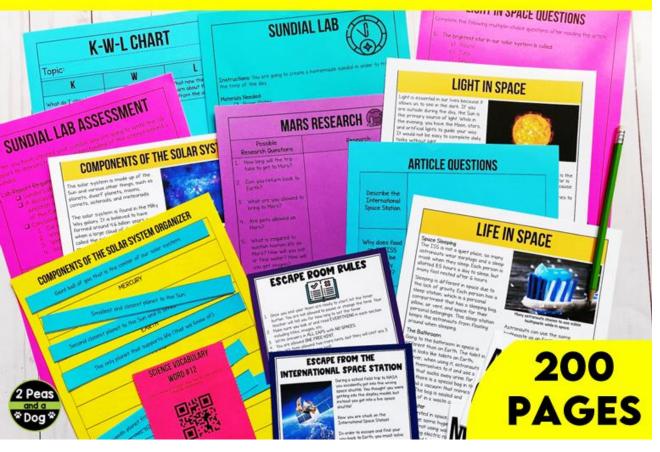
SPACE UNIT

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

OO

- Introduction: Safety Rules& Unit Vocabulary
- Solar System Components
- Mass vs. Weight
- Light in Space
- Humans in Space
- Space Exploration Tools
- Space Exploration and The Environment
- The Earth, Moon, and Sun

- Lab Sun Dial Creation
- Canadian Contributions to Space
- Space Exploration
- Mission to Mars
- Space Unit Test
- Unit Review/Sub Plans Bill Nye and Magic School Bus Videos
- Space Digital Escape Room

UNIT ORGANIZATION

ONTARIO CURRICULUM ALIGNMENT

Lesson	2007 Curriculum	2022 Curriculum
Introduction Safety Rules & Vocabulary	2.1, 2.4	A1.4, A1.5
#1A Solar System Components	3.1	E2.1
#1B Mass and Weight	Not Included	E2.2, E2.3
#2 Light in Space	3.2	E2.4
#3 Humans in Space	3.5	E1.1
#4A & B Space Exploration Tools	3.4	E2.6, E1.2
#5 The Earth, Moon, and Sun	3.5	E2.5
#6 Sun Dial Creation	2.1, 2.2	A1.1, A1.2, A1.3, A1.4, A1.5
#7 Canadian Contributions To Space	1.1	Not Included Use As Sub Plans If Needed
#8 Space Exploration	1.2	E1.3
#9 Mission To Mars	2.3, 2.4, 2.5	A1.1, A1.2, A1.3, A1.4, A1.5

CURRICULUM **ALIGNMENT**

LESSON OVERVIEW

Lesson	Activity Type	Name	Suggested Time & Curriculum Expectations	
T .	Class Discussion	Safety Rules &	2 Classes	
Intro	QR Code Scavenger Hunt	Unit Vocabulary	2.1, 2.4	
4.4	Whole Class Reading,	Solar System	2 Classes	
#1A	Cut & Paste, and Instasnap	Components	3.1	
#1D	Calculations Activity	Mass and Weight	1 Class	
#1B			E2.2, E2.3	
#2	Multiple Choice	Liebt in Space	1 Class	
	Questions	Light in Space	3.2	
2	Whole Class Reading	Illiana di Cara	1 Class	
#3	and Questions	Humans in Space	3.3	
#4A &	Whole Class Reading	Space Exploration	1 - 2 Class	
#4B	and Graphic Organizer	Tools	3.4	
#5	Whole Class Readings	The Earth, Moon,	1 – 2 Classes	
#5	and Diagrams	and Sun	3.5	
#6	Caiana a Lak	Com Dial Crantis	Several Classes	
#6	Science Lab	Sun Dial Creation	2.1, 2.2	

UNIT PLAN

INTRODUCTION

}}}}} Unit Vocabulary

Lesson Overview:

Students will work on reviewing vocabulary for this unit.

Materials Needed:

- ☐ Video: Solar System 101 National Geographic
- ☐ Photocopy a class set or use the provided Google Slides version of the following:
 - Vocabulary sheets (QR Code or Non-QR Code option)
 - Vocabulary graphic organizer
 - Definitions (For IEP and ESL students)
 - Definitions Google Slides

Teacher Instructions:

- 1. Watch the video Solar System 101 National Geographic to introduce this topic.
- 2. Hang the vocabulary words up around the classroom or hallway using the QR code or non-QR code format.
- 3. Divide the class into groups of 4.
- 4. 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

LESSON VOC 5. Onc def she

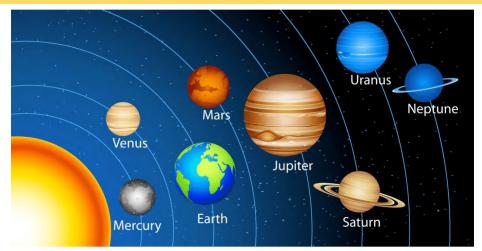
definitions

PLANS

WHAT'S INSIDE?



COMPONENTS OF THE SOLAR SYSTEM



Other Celestial Entities

Comets

Comets o layer. The Their tails

ARTICLES

a thick ice s in size.

Asteroids

Asteroids are like comets, except they lack ice. They are just rock, dust, and metal. The majority of asteroids are generated between Mars and Jupiter in a region known as the asteroid belt. Asteroids are much smaller than planets but larger than meteoroids, which are only pebble—sized particles.

Meteoroids

Meteoroids are tiny, rocky space debris that floats around the solar system. The majority of meteoroids come from the asteroid belt as well as other parts of the solar system. Meteoroids, often known as shooting stars, can collide with the Earth's atmosphere. They typically burn up in the atmosphere, resulting in a bright flash of light in the sky.

Meteorite

On the other hand, a meteorite is simply a meteoroid that did not burn out in the atmosphere and hit the Earth's surface. Therefore, they can come without warning and can hit objects on the ground.

SCIENCE VOCABULARY WORD #1

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

THINKING QUESTION

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

Would you like to try living in space? Explain your thinking.

ENGAGING ACTIVITIES

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WHAT'S INSIDE?





THE SUN

Giant ball of gas that is the center of our solar system

Smallest and a

Second closest planet to the

The only planet that s

Known as the "red planet" b

ANSWER KEYS

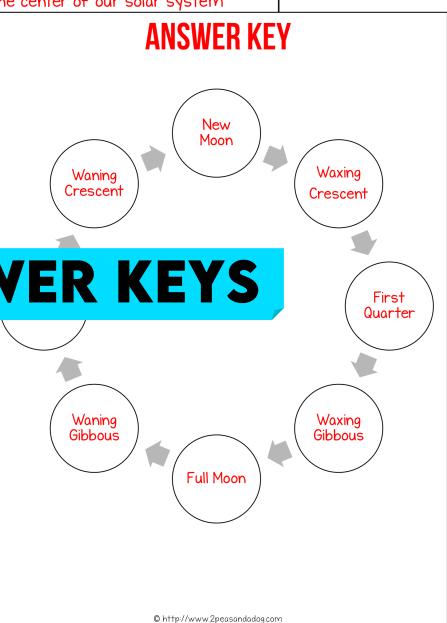
Known for its large ring

Seventh planet from tl

Furthest planet from

OTHER CEL Includes comets, aster-

O http:/



SUNDIAL LAB



Instructions: You are going to create a homemade sundial in order to track

MISSION TO MARS ASSIGNMENT



Your family has decided that they want to move to Mars. They are going to let you make the final decision. You must research this idea and report back to your family with a final decision on whether or not you are all moving to Mars or staying on Earth.

Assignment Requirements

3. Source list — remen

or books used

Sources

provided.

- 1. Research is completed through the use of guiding guestions and graphic organizers. These must be handed in for assessment.
- 2. Final decision on the move in written and presentation form

					4
Criteria	1			100	
Research Information	Limited researd provided	CA	SE	ST	U
Written Response	Limited information provided.	Some information provided.	decision is provided in the written response.	out decision is presented in the written response.	<u>++</u>
In Class Presentation (1-2 minutes)	Presentation not prepared.	Presentation provides some information on the final decision.	Presentation explains if the family will or will not move.	Presentation is well prepared and supported with visual materials.	
_	No sources	Some sources	Most sources	All sources	

provided.

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provided.

provided.

writing utensils

Smart Phone)

plate, cut out a middle in the centre (with in the middle.

ur paper plate outside a little before 12pm. er plate toward the Earth's celestial point

the paper plate, write the number 12 on the a ruler parallel to the straw.

> ır (e.g., draw a and write 1

the next

TEACHER FEEDBACK

"This resource is great! My students were continually engaged throughout. There was a variety of activities and the readings include great photos and illustrations. I also like how simple and laid out the lesson plans are. I look forward to using the related Escape Room resource at the end of our unit." - Crystal B.

INTRODUCTION

F

F



SCIENCE SAFETY RULES



OALE LIBELU GUL	SAFE	TY RU	LES (JUIZ
-----------------	------	-------	-------	-------------

Complete the following true/false questions on safety.

- 1. When you clean-up, wash your hands with just water.
- ✓ Know the location of the 2. Before you begin, you must listen to ALL the

teacher's instructions.

2. ATTIRE

1. LISTEN

✓ Wear safety goggles, sur

✓ Pay attention to ALL the

- ✓ Tie-up any loose items (3. Remember to tie-up any loose items (e.g., hair,
- ✓ Wear closed—toe, comfo clothing, jewelry, etc.).
- 3. READ CAREFULLY
- ✓ Any labels of che
- ✓ The procedure o
- 4. T00LS
- ✓ Handle all tools w
- ✓ Inform the tead spill.
- ✓ Do not taste test any ite
- 5. CLEAN-UP
- ✓ Wash hands with soap a
- nce room. SCIENCE ion is located SAFETY up as you go!
 - 7. Handle all tools with care, especially sharp objects.
- \checkmark Thoroughly wash all used 8. Wear open—toe shoes and use gloves/goggles as
 - 9. Read labels on chemicals used carefully (e.g., WHMIS F symbols).
 - © http 10. Do not tell the teacher if there is a spill or if an item is broken/faulty. © http://www.2peasandadog.com

Vocabulary Definition Word

SCIENCE VOCABULARY WORD #1

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





LESSON 1A & 1B

Astronaut weight on Earth

Astronaut mass on the Moon

COMPONENTS OF THE SOLAR SYSTEM

The solar system is made up of the Sun and various other things, such as planets, dwarf planets, moons, comets, asteroids, and meteoroid



Task: Cut out or write down the following facts and place them in the correct spot in the organizer.

The solar system is found in the Way galaxy. It is believed to have formed around 4.6 billion years ac when a large cloud of dust and ga called the solar nebula collapsed, creating the Sun, planets, and oth solar system objects.

The Sun

The Sun is a giant ball of gas locat the center of the solar system. the biggest object in the solar sys The Sun is made up of many elements, like hydrogen, helium, carbon, and nitrogen. Temperatur the Sun's cor

The Sun's gra times more so powerful t

planets have

million degree

attraction is

them. The Sun is the foremost s of light and heat on Earth, allowing to exist

The planets in the solar system classified as Terrestrial or Jovian based on their structure and phymakeup.

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The only planet that supports life (that we know of)

The largest planet in the solar system

Giant ball of gas that is the center of our solar system

Includes comets, asteroids, meteoroids, and meteorites

SOLAR SYSTEM Irk planet COMPONENTS

size to Earth

Known as the "red planet" because of iron oxide or rust in its soil

Seventh planet from the Sun; a chilly and windy planet.

Known for its large rings; the sixth planet from the Sun

MASS AND WEIGHT

MASS AND W	EIGHT ACTIVITY 🚉	}
Your Task: Fill in the last two choweight for each location. Read the calculations.		
Astronaut mass on Earth	227kg	Ted to g

227kg

gravity, such that it is brce of gravity on an object 227kg or N t is generally measured in ons (N).

Weight

MASS VS. WEIGHT Earth, Astro

1L of water weight on Earth ferent planets like Earth h will have the same mass 1L of water mass on the Moon

1L of water weight on the Moon t, since the gravitational (take kg and multiply by 0.17)

Elephant mass on Earth 4000kg ld be different than it is on irth, a human would weigh Elephant weight on Earth

Elephant mass on the Moon

Elephant weight on the Moon (take kg and multiply by 0.17) © http://www.2peasandadog.com

LESSON 2 & 3



LIGHT IN SPACE

Light is essential in our lives because it

allows us to see in the dark. If are outside during the day, the S the primary source of light. While the evening, you have the Moon, and artificial lights to guide your It would not be easy to complete tasks without light.

Luminous and Non-Luminous Ligi

A luminous object is any object th emits its light. In other words, an source of light is a luminous object The Sun and light bulbs, for exam are luminous objects because the emit their own light. Whereas, a 1 2. Non-luminous light is: luminous object does not emit ligh but reflects it from a luncipaus

The Moon and mirrors are of non-luminous objects do not emit light. but only from other sources such

The Sun and Stars

The Sun is the primary s in our solar system. Nucle reactions are taking place in the core. These reactions generate he and light.

Stars are celestial bodies that pr their own heat and light that the form enormous groups that em their own light, such as constellat clusters, and galaxies. However, because of their great distance our planet, the light they emit ap tiny. The brightest star is Sirius. sometimes known as the "Dog St

LIGHT IN SPACE QUESTIONS

Complete the following multiple-choice questions after reading the article.

- 1. Luminous light is:
 - a) Light that is reflected
 - b) Light that makes its own light
 - c) Light from a telescope
 - d) Light from the Moon
- - a) Light that is reflected

LIGHT IN SPACE

e of liaht?

- c) The Moon
- d) The Sun
- emit in vast quantities. Stars usu 4. What type of reaction is occurring in the Sun to create light?

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- a) Nuclear bomb
- b) Chemical fusion
- c) Nuclear fusion
- d) Electricity



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LIFE IN SPACE

ARTICLE QUESTIONS Describe the International Space Station. Photo of Earth from space n the TSS must meet certain ements. It must be lightweight, ous, tasty, wet or sticky (to stop Why does food floating crumbs), compact, and on the ISS urized to make **HUMANS IN** have to be for the whole specially designed? SPACE eaten the same y are on Earth. getables, nuts, dried How are meal and meat. Other foods, such as supplies ages and spinach, must be ated before they can be planned for the med. When astronauts drink in astronauts? they use a special straw and ight from the packaging. re planned out in advance so is enough supplies for three Explain two a day and one snack. Depending ways that astronaut, they get anywhere astronauts save .,900 to 3,200 calories per day. water while in space.

LESSON 4A & 4B

SPACE EXPLORATION TOOLS

Many brilliant thinkers, philosophers,

mathematicians, artists, and scie have spent endless hours trying solve the mysteries of space. As knowledge widens and technology develops, tools were invented to observe the stars and even explo the edges of our solar system a beyond. Scientists developed new to explore the vastness of space life support, and many others hav Explorations Tools Chart. helped us explore space. This art will focus on three space explora tools: the telescope, spacecrafts, life support systa

The Telescope

A telescope is a astronomers to objects. Early tel by utilizing lenses clear glass). Mos telescopes use o capture and focu

One of the most telescopes is the Hubble Space Telescope, launched on April 24, It is a large space observatory or the Earth used to analyze various forms of light ranging from ultra to infrared. Hubble has two came universe for scientists to analyse

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SPACE EXPLORATION TOOLS FACTS



Instructions: Take the facts below and rewrite them in the correct Tools for observation, transportal area (Telescope, Spacecraft, Life-Support System) of the Space

> ★ This tool is critical to space exploration because it is used to support life.

SPACE EXPLORATION TOOLS

a controlled fuel and oxidizer.

tial objects from

are images.

- ★ Hubble is a famous example of one of these tools; launched on April 24, 1990.
- systems that collect photos of $t \mid \star$ This tool can move at hypersonic speeds.
 - ★ Monitors atmospheric levels, water supply, waste management, air pressure, fire detection, and suppression.

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LESSON #4B

BENEFITS OF SPACE EXPLORATION **TO THE ENVIRONMENT**

After reading the article, put a checkmark next to the environmental benefits of space exploration.

- ☐ Satellites are used to observe our oceans, atmosphere, ice/glaciers, and land.
- □ Space technology greater a lot of space junk that pollutes the universe. SPACE

EXPLORATION

AND THE

- RAL space accuracy.
- ☐ Calibratio could provid
- ☐ Research warming ar
- ☐ The infor but nothing
- ENVIRONMENT ☐ Satellites carbon monoxide and methane.
- ☐ Space exploration also monitors forests and their health.
- ☐ Technology does more harm to the planet than help it.
- ☐ More technology continues to be developed to keep track of other climate/environment issues like the carbon cycle.

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le Environment

oration technology is used

combat climate change Eye on Earth

og.com

rksheet

video. mbat

onment

LESSON 5 & 6



THE EARTH, MOON, AND SUN

The Sun and the Moon are an important part of our lives. The our source of warmth and light. also supplies energy to the plants we use. The sundial is the oldest known equipment for determining time. It uses the Sun's position precisely measure time.

Alternatively, the Moon helps us our way at night and is used in vo calendars. The length of time ne to go from full moon to new moo which is around 29.5 days, gave r the idea of a month. The movem and interaction of the Sun and the Moon influence the seas

phases of the Moon, and

Day and Night

of day and night.

The Earth revolves on it every 24 hours. The axis imaginary line between: poles and is inclined at a anale. Thus, the Earth ro counterclockwise when v above the North Pole. Th cause days and nights. The Earth turns clockwise from west to ear The half which faces the Sun has while the other half gets night.

Time Zones

Because of the Earth's rotation. is a cycle of daylight and darknes every 24 hours.

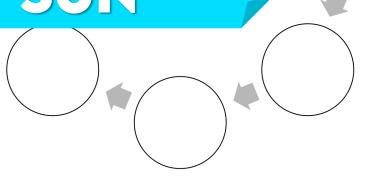
THE EARTH, MOON, AND SUN **

Moon Phases

Fill-in the graphic below with all the Moon phases.



THE EARTH, MOON, AND SUN



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SUNDIAL LAB ASSESSMENT

After you have created your sundial, you are going to write the lab report to demonstrate your understanding of the science behind a sundial

Lab Report Requirements

- ☐ Sundial Lab graphic organizers
- A discussion about the accuracy of your sundial, which direction you expected the shadow to move, and the impact of the Farth's tilt on a sundial

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☐ Conclusion Questions

4. Would

- 1. Did you enjoy this lab? Why or why not?
- 2. What problems did they encounter?
- 3. Were there any surprises?



demonstrated.

SUNDIAL LAB

middle in the centre (with

before 12pm.

Criteria	Level:			<u> </u>	Cicstiai poini
Sundial Lab	Student was unprepared during sundial lab. Student did not actively participate in the lab.	some of the materials required for the sundial lab. Student participated in the lab, but did not take on an active role.	Student had the required materials for the sundial lab. Student participated in the lab, and took on an active role.	i on a leadership	to the straw. for the next hour (e.g., draw a hen, use a ruler and write 1 new time). urs of the school day. complete the task the next
Sundial Lab Report	Lab report is incomplete. Several required elements are missing.	Lab report is missing key elements. Some elements are complete.	Lab report is complete. Some elements could use more detail.	Lab report is well—written and organized. Attention to detail is	u have completed these two



nade sundial in order to track

LESSON 7 & 8



CANADIAN CONTRIBUTIONS IN SPACE

Canadian Space Achievements

Canadian astronauts and astrono have a lot of achievements in spo exploration and research.

The Alouette 1 satellite was designed. and built by Canadians in 1962. T satellite investigated the ionosph (the atmosphere's electrically ch layer) to see if it might interfere long-distance radio transmission

Canadians have also created their "Hubble" telescope called the MOS Microvariability and Oscillation of S Telescope. MOST will supplement massive Hubble Small investigate th

Another Cana when they se space. On Oct Marc Garneau Canadian in sr Challenger.

The formation Agency was a

Canadian Space Agency aims to promote the peaceful use and development of space and to en space knowledge through science

Canadian Astronauts

Some notable astronauts from t Canadian Space Agency are:

CANADIAN C	ONTRIBU	TIONS IN	SPACE
------------	---------	----------	--------------

Instructions: Briefly explain the importance of each person or item to space exploration.

Chris Hadfield

CANADIAN CONTRIBUTIONS TO SPACE

John Richard Bond

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THE IMPACT OF SPACE EXPLORATION

Even before the invention of rockets

SPACE EXPLORATION CHART

After reading the article, put the following space exploration topics in the correct column in the chart.

☐ Risk

Advantages

- ☐ Communication
- Navigation
- ☐ Space Junk
- ☐ Medicine
- Pollution
- ☐ High Costs
- ☐ Climate Change Observation

ddition broadcast satellites

pace satellite over the planet Earth smit television signals to ground Disadvantages dcasting facilities.

SPACE EXPLORATION

stem (GPS) ased in position with n the world. avs a week.

riments on diseases and have eloped technology for millions of ole on Earth. For example, the gical experiments in space, such ne formation of insulin crystals, tove our ability to combat se. The Canadarm technology also used to develop surgical ts, such as neuroArm, a small t arm capable of performing surgery that would otherwise npossible.

LESSON 9 & 10

about Mars?



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MISSION TO MARS ASSIGNMENT

MARS RESEARCH PLANNER Your family has decided that What do I already know What do I want to know

about Mars?

going to let you make the fir and report back to your fam not you are all moving to Ma

Assignment Requirements

- 1. Research is completed t graphic organizers. These
- 2. Final decision on the n

or books u	sed	ISSION TO
Criteria		NAADC
Research Information	L re pi	MARS
Written Response	L information provided.	INQUIRY
In Class Presentation (1–2 minutes)	Presentation not prepared.	
Sources	No sources provided.	
	© h	**

	UNIT TE	
	Name:	_ Class:
	UNIT TEST	ct answer from the different center of the solar system.
lame:	Class:	, '
hort Answer Question (5 N	Marks)	
xplain some positive and n	egative parts of space exploration.	
		e solar system. To be labeled a
		- lun.
		ape due to gravity.
		ear out all other objects of a
	SPACE U	NIT
	TEST	This tool monitors
		hagement, air pressure, etc. What is
		-
		-
		-
		e are some instances when day and
		_

LESSON 11 & 12



BILL NYE: SPACE EXPLORATION FILL-IN THE BLANK

vacuum	gravity	BILL NYE: PLANETS AND I	00 W	NS
foot-restraint	rs te	Complete the following True/False questions.		
space s		. There are 12 different planets.	Т	F
1. A few hundred year huge magnifier, to	rs ago, people explore space	2. Mercury is the first planet.	Т	F
2. The first tool in sp		3. The largest planet is Jupiter.	Т	F
3. Space is 300k that pulls us dow	U	IIT REVIEW		F
4				F
5. Space is empt		OR		F
to wear	S	UB PLANS		F
6. Space suits ne				
7. Astronauts need to	practice their	Earth's orbit is round and makes a full circle around the Sun.	T	F
stable.		 Gravity is the reason why orbits are in the same direction, counter—clockwise. 	Т	F
8. An Interplanetary N	Navigator desig	O. Planets closer to the Sun move slower compared to planets further away.	Т	F
	© http			

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LESSON #12

THE STORYLINE

ESCAPE FROM THE INTERNATIONAL SPACE STATION



During a school field trip to NASA you accidently got into the wrong space shuttle. You thought you were getting into the display model, but instead you got into a live space shuttle!

Now you are stuck on the International Space Station!

Room

solve this digital escape room. I to complete, but every class is

one)

FLIGHT DIGITAL ESCAPE ROOM

covided

use a

tudents

ESCAPE ROOM RULES



- Once you and your team are ready to start, hit the timer button. You are not allowed to pause or change the time. Your teacher will tell you for how long to set the timer.
- Make sure you look at and read EVERYTHING in each section including titles, images, etc.
- 3. Write answers in ALL CAPS with NO SPACES.
- 4. You are allowed ONE FREE HINT.
- 5. You are then allowed two more hints, but they will cost you 3 minutes on the clock per hint!
- 6. Please do not Google the answers.
- 7. Please do not share your answers with other students.

at contains an escape room e escape room section, open up ner. Start the timer once you e and the rules. Please play by cape."

-time translation. Just hold the creen.

com

LESSON FORMATS





✓ Individual & Whole Unit





✓ Google Slides

RESOURCE CAN BE USED IN-PERSON OR ONLINE