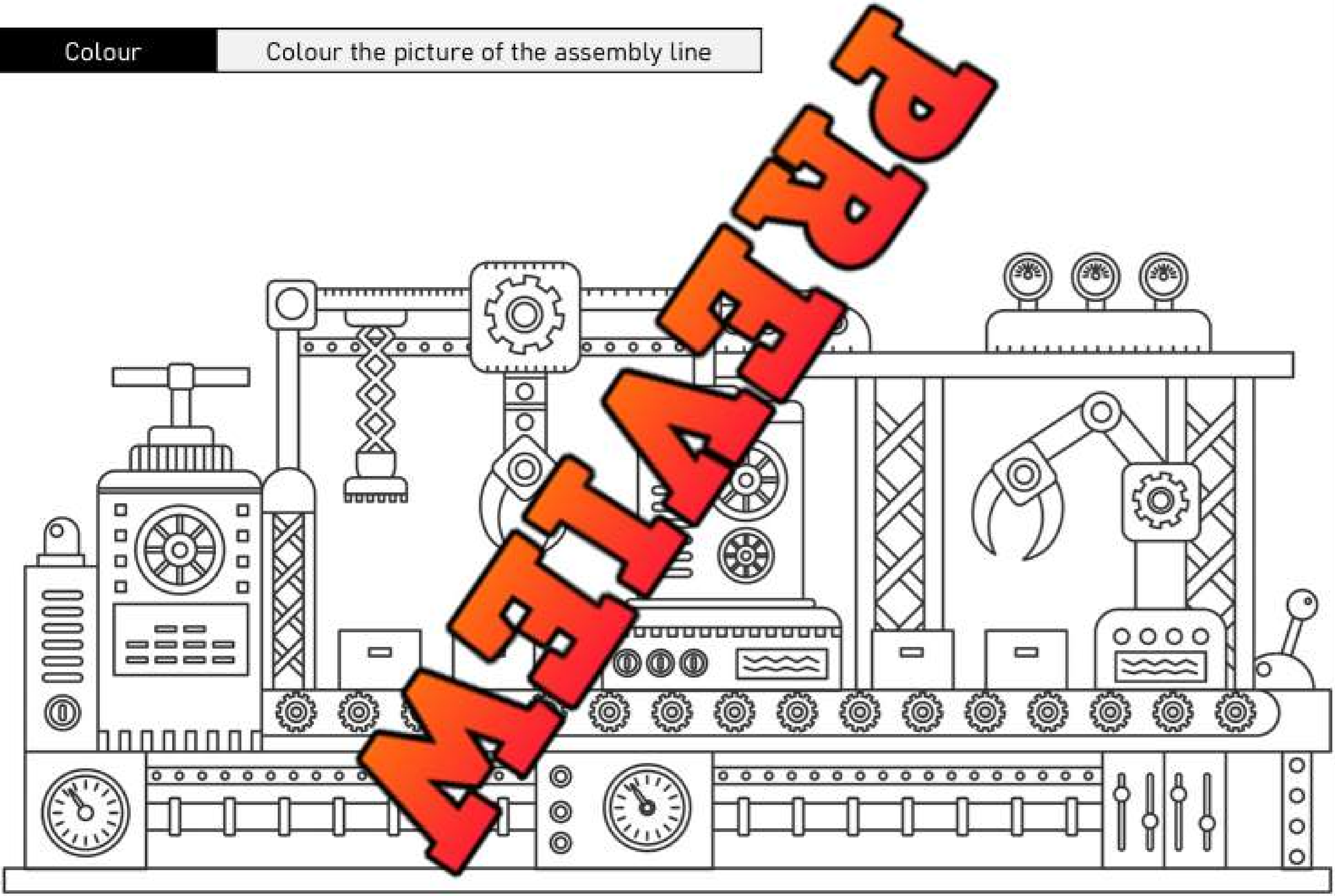
Colour	Colour the picture of the assembly line



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CS.1

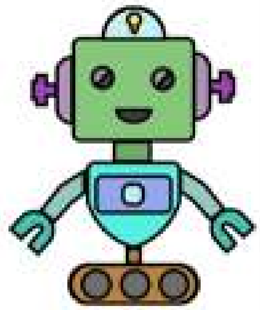
Questions Answer the questions below

1) What are the robots making?			
2) Do you think the robots make cars faster or slower than people?			
Faster		Slower	
3) What are the humans doing in the diagram? Circle the answers.			
Building	Carrying	Selling	Driving
Inspecting	Buying	Painting	Lifting

Robots - Simple Machines

Robots are helping the world in many ways. They are used in factories to make the things we use everyday. Without robots, humans would need to assemble the parts needed to make these things.

Robots use simple machines to get work done. Check out the simple machines used by robots on assembly lines.



- ✓ Wheel[illegible]d axles for wheels that allow robots to move around
- ✓ Lever[illegible]ork as arms for the robot to move things
- ✓ Robo[illegible]w[illegible]ols that are wedges or screws used to do work

Draw D[illegible]w a ro[illegible]heels, levers for arms, and tools for hands

Which simple machines does your robot have?

Name: ____________________ Date: ____________________

Units Test - Forces

Multiple Choice /10

1) A ladder is an example of a…

a) Wheel and Axle

b) Inclined Plane

c) Wedge

d) None of [illegible]ove

2) An example of a pulling force is…

a) Kicking a ball

b) Punching a punching bag

c) Playing tug of war

d) Pushing someone on a swing

3) When [illegible]ads squeeze a bike tire to [illegible]ce in action…

a) Elect[illegible]tic Fo[illegible]

b) Gravity

c) Friction

d) Muscular Force

4) A seesaw is an example of which type of simple machine?

a) Wedge

b) Lever

c) Inclined Plane

[illegible]Wheel and Axle

5) A knife is an example of whi[illegible] of simple machine?

a) Wedge

b) Lever

c) Inclined Plane

d) Wheel and Axle

6) [illegible] is an example of a…

a) Wh[illegible]nd

[illegible]ed Pl[illegible]

c) W[illegible]

d) None o[illegible]e

7) When skating on a rink, it is slippery because there isn't much…

a) Friction

b) Gravity

c) Pulling force

d) Pushing force

8) Which mater[illegible] ma[illegible] don't slip on the ground?

a) Plastic

b) Wood

c) Rubber

d) Glass

9) A slide on a playground is an…

a) Wheel and Axle

b) Inclined Plane

c) Wedge

d) None of the above

10) Using inclined planes makes our life…

a) Harder

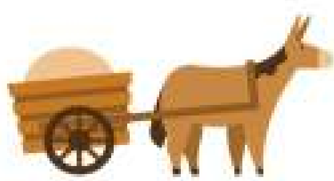
b) Easier

Fill in the Blanks | Circle the correct word for the blank

1)	1) A force is always a push or ________ (throw, pull)
2)	2) Gravity is a ________ force. (pushing, pulling)
3)	3) When sitting on a chair, the chair has a(n) ________ force. (balanced, unbalanced)
4)	4) When kicking a soccer ball, the ball has a(n) ________ force. (bal[illegible]d, unbalanced)
5)	5) I[illegible]ct has balanced forces acting on it, it will ________. [illegible]
6)	6) A bul[illegible] a ________ force. (strong, weak)
7)	7) A wheelb[illegible] is a[illegible] ________. (lever, inclined plane)
8)	8) A ladder is a ________ [illegible]er, inclined plane)
9)	9) An ulu is a ________ (wed[illegible]er[illegible]
10)	10) An antler can be used as a ________ [illegible] lever)

Directions | Is the picture a push or pull?

Push | Pull



Push | Pull

Push | Pull

Push | Pull

Push | Pull

Push | Pull

True or False — Is the statement true or false?

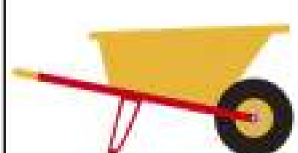
1) Friction on ice is strong	True	False
2) Tension is when we push a rope together	True	False
3) Tension is when we pull a rope apart	True	False
4) Elastic force happens when we stretch an object	True	False
5) When [illegible] y a ball, we use applied force	True	False
6) In [illegible] ne of t [illegible] pulling forces are used	True	False
7) A wheelba [illegible] inclin [illegible] e	True	False
8) You can't change the [illegible] of a [illegible] object	True	False
9) Force can be applied in all [illegible] ecti [illegible]	True	False
10) A bulldozer uses a weak force	True	False

Label — Which simple machine is in the picture?

Lever	Wedge	Inclined Plane	W[illegible]

1) 

2) 

3) 

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