SYSTEMS IN ACTION

PDF & DIGITAL FORMATS

2 Peas and a Dog

Middle School Teaching Resources

RESOURCE INCLUDES

- ✓ Ontario Curriculum Aligned
- ✓ Detailed Lesson Plans
- ✓ Readings, Videos, Graphic Organizers, Group Work, Projects, Rubrics
- ✓ Hands-On Science Labs
- ✓ MP3 Audio Files
- ✓ Answer Keys
- ✓ Quizzes & Unit Test
- ✓ Print & Digital Formats

INCLUDED LESSONS

- Introduction - Science Safety
- Systems Introduction - What Are Systems?
- Unit Vocabulary
- Types of Systems
- Purpose, Inputs, and Outputs of Systems
- Processes and Components of a System
- Systems in Action Quiz #1
- Force, Work, Displacement, Energy, and Efficiency
- Calculating Work, Force, & Displacement
- Understanding and Calculating Work
- The 6 Simple Machines
- Mechanical Advantage
- Systems in Action Quiz #2
- Energy in Mechanical Systems
- Productivity with Systems in Various Industries
- The Evolution of Cell Phones
- Inquiry - Evolution of a System
- Systems in Action Mid-Unit Quiz
- Pulley Experiment
- Rube Goldberg Machine
- Owner's Manual Exploration
- Inquiry - The Impacts of New and Existing Systems
- Meeting Needs With Existing Systems
- Systems in Action Unit Test
- Sub Plans/Bonus Files - Bill Nye Video & Self-Driving Cars Non-Fiction Article

UNIT ORGANIZATION

GRADE 8 SYSTEMS IN ACTION ONTARIO CURRICULUM ALIGNMENT

Lesson	2007 Curriculum	2022 Curriculum
Introduction & 1: Safety & Vocabulary	2.1, 2.6	A1.4, A1.5
2. Types of Systems	3.1	D2.1
3. Purpose, Inputs & Outputs of Systems	3.2	D2.2
4. The Processes and Components of a System	3.3	D2.3
5. Quiz	Review	Review
6. Work, Energy, Force, and Efficiency	3.4	D2.4
7A. Calculating Work	3.5	D2.5
7B. Understanding Work	2.2	D2.5
8. 6 Simple Machines	3.6	D2.6
9. Understanding Mechanical Advantage	3.6	D2.6
10. Quiz	Review	Review
11. Energy in Mechanical Systems	3.7	D2.7
12. Productivity with Systems in Various Industries	3.8	D2.9

CURRICULUM ALIGNMENT

LESSON OVERVIEW

Lesson	Activity Type	Name	Suggested Time
Intro & #1	Class Discussion QR Code Scavenger Hunt	What are Systems? & Unit Vocabulary	1 – 2 Classes
#2	Whole Class Readings, Videos & Sort and Match	Types of Systems	1 – 2 Classes
#3	Whole Class Readings & Photo Analysis	Purpose, Inputs & Outputs of Systems	1 – 2 Classes
#4	Whole Class Readings, Videos & Labelling Activity	The Processes and Components of a System	1 – 2 Classes
#5	Quiz	Quiz	0.25 Class
#6	Whole Class Readings, Videos & Note Taking	Work, Energy, Force, and Efficiency	2 Classes

UNIT PLAN

LESSON #1

Unit Vocabulary

Lesson Overview:
Students will work on reviewing vocabulary for this unit.

Materials Needed:
- ❑ Reliable technology (computer, internet, data projector)
- ❑ Photocopy a class set or use the provided Google Slides version of the:
  - Vocabulary sheets (QR Code or Non-QR Code option)
  - Vocabulary graphic organizer
  - Definitions (For IEP and ESL students)
  - Definitions Google Slides

Teacher Instructions:

1. Hang the vocabulary words up around the classroom or in the hallway using the QR code or non-QR code format.
2. Divide the class up into groups of 4.
3. Have students walk around the classroom or hallway and find the vocabulary sheets. Students need to scan the QR code with their phones to uncover the mystery word. Once they have uncovered the mystery word, have them write it on the voc
4. This the Google Slid
5. Onc he def definitions she

LESSON PLANS

WHAT'S INSIDE?

TYPES OF SYSTEMS

What are Systems?

When you think of systems, you might think of a computer or gaming system. You may even think of a bus system. Systems are everywhere. Systems occur when there are components or processes that work together to perform a goal or meet a need. Some systems are human-made (e.g., bikes), while others are natural (e.g., bird colonies). There are mechanical systems that make sure cars are made and transportation systems are created to ensur uman body is em, which allows y ou process your food. There are also many social systems. For example, schools are a social system. There are rules that both students, teachers, and administrators have to follow to make sure there is order in education. There are two major types of systems that exist – physical systems and social systems. Both sets of systems and all of their subsystems make our world function.

Mechanical Systems

Mechanical systems involve the combination of simple machines that work together to perform a task. Elevators, for example, are a mechanical system. Elevators use pulleys to push people up and bring them back down.

ARTICLES

SCIENCE VOCABULARY WORD #1

Using a phone or a tablet, scan the QR code below to find the hidden word.

ENGAGING ACTIVITIES

TYPES OF SYSTEMS - SORT AND MATCH

Cut out the titles and images below. Match the correct title with all the images that relate. Once checked by your teacher, glue the pieces onto the back of the "Types of Systems" article.

Physical Systems

Social Systems


School


Hospital


Respiratory System

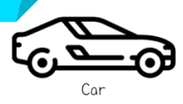

Elevator


Train


Garden


Playground


Lawyer/Judge


Car


City

WHAT'S INSIDE?

SAMPLE ANSWERS

Photo of a Lush Garden

What is the purpose?	What are the inputs?	What are the outputs?
• The purpose of a garden is to grow things.	• The garden needs seeds, fertilizer,	

Photo of a Bicycle

What is the purpose?	What
• The purpose of a bike is you f to an	• One the

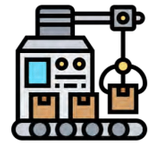
Photo of a Computer Chair

What is the purpose?	What
• The purpose of a computer chair is to sit comfortably, with correct posture, at a computer or desk.	• An inpu the

SAMPLE ANSWERS

In your own words, describe mechanical advantage.	MA stands for Mechanical Advantage. This is the way of expressing how much easier work becomes when using a simple machine. In the equation, F_{in} is the force that is exerted, while F_{out} is the force that you get as a result of the force exerted.
What is the difference	Another way of looking at this equation is to think of F_{in} as the force you actually have to exert to complete the task, and F_{out} as the force it would e.
How do you calculate mechanical advantage?	We can calculate how much easier the work becomes when we use simple machines using an equation: $MA = \frac{F\ out}{F\ in}$
What does it mean when the mechanical advantage is 1?	When there is a mechanical advantage of 1, it means that both the input and output force are exerting the same energy. In these cases, the direction between both forces changes – it does not make the work easier.

RUBE GOLDBERG CREATION LAB



Task: Your task is to use your knowledge of simple machines and systems to create a Rube Goldberg machine that performs a function or meets a need.

Instructions:

ant to accomplish, or what need you want to
berg Machine.
n the provided graphic organizer.
succinct plan in mind, begin collecting all the
an use anything that you have access to, like
rope, tape, screws, etc. Nothing can be
materials must be found at school or in your

your materials, you can begin to build your
s point, you will want to write down the
ou go along.
tem is complete, you will need to test it. Use
ded and test your machine a few times to
nk about what works and what could be done

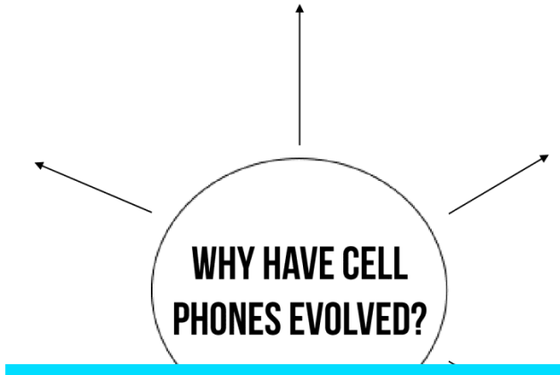
hine a few times, you will want to complete
graphic organizer. Think about what would
changed a piece or a component of the

achine entirely, you can complete the lab

nplete, you will do a brief 3–4 minute
esent the device, discuss the simple machines
our device, as well as any challenges or
oughout the building

THE EVOLUTION OF CELL PHONES

In the mind map below, think about reasons why cell phones may have evolved over the last 50 years.



ANSWER KEYS

LABS & INQUIRIES

TEACHER FEEDBACK

"This is an awesome unit! I have all your Grade 8 science units and this was an excellent addition to the others. Excellent variety of lessons, activities, and assignments. My students found it engaging and meaningful. Thanks!" - Margaret B.

INTRODUCTION

SCIENCE SAFETY RULES

1. LISTEN
   - ✓ To ALL the teacher's
   - ✓ Know the location of
2. ATTIRE
   - ✓ Wear safety goggles
   - ✓ Tie-up any loose ite
     especially when wor
   - ✓ Wear
3. READ
   - ✓ Any la
     symbo
   - ✓ The pr
4. TOOLS
   - ✓ Handle all tools with c
   - ✓ Inform the teacher
     there is a spill.
   - ✓ Do not taste test any
5. CLEAN-UP
   - ✓ Thoroughly wash all u
   - ✓ Wash hands with soa

SAFETY RULES QUIZ

Complete the following true/false questions on safety:

1. When you clean-up, wash your hands with just water.	T	F
2. Before you begin, you must listen to ALL the teacher's instructions.	T	F
3. Remember to tie-up any loose items (e.g. hair,	T	F
	T	F
	T	F
6. Do not bother reading your procedure, just make it up as you go!	T	F
7. Handle all tools with care, especially sharp objects.	T	F
8. Wear open-toe shoes, and use gloves/goggles as needed.	T	F
9. Read labels on chemicals used carefully (e.g., WHMIS symbols).	T	F
10. Do not tell the teacher if there is a spill or if an item is broken/faulty.	T	F

SCIENCE SAFETY RULES

EVERYDAY SYSTEMS

Instructions: Complete the graphic organizer to help you understand how you use systems in your daily life.

K-W-L CHART

Topic: Systems in Action

K	W	L
What do I about		What new things did I

SYSTEMS INTRODUCTION: WHAT ARE SYSTEMS?

LESSON 1 & 2

SCIENCE VOCABULARY WORD #1

Using a phone or a tablet, scan the QR code below to find the hidden word.

SCIENCE VOCABULARY

MECH

ADVA

UNIT VOCABULARY

TYPES OF SYSTEMS

hink of a computer or
bus system. Systems are
are components or
n a goal or meet a need.
ikes), while others are
chanical systems that
tation systems are created
round easily. The human
respiratory system, which
stem that helps you
stems. For
ules that both
llow to make sure
ypes of systems
Both sets of
world function.

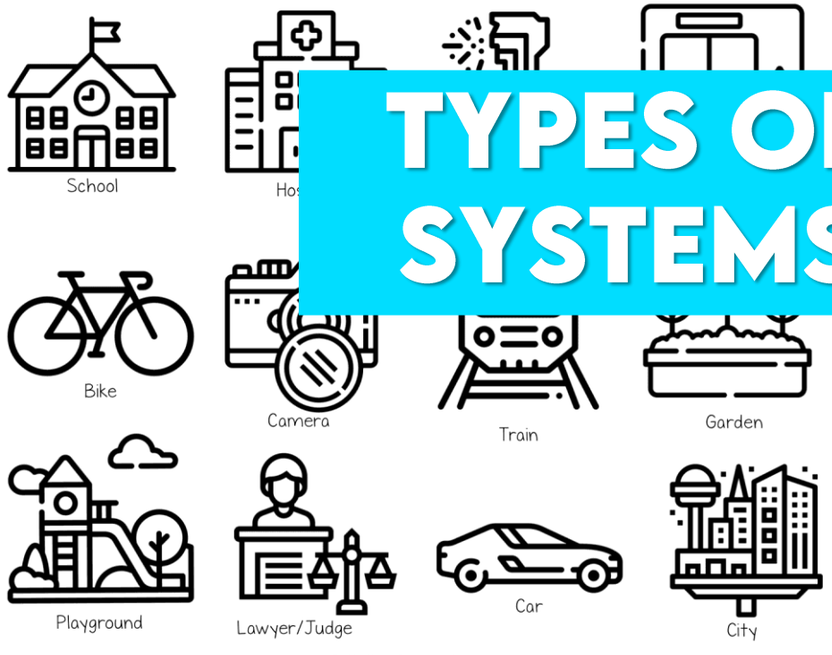
tion of simple machines
levators, for example, are a
s to push people up and

TYPES OF SYSTEMS - SORT AND MATCH

Cut out the titles and images below. Match the correct title with all the images that relate. Once checked by your teacher, glue the pieces onto the back of the "Types of Systems" article.

Physical Systems

Social Systems



TYPES OF SYSTEMS

LESSON 3 & 4

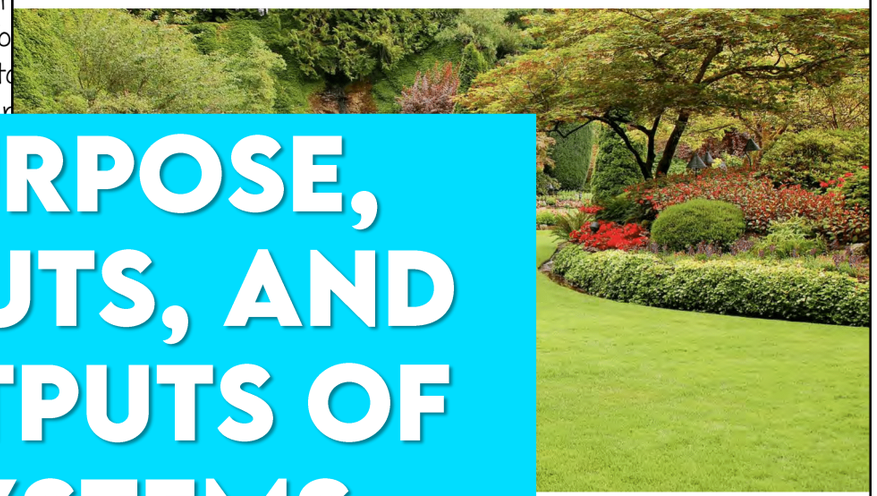
PURPOSE, INPUTS, AND OUTPUTS

What is the Purpose of a Sy
When you are thinking about
system, you want to know
exactly the system does. Fo
purpose of a toaster is to t
purpose of a speaker is to
purp
mess
possi
than

What
The i
going
desir
of a
to be
the t
bread.

What is the Output of a Sys
The output of a system ref
come out of the system as
input. In other words, what
used for? For the toaster e
will be that the toast warm
of the toaster to become t

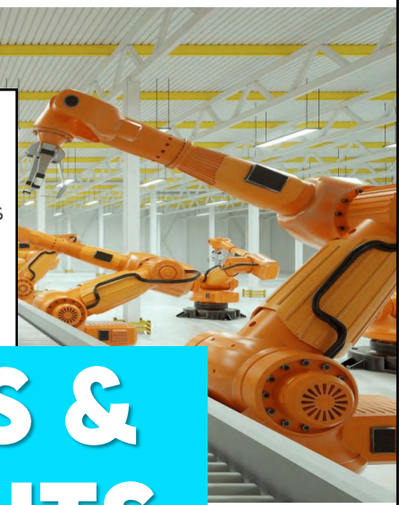
PHOTO ANALYSIS



purpose?	the inputs?	What are the outputs?

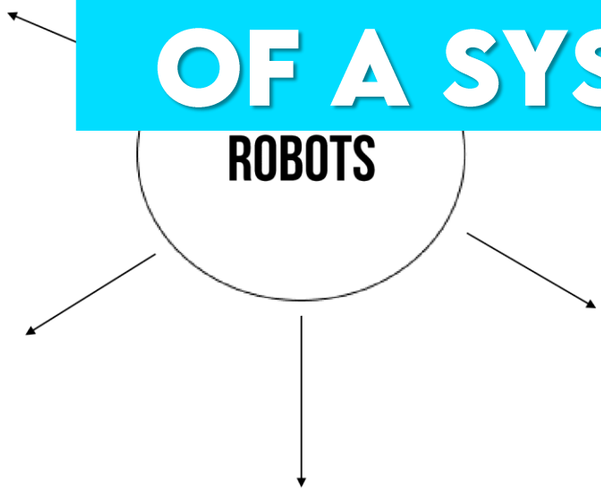
PURPOSE, INPUTS, AND OUTPUTS OF SYSTEMS

PROCESSES AND COMPONENTS OF ROBOTS



ROBOT BRAINSTORMING ACTIVITY

In the mind map below, think about which systems or components are needed to make and use robots.



PROCESSES & COMPONENTS OF A SYSTEM

things that
hat make
y and efficiently.
p that acts as their brain.
rols – can tell the robot
o have their physical
the robot and protects its
found in robots,. These
heir structures to perform
listen, there is also likely a
s are, as well as how far
ject or person. There are a
it function correctly and
hore of the components,

LESSON 5 & 6

LESSON #5

Syste

Lesson Overview:
Students will demonstrate t
past few lessons with a quiz

Materials Needed:
- ❑ Photoc
  - ▪ Sy

Teacher I
1. Hand
2. Set a
3. Once the quiz is complet

© htt

SYSTEMS IN ACTION QUIZ #1

Name: _____

Complete the following True/False questions on systems in action by circling the correct answer.

	T	F
	T	F
3. The input force of a system refers to what will come out of the system.	T	F
4. The outputs of a garden would be the food you can eat, as well as the flowers and plants that grow.	T	F
5. If you know the purpose of a machine, you know what the system or machine will do.	T	F

/5

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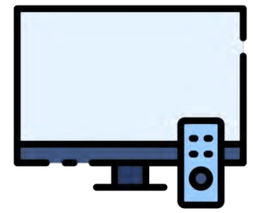
SYSTEMS IN ACTION QUIZ #1

FORCE, WORK, DISPLACEMENT, ENERGY, AND EFFICIENCY



w well you get your work
and output energy was
and whether that energy
f you think about a TV, the
cumentary for
icity, and the output
utput
g, it
ed to
d it is
nuch
t TV is.
the total input energy is
200J
% efficient.

WORK, FORCE, DISPLACEMENT, ENERGY, AND EFFICIENCY

Term Name	Scientific Definition	Real-Life Example
Force		
Work		
Displacement		
Energy		
Efficiency		

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FORCE, WORK, DISPLACEMENT, ENERGY, & EFFICIENCY

LESSON 7A & 7B

CALCULATING WORK, FORCE, AND DISPLACEMENT

Why Calculate Work?

If we calculate work, then
energy was used to move o
a force causes something t
how

You
took
mov
of t
New
Jou
joule
spe

How do I calculate work?

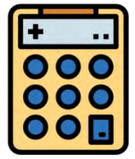
Use the equation below to c

Work = force

W = f x d

on is to push
ce used is
one trying to

CALCULATING WORK PROBLEMS



Equation

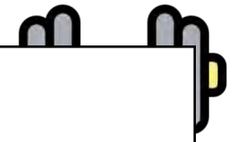
W = f x d

Instructions: Calculate work with the following questions. Be sure to show your work.

4. After you are done at the gym, you need to put away all of your weights. The force needed is 50N and the weights move 3.5 metres. How much work is needed to move the weights?

CALCULATING WORK, FORCE, & DISPLACEMENT

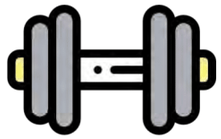
UNDERSTANDING AND CALCULATING WORK



EXERCISE ACTIVITY:

CALCULATING FORCE AND WORK

Exercise 2 Dumbbell Row: Stand with your feet hip distance apart and a soft knee. Hinge at the hip and begin with your arm hanging (dumbbell in hand). Pull the dumbbell to your hip, while maintaining the same hinged hip position. This exercise targets your trapezius muscle in your back.



Calculate the work. But first, you need the force.	
F = m = __ = __	Fill in the first blank with the
W = f W = __ W = __	Fill in the second blank with the measurement that the weight travels when you complete a row.

UNDERSTANDING & CALCULATING WORK

your teacher assigns you?
mmunicate how much work
mes the distance.

stands for work, measured
ch is measured in Newtons
es (m).

ns (N) and metres (m) are
).

ng 20kg
would need
or each

N x 0.8M
6J

117.6J of work.

LESSON 8 & 9

6 SIMPLE MACHINES

What are Simple Machines?

Simple machines were creat… to help make everyday tasks easier… and more efficient for peop… that, when combined, use le… simple machines everyday. … challenging life would be wit… get into buildings, wheels for… things together. There are s… get the same work done, w… inclined plane, pulley, wedge,…

What are Levers…

Levers are everywhere: in p… equipment, etc. Levers are … This particular point is calle… makes it easy to move heav… there is effort and load on … there is effort exerted on … end. In this example, the fu… if the fulcrum is placed clos… required to move the load.

6 SIMPLE MACHINES ALL AROUND US

Instructions: Try to write a definition for each simple machine based on your current knowledge. After, look around the classroom or think of examples for each.

Simple Machine	Definition	Example
Lever		
Inclined Plane		
Wedge		
Screw		
Wheel and Axle		

THE 6 SIMPLE MACHINES

MECHANICAL ADVANTAGE

PRACTICE WITH MECHANICAL ADVANTAGE

Let's practice

1. I apply 350N of force to push a cart full of computer paper up a ramp to go into the … of paper to t…
   a) What is …
   b) What ty…

Practice Questions

2. I apply a force of 400N to my lacrosse stick to cause the ball to travel quickly and as far as possible to get as close to the goal as possible. Because the lacrosse ball does not weigh much, my resulting force is 200N.
   a) What is the mechanical advantage of the lacrosse stick?
   b) Was the result surprising? What possible explanation could you give for the mechanical advantage?

MECHANICAL ADVANTAGE

…?

…our lives easier by …olish work. The …ective the …

…1, and there are several …change the direction of …er to push than to pull …to it. Another reason for …Here, you do not want the …hallenge your muscles. …ough, it means that input … it does not necessarily …

…than 1, it is actually more …equired) to do the work …ut it. In these situations, … for speed (or for another …rosse or hockey would be …the stick as a lever).

LESSON 10 & 11

SYSTEMS IN ACTION QUIZ #2

Name: _____

Complete the following ques

1. Imagine your friend asks y
cafeteria table. They pass i
2.5 metres. How much wor
(2.5 marks)

SYSTEMS IN ACTION QUIZ #2

Name: _____

Complete the following questions by showing all of your work.

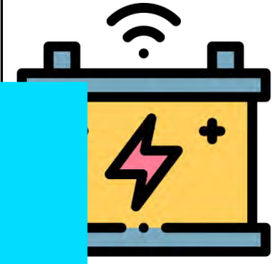
1. Imagine your friend asks you to pass a ketchup bottle at the school
ance of
bottle? Use

SYSTEMS IN ACTION QUIZ #2 (2 OPTIONS)

/5

ENERGY IN MECHANICAL SYSTEMS

How to make these systems more efficient?
Efficiency is all about making a system more useful, and especially
erate the machine. If you
goal of the car is for a
s the engine and moves
more efficient than walking.
cause of the metal rubbing
will occur, which will make



cient is by making
require oil, since
, there are not any
use friction and produce
fficient since they reduce

ENERGY IN MECHANICAL SYSTEMS

How do mechanical systems produce heat?	
What is friction? How doe Pro exa	
In wha you mec syste efficient?	
Think of another example of a mechanical system that produces heat due to friction.	

ENERGY IN MECHANICAL SYSTEMS

LESSON 12 & 13

IMPROVED PRODUCTIVITY IN SYSTEMS

What is productivity?
Productivity in science refer
to complete a task in a cert
productive you are, the less
given task.

How have some
Industries are
productive and
save time, mor
boosted their p
automated sys
manual labour, are often mu
unlike human employees. Ro
accomplish tasks much quick
example, a robotic system r
and place it in a different loc
ease. This particular task wo
of energy to do without the

ROBOTIC SYSTEMS IN INDUSTRIES

Robotic (or automated) systems are often more efficient, quicker, and stronger than humans. This helps boost productivity in various industries. Watch the video Robot-assisted packaging: 30% more productivity to learn more about how robotic systems improve productivity.

How have robotic systems helped this industry?

How does the robotic system work within this particular industry?

PRODUCTIVITY WITH SYSTEMS IN VARIOUS INDUSTRIES

WHY DO CELL PHONES EVOLVE?

nes, often refers to a
ver time. This development
ds and wants of people.
nore complex to match how

evolve for many reasons,
s. People are social beings
done in
eloped
f
ple can

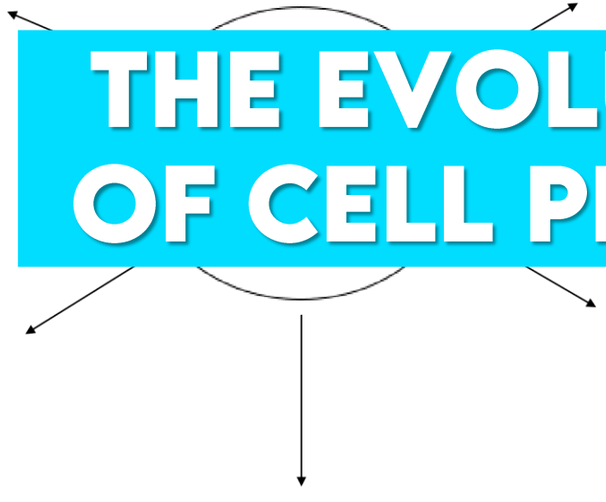
phones to reflect the
le are "on the go," and use
food and groceries, and

nly extended to size.
d, smart phones can easily
become very portable.

dog.com

THE EVOLUTION OF CELL PHONES

In the mind map below, think about reasons why cell phones may have evolved over the last 50 years.



THE EVOLUTION OF CELL PHONES

LESSON 13 OPTIONAL INQUIRY

EVOLUTION OF A SYSTEM

Instructions: Through a presentation, you are asked to choose a system and research the social factors that have influenced its evolution.

Presentation Requirements:

1. Name and picture of the system.
2. An explanation of how the system was originally used, how it evolved, and how people could adapt to make the system evolve again.
3. A descriptio
   - How has system
   - Why th
4. Source list – or books use
5. The present informative.

Possible Topics (but not limited to these):

- Recycling centres
- Elevators
- Roller coasters
- Air conditioning units
- Changing traditional work hours
- Hospitals
- Health care systems
- Bikes

EVOLUTION OF A SYSTEM

What is the name of the system?	
What factors drove the system to evolve?	

EVOLUTION OF A SYSTEM OPTIONAL INQUIRY

LESSON 14 & 15

LESSON #14

Systems in

Lesson Overview:
Students will demonstrate t
past few lessons with a quiz

Materials Needed:
- ❑ Photocopy a class set or
  Mid-Unit Systems in Acti

Te
1.
2.
3.

© htt

MID-UNIT SYSTEMS IN ACTION QUIZ

Name: _____

Complete the following True/False questions on systems in action by circling the correct answer.

1. Work occurs when force can move an object and exert energy. T F
2. The equation for work is calculated by dividing T F
3. When a machine or system is using little and energy well, it is considered efficient. T F
6. Inclined planes and wedges hold a similar function. T F
7. Mechanical advantage describes how much easier work becomes with simple machines. T F
8. The equation for mechanical advantage uses force in divided by the force out. T F
9. When the mechanical advantage is 1, that means the work was easier. T F
10. Oils help reduce friction in vehicles. T F

/10

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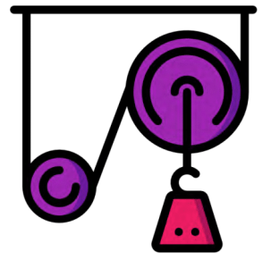
SYSTEMS IN ACTION MID-UNIT QUIZ

PULLEY EXPERIMENT

Task: You are going to conduct an experiment



s question on the science lab

ment. If you do not have a
using a bar.
a bar (or metre stick) in the
p in between the chairs that

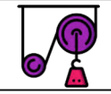
a 1lb weight or a textbook) and
ghted item.
system, you are going to pull
load.
ervations under the
ent.
with two pulleys or two pieces
he extra pulleys or rope is
our observations and findings

d continue to record your

outline your experience.

g.com

PULLEY EXPERIMENT



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PULLEY EXPERIMENT

LESSON 16 & 17

RUBE GOLDBERG CREATION LAB

Task: Your task is to use your knowledge of simple machines and systems to crea machine that performs a funct

Instructions:

- ❑ Decide on what task you wa meet, with your Rube Goldb
- ❑ After, sketch your design or
- ❑ When you have a clear and necessary materials. You ca glue, rulers, Domino pieces, purch home
- ❑ Once mach proce
- ❑ When the g see if to im
- ❑ After the P happen if you removed or c machine.
- ❑ When you complete the ma report.
- ❑ After the lab report is com presentation where you pre you used, the purpose of yo difficulties that may have p process.

RUBE GOLDBERG – CREATION LAB

surprises while doing the lab?

Would you recommend this lab to future students?

RUBE GOLDBERG MACHINE LAB

OWNER'S MANUALS

onsumers to be able to use they purchase it. The ll contain most of the turning it on and off, to ting any potential problems. ble, owner's rm. However, ual virtually.

pecific question is s problem, most presentatives that nowledge about the an issue that you may have. t a new gaming system eam directly. They can help a virtual online assistant hat-like feature.

dog.com

OWNER'S MANUAL REFLECTION

1. Which owner's manual was the most interesting to you? Why?

2. W

3. W
under standing of owner's manuals, safety, and efficiency shifted throughout the lesson?

OWNER'S MANUAL EXPLORATION

LESSON 18 & 19

THE IMPACTS OF NEW AND EV

Station #2

Explain your topic. What is the idea? What is the issue with the topic?

t make it
n your

Syste
These
enviro
two o
econo

Option 1
• Mass produced furnit vs. Handcrafted furn

How does your topic influence the economy? Who benefits the most from the service? Where does the money go? Does it help the economy?

How does your topic influence the environment? Is it positive or negative? Explain with details from your research.

INQUIRY: THE IMPACTS OF NEW AND EXISTING SYSTEMS

MEETING NEEDS WITH EXISTING SYSTEMS PERSPECTIVE ASSIGNMENT

MEETING NEEDS WITH EXISTING SYSTEMS

Which perspective are you researching?	
What is the question discuss How does i the indiv	

he audience.

dividual, society, and the

rtant to you.
eeds is more efficient.
the websites, videos, or books

Level 3	Level 4
Researched with most details provided. More information is needed on	Thoroughly researched details and perspectives. ovided.
	l project ows an tensive on to detail.
	nation was ed to the pic and nstrates an tensive erstanding of the topic..
Most sources provided.	All sources are provided.

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MEETINGS NEEDS WITH EXISTING SYSTEMS

LESSON 20 & BONUS FILES

UNIT TEST /20

Name: _____ Class: _____

Multiple Choice Instructions: Se

1. The _____ of a syste
get its desired results.
A) Purpose
B) Input
C) Output
D) Processes

D) Fulcrum

4. Simple machines allow us to
required to do work.
A) Energy
B) Force
C) Efficiency
D) Friction

5. _____ occurs whe
together.
A) Heat
B) Components
C) Force
D) Friction

UNIT TEST

Name: _____ Class: _____

Short Answer Questions: Respond to the following questions in sentence format.

14. Explain how the terms work, force, displacement, energy and efficiency

SYSTEMS IN ACTION UNIT TEST

BILL NYE – SIMPLE MACHINES

Name: _____ Class: _____

❑ Inclined plane	❑ Force
❑ Direction	❑ Simple machines
❑ Forces	❑ Chain
❑ Pitch	❑ Effort
❑ Rod	❑ Smaller
❑ Screw	❑ Lift
❑ Size	❑ Fulcrum
❑ Levers	❑ Distance
❑ Work	❑ Heavy

SUB PLANS OR UNIT REVIEW

4. Catapults and seesaws are examples of _____ because they can change the direction of _____.

5. Wheels on bicycles are _____ _____. The gears are wheels with teeth. The front and back are connected by a _____. The rider can put out less _____ for a longer _____.

BONUS FILES

SELF-DRIVING CARS

What is a Self-Driving Car?

A self-driving car is a vehicle th
can drive itself without any hur
assistance.

Self-driving technology is alrea
used in many vehicles, but full
driverless cars are not widespr

Currently, some cars already ha
partial self-driving features. Th
are cars that can park themse
keep you driving at one speed
without your foot on the gas
(cruise control) or brake
automatically.

These cars have a level of self
driving, but driverless cars, whe
the car operates itself for you,
still being developed.

Today's models of driverless ca
are not fully autonomous. Some
require the driver's hands to be
the wheel to ensure they are r
to take over in case of emerger

Level Up

Vehicles have different levels o
self-driving, ranging from 0 to
For a Level 0, all major systems
car are controlled by humans. F
Level 5, none are controlled by

Advantages of Self-Driving Cars	Disadvantages of Self-Driving Cars

SUB PLANS OR UNIT REVIEW

ARTICLE QUESTIONS /10

Name: _____

THINKING QUESTION

Assessment	Below Expectations	Meets Expectations	Above Expectations
	✓ -	✓	✓ +

Are self-driving vehicles a good idea? Explain your thinking.

_____

_____

_____

_____

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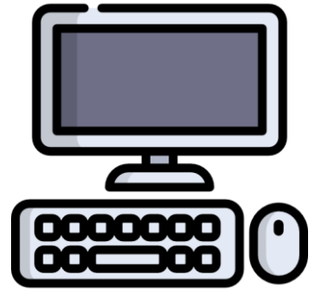
LESSON FORMATS

PDF

✓ Individual & Whole Unit



DIGITAL

✓ Google Slides

RESOURCE CAN BE USED IN-PERSON OR ONLINE