Workbook Preview

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Grade 2 – Science Unit

Simple Machines and Movement

	Curriculum Expectations	Pages
D1.1	assess the impact of simple machines on the daily lives of people in various communities	88-97, 114-115
D1.2	assess the impact on the environment of technologies that use simple machines to facilitate	111-113
D2.1		
D2.2	identify ways in which the position of an object can be changed	18-20, 24-26, 29-31
D2.3	identify the six basic types of simple machines: lever, inclined plane, wedge, pulley, wheel and axle, and screw	32-36, 39-50, 54-55, 64-68, 73-78, 80-82, 86-94
D2.4	describe ways in which each type of simple machine is used in daily life to make tasks easier	39-47, 51-52, 54-55, 64-68, 73-78, 80-82, 86-87
D2.5	compare, qualitatively or quantitatively, the force required to move an object using various simple machines to the force required to move the object without using a simple machine	45-47, 51-54, 56-59, 62-63, 71-79, 83

Preview of 80 pages from this product that contains 177 pages total.

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Grade 2 Science Unit

Strand A - STEM Investigation and Communication Skills



	Curriculum Expectations	Pages
A1.1	use a scientific research process and associated skills to conduct investigations	27-28, 99-100
A1.2	use a scientific experimentation process and associated skills to conduct investigations	16-17, 21-23, 84-85, 98
A1.3	use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems	60-61, 69-70
A1.4	follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials	16-17, 21-23, 60-61, 69-70, 84-85
A1.5	communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes	16-17, 21-23, 60-61, 69-70, 84-85
A2.1	write and execute code in investigations and when modelling concepts, with a focus on decomposing problems into smaller steps	16-17, 37-38, 101-106
A2.2	identify and describe impacts of coding and of emerging technologies on everyday life	37-38, 107-110
A3.1	describe practical applications of science and technology concepts in their home and community, and how these applications address real-world problems	99-100
A3.2	investigate how science and technology can be used with other subject areas to address real-world problems	99-100
A3.3	analyse contributions to science and technology from various communities	107-110

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SIMPLE MACHINES AND MOVEMENT



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Name: _____ 18

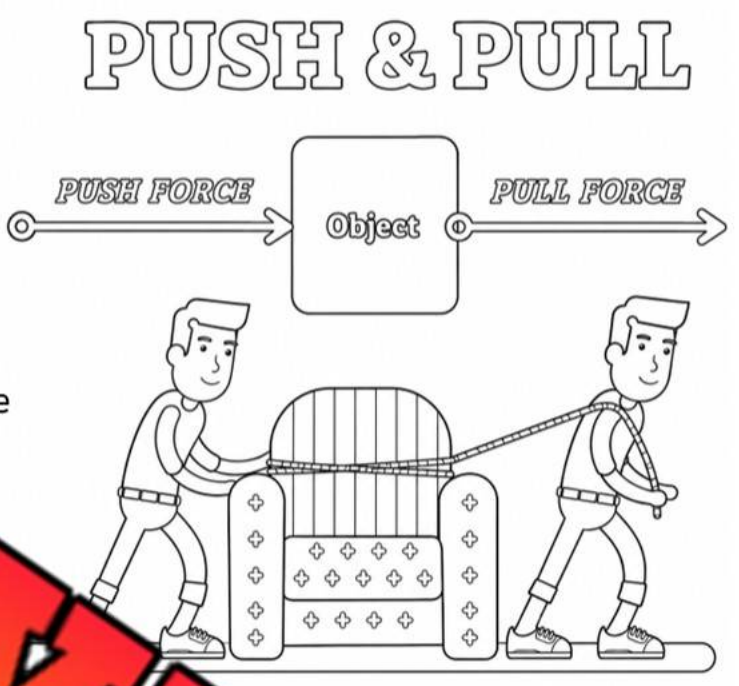
Curriculum Connection
D2.2

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 y e pushed a book acros esk to s you, or maybe they pulled a yo nds. These are two ex s of a pull forces that caused s o mov

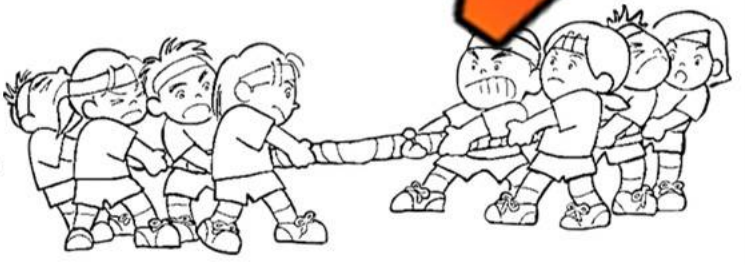


PREVIEW



Pushing Forc

A **push** is when we mov objec from us. The child on this swing is the obj ein an is pushing the child using a pushing for man 't apply enough pushing force, the child wo t 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

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Curriculum Connection
D2.2



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) Climbi e	Push	Pull

PREVIEW

Think

Give an of a push and a pull force.



Push	
Pull	

Visualizing

Draw what you were picturing while you were readin ure.

_____

_____

_____

_____

_____

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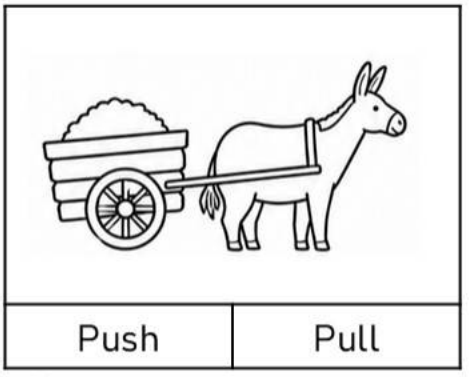
Curriculum Connection
D2.2

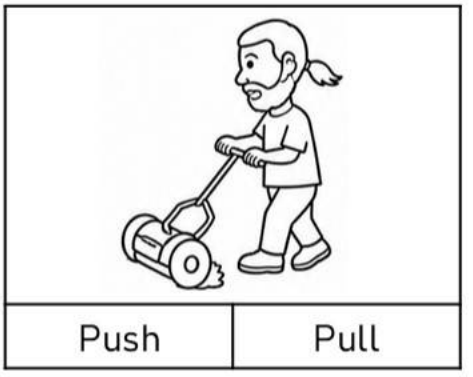
Push or Pull?

Directions Is the picture a push or pull?

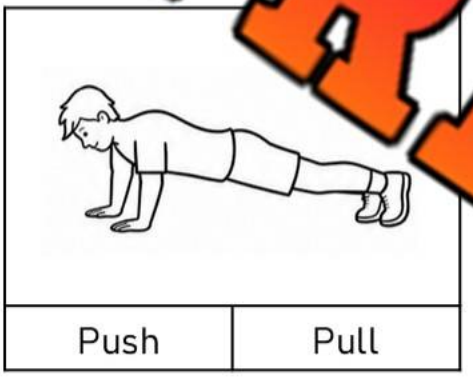




Push	Pull



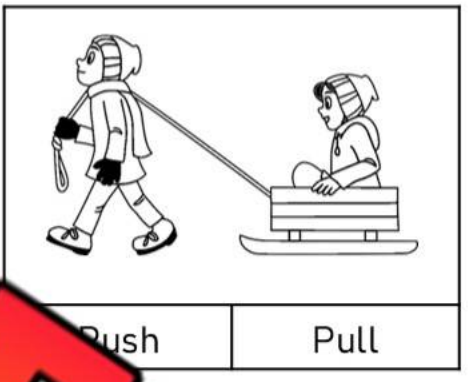
Push	Pull



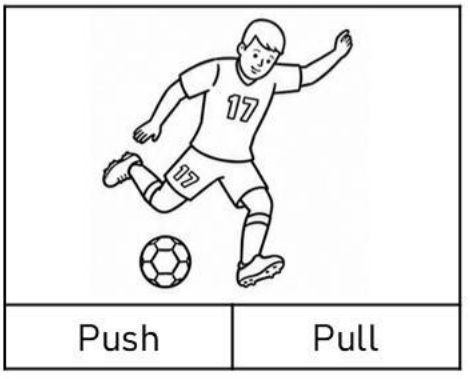
Push	Pull



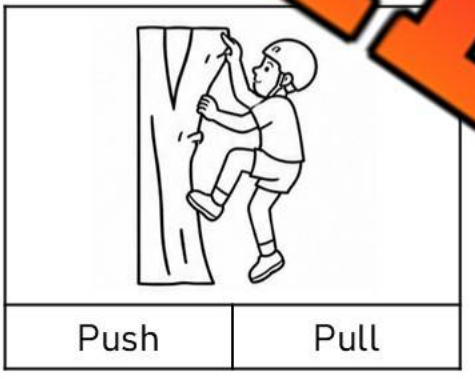
Push	



Push	Pull



Push	Pull



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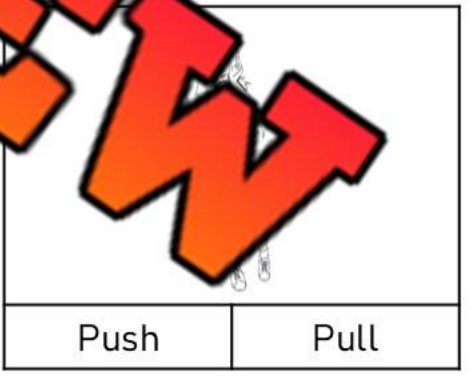
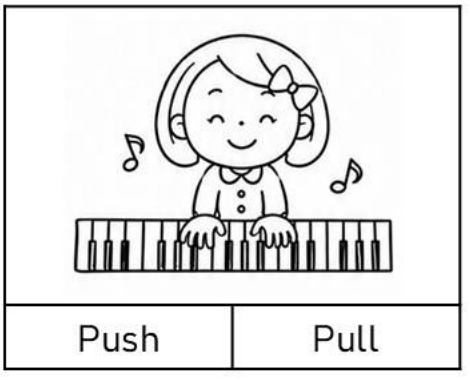
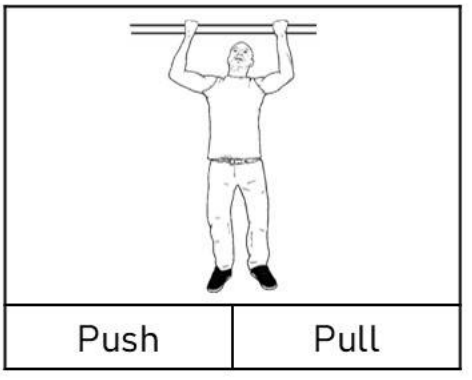


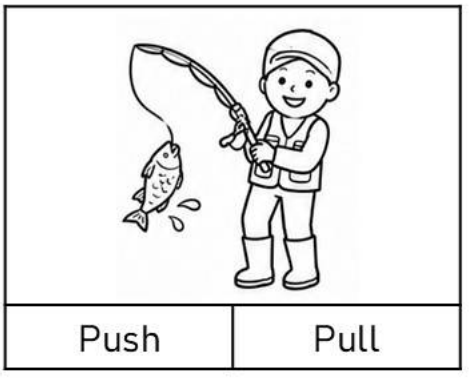
Push	Pull



Push	Pull



Push	Pull



Push	Pull

PREVIEW

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Name: _____ 21

Curriculum Connection
A1.2, A1.4, A1.5

Gravity – Push/Pull Activity

Research Question
What are we learning about?

A **pull** is when you bring an object closer to you. A **push** is when you move an object away from you.

The Earth has gravity. **Gravity** is a force that is always pulling us toward the center of the Earth. When you jump, you are being pulled by the Earth's gravity down to the ground.

PREVIEW

Materials
What you will need for the experiment:

- ❑ Hill
- ❑ Timer – or have students count
- ❑ Objects that roll
  1) Soccer ball
  2) Tennis ball
  3) Soda can
  4) Ping pong ball or golf ball
  5) Big yoga ball



Procedure
How you will complete the experiment:

1) Write the objects you have on the back of the page
2) Rank which object will roll to the bottom the fastest (1) and the slowest (5 – if you have 5 objects)
3) Take your objects to a hill to test your hypothesis
4) Roll the objects and use the timer or count how long it takes for the objects to reach the bottom of the hill

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Curriculum Connection
A1.2, A1.4, A1.5

Hypothesis Which objects will you use? Which will be the fastest? Slowest?

Objects Write them Below	**Ranking** 1 = Fastest, 6 = slowest

PREVIEW

Observations How long did each b[illegible]ake[illegible]ll down the hill?

Objects – Write them Below	**Time –** S[illegible]s



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Curriculum Connection
A1.2, A1.4, A1.5

Results Answer the questions below.

1) Which objects rolled to the bottom the fastest?

2) Did bigge[illegible]ier [illegible]cts roll faster? Or was it the lighter and smaller objec[illegible]plain

3) What is gravity? Is it a pulling or pushi[illegible]f

4) Why do the objects end up at the bottom of the hill? Why don't they stop in the middle?

PREVIEW

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Name: _____ 24

Curriculum Connection
D2.2

Force

What Makes Things Move?

Things move when we exert a force on them. Things do not have force inside them. Another object or living being exerts force to cause the movement.

A bulldozer exerts force on a sand pile to move the sand. People and animals have muscles inside them that can produce force. A person can exert force to p wing. A horse can exert force to pull a wagon.



Speed o

Thing move at speeds. When we push someone gently on a swing, the swing moves s e harder, the swing moves faster and farther. As we p er, we more force.



When we ride o i e slowly or fast. When we pedal fast, we are using mo and g r.

PREVIEW

Fill in the Blanks

Write the miss rd on e

1) Movement happens when we exert _____

2) When we pedal our bicycles hard, we are exerting mo _____

3) Humans have _____ that can produce force

4) Things do not have _____ inside them.

5) When we push gently, we are using _____ force.

Making Connections

What does the reading remind you of in your life?

This reminds me of the time _____

_____

_____

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Curriculum Connection
D2.2

Exit Cards

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

Name: _____

Order the actions from LEAST force to MOST force using numbers from 1–4.

Push a [illegible]	Push a toy car softly	Pull a heavy wagon	Pedal a bicycle fast
☐	☐	☐	☐

Name: _____

Order the actions from LEAST force to [illegible]

Push a swing gently	Push a toy car softly	[illegible]	[illegible] a bicycle fast
☐	☐	☐	☐

Name: _____

Order the actions from LEAST force to MOST force using numbers from 1–4.

Push a swing gently	Push a toy car softly	Pull a heavy wagon	Pedal a bicycle fast
☐	☐	☐	☐

PREVIEW

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Name: _____ 26

Curriculum Connection
D2.2

Gravity – A Pulling Force

What is Gravity?

Gravity is the force that pulls objects to the centre of the Earth. Without gravity pulling us, we would fall right off the Earth's surface and float away! Gravity is also the reason why when you throw a ball into the air, it comes back down.



When you throw a ball, you are applying a pushing force by pushing it air. Gravity's force is much stronger than yours. This me be pulled back down.

Grav our We

Our weight is ity. ht is the measurement of the force of gravity pulling us down. This me weig rd gravity is pulling us towards the Earth's surface. On other plane moo eigh a different amount because their gravitational pull is stronge er.

PREVIEW

Draw Draw a sport where gravity cts the in the picture.

Questioning Write two questions you have after reading the text.

1)	
2)	

Name: _____ 32

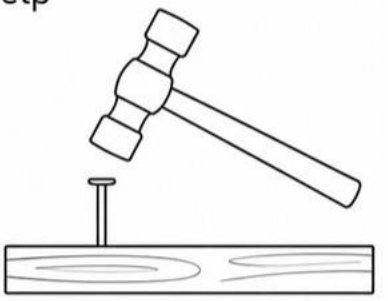
Curriculum Connection
D2.3

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]**e** [illegible]ything that makes a force stronger.



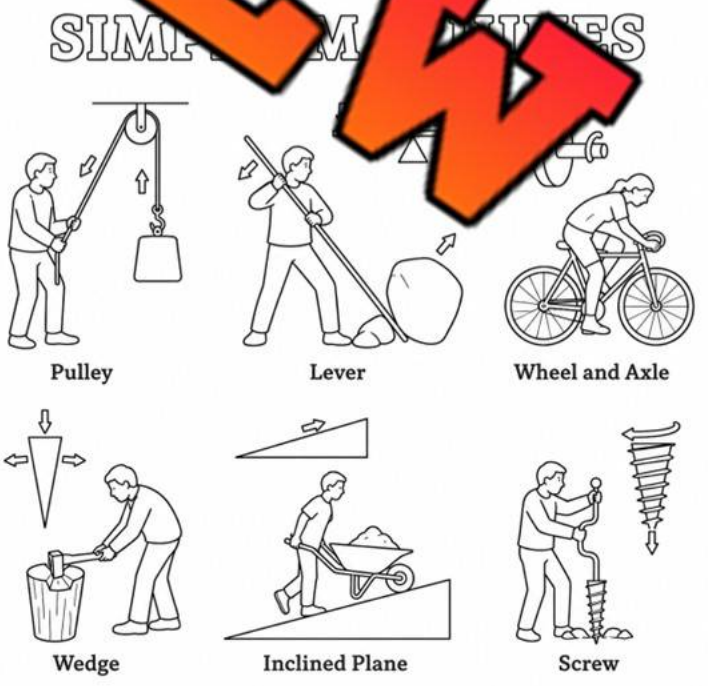
[illegible] is [illegible]hine because it makes a stronger force on a nail. [illegible] fo[illegible] are also machines because they [illegible] force[illegible] so we can eat our food.

For example, if you t[illegible]ut [illegible]ea[illegible] your hands, you would struggle. If you use a knife, the force you mak[illegible]e kn[illegible] tronger on the steak. When we hit a nail with a hammer, the handle of the h[illegible]mer [illegible]ses the force you apply. The longer the hammer, the stronger [illegible]rce [illegible] [illegible]ledge 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.



PREVIEW

Name: _____ 33

Curriculum Connection
D2.3

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 is an example of a pulley	True	False
5) A bicyc[illegible] a wheel and axle	True	False

Ques[illegible]

A[illegible] questions below.

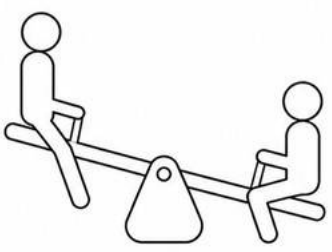
1) What is a ma[illegible] y do [illegible] hem?

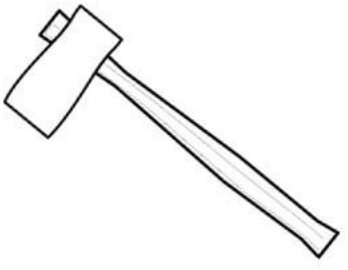
2) When have you used a simple machine?

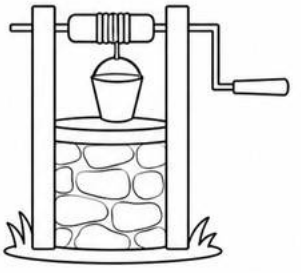
PREVIEW

Label

Which simple machine is in the picture?







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Name: _____ 35

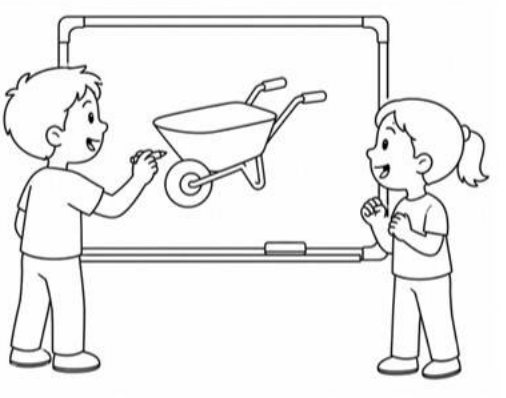
Curriculum Connection
D2.3

Activity – Simple Machine Pictionary

Objective

What are we learning about?

Students will identify simple machines used in everyday objects and explain how they help people move objects or make work easier.



Materials

What will we need for the activity?

- White board
- Markers
- Cards with simple machines words

PREVIEW

Instructions

How will we complete the activity?

1) Split the class into two teams, made by rows or groups of desks.
2) Have one student from Team A come up and pick a card. They should keep the card a secret from everyone else.
3) The student then draws what's on the card on a whiteboard using only lines and shapes.
4) Start a timer for 2 minutes. During this time, Team A tries to guess what is being drawn.
5) If Team A guesses the drawing correctly before the timer goes off, they earn a point.
6) Next, it's Team B's turn. A student from Team B picks a card and draws, while their team guesses.
7) Alternate turns between the two teams, letting different students draw each time.
8) Continue the game until all the cards have been used. Keep track of points for each team.
9) At the end, count the points. The team with the most points is the winner.

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Name: _____ 36

Curriculum Connection
D2.3

Pictionary Topics | Cut out the topics below.

Pictionary Cards	
Scissors	Ramp
Bicycle	Wagon
[illegible]	Hammer
[illegible]	Axe
Pulley	Shovel
Wheelbarrow	[illegible]rane
Doorknob	[illegible]eesa[illegible]
Knife	[illegible]
Stairs	Cart
Nail	Skateboard
Elevator	Toy car
Swing	Wheel

PREVIEW

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Name: _____ 37

Curriculum Connection
A2.1, A2.2

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 in the commands below with your own ideas

Can I lift the heavy box by myself?

IF the box is too heavy

ELSE



THEN

_____

_____

_____

_____

Do I need help pulling the bucket from the well?

IF the bucket is too heavy

THEN

_____

_____

_____

ELSE

_____

_____

_____

_____



PREVIEW

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Name: _____ 38

Curriculum Connection
A2.1, A2.2

Directions Fill in the ELSE commands below with your own ideas

Is the nail hard to push into the wood?

IF the nail will not go into the wood

THEN

ELSE



Is the jar lid too tight to open?

IF the jar lid is too tight

THEN

ELSE



Could I get hit on the head in this game?

IF I get hit on the head in this game?

THEN

ELSE



PREVIEW

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Name: _____ 39

Curriculum Connection
D2.3, D2.4

Wheel and Axle

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 spin if it is pushed or pulled. This machine can help move loads and als

cycle ar re examples of machines that use a wheel and axle to move objects wheel and axle to lift objects. A winch is an example of a wi d axl ift a heavy object.

PREVIEW



Example – A Well

A well often uses a wheel and axle t ter f the ground. In this example, turning t wheel s th rope around the rod which lifts the bucket. ply a movement to the crank which lifts the load straigh

Stronger Force

If we dragged a cart across the ground, the friction would mak d o move anything heavy. **Friction** is a force that makes it hard to slide an obje 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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Name: _____ 40

Curriculum Connection
D2.3, D2.4



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]on of the wheel didn't change much	True	False

PREVIEW

Questi[illegible] [illegible]sw[illegible] questions below.



1) What is a w[illegible]ar[illegible]te ?

_____

_____

_____

2) When have you used a wheel and axle?

_____

_____

_____

Visualizing Draw what you were picturing while you were reading. Explain the picture.

_____

_____

_____

_____

_____

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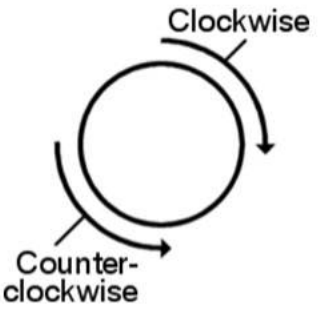
Name: _____ 41

Curriculum Connection
D2.3, D2.4

Wheel and Axle - Clockwise/Counter-Clockwise

Clockwise and Counter-Clockwise Turns

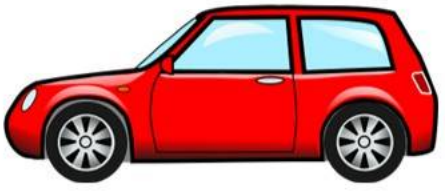


When something moves in a circle, it can move either clockwise or counter-clockwise. **Clockwise** means the object moves in the same direction as the hands on a clock. **Counterclockwise** means th ct moves in the opposite direction of a clock.

W turns, it moves either clockwise or counter-clockwise. If you are right si ar when looking at the front, the wheels will move counter-cloc ar s backwards, these wheels will move counter-clockwise.

PREVIEW

Questions Which direction wh e turn?



1)	If the car move war	
2)	If the car moves ba	



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



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

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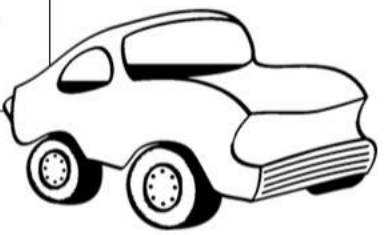
Name: _____ 42

Curriculum Connection
D2.3, D2.4

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] of the car from the bottom.

2) Can each wheel spin on its [illegible]? Yes No

3) What materials are the wheel and [illegible] made [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

PREVIEW

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Name: _____ 43

Curriculum Connection
D2.3, D2.4

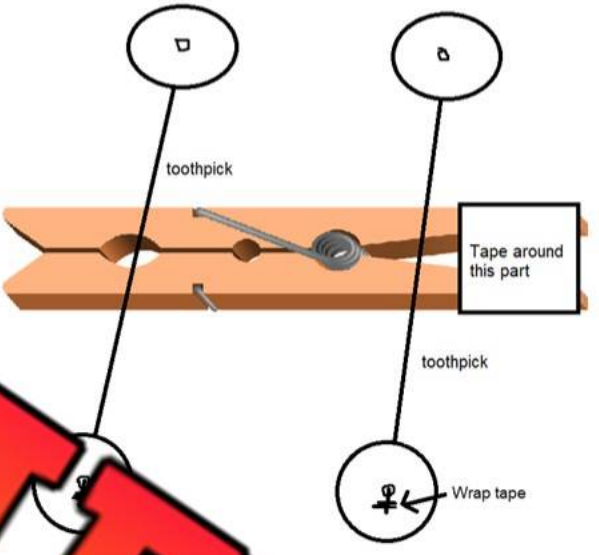
Activity - Clothespin Car

Research Question — What are we learning about?

The goal of this activity is to build a vehicle that has moving parts. We will be building a vehicle that has axles for the wheels to spin around.

Materials — What will you need for the experiment?

- ❑ 1
- ❑ 4 w ls (cu board circles, or buttons/p with a the middle)
- ❑ 2 wooden tooth s o rs (about 5 – 8 cm wide xles)
- ❑ Masking tape
- ❑ Glue – optional



Method — How will you complete the experimen

1) Build the wheel and axle. Put the toothpick through hol of your wheels. Put two wheels on one toothpick

2) Tape a thin layer around the very end of the toothpicks. This is t p the wheel from sliding off the axle (toothpick). You could also tape around the inside of the wheel to stop the wheel from sliding in towards the car.

3) Connect your axle to your car. Take the toothpick and wheels and put one between the groove on the front of the clothespin. You can glue or tape it down for additional strength

4) Put the other toothpick and wheels into the back of the clothespin, up against the spring. Secure it there by taping around the end.

5) Test your car by sliding it along a flat surface or by making a ramp.

PREVIEW

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Name: _____ 44

Curriculum Connection
D2.3, D2.4

Diagram Draw a picture of your clothespin car. Label the wheels, axles, and body of the car.

Results Answ[illegible] quest[illegible]

1) What would happen if [illegible]ls w[illegible]ed to the axle? Would the tires spin?

2) Were the wheels grippy enough to spin on the g[illegible]? Why ar[illegible]py wheels important for toy cars and real cars? Use the term fric[illegible] yo[illegible]

3) How could you improve the design of your car? What would you do differently?

PREVIEW

Name: _____ 45

Curriculum Connection
D2.3, D2.4, D2.5

Gears

What are Gears?

A **gear** is a wheel with teeth that slot together. When one gear turns, the other turns as well. Gears are made in different sizes with different number of teeth. When we connect a smaller gear to a larger gear, we can make a small force much bigger.

For example, the picture shows a gear with 8 teeth spinning a gear with 16 teeth. If we spin the small gear, it will be two times easier to spin the larger gear. It will also spin much slower, as one rotation of the smaller gear will only rotate the bigger gear half way.



Bicycles

Bicycles use gears that are connected by a chain. The chain works the same way as a gear because it has teeth that connect to the gears. One gear is on the pedals and the other is on the back wheel.

As you pedal a larger gear, the chain transfers the turning force from the pedals to make the gear on the wheel go around and move the bike along. On many bikes, the gears are different sizes so that you can change the gear.



When you want your bike to go fast, you switch the pedal gear to a larger gear that has more teeth. If the pedal gear has 20 teeth and the smaller gear on the wheel only has 10, your wheel will rotate twice as fast as your pedal gear. Your force has been made twice as strong, but it will be twice as hard to pedal. This is great for going downhill.

When you are going uphill, you want to use less force into the pedal. So you should change the pedal gear to the smallest and the wheel gear the biggest. It will be easy to turn the small gear, but you won't move the wheel gear as much.

PREVIEW

Name: _____ 46

Curriculum Connection
D2.3, D2.4, D2.5



Questions
Answer the questions below.

1) What is a gear?

2) If you a[illegible] uphill, should your pedal gear be bigger or smaller than your wheel gear?

PREVIEW

Making Connections
Whe[illegible]ve y[illegible]?

True or False
Is the statement true or false?

1) A bigger gear needs less force to turn it	True	False
2) A smaller gear needs less force to turn it	True	False
3) A bicycle uses two separate gears connected by a chain	True	False
4) To make pedaling easy, use a smaller pedal gear	True	False
5) A bicycle gear system will work without a chain	True	False

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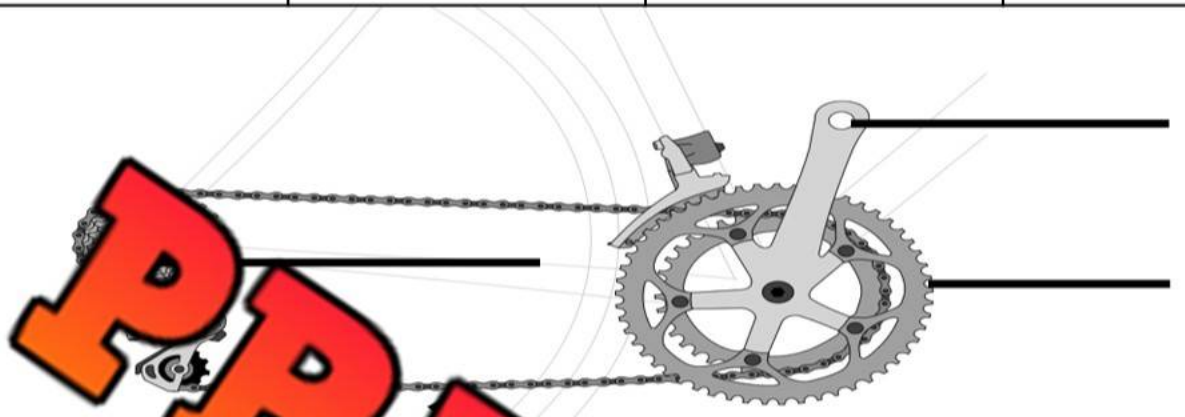
Name: _____ 48

Curriculum Connection
D2.3

Bicycle – Diagram

Word Bank			
Gears – Back Wheel	Chain	Gears - Pedal	Pedal



PREVIEW

Components of a Bicycle	What Does It Do?
Gears – Back Wheel	
Chain	
Gears – Pedals	
Pedals	

Draw Draw a bike with a gear system.

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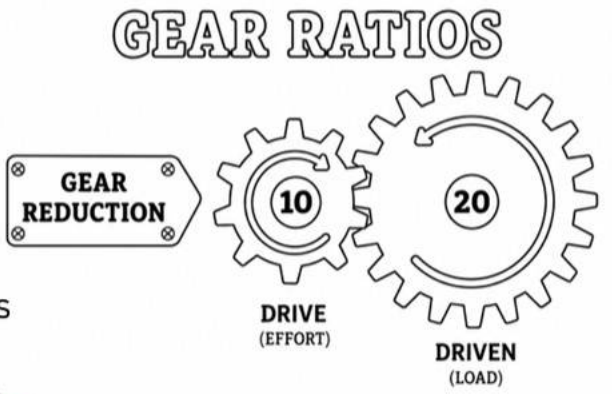
Curriculum Connection
D2.4, D2.5

Gear Ratio

Gears – Increasing Force and Speed

Gears are used to increase the force from the drive gear to the driven gear. They are also used to spin a driven gear faster. Finding out the gear ratio tells us how much our force or speed is increased.



Exampl[illegible]

Top [illegible] Ratio

The gear ratio [illegible] pu[illegible]r is 10 to 20. Since 10 is half [illegible] when [illegible]ear spins one time, the driven ge[illegible] spins h[illegible]

Since the drive gear is [illegible]ter, [illegible] easy to spin. This means our force w[illegible] stronger from the driven gear. If we put 10 Newtons (N) of force into the drive gear, it would make double the force out of the driven ge[illegible] So, you would make 20 N of force!



PREVIEW

Button Gear Ratio

The bottom gear ratio is 20 to 10. We know that 20 is twice as big as 10. This means when we spin the drive gear once, it will spin the driven gear two times. This means our speed is faster.

Imagine a bike. If we use this ratio, when we pedal one time around, our bike tire will spin two times. This means we move further with just one pedal.

The problem is our force is weaker. It will be harder to move the bigger drive gear. If we use 10 N of force into the drive gear, our driven gear will get only 5 N.

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Name: _____ 52

Curriculum Connection
D2.4, D2.5



True or False Is the statement true or false?

1) A smaller drive gear is easier to turn	True	False
2) A smaller drive gear makes more force	True	False
3) A smaller drive gear makes more speed	True	False
4) A larger drive gear makes more speed	True	False
5) A large[illegible]rive gear makes more force	True	False

Questio[illegible] [illegible]the questions below.

1) If you were bi[illegible] wo[illegible] you want a smaller or bigger drive gear? Explain.

2) If you were trying to go fast, would [illegible]want a [illegible] bigger drive gear? Explain.

PREVIEW

Draw Draw a picture of the different gear ratios below.

5 to 10	**12 to 6**

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Name: _____ 53

Curriculum Connection
D2.5

Gear Ratio

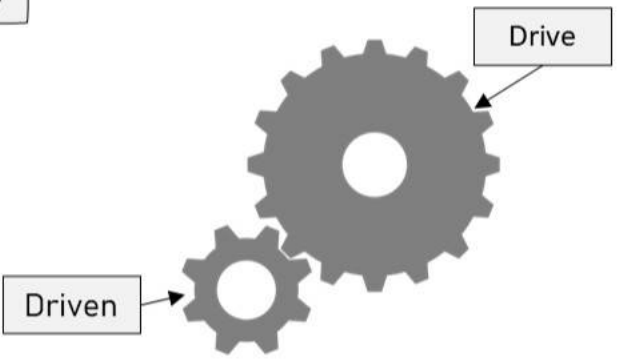
Questions Fill in the table by reading the diagrams.

1)



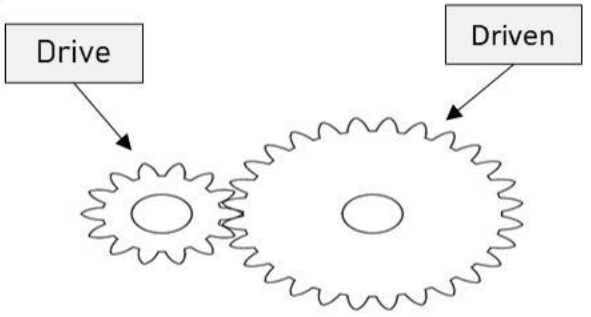
Gear R	
Speed or Force?	
10 N into Drive Gear. How many N in Driven gear?	
How many rotations of Driven gear?	

2)



Gear Ratio	
Speed or Force?	
into Drive Gear. How in Driven gear?	
tations of Drive	

3)



Gear Ratio	
Speed or Force?	
10 N into Drive Gear. How many N in Driven gear?	
How many rotations of Driven gear?	

4)



Gear Ratio	
Speed or Force?	
10 N into Drive Gear. How many N in Driven gear?	
How many rotations of Driven gear?	

PREVIEW

Name: _____ 54

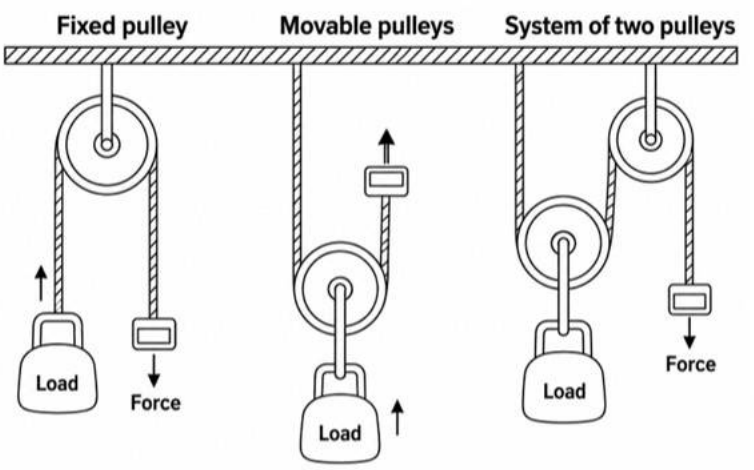
Curriculum Connection
D2.3, D2.4, D2.5

Types of Pulleys

Types of Pulleys

There are three main types of pulleys.

1) Fixed Pulley
2) Moveable Pulleys
3) Syste[illegible] Two Pulleys – Com[illegible]lleys



PREVIEW

Fixed [illegible]y

A **fixed pulley** [illegible]ove. [illegible]ften fixed to a ceiling or a wall. When you pull down on the rope, [illegible]ame [illegible]n [illegible]ce is applied to the load moving up. A fixed pulley does not make ou[illegible] stronge[illegible] changes the direction of our force.

A fixed pulley is great w[illegible] you [illegible] the direction of your force. Since it is easier to pull down than pu[illegible]ixed p[illegible]re great at lifting things up into the air. A flag pole uses a fixed pulley. Whe[illegible] pull [illegible] down, the flag goes up.

Moveable Pulley

A **moveable pulley** moves with the load. It does not change the di[illegible]rce but it does make your force two times stronger. If you want to move a[illegible]t up, you will still need to pull upwards, but the load will feel half as heavy.

Two Pulley System – Compound Pulleys

A **compound pulley** is a system of two or more pulleys. For a two pulley system that has a moveable pulley, your force will be multiplied by two. You can determine the advantage by counting the number of rope sections supporting the load.

In the diagram, you'll notice 2 rope sections supporting the load, so your force is multiplied by two. A three-pulley system could provide an advantage of 3 times.

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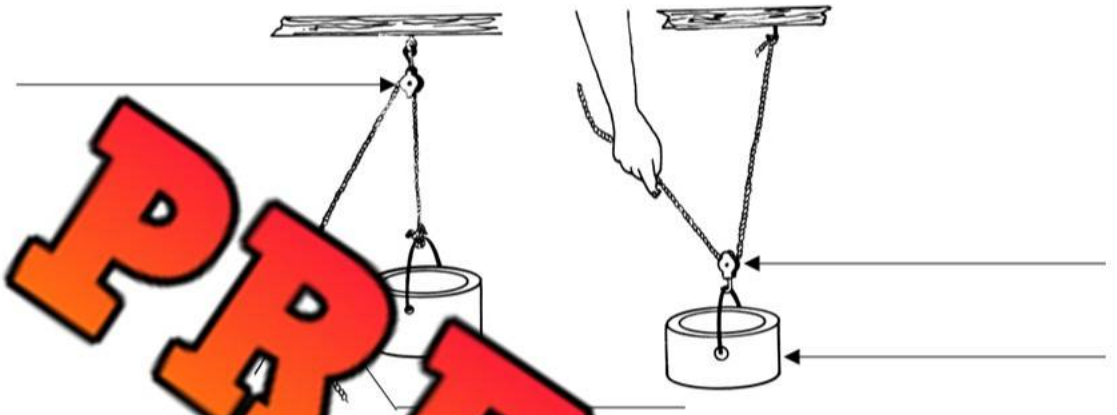
Curriculum Connection
D2.3, D2.4

Diagram

Label the diagram using the terms from the word bank.

Word Bank			
Effort	Load	Fixed Pulley	Moveable Pulley



Definitions

What do[illegible] the ter[illegible]n?

Fixed Pulley	
Moveable Pulley	
Compound Pulley	

Making Connections

When have you ever used a pulley?

PREVIEW

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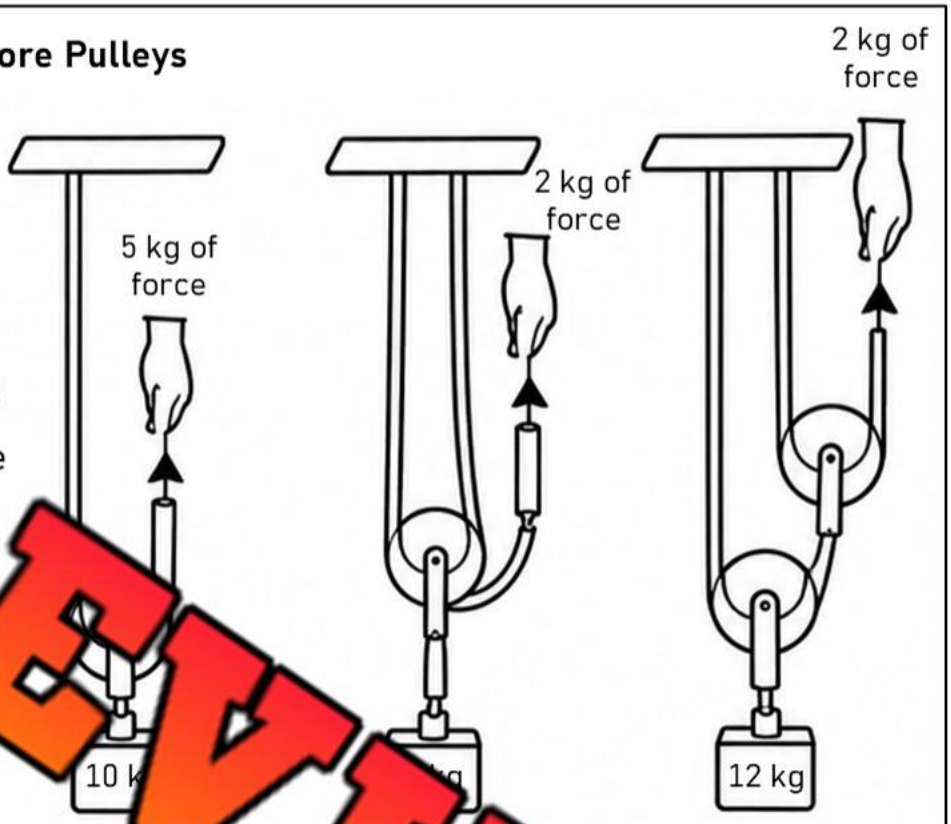
Pulleys

Compound Pulleys – 2 Or More Pulleys



When we use two or more pulleys together, we are making our force even stro

M advantage is h ce is increased b e pulley system w sing.

We can calcula mechanical advantage in a pulley system by counting the number of supporting ropes that are holdi the

Pulley # 1

In the first pulley, two ropes are supporting the 10 This the mechanical advantage is 2. To lift the load, you'll need 5 of f because our 5 kg of force is multiplied by 2, which is enough f 10 kg load.

Pulley # 2

In the second example, there are 4 ropes supporting the load. Therefore, the mechanical advantage is 4. This means a force of 2 kg could lift the 8kg load.

Pulley # 3

In the last example, there are 6 ropes supporting the load. A load of 12 kg could be lifted with only 2 kg of force. Imagine trying to lift something 600 kg. Using this pulley system would mean you'd only need to use 100 kg of force.

PREVIEW

Name: _____ 57

Curriculum Connection
D2.5



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

1) A fixed pulley has a mechanical advantage of 2	True	False
2) A moveable pulley has a mechanical advantage of 2	True	False
3) The more ropes supporting the load, the higher the mechanical advantage	True	False
4) A fixed pulley changes the direction of your force	True	False
5) To lift a very heavy load, you should use one pulley	True	False

Question Answer the questions below.

1) What does mechanical advantage mean?

2) What are the two ways that pulleys help us?

PREVIEW

Draw Draw 2 different pulley systems that have the mechanical advantages stated.

Mechanical Advantage of 2	**Mechanical Advantage of 4**

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Curriculum Connection
D2.5

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?

	A pulley pushes objects into the ground.
	A pulley can help lift heavy objects.
	Two or more pulleys together can make lifting easier.

Name: _____ | Mark

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

	A pulley pushes objects into the ground.
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Name: _____ | Mark

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	Two or more pulleys together can make lifting easier.

Name: _____ | Mark

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

	A pulley pushes objects into the ground.
	A pulley can help lift heavy objects.
	Two or more pulleys together can make lifting easier.

PREVIEW

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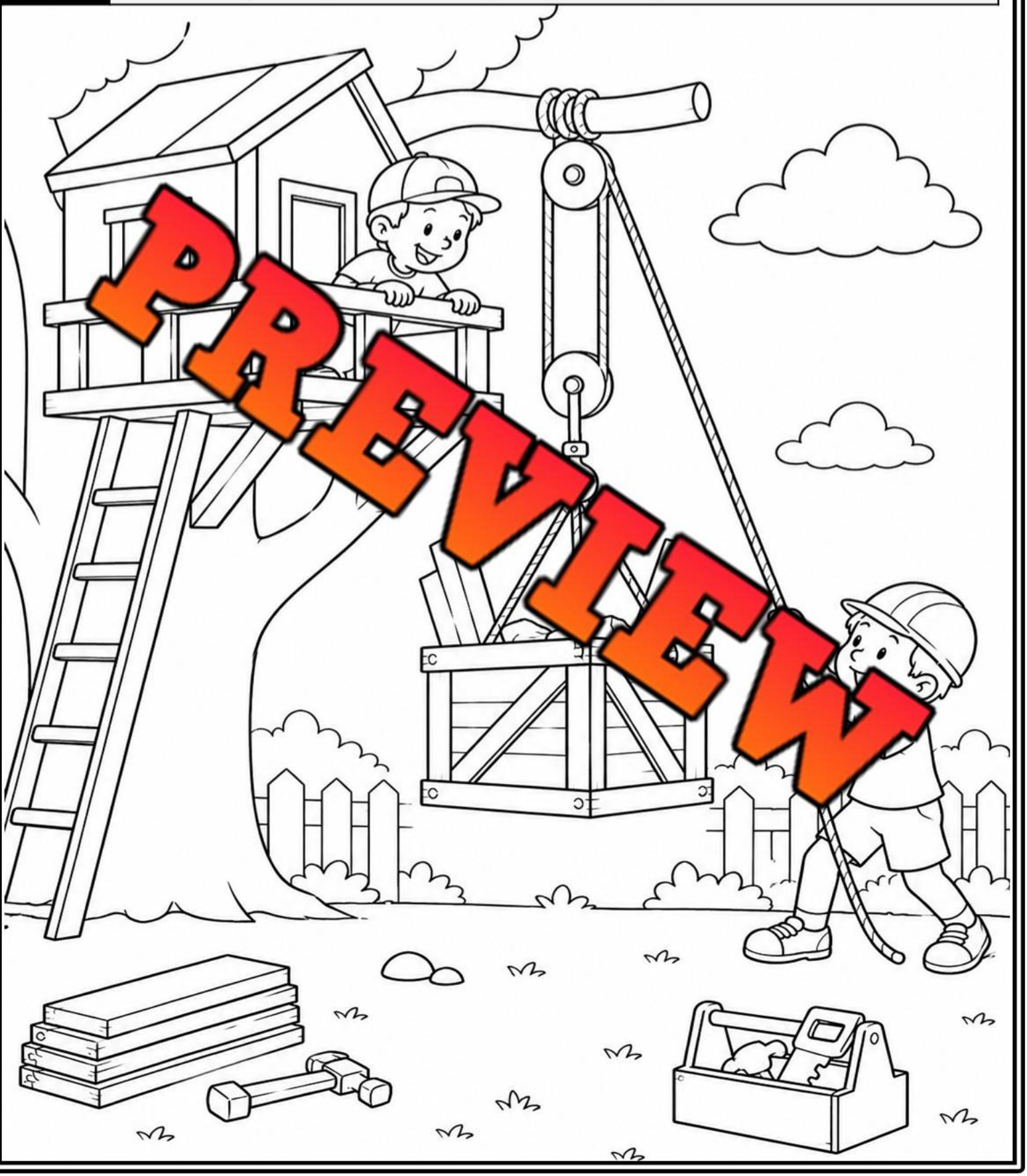
Name: _____ 59

Curriculum Connection
D2.5

Colour Look at the children using a pulley to lift heavy materials into the treehouse. Colour the picture and circle the pulley system you can see in the scene.



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Curriculum Connection
A1.3, A1.4, A1.5

Activity – Building a Pulley System

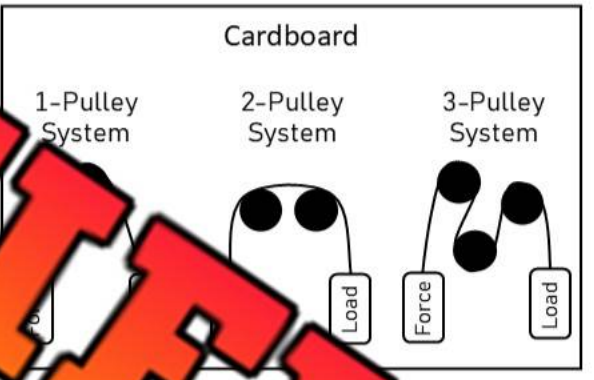
Experiment — What is this experiment all about?

Background: Simple machines are used to make work easier. Work can be defined as force multiplied by distance. Moving your book from one desk to another is work. You are applying force for a certain distance as you push the book to another desk.

Imagine you want to get the same amount of work done, but by using less force. This can be done using simple machines, like a pulley.

Materials — machine to make work easier.

- Large box
- Cans of two different sizes
- Yarn or rope
- A bottle of water
- Small bucket
- Weights – Can be any objects – rocks or silverware would work well
- Hot glue



PREVIEW

Procedure — How to build the pulley system

1) Hot glue the cans to the cardboard. Put them in positions where they can be used optimally as pulleys.
2) Attach one end of the string to the bucket and the other to the bottle of water.
3) Put the string around one can to mimic a one pulley system. Add some weight to the bucket. Record what weight moves the water bottle.
4) Put the string around a second can to mimic a two-pulley system. Record whether the same weight moves the bottle of water.
5) Put the string over a third pulley. Record whether it moves the water bottle.

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Name: _____ 61

Curriculum Connection
A1.3, A1.4, A1.5

Diagram Draw your 1, 2, and 3 pulley systems.

1-Pulley	**Pulley System**	**3-Pulley System**

PREVIEW

Observations What ha

Pulley System-	ve t ter bottle?
1 Pulley	
2 Pulleys	
3 Pulleys	

Results Answer the question below.

What happened? Did the pulley systems work differently? Did they affect how far the rope had to move? Explain.

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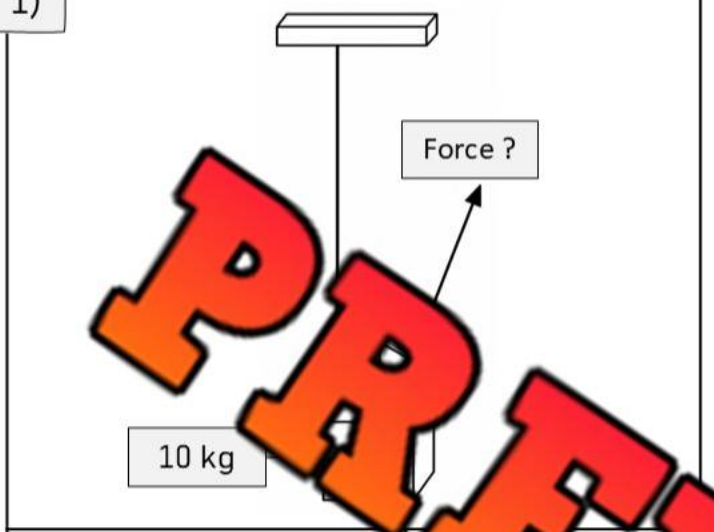
Curriculum Connection
D2.5

Pulleys – Mechanical Advantages

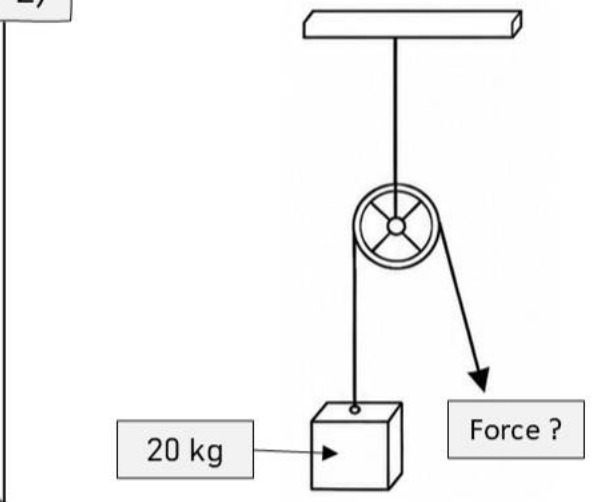
Questions Fill in the table by reading the diagrams.

1)



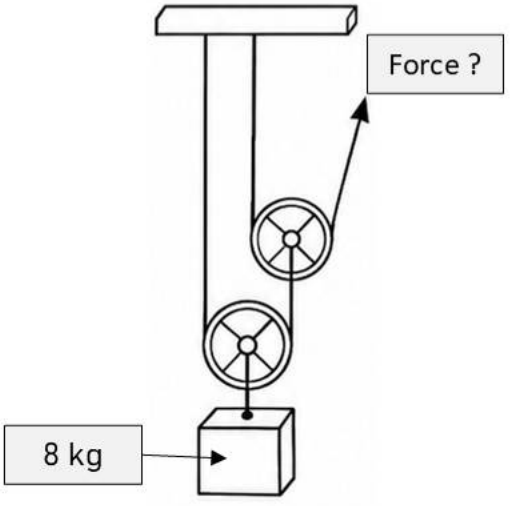
Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	

2)



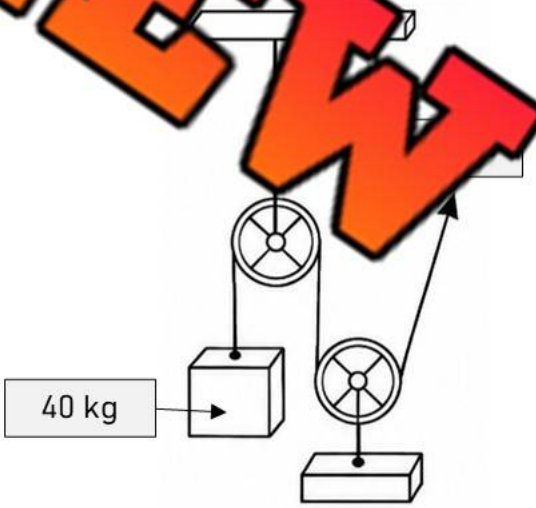
Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	

3)



Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	

4)



Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	

PREVIEW

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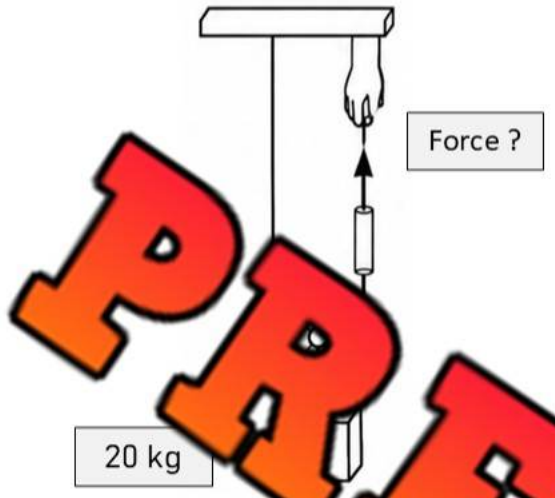
Name: _____ 63

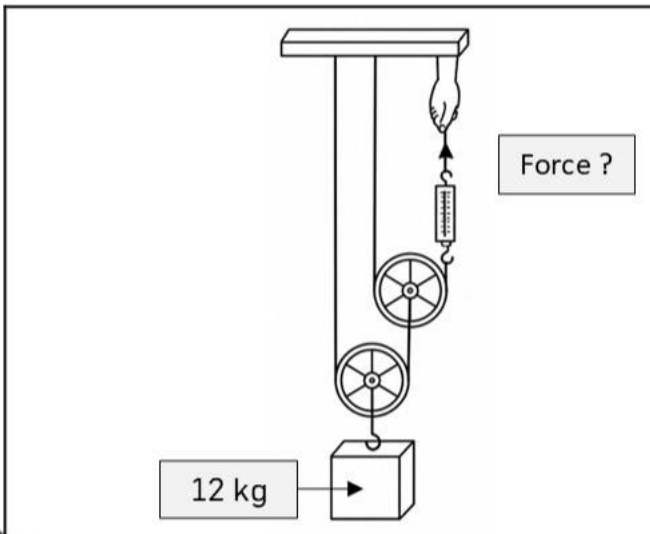
Curriculum Connection
D2.5

Pulleys – Mechanical Advantages

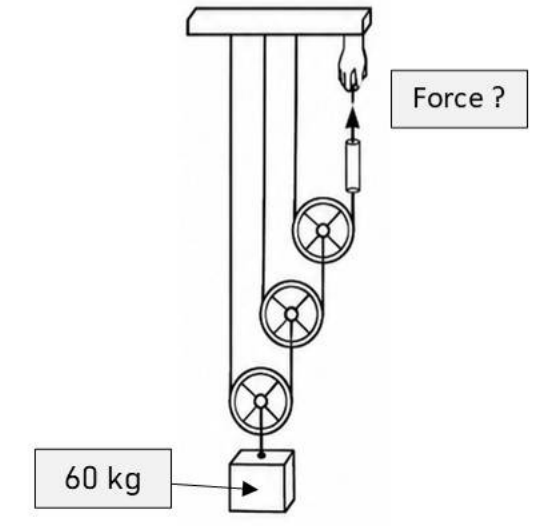
Questions Fill in the table by reading the diagrams.



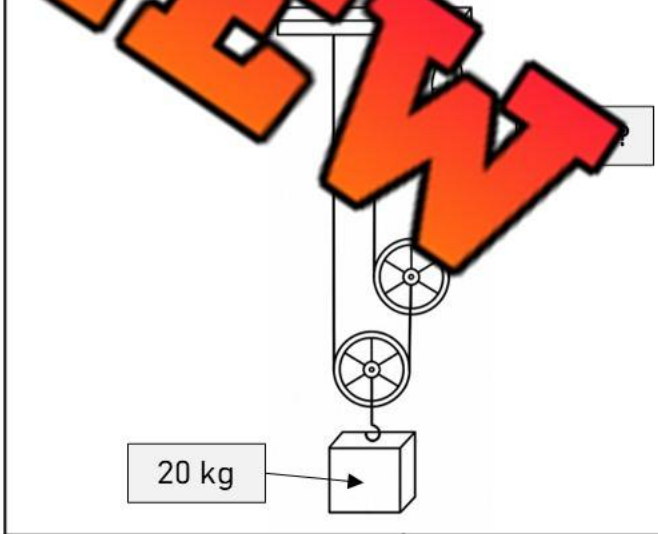
Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	



Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	



Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	



Supporting Ropes	
Mechanical Advantage	
Force Needed (N)	

PREVIEW

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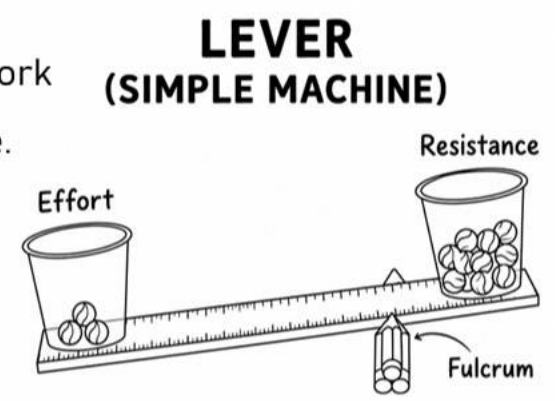
Name: _____ 64

Curriculum Connection
D2.3, D2.4

Levers

What is a lever?

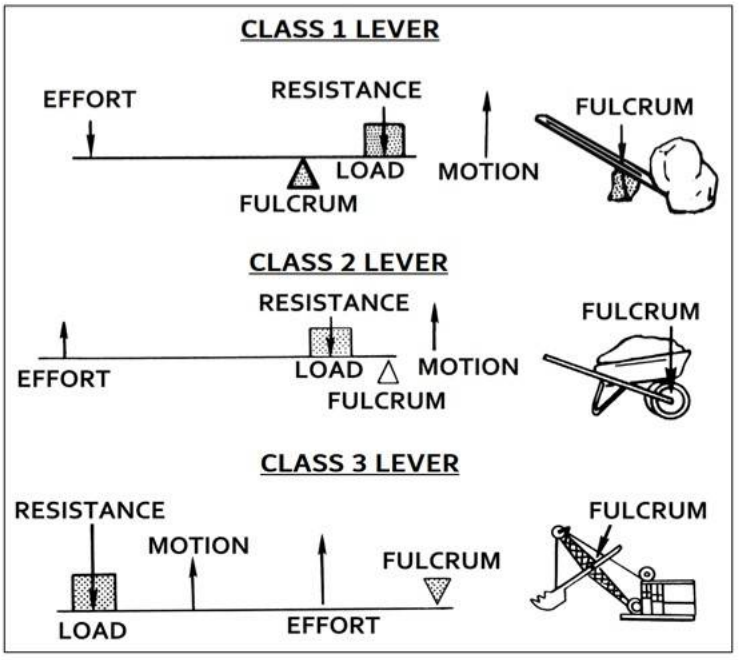
A lever is a simple machine that is used to make work easier by using leverage which multiplies the force. Let's say you needed to move a box of heavy treats up to the top floor of your treehouse. You could carry the box but that would be difficult. You could make the work easier by using a lever.



To make a lever you need a long flat board, a fulcrum, and someone to apply a force. You could use a large rock as a fulcrum and rest the long board over top of it so that the rock is in the middle. You would place the box of treats on one end and push down on the other end. This would lift the box into the air.

This is an example of a type 1 lever because the fulcrum is in the middle of the load and the force. Levers not only multiply a force, but they can change the direction of a force.

Types of Levers



Class 1 Lever	The load is between the effort and the fulcrum and when effort is being applied
Class 2 Lever	The load is between the fulcrum and the effort
Class 3 Lever	The effort is between the fulcrum and the load

PREVIEW

Name: _____ 65

Curriculum Connection
D2.3, D2.4

Questions

Answer the questions below using evidence from the text.

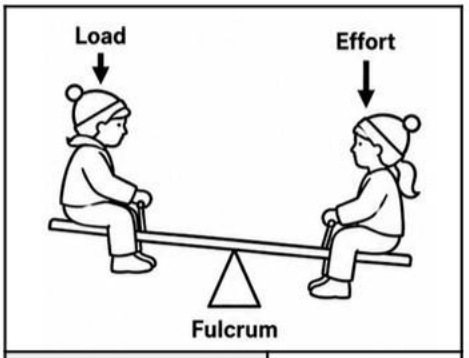
1) What is a lever?

2) When h... used a lever? What class of lever was it?

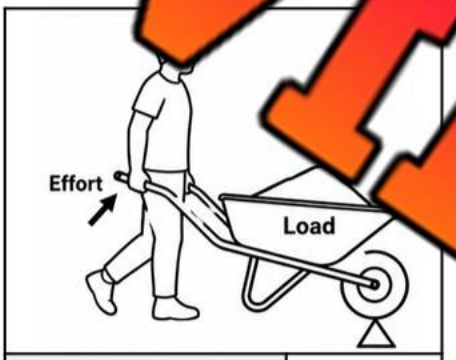
PREVIEW

Examples

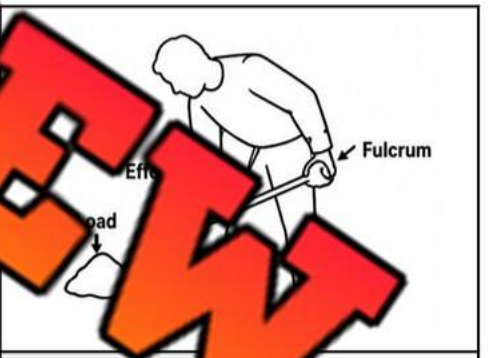
What type of ...he ...owing?



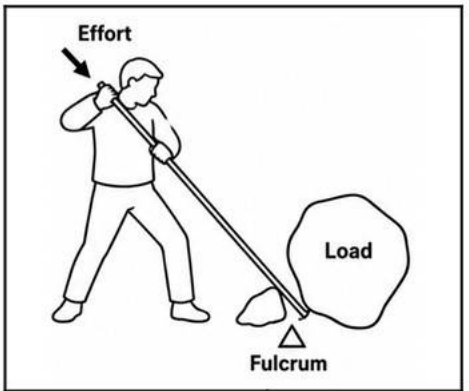
Class of Lever



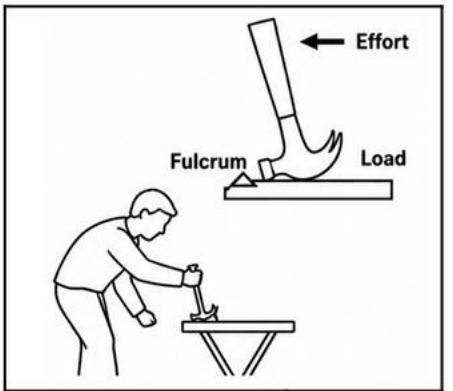
Class of Lever



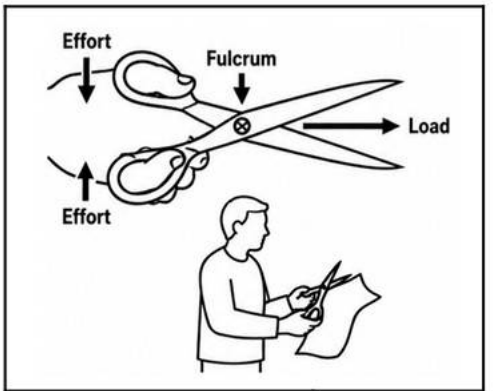
Class of L...



Class of Lever



Class of Lever



Class of Lever

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Curriculum Connection
D2.3, D2.4

Exit Cards

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

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

The part of the lever that you push or pull on is...	
	○ Effort
○ Fulcrum	○ Resistance
A lever is a simple machine that helps you...	
○ Slow objects down	○ Create electricity
○ Make work easier	○ Make objects heavier

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

The part of the lever that you push or pull on is...	
○ Load	○ Effort
○ Fulcrum	○ Resistance
A lever is a simple machine that helps you...	
○ Slow objects down	○ Create electricity
○ Make work easier	○ Make objects heavier

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

The part of the lever that you push or pull on is...	
○ Load	○ Effort
○ Fulcrum	○ Resistance
A lever is a simple machine that helps you...	
○ Slow objects down	○ Create electricity
○ Make work easier	○ Make objects heavier

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

The part of the lever that you push or pull on is...	
○ Load	○ Effort
○ Fulcrum	○ Resistance
A lever is a simple machine that helps you...	
○ Slow objects down	○ Create electricity
○ Make work easier	○ Make objects heavier

PREVIEW

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Name: _____ 69

Curriculum Connection
A1.3, A1.4, A1.5

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
- T
- Tape
- Weights – hat al same weight (marbles, paper clips, etc.)
- Fulcrum – metal ed together, eraser

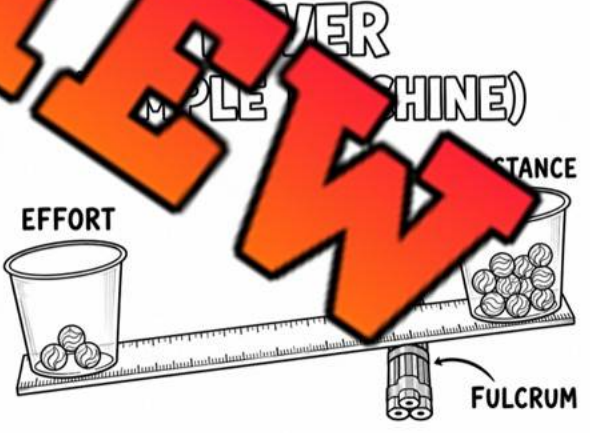
PREVIEW

Procedure How you will comp e th

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.

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Curriculum Connection
A1.3, A1.4, A1.5

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 ce C			

Diagram

Draw a diagram of the 3 levers you made.

In the Middle	
Close to Effort Cup	
Close to Resistance Cup	

PREVIEW

Results

Answer the questions below.

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

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Name: _____ 71

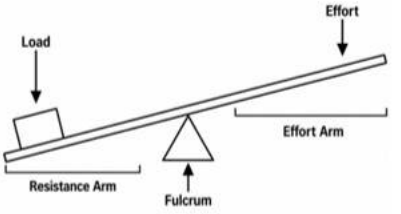
Curriculum Connection
D2.5

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.

Calcu[illegible]te the MA and output force in the examples below.

	Effort A[illegible]	Loa[illegible]m Length	MA	Input Force	Output Force
1)	10 cm	[illegible]	2	10 N	
2)	4 m	[illegible]m		5 N	
3)	2 m	1 m	[illegible]	[illegible]N	
4)	3 m	3 m	[illegible]	[illegible]0 N	
5)	10 cm	2 cm	5	100 N	
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	

PREVIEW

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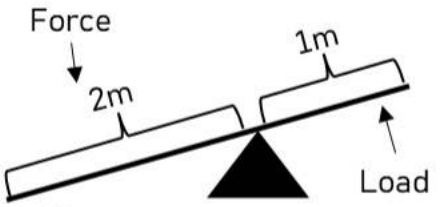
Name: _____ 72

Curriculum Connection
D2.5

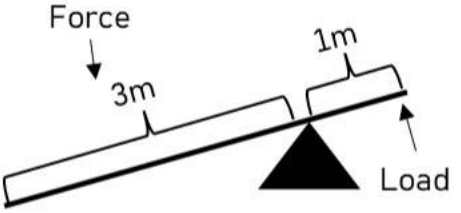
Calculate Calculate the MA and output force in the examples below.

1)



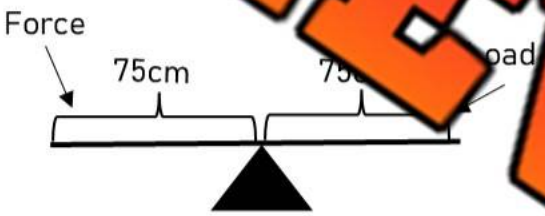
[illegible]	100 N
[illegible]put Force	

2)



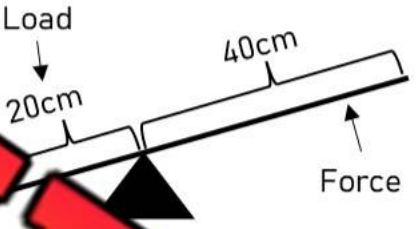
MA	
Input Force	25 N
Output Force	

3)



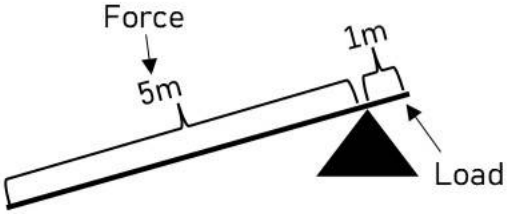
MA	
Input Force	200 N
Output Force	

4)



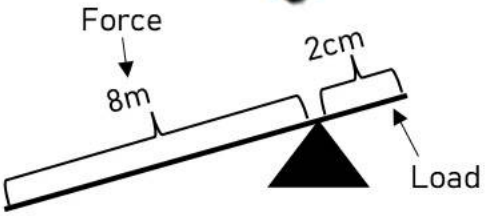
[illegible]ce	50 N
Output Force	

5)



MA	
Input Force	10 N
Output Force	

6)



MA	
Input Force	20 N
Output Force	

PREVIEW

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Name: _____ 73

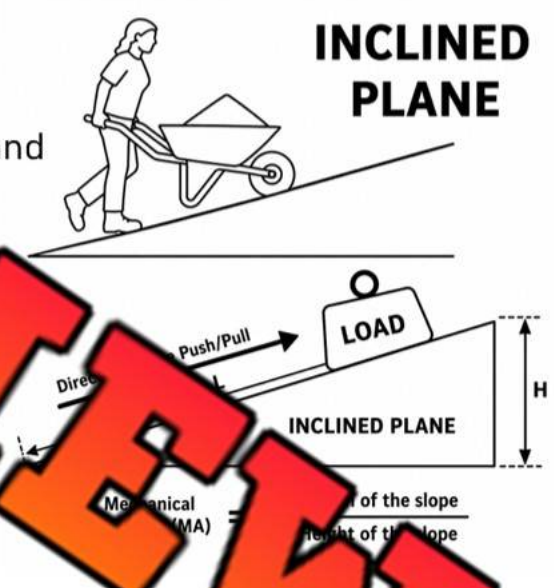
Curriculum Connection
D2.3, D2.4, D2.5

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.

When we need to lift an object upwards, we can carry it or slide it along a ramp. This is often easier than picking up big objects. The Egyptians used inclined planes to lift heavy stones when they built the pyramids.



Tradeoff

An inclined plane always has a horizontal length and a vertical height. **Horizontal** means sideways. **Vertical** means up and down.

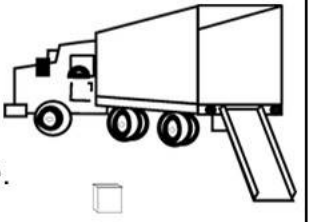
If we make a shorter horizontal length, the inclined plane will be steeper. This will make the distance we need to push shorter but we need more force to move the object.

If we make the horizontal length longer, we are creating a ramp that needs less force to push. The problem is that we need to push the object further.

PREVIEW

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!

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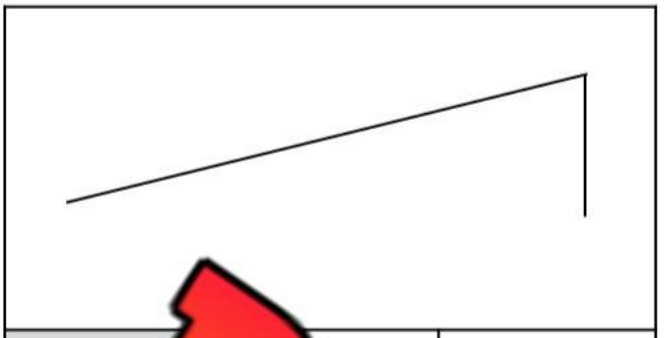
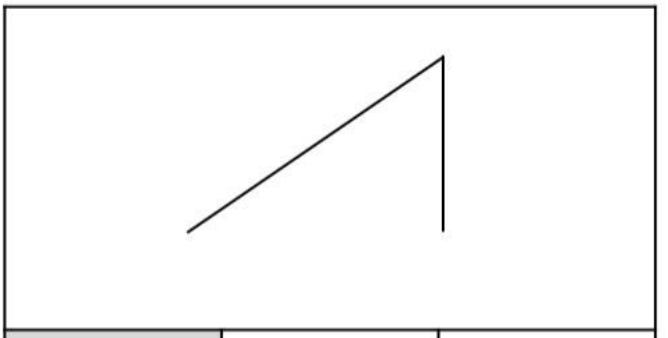
Name: _____ 74

Curriculum Connection
D2.3, D2.4, D2.5

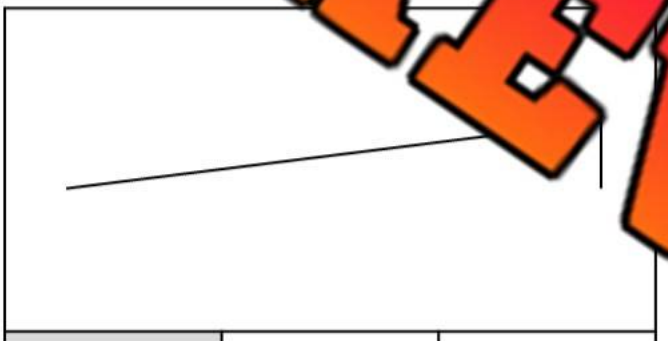
Describe Circle the descriptions of the inclined planes below.



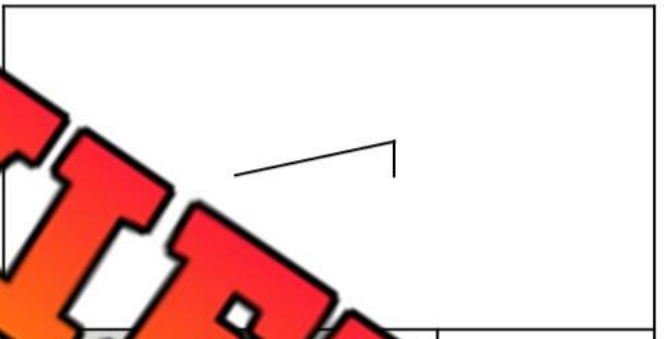
Slope	[illegible]	Gentle
[illegible]	[illegible]	Heavy
Distance	[illegible]	[illegible]



Slope	Steep	Gentle
Effort	Light	Heavy
Distance	Far	Short



Slope	Steep	Gentle
Effort	Light	Heavy
Distance	Far	Short



[illegible]	[illegible]	Gentle
[illegible]	[illegible]	[illegible]
Distance	[illegible]	[illegible]

PREVIEW

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

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Curriculum Connection
D2.3, D2.4, D2.5

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
4) A longer horizontal length needs less force to push.	True / False
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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

PREVIEW

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Name: _____ 77

Curriculum Connection
D2.3, D2.4, D2.5

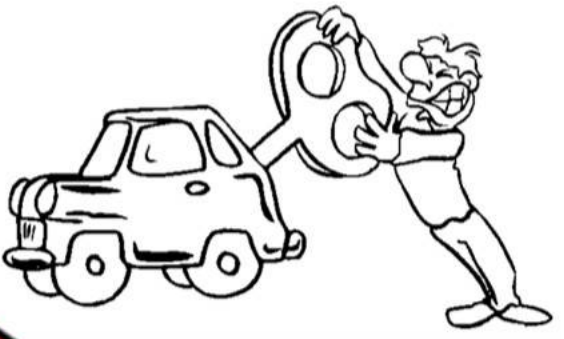
Experiment - Inclined Plane

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 t will you need for the experiment?

- T na
- Car oard
- Books
- Metre stick
- Tape



PREVIEW

Method How will you complete the iment?

1) Stack three books on top of each other. Te he g f cardboard to the edge of the top book. Tape the bottom edge rdb o the floor. You should now have an inclined plane that looks like a ra ic

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

3) Measure how far the car travels using the metre 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.

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Name: _____ 78

Curriculum Connection
D2.3, D2.4, D2.5

Observations How far did your car do?

Height in Books	Distance in CM
3 Books	
4 Books	
Books	
s	

Results A est below.

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

2) Does it get easier or harder to move something up a ine 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?

PREVIEW

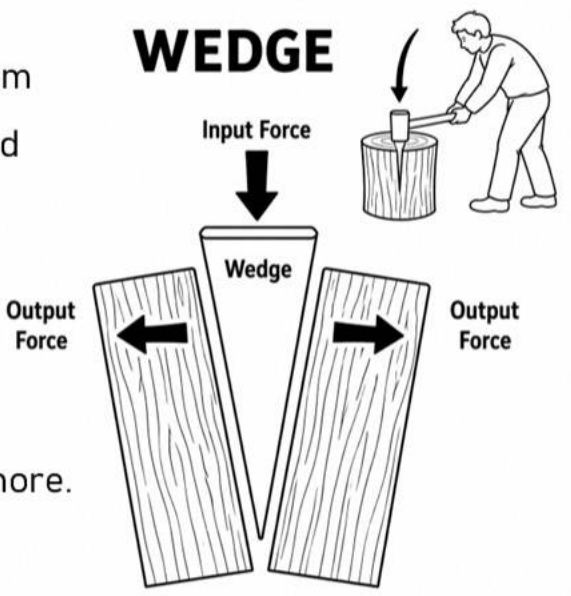
Name: _____ 80

Curriculum Connection
D2.3, D2.4

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 is a type of an inclined plane (or two incl es that is often attached to a han euges h used for millions of years to hunt trees, and much more.

PREVIEW

How do they work

When we apply a force wide sid dge, the sharp edge goes further into the object. In the diagram ove wedge into a piece of wood to split the wood.

When we apply a downward pushing f to th the wedge creates a side to side force into the o us it to split. An example of a **single wedge** is a chisel, w 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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Name: _____ 81

Curriculum Connection
D2.3, D2.4

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

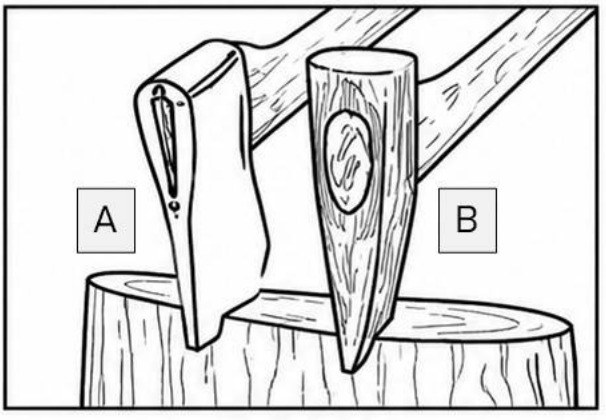
1) A chisel is a single wedge	True	False
2) A double sided axe is a single wedge	True	False
3) A downward input force makes outward forces	True	False
4) Longer and thinner wedges are not as sharp	True	False
5) Longer [illegible]nner wedges are sharper allowing it to travel further	True	False

Quest[illegible] Answ[illegible]estions below using evidence from the text.

1) What is a we[illegible] do th[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.



PREVIEW

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Curriculum Connection
D2.3, D2.4

Exit Cards

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

Name: _____

Circle the word that fits on the blank.

1) A _____ can hold objects together.	nail
	chisel
2) A _____ is a triangular tool.	lever
	wedge
3) A _____ is an example wedge.	knife
	screw
4) _____ scrape when used as wedges.	Axles
	Blades
5) A _____ can cut or split.	ramp
	wedge

Name: _____

Circle the word that fits on the blank.

1) A _____ can hold objects together.	nail
	chisel
2) A _____ is a triangular tool.	lever
	wedge
3) A _____ is an example wedge.	knife
	screw
4) _____ scrape when used as wedges.	Axles
	Blades
5) A _____ can cut or split.	ramp
	wedge

Name: _____

Circle the word that fits on the blank.

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	chisel
2) A _____ is a triangular tool.	lever
	wedge
3) A _____ is an example wedge.	knife
	screw
4) _____ scrape when used as wedges.	Axles
	Blades
5) A _____ can cut or split.	ramp
	wedge

PREVIEW

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Name: _____ 83

Curriculum Connection
D2.5

Colour Look at how the campers are using wedges to help them at the campsite. Colour the picture neatly and circle the objects that are shaped like wedges.



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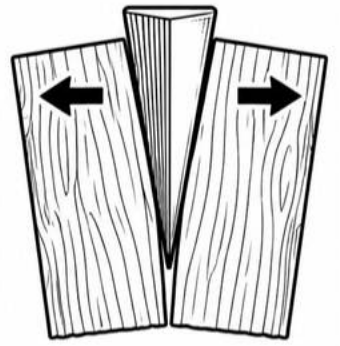
Name: _____ 84

Curriculum Connection
A1.2, A1.4, A1.5

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 in half. How well does a wedge cut playdou

Mat s

W will need for the experiment

- Playdough
- Wedge (triangula d n bl
- Plastic knives (optiona





Procedure

How you will comp e e t

1) Take out a ball of playdough
2) First have students try to cut the playdough in half 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.

PREVIEW

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Curriculum Connection
A1.2, A1.4, A1.5

Observations

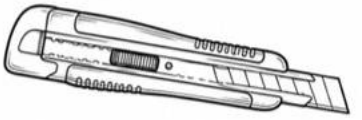
What happened when you cut the playdough?

Cutting Tool	What Happened? Did It Cut It Well? Did It Cut It Cleanly?
Palm	
Side of Hand	
W	
Knife	

PREVIEW

Results

Answer the qu s b



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?

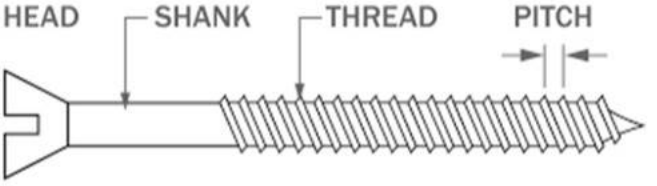
Name: _____ 86

Curriculum Connection
D2.3, D2.4

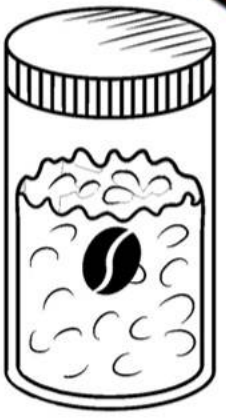
Screw

Screw

A screw is another type of inclined plane that is in the shape of a cylinder. It has a head at one end and a pointed tip at the other. A screw is different than a nail because it has threads below the **shank** of the screw. The width of the threading is called the pitch.



Screws are useful for holding things together. When we turn a screw into a surface, the helical threads on the screw are positioned to allow the screw to go deeper into the surface. A screw will resist pulling out as the threads won't allow it to slide out.



Screws are used often in our everyday lives. Screw top lids on jars keep them secured to the jar. Light bulbs also use screw threads to twist into position.



PREVIEW

Types of Screws

A **bolt** is a type of screw that does not have a pointed tip. This means it cannot be drilled into place. Instead, it is placed into a pre-drilled hole and a **nut** is put on the other end of the screw to hold things together.

A **drill bit** is a type of screw that makes holes in objects. A drill bit has a pointed end and threads that allow the bit to go deeper into the surface. Some examples of other screws are bottle tops, light bulbs, faucet taps, cork openers and guitar tuners.



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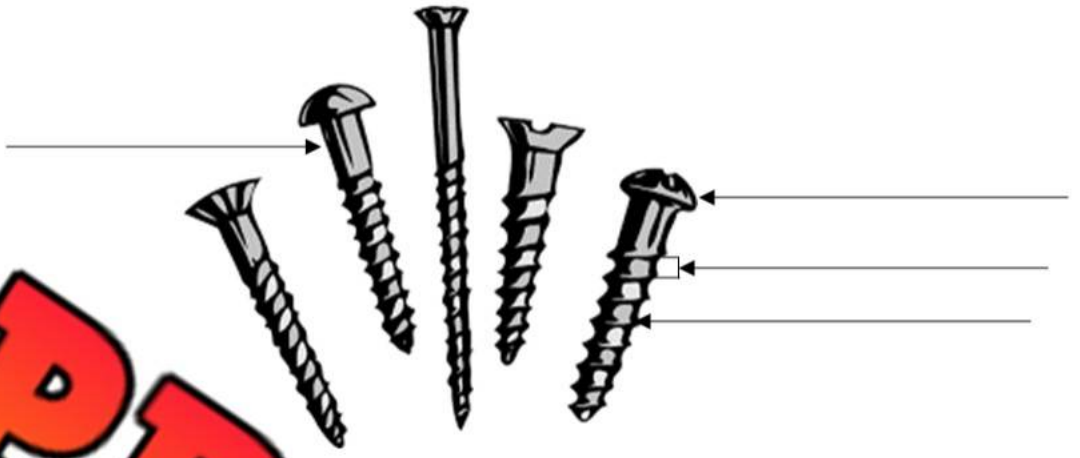
Name: _____ 87

Curriculum Connection
D2.3, D2.4

Diagram Label the diagram using the following terms: pitch, shank, head, thread.



Questions Answer the questions below using evidence from the text.

1) What are screws used for?

2) When have you used a screw? Explain.

Draw Draw three different types of screws.

PREVIEW

Name: _____ 91

Curriculum Connection
D1.1, D2.3

Memory Game – Match the Machine

Objective What are we learning about?

Students will identify simple machines and match them to objects that use them. Students will also explain how simple machines help change force or movement in everyday life.

Materials [illegible] will need for the activity:

- Set of Mem[illegible] cards for each group (pro[illegible]
- A small table or [illegible] on [illegible]



Instructions How you will complet[illegible]ctivity

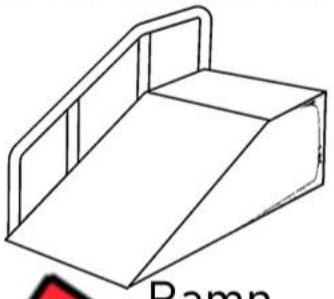
1) Divide the class into groups of 3 or [illegible]e ea[illegible] a set of Memory Game cards (provided)
2) Have each group lay all the cards face dow[illegible]rid[illegible]tab[illegible]e or the floor.
3) The students take turns flipping over two cards at a [illegible]ne[illegible]g to find a matching pair.
4) If a student finds a match, they remove those cards from the grid and keep them.
5) If the cards do not match, they are turned back over, and the next student takes a turn.
6) The game continues until all the cards have been matched.
7) After the game, review the matches.
8) Discuss how simple machines help people push, pull, lift, or move objects more easily.

PREVIEW

Name: _____ 92

Curriculum Connection
D1.1, D2.3

Cards | Memory Game Cards



Ramp

Inclined plane



Scis[illegible]

Lever and wedge



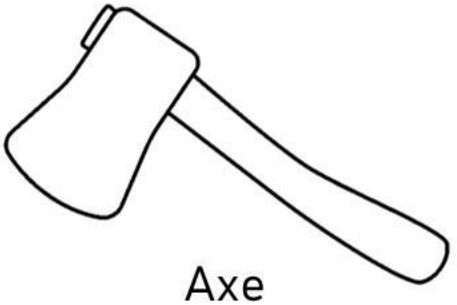
Wheelbarrow

Le[illegible] and wheel
[illegible]xle



Bicycle

Wheel and axle



Axe

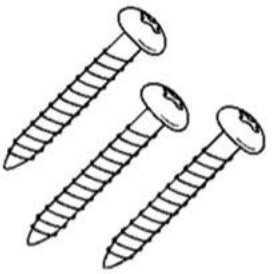
Wedge

PREVIEW

Name: _____ 93

Curriculum Connection
D1.1, D2.3

Cards | Memory Game Cards



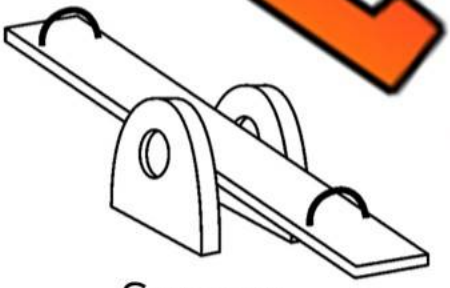
Screw

Screw



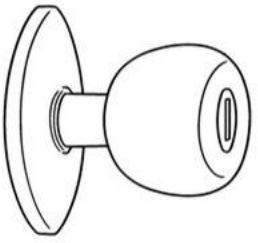
Cra

Pulley



Seesaw

ver



Door knob

Wheel and axle



Knife

Wedge

PREVIEW

Name: _____ 101

Curriculum Connection
A2.1

Coding – Making Compound Machines

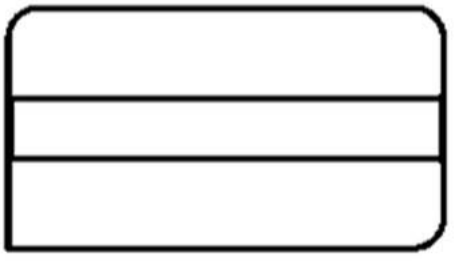
Directions Follow the code to design an excavator.

run program
cut out all the shapes
paste the tracks on the bottom
glue the window on the front of the tracks
glue the side panel behind the window
paste the arm on the front of the window
paste the bucket on the arm

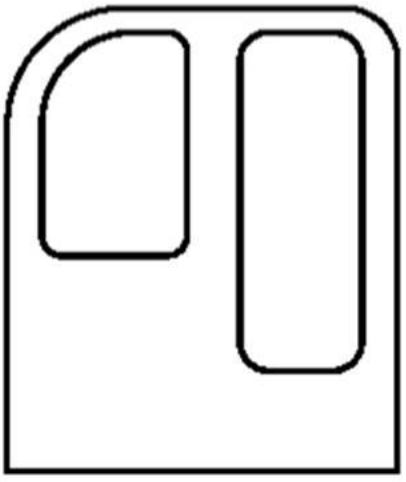
PREVIEW



Tracks



Side Panel



Window

Bucket



Arm

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Name: _____ 102

Curriculum Connection
A2.1

Coding – Making Compound Machines

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



PREVIEW

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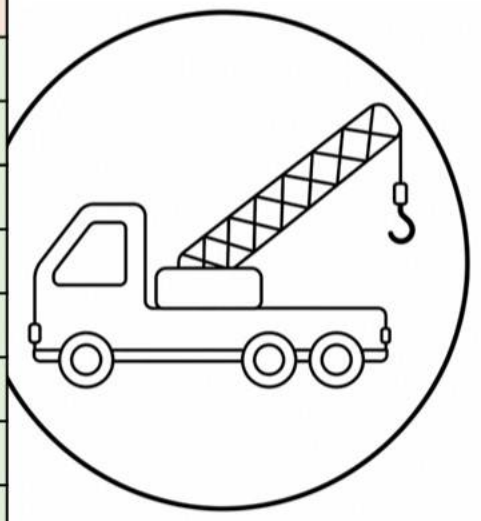
Name: _____ 103

Curriculum Connection
A2.1

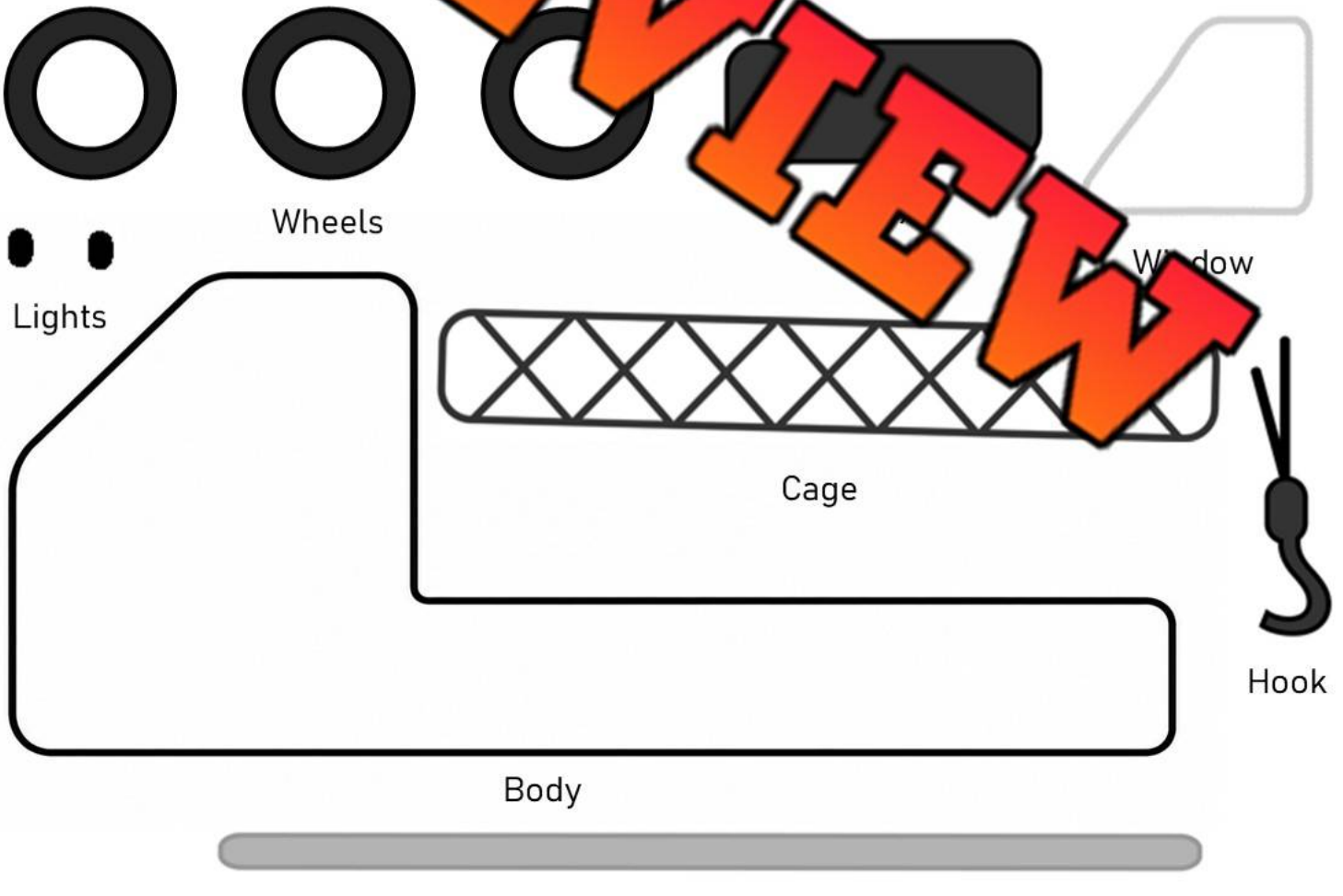
Coding – Making Compound Machines

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 the cage on the front and back of the body
paste the window on the front of the body
paste the hook on the back of the body
paste the lights on the engine
paste the cage on the body



PREVIEW



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Name: _____ 104

Curriculum Connection
A2.1

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 a jar is a screw	then	Move ↓ 4 spots
5)		then	Move ↓ 3 spots
6)	feel lighter	then	Move ← 5 spots
7)		then	Move → 4 spots
8)		then	Move → 4 spots
9)		then	Move ↑ 3 spots
10)	If throwing a ball is a pushing		Move → 2 spots





PREVIEW

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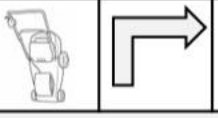
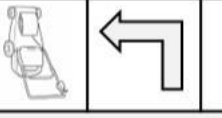
Name: _____ 105

Curriculum Connection
A2.1

Coding – Robot Lawn Mower

This is a self-driving lawn mower	Right makes it turn right	Left makes it turn left	Forward makes the car move forward by the number shown
			
It unde…	**Right**	**Left**	**Forward 2**

PREVIEW

Directions W…o get …wn mower to cut the field of grass.

Codes – Forward, T… …t, Tur…	
Line 1	
Line 2	
Line 3	
Line 4	
Line 5	
Line 6	
Line 7	
Line 8	
Line 9	



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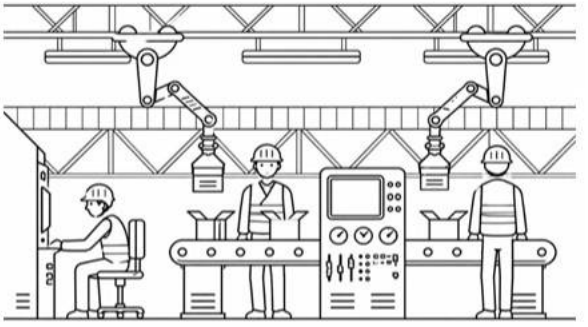
Name: _____ 107

Curriculum Connection
A2.2, A3.3

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
- ✓ Worki[illegible]ll day and night
- ✓ Doing [illegible]erous work

We s[illegible]pl[illegible]de the robots. When a robot breaks, a human fixes the robot. People a[illegible]o wat[illegible]s to make sure they are working.

PREVIEW

Fill in the Blanks [illegible]se th[illegible]words to fill in the blanks.

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

1) _____ is written so robo[illegible]w w[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?

_____

_____

_____

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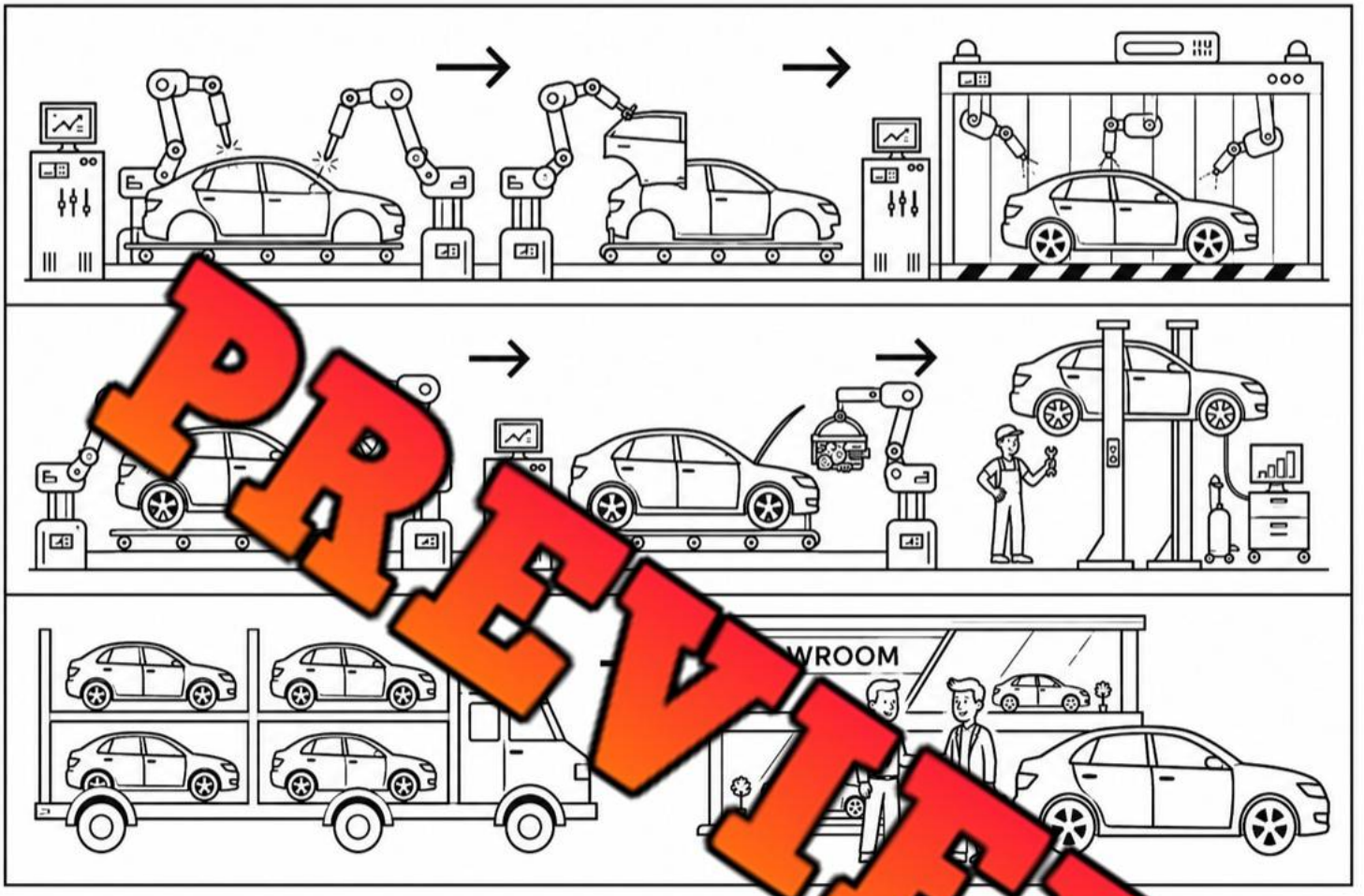
Name: _____ 109

Curriculum Connection
A2.2, A3.3

Coding – Robot Assembly Lines



PREVIEW

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

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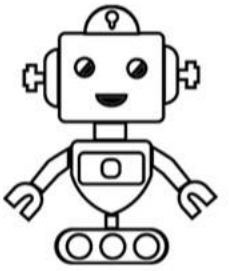
Name: _____ 110

Curriculum Connection
A2.2, A3.3

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
- ✓ Rob[illegible]ools that are wedges or screws used to do work

PREVIEW

Draw D[illegible]raw a[illegible]wh[illegible]ls, levers for arms, and tools for hands.

Which simple machines does your robot have?

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Name: _____ 111

Curriculum Connection
D1.2

Effects of Machines on the Environment

Effects of Machines on the Environment

Some machines we use are bad for the environment. There are machines that burn gas that make air pollution. There are also machines that are dangerous to humans and animals.



Machines [illegible] Energy

Any [illegible] energy to work will create pollution. Check [illegible] examples below.

- Vehicles – [illegible] that [illegible] greenhouse gases that pollute our air
- Plug in machines – [illegible] plug [illegible] electricity. Some of the electricity we make in Canada is made [illegible] fuels and this makes air pollution.
- Machines with a battery – Machines [illegible] batteries [illegible] leaf blowers use electricity to charge their batteries. Also, [illegible] of the batteries end up in garbage dumps for [illegible]

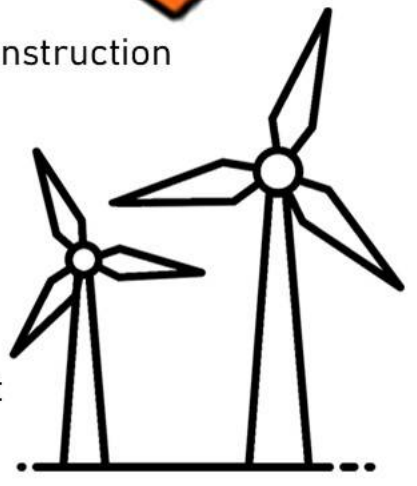


Dangerous Machines

Machines can also be dangerous to humans and animals. Every [illegible] than 25,000 deer and moose are hit by cars.

The noise from machines is also affecting animals. Construction sites with cranes and backhoes make a lot of noise that scare animals. The use of machines to build towns and roads pushes animals away from their homes.

Windmills are used to make electricity. Wind farms have many windmills in one spot. Many birds are being hurt by flying too close to the moving windmills.



PREVIEW

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Name: _____ 112

Curriculum Connection
D1.2



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

1) Machines that burn gas are bad for the environment	True	False
2) Cars are machines that make air pollution	True	False
3) Electricity doesn't make any pollution	True	False
4) Batteri[illegible]e good for the environment	True	False
5) Som[illegible]s[illegible]e very loud	True	False

Question W[illegible] m[illegible]es bad for the environment?

_____

_____

_____

_____

Visualizing Draw what you were picturing while you we[illegible]ding[illegible]picture.

_____

_____

_____

_____

_____

_____

_____

PREVIEW

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Curriculum Connection
D1.2

Exit Cards

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

Name: _____

Guess who I am and write the answer!

Wind turbine	Noise pollution	Windmill
Battery machine	Air pollution	

Mark

1) I use moving air to make electricity.	
2) I mak[illegible] noise that can disturb animals.	
3) I ma[illegible] dirty with smoke from cars and trucks.	
4) I [illegible] of gas.	
5) I can hurt [illegible] close to me.	

Name: _____

Guess who I am and write the answer!

Wind turbine	Noise pollution	Windmill
Battery machine	Air pollution	

Mark

1) I use moving air to make electricity.	
2) I make loud noise that can disturb animals.	
3) I make the air dirty with smoke from cars and trucks.	
4) I use electricity instead of gas.	
5) I can hurt birds if they fly too close to me.	

Name: _____

Guess who I am and write the answer!

Wind turbine	Noise pollution	Windmill
Battery machine	Air pollution	

Mark

1) I use moving air to make electricity.	
2) I make loud noise that can disturb animals.	
3) I make the air dirty with smoke from cars and trucks.	
4) I use electricity instead of gas.	
5) I can hurt birds if they fly too close to me.	

PREVIEW

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Name: _____ 114

Curriculum Connection
D1.1, D2.3

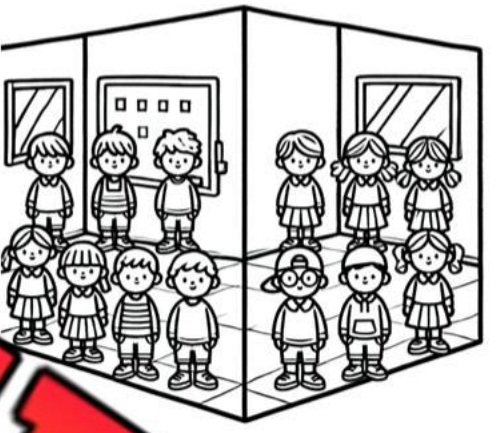
Two Corners – Which Machine Would You Choose?

Objective What are we learning about?

Students will learn about simple machines by listening to questions, choosing between two options, and explaining how machines help people in everyday life.

Materi What need for the activity:

- A list of qu
- Labels for each "Corner 1" and "Cor



Instructions How you will complete activity

1) Label two corners of the room as Corne an ke the labels clear for everyone to see.

2) Explain that they will listen to questions about simple m choose the corner that matches their opinion.

3) Read one question aloud and tell students what each corner represents. Students will think about their answer and move to the corner that matches their choice.

4) Once in their corners, students will talk to others about why they made their choice.

5) After discussing, bring the class together to share their ideas as a group.

6) Repeat the activity with the next question.

PREVIEW

Name: _____ 115

Curriculum Connection
D1.1, D2.3

Two Corners Read the questions to the class:

	Question	Corner 1	Corner 2
1	Which machine would help you move a heavy box?	Ramp	Pulley
2	Which machine would you rather use at a playground?	Slide	Seesaw
3	Which machine is more fun to use?	Bicycle	Scooter
4	Which would help move a construction site?	Crane	Wheelbarrow
5	Which machine would you use to carry books?	Wagon	Backpack cart
6	Which machine would help you move upstairs?	Stairs	Elevator
7	Which machine is more helpful in the kitchen?	Knife	Can opener
8	Which machine would you rather ride?	Skateboard	Bicycle
9	Which machine helps move things faster?	Wheels	Ramp
10	Which machine would help clean faster?	Rolling cart	Broom

PREVIEW

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Name: _____ Date: _____

Unit Quiz – Movement

Multiple Choice /10

1) A knife is an example of which type of simple machine? a) Wedge b) Lever c) Inclined Plane d) Wheel a[illegible]le	2) A seesaw is an example of which type of simple machine? a) Wedge b) Lever c) Inclined Plane d) Wheel and Axle
3) A bott[illegible] example of which type of sim[illegible] a) We[illegible] b) Pulley c) Inclined Plane d) Screw	4) A bicycle is an example of which type of simple machine? a) Wedge b) Lever c) Inclined Plane [illegible]) Gear
5) A wagon is an example of w[illegible]ple machine? a) Wedge b) Lever c) Inclined Plane d) Wheel and Axle	[illegible]n you use a pulley, you are changing _____ of the load. a) We[illegible] b) [illegible] c) [illegible]ion d) Load
7) A can opener uses which type of simple machine? a) Wedge b) Lever c) Inclined Plane d) Gear	8) When we con[illegible]ct g[illegible] a) Gear ratio b) Idler Gear c) Gear train d) Cog
9) The weight that we are lifting is called the… a) Object b) Load c) Person d) Thing	10) An axe uses which type of simple machine? a) Wedge b) Lever c) Inclined Plane d) Gear

PREVIEW

Fill in the blanks **/10**

1) Trains usually move in a _____. (straight line, circle)
2) A snowboarder moves in a _____ pattern. (circular, zig-zag)
3) A guitar string moves _____. (up and down, in a curve)
4) A merry-go-round moves in a _____. (straight line, circle)
5) A forc[illegible]s a push or _____. (throw, pull)
6) Gra[illegible]s a _____ force. (pushing, pulling)
7) An axe with a _____ handle gives it more force. (long, short)
8) A lever needs a beam, [illegible] and _____. (fulcrum, log)
9) A gentle slope is _____ than [illegible] slope. (easier, harder)
10) When we rub two things together, the force[illegible]ed _____. (gravity, friction)

PREVIEW

Draw a lever below. Label the following parts on your diag[illegible]d, b[illegible], force, fulcrum

Label | Which simple machine is in the picture?

Lever	Pulley	Wedge	Screw	Inclined Plane	Wheel and Axle

1)



2)



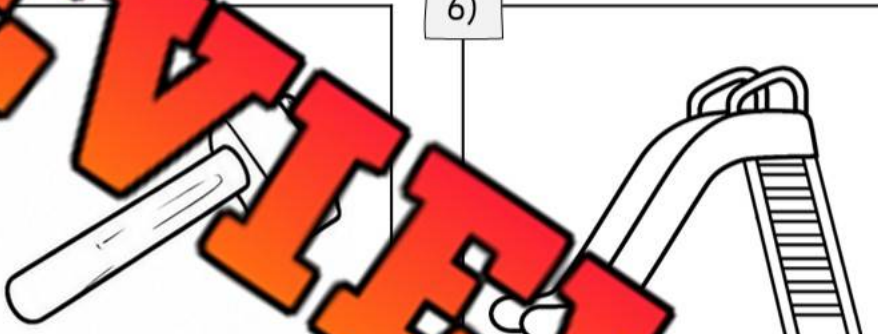
3)



4)



5)

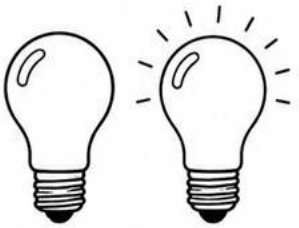


6)

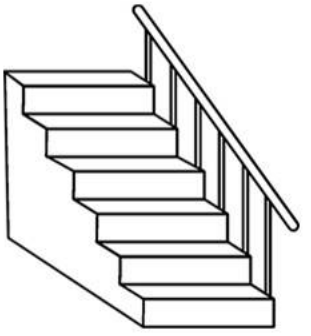
7)



8)



9)



PREVIEW

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