

# Outer Planetary Topics

**Preview** is a compressed file



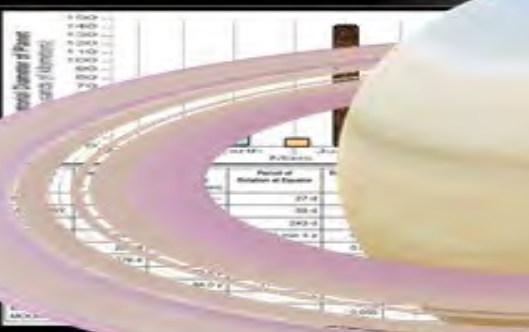
The background of the slide features a large, detailed image of the planet Saturn with its prominent ring system. The planet is shown from a slightly angled perspective, highlighting the texture of the rings and the surface of the planet. The overall color scheme is dark, with the bright yellow and white of the rings and the planet's surface providing a strong contrast.

# Preview

- B.) All Rocks and Debris
- C.) Methane Gas
- D.) Tidally Active Sulfur
- E.) Mostly Ice



THE ICE IS VERY REFLECTIVE



Largest moon in solar system  
 Larger than Mercury, less mass  
 Mostly rock, water ice, iron  
 Heavily cratered  
 Only moon with magnetosphere

**Io**  
 The most volcanically active of the Jovian moons, Io is covered in hundreds of volcanoes. It is the only moon in the solar system with active volcanoes. It was discovered by Galileo in 1610.

**Europa**  
 Europa is a small, icy moon with a smooth surface. It is believed to have a subsurface ocean of liquid water. It was discovered by Galileo in 1610.

**Ganymede**  
 Ganymede is the largest of the Jovian moons. It is a large, rocky moon with a complex surface. It was discovered by Galileo in 1610.

**Callisto**  
 Callisto is the second largest of the Jovian moons. It is a large, rocky moon with a heavily cratered surface. It was discovered by Galileo in 1610.

- **Gas Giant:** A large, low-density planet, composed primarily of hydrogen, helium, methane, and ammonia, in either gaseous or liquid state. (**Jupiter** and **Saturn**)



• Halley's Comet passes by Earth every 76 years. It last past by in 1986

It will return in... 2062



Its periodic return demonstrated that Halley's comet was in a orbit around the Sun and not caused by omens.

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- The scattered disc is a distant part of the solar system beyond the Kuiper Belt.
  - The area has small icy minor planets known as scattered disc objects (SDOs).



# 8 Lessons

# Interactive Slideshows

- Saturn's core is...

- A.) Very cold
- B.) Extremely Hot

10

- Saturn's interior, reaching 11,700 °C radiates 2.5 times more energy into space than it receives from the Sun.



Bar graph of the distance of each planet from the Sun in Astronomical Units.



- Name this region of space beyond the Solar System that theoretically contains about one trillion inactive comets.

20 Oort Cloud



- Video (Optional) Saturn Crash Course.

- <https://www.youtube.com/watch?v=E8GNde5nCSg>



- Triton

- Coldest place in solar system -391 degrees F
- Rotates opposite of planet, only place in SS

Called retrograde



Saturn is about 95 times more massive than planet Earth. It weighs 95.15 times more than Earth. 6.4 pounds more?

Be aware, Mass is not the same as size. The density of Earth is 5.52 g/cm<sup>3</sup>, while the density of Saturn is 0.687 g/cm<sup>3</sup>.



Learn more + differences between mass and weight at... <http://www.exploratorium.edu/ronh/weight/>

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- Which is Dionysus?
- A= Rhea



- Neptune
- Outermost planet.
- Orbits sun 165 Earth Years



Shares orbit with 3 Trojan Asteroids. A trojan is a small celestial body that shares the orbit of a larger one, remaining in a stable orbit.



# Activities, Notes, Keys, Games Assessments, and more all built-in

## • Uranus

The Other Planets



– Tipped on side (Early Comet Strike?).

## Rings



Uranus is rolling around in its orbit.

See simulator at:  
[http://soft.it.edu/classes/phys301/lectures/gas\\_planets/Seasons\\_Nav.swf](http://soft.it.edu/classes/phys301/lectures/gas_planets/Seasons_Nav.swf)

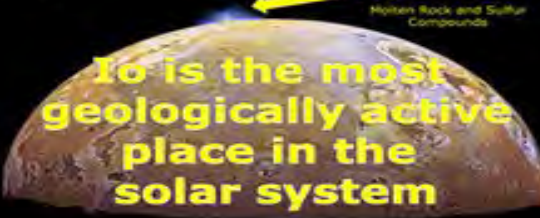
- **Ice Giants:** A giant planet composed mostly of astronomical ices including water, methane, oxygen, carbon, nitrogen, and sulfur, and smaller than a gas giant.

• (Uranus and Neptune)

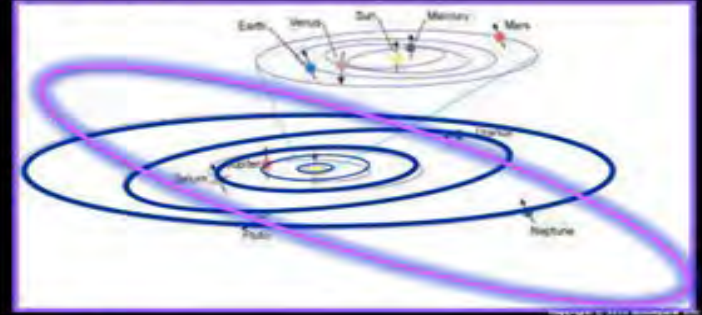
## • Io –

Supervolcano  
Molten Rock and Sulfur Compounds

**Io is the most geologically active place in the solar system**



– Orbits on a different plane than all the others.



## • Uranus

- 3rd Largest Planet
- Takes 84 Earth years to orbit sun.
- Methane absorbs red and reflects blue.



## • Jupiter's Red Spot

- 2 Earth's would fit inside
- Storm has been raging for 400 years.
- It's a storm that becomes larger by consuming other storms.



Studies have shown it's getting smaller every year.

- If the planet wasn't cool enough, it may also rain diamonds which then float in a dense liquid layer forming "diamondbergs" made of uncut diamonds.



Learn more about how these planets may be able to rain diamonds at:  
<http://www.sciencemag.com/impact/news/ice-raining-diamonds-made-neptune-and-uranus-16096459/>

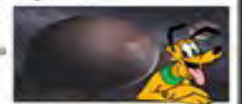
## • Questions for Article (On Next Slide)

- Who made this decision?
- What disqualifies Pluto and qualifies a planet?

### Pluto loses status as a planet

Astronomers have voted to strip Pluto of its status as a planet. About 2,500 scientists meeting in Prague have adopted historic new guidelines that see the small, distant world demoted to a secondary category.

The researchers said Pluto failed to dominate its orbit around the Sun in the same way as the other planets.



Pluto was discovered in 1930 by US astronomer Clyde Tombaugh. [See more details](#)



Part 6 of Astronomy Unit: The Outer Planets, Gas Giants, Ice Giants, Density of Outer Planets, Jupiter, Red Spot, Composition of Outer Planets, Jovian Moons, Saturn and its Moons, Uranus and its Moons, Neptune and its Moons, The Kuiper Belt, Demotion of Pluto, Oort Cloud, Comets

## Part 6 Astronomy Unit



Part 6 Lesson 1 Gas Giants



Part 6 Lesson 2 Jupiter



Part 6 Lesson 3 Jovian Moons



Part 6 Lesson 4 Saturn



## Part 6 Lesson 5 Ice Giants



Part 6 Lesson 6 Outer Solar System



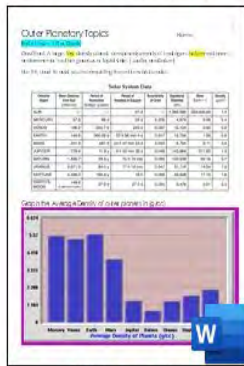
Part 6 Lesson 7 Review Game



Part 6 Lesson 8 Review Game Answers



## Part 6 Lesson 9 Space Expo Project



Part 6 Work Bundle Answers



Part 6 Work Bundle Digital



Part 6 Work Bundle Print

# SlideSpark Science



## MIDDLE-LEVEL EDUCATIONAL RESOURCES

Interactive slideshows provide the roadmap for an amazing learning experience for students in grades 5-9. A Detailed set of work bundles chronologically follow the digital learning, providing a clear and intuitive roadmap to understanding. As the teacher or student advances through a slideshow, exciting hands-on activities, fantastic visuals, fill-in notes, review opportunities, video links, assessments, and much more are strategically placed throughout. Interactive learning unfolds step by step and supported by the work bundle to reach all types of learners. Everything you need to run to an amazing learning experience is provided in this one-of-a-kind science curriculum.

Each unit in the curriculum is designed to help teachers deliver the best possible learning experience for their students. Our interactive science slideshows are filled with questions and answers, important fill-in notes, hands-on activities, projects, games, built-in quizzes, and end of the unit assessment pieces. Students follow along with a work bundle that documents the entire learning experience for a fantastic review and assessment piece.

Saturn is about 95 times more massive than planet Earth. But you only weigh 6.4 pounds more?

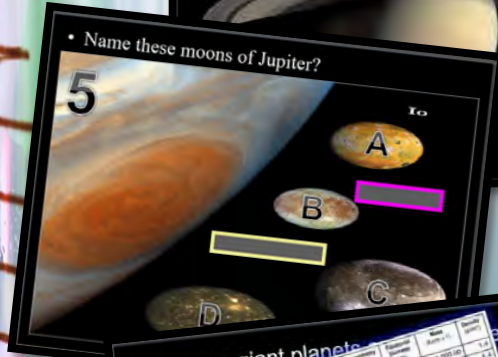
Be aware, Mass is not the same as size.



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• Name these moons of Jupiter?

5



• The gas giant planets are not very different from each other, but are different from the rocky planets.

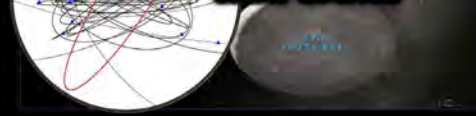
| Planet  | Mass (Earth masses) | Radius (Earth radii) | Density (g/cm³) | Escape Velocity (km/s) | Surface Gravity (g) | Orbital Period (years) | Distance from Sun (AU) |
|---------|---------------------|----------------------|-----------------|------------------------|---------------------|------------------------|------------------------|
| Jupiter | 318                 | 11.2                 | 1.33            | 59.5                   | 2.54                | 11.9                   | 5.2                    |
| Saturn  | 95                  | 9.4                  | 0.70            | 35.5                   | 1.07                | 29.5                   | 9.5                    |
| Uranus  | 45                  | 4.0                  | 1.27            | 21.3                   | 0.92                | 84.0                   | 19.2                   |
| Neptune | 46                  | 3.9                  | 1.64            | 23.5                   | 1.14                | 68.7                   | 30.1                   |

Jupiter Saturn Uranus Neptune Pluto  
Density of Planets (g/cc)

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SDO's have random and wild orbits



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- Gas Giant: A large, low-density planet, composed primarily of hydrogen, helium, methane, and ammonia, in either gaseous or liquid state. (Jupiter and Saturn)



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## Part 6 Outer Planetary Topics

Name: \_\_\_\_\_

Gas Giant: A large, \_\_\_\_\_ density planet, composed primarily of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_, in either gaseous or liquid state. (Jupiter and Saturn)

Use this chart to assist you in completing the entire work bundle.

Solar System Data

| Celestial Object | Mean Distance from Sun (million km) | Period of Revolution (Earth years) | Period of Revolution at Equator | Equatorial Diameter (km) | Mass (Earth = 1) | Density (g/cm <sup>3</sup> ) |
|------------------|-------------------------------------|------------------------------------|---------------------------------|--------------------------|------------------|------------------------------|
| SUN              | —                                   | —                                  | 27.3 d                          | —                        | 1,760,000        | 1.4                          |
| MERCURY          | 57.8                                | 88 d                               | 58 d                            | 4,878                    | 0.055            | 5.4                          |
| VENUS            | 108.2                               | 224.7 d                            | 243 d                           | 12,104                   | 0.82             | 5.2                          |
| EARTH            | 149.6                               | 365.25 d                           | 23 h 56 min 4 s                 | 12,756                   | 1.00             | 5.5                          |
| MAARS            | 207.8                               | 687 d                              | 24 h 37 min 23 s                | 6,794                    | 0.11             | 3.9                          |
| JUPITER          | 778.4                               | 11.9 y                             | 9 h 50 min 30 s                 | 142,984                  | 317.83           | 1.3                          |
| SATURN           | 1,426.7                             | 29.5 y                             | 10 h 14 min                     | 120,536                  | 95.16            | 0.7                          |
| URANUS           | 2,871.0                             | 84.0 y                             | 17 h 14 min                     | 51,118                   | 45.94            | 1.3                          |
| NEPTUNE          | 4,495.3                             | 164.8 y                            | 16 h                            | 49,528                   | 17.15            | 1.4                          |
| EARTH'S MOON     | 384,400                             | 27.3 d                             | 27.3 d                          | 3,476                    | 0.01             | 3.3                          |

Graph the Average Density of outer planets in (g/cc)



Red Slide Notes: Help students record important information in a fun and easy-to-understand way. Designed red-colored slides contain a few pieces of crucial information that students must record into their work bundle to complete the notes. Students will use these important notes throughout the work bundle.

The set-up of the slideshows are designed to make learning fun and interactive for students. With a mix of questions and answers, teachers can use these slides to get their students thinking and actively participating in their education. Plus, the answers are always revealed on the next slide, providing students with immediate feedback and helping teachers assess their understanding.

- Which letter represents the Gas Giants?

| Planet | Diameter* | Mass* | Density |
|--------|-----------|-------|---------|
| A      | 0.38      | 0.06  | 5.4     |
|        | 0.95      | 0.85  | 5.3     |
|        | 1.00      | 1.00  | 5.5     |
|        | 0.53      | 0.11  | 4.0     |
| B      | 10.8      | 318   | 1.33    |
|        | 8.9       | 95    | 0.68    |
|        | 4.1       | 15    | 1.2     |
|        | 3.8       | 17    | 1.7     |

- Which letter represents the Gas Giants?

• Answer: B

| Planet  | Diameter* | Mass* | Density |
|---------|-----------|-------|---------|
| A       | 0.38      | 0.06  | 5.4     |
|         | 0.95      | 0.85  | 5.3     |
|         | 1.00      | 1.00  | 5.5     |
|         | 0.53      | 0.11  | 4.0     |
| Jupiter | 10.8      | 318   | 1.33    |
| Saturn  | 8.9       | 95    | 0.68    |
| Uranus  | 4.1       | 15    | 1.2     |
| Neptune | 3.8       | 17    | 1.7     |

Which Letter below represents the outer planets? Why?

| Planet | Diameter* | Mass* | Density |
|--------|-----------|-------|---------|
| A      | 0.38      | 0.06  | 5.4     |
|        | 0.95      | 0.85  | 5.3     |
|        | 1.00      | 1.00  | 5.5     |
|        | 0.53      | 0.11  | 4.0     |
| B      | 10.8      | 318   | 1.33    |
|        | 8.9       | 95    | 0.68    |
|        | 4.1       | 15    | 1.2     |
|        | 3.8       | 17    | 1.7     |

Density = the smaller the number the more dense an object is.  
 • Density is Mass divided by volume.  

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}} = \frac{\text{g}}{\text{cm}^3}$$
 Density of more than 1 = Sink in water,  
 Density of less than one = Float in water.

What is the density of Jupiter?  
 Mass of Jupiter  $1.899 \times 10^{27}$  kg  
 Volume of Jupiter  $1.43 \times 10^{15}$  km<sup>3</sup>

Will Saturn sink or float if it fell in water? Explain below

Next Slide

slideshow supports  
Work Bundle

# Lesson Planning

Daily lessons space exciting hands-on activities, red slide notes, video and academic links, projects, simulations, readings, built-in quizzes, and review opportunities throughout the slideshows. A typical day may have many different learning styles being targeted. Daily lesson planning becomes advancing through the slideshow roadmap the night before. Each lesson is roughly 50 minutes, but sometimes things can speed up or slow down. The best strategy is just to go at your classes own pace. The work bundle chronologically follows the interactive slideshow and you can always spend extra time assessing the quality of the writing within. If you don't quite finish a lesson, you can always pick it up the next day where you left off. The only real trick in timing is not starting a larger activity if you don't have the available time to complete. The slideshows have been designed to be a low stress, go at your classes own pace experience. Most activities are designed to be cost effective, using general materials that can be gathered from your local stores.

## Gas Giants



Part 6 Lesson 1 Gas Giants

## Jupiter



Part 6 Lesson 2 Jupiter

## Jovian Moons



Part 6 Lesson 3 Jovian Moons

## Saturn



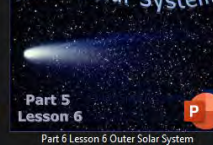
Part 6 Lesson 4 Saturn

## Ice Giants



Part 6 Lesson 5 Ice Giants

## Outer Solar System



Part 6 Lesson 6 Outer Solar System

## Review Game



Part 6 Lesson 7 Review Game

## Review Game



Part 6 Lesson 8 Review Game Answers

## Space Expo



Part 6 Lesson 9 Space Expo Project



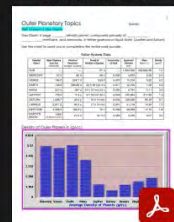
Part 6 Work Bundle Answers



Part 6 Work Bundle Digital



Part 6 Work Bundle Print



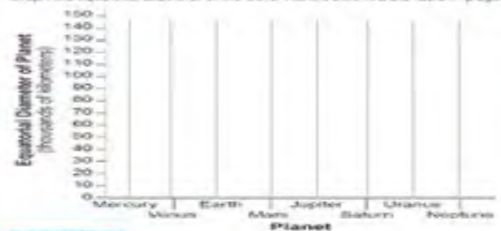
Part 6 Work Bundle Writable pdf

One clear, organized bundle guides students through notes, review, and assessments with ease.

# Follow Along Work Bundle

Each science unit comes with several work bundles. The bundles should be printed before the unit begins and distributed to the students on the first day of the unit. The work bundles will be due shortly after the completion of the unit. The work bundle will become a resource for the review games, crossword puzzles, and will be collected for assessment. The work bundle follows the entire learning experience and will be used every day. They are chronological to the lessons and provide places to record fill-in notes, answer questions, collect data, graph and much more. An answer version is provided that can be distributed to your support professionals. A digital version of the work bundle and some writable .pdf versions are provided if you want to go paperless. These work bundles are perfect for students looking for an easy and organized way to track their progress and stay on top of their studies.

## A collage of celestial bodies including Saturn, Jupiter, Earth, and various moons and asteroids, set against a background of lined paper.



**Jupiter**  
 Science: Encarta online di 8 anni

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- Twice as massive as all other planets combined.
- Fourth brightest object in sky.
- Gas Giant (Jelly is... is you go down)
- May have a small rocky core
- Mostly Hydrogen and a bit of Helium.
- High Velocity cause bands
- Red Spot (Giant 1)
- 17 Moons or Satellites (2019)

Which of the choices below is a bogus fact about a product?

- about Jupiter?  
A) Jupiter is massive as all other planets combined.  
B) Jupiter brightest object in sky.  
C) Gas Giant (Gerts denser as you go down).  
D) May have a small rocky core.  
E) Jupiter has a lot of rings.  
F) High velocity means loose bandings.  
G) Red Spot (Giant Storm).  
H) 99% Moons or Satellites.

[illegible]

A large number of exoplanets have been discovered in the last few years. The following table shows the mass of the planet in Earth masses ( $M_E$ ) and the orbital distance in Astronomical Units (AU).

The table is titled "Solar System Data" and contains the following columns: Planet Name, Mass ( $M_E$ ), Orbital Distance (AU), and Density ( $\text{g cm}^{-3}$ ).

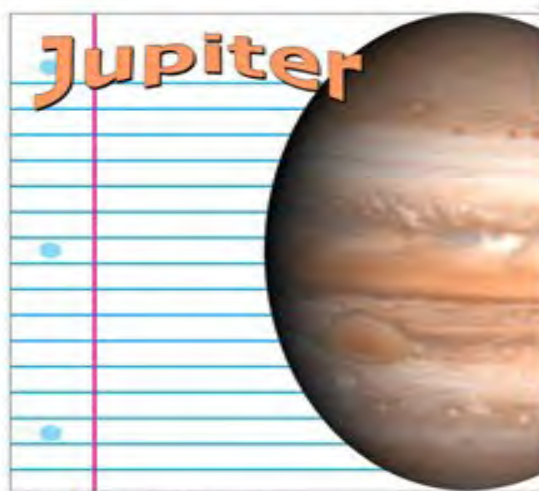
| Planet Name | Mass ( $M_E$ ) | Orbital Distance (AU) | Density ( $\text{g cm}^{-3}$ ) |
|-------------|----------------|-----------------------|--------------------------------|
| Mercury     | 0.055          | 0.39                  | 5.4                            |
| Venus       | 0.815          | 0.72                  | 5.2                            |
| Earth       | 1.000          | 1.00                  | 5.5                            |
| Mars        | 0.107          | 1.52                  | 3.9                            |
| Jupiter     | 317.8          | 5.20                  | 1.3                            |
| Saturn      | 95.2           | 9.54                  | 0.7                            |
| Uranus      | 45.9           | 19.2                  | 1.2                            |
| Neptune     | 45.9           | 30.1                  | 1.6                            |

The density of the outer planets is significantly lower than that of the inner planets.

Graph the Average Density of outer planets, in  $\text{g/cm}^3$



# Jupiter



Optional: Calculate your weight on Jupiter.

Remember, Weight has to do with gravity, mass is constant

- Multiply your weight by 2.5 = Weight on Jupiter (Large mass more gravity) and it's just gas. Imagine if it were rocky!

Your weight = \_\_\_\_\_ \* 2.5 = \_\_\_\_\_ Weight on Jupiter

Find the bogus term below!

|                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Io -</li> <li>A.) Rotten orange with acne.</li> <li>B.) Tidally active (no water, sulfur).</li> <li>C.) Volcanically inactive.</li> <li>D.) No impact craters because of volcanic dust.</li> </ul>                            | <ul style="list-style-type: none"> <li>• Ganymede</li> <li>A.) Smallest moon of Jupiter</li> <li>B.) Larger than Mercury, less mass</li> <li>C.) Silicate rock, water ice, iron</li> <li>D.) Heavily cratered</li> <li>E.) Only moon with magnetosphere</li> <li>F.) Thin oxygen layer in atmosphere</li> </ul> |
| <ul style="list-style-type: none"> <li>• Europa</li> <li>A.) Made of smooth white ice.</li> <li>B.) No craters (water seeps up)</li> <li>C.) Liquid water under ice (life?)</li> <li>D.) Many cracks in the ice</li> <li>E.) Gas core under the sea of ice.</li> </ul> | <ul style="list-style-type: none"> <li>• Callisto</li> <li>A.) Frozen water and dust</li> <li>B.) Geological Dead</li> <li>C.) Only moon known to have life</li> <li>D.) 4th Moon of Jupiter</li> </ul>                                                                                                         |

Saturn Part 5 Lesson 4 Saturn

- \_\_\_\_\_ of Moons (27+ Moons)
- Not very \_\_\_\_\_ (can float in water).
- Similar in composition to Jupiter
- Hydrogen 75% and Helium 25%
- Just missed becoming a star
- Has rings (A, B, and C etc.)
- Billions of particles from dust to meters long
- Mostly \_\_\_\_\_ and \_\_\_\_\_

Pick one Saturn obscure moon and record some info about it. Just google Saturn's Moons!



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Please name the Jovian Moons and provide some information about each.



## Jovian Moons

Ice Giants: A giant planet composed mostly of astronomical \_\_\_\_\_ including water, methane, oxygen, carbon, nitrogen, and sulfur, and smaller than a gas giant.

• (Uranus and Neptune)

Uranus Part 4 Lesson 5 Ice Giants

- \_\_\_\_\_ Largest Planet
- Takes \_\_\_\_\_ Earth years to orbit sun.
- Methane absorbs red and reflects \_\_\_\_\_
- Winds of \_\_\_\_\_ km/hr.
- Tipped on \_\_\_\_\_ (Early Comet Strike).
- \_\_\_\_\_ moons, 5 large, 22 small.
- Dubbed an ice giant, since 80% or more of its mass is made up of a fluid mix of water, \_\_\_\_\_ and \_\_\_\_\_.

Which is bogus of Uranus?

- A.) Largest Planet
- B.) Takes 84 Earth years to orbit sun.
- C.) Methane absorbs red and reflects blue.
- D.) Winds of 700 km/hr.
- E.) Tipped on side (Early Comet Strike).
- F.) 27+8 Moons, many named after William Shakespeare characters, and Alexander Pope's Poems.

Which is bogus of Uranus?

- A.) 3rd Largest Planet
- B.) Takes 84 Earth years to orbit sun.
- C.) Methane absorbs blue and reflects red.
- D.) Winds of 700 km/hr.
- E.) Tipped on side (Early Comet Strike).
- F.) 27+8 Moons, many named after William Shakespeare characters, and Alexander Pope's Poems.

Neptune

- \_\_\_\_\_ planet.
- Orbits sun \_\_\_\_\_ Earth years.
- Made of mostly hydrogen 80% and some Helium 19%
- Also Methane, Rock, Methane, Water, Ammonia
- Winds of \_\_\_\_\_ mph
- 4 faint rings
- \_\_\_\_\_ Moons

Which is bogus of Neptune?

- A.) Innermost gas planet.
- B.) Orbits sun 165 Earth Years
- C.) Methane, Rock, Methane, Water, Ammonia
- D.) Soft winds of 12 mph
- E.) 4 faint rings.
- F.) 14 Moons

Which is bogus of Neptune?

- A.) Outermost gas planet.
- B.) Orbits sun 165 Earth Years
- C.) Methane, Rock, Methane, Water, Ammonia
- D.) Soft winds of 12 mph
- E.) 4 faint rings.
- F.) 14 Moons

\_\_\_\_\_ and the Giant Red Spot below.



Part 4 Lesson 3 Jovian Moons

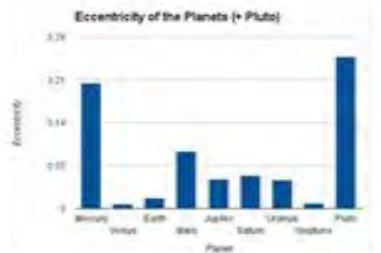
Distance from the Sun in Astronomical units.  
Please provide some information about Jupiter below. • Size. • rotational period. • year. • name the Jovian moons. • composition. • temp. • Other facts.

Please answer the questions below based on this graph.

Which outer planet has the most eccentric orbit?

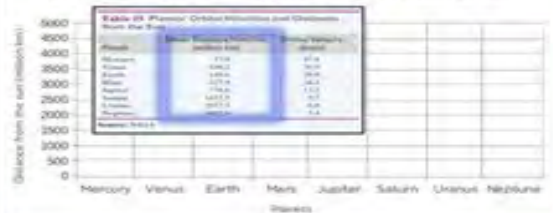
Which outer planet has the least eccentric orbit?

Compare the eccentricity of Pluto and Neptune?



Please graph out the distance of the outer planets from the sun in Astronomical Units.

Graph showing the distance of each planet from the Sun



Super Ball Pronounced Expert

- All objects in the region of objects that orbit the Sun.
- Objects that orbit the Sun in a nearly circular orbit.
- Objects that orbit the Sun in a highly elliptical orbit.

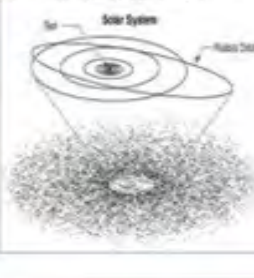
Comet Orb Objects (COCs)

- The Solar System is a disk-shaped system of objects that orbit the Sun.
- The objects that orbit the Sun are called comets.

Our Solar System is a disk-shaped system of objects that orbit the Sun.

- The Solar System is a disk-shaped system of objects that orbit the Sun.
- The Solar System is a disk-shaped system of objects that orbit the Sun.

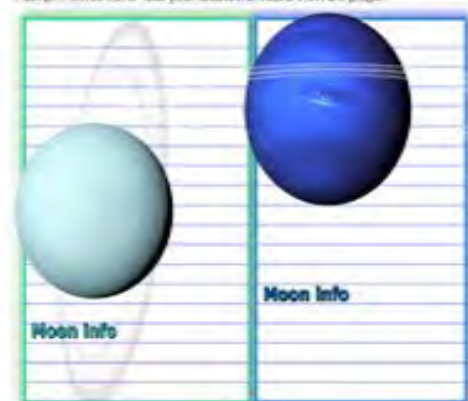
Comets are objects that orbit the Sun. They are made of ice and dust. They have long tails that point away from the Sun. They are found in the outer Solar System.



Please research and provide some info about a comet that orbits the Sun. Draw an orbit of a typical comet in our solar system. (What do you call the nucleus of a comet?)



Please provide some information about planets and long time before and some of their moons. (You can start with a period of 1 year. Compare a comparison to temp. - Other facts - use your reference material from last page.)



What is a comet? Think Astronomer



What is a comet? Think Astronomer. The Sun is the center of the solar system. The planets and comets orbit the Sun. The Sun is the center of the solar system.

What is a comet? Think Astronomer. The Sun is the center of the solar system. The planets and comets orbit the Sun. The Sun is the center of the solar system.



Part 6 Outer Planetary Topics

| Topic                 | Topic                 | Topic                 | Topic                 | Topic                 | Topic                 |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. The Outer Planets  | 2. The Outer Planets  | 3. The Outer Planets  | 4. The Outer Planets  | 5. The Outer Planets  | 6. The Outer Planets  |
| 7. The Outer Planets  | 8. The Outer Planets  | 9. The Outer Planets  | 10. The Outer Planets | 11. The Outer Planets | 12. The Outer Planets |
| 13. The Outer Planets | 14. The Outer Planets | 15. The Outer Planets | 16. The Outer Planets | 17. The Outer Planets | 18. The Outer Planets |
| 19. The Outer Planets | 20. The Outer Planets | 21. The Outer Planets | 22. The Outer Planets | 23. The Outer Planets | 24. The Outer Planets |
| 25. The Outer Planets | 26. The Outer Planets | 27. The Outer Planets | 28. The Outer Planets | 29. The Outer Planets | 30. The Outer Planets |

What is a comet? Think Astronomer

| Topic                 | Topic                 | Topic                 | Topic                 | Topic                 | Topic                 |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. The Outer Planets  | 2. The Outer Planets  | 3. The Outer Planets  | 4. The Outer Planets  | 5. The Outer Planets  | 6. The Outer Planets  |
| 7. The Outer Planets  | 8. The Outer Planets  | 9. The Outer Planets  | 10. The Outer Planets | 11. The Outer Planets | 12. The Outer Planets |
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| 25. The Outer Planets | 26. The Outer Planets | 27. The Outer Planets | 28. The Outer Planets | 29. The Outer Planets | 30. The Outer Planets |

 Outer Planetary Topics

Get Data: A judge, who serves as the corporate arbitrator of disputes, hears and resolves all other disputes (such as stock and debt).

[illegible]

| Phenol | Concentration <sup>a</sup> | Active <sup>b</sup> | Excess <sup>c</sup> |
|--------|----------------------------|---------------------|---------------------|
| A      | 0.20                       | 0.000               | 0.0                 |
|        | 0.50                       | 0.000               | 0.0                 |
|        | 1.00                       | 0.000               | 0.0                 |
|        | 10.00                      | 0.000               | 0.0                 |
|        | 100.00                     | 0.000               | 0.0                 |
| B      | 0.20                       | 0.000               | 0.0                 |
|        | 0.50                       | 0.000               | 0.0                 |
|        | 1.00                       | 0.000               | 0.0                 |
|        | 10.00                      | 0.000               | 0.0                 |
|        | 100.00                     | 0.000               | 0.0                 |

Density =  $\frac{\text{mass}}{\text{volume}}$

Density =  $\frac{\text{mass}}{\text{volume}}$  g / cm<sup>3</sup>

Density of most from 1 to 10 g / cm<sup>3</sup>

Density of less than one is float in water

What is the density of Jupiter?  
Mass of Jupiter =  $1.9 \times 10^{27}$  kg  
Volume of Jupiter =  $1.43 \times 10^{27}$  m<sup>3</sup>

Density =  $\frac{\text{Mass}}{\text{Volume}}$

Density of Jupiter =  $\frac{1.9 \times 10^{27} \text{ kg}}{1.43 \times 10^{27} \text{ m}^3}$

Density of Jupiter = 1.32 kg/m<sup>3</sup>

1.32 kg/m<sup>3</sup> is less than the density of water (1000 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of air (1.2 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of hydrogen (0.089 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of helium (0.178 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of neon (2.0 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of argon (1.78 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of krypton (3.71 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of xenon (5.54 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of radon (9.73 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of osmium (22.59 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of iridium (22.56 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of platinum (21.45 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of gold (19.32 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of silver (10.49 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of copper (8.96 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of iron (7.87 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of steel (7.85 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of aluminum (2.70 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of titanium (4.51 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of nickel (8.84 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of cobalt (8.86 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of manganese (7.47 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of zinc (7.14 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of cadmium (8.65 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of barium (3.51 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of strontium (2.54 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of calcium (1.55 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of magnesium (1.74 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of sodium (0.97 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of potassium (0.86 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of rubidium (0.67 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of cesium (0.73 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of francium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of actinium (0.67 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of protactinium (0.67 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of uranium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of neptunium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of plutonium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of americium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of curium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of berkelium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of californium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of einsteinium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of fermium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of mendelevium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of nobelium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of lawrencium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of roentgenium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of darmstadtium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of cobalt (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of nickel (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of copper (0.69 kg/m<sup>3</sup>)

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1.32 kg/m<sup>3</sup> is less than the density of germanium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of arsenic (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of selenium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of bromine (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of krypton (0.69 kg/m<sup>3</sup>)

1.32 kg/m<sup>3</sup> is less than the density of xenon (0.69 kg/m<sup>3</sup>)

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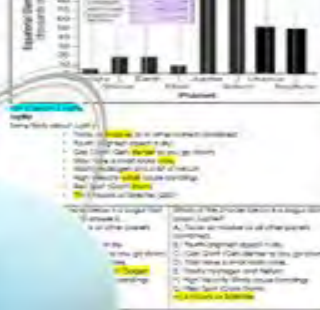
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1.32 kg/m<sup>3</sup> is less than the density of curium (0.69 kg/m<sup>3</sup>)

1.32 kg/m<

Order the Exoplanets (planets) by the Outer Planets below. Drag-Robee 14

[illegible]

## 10 Jovian Moons

[illegible][illegible][illegible]

**Saturn**

...the planet's rings are made of ice and rock, and are the most prominent feature of the planet. The rings are composed of many small particles, ranging in size from a few centimeters to several meters. The rings are located in the plane of the planet's equator, and are tilted at an angle of about 2.5 degrees relative to the plane of the planet's orbit around the Sun.

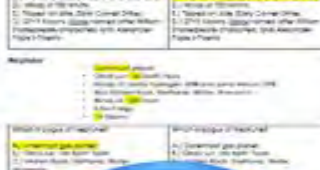
...the planet's atmosphere is composed of hydrogen, helium, and methane. The atmosphere is very thin, and is located in the upper layers of the planet's interior. The atmosphere is composed of many small particles, ranging in size from a few centimeters to several meters. The atmosphere is located in the plane of the planet's equator, and is tilted at an angle of about 2.5 degrees relative to the plane of the planet's orbit around the Sun.

...the planet's interior is composed of hydrogen, helium, and methane. The interior is very hot, and is located in the lower layers of the planet's interior. The interior is composed of many small particles, ranging in size from a few centimeters to several meters. The interior is located in the plane of the planet's equator, and is tilted at an angle of about 2.5 degrees relative to the plane of the planet's orbit around the Sun.

...the planet's surface is composed of hydrogen, helium, and methane. The surface is very hot, and is located in the lower layers of the planet's interior. The surface is composed of many small particles, ranging in size from a few centimeters to several meters. The surface is located in the plane of the planet's equator, and is tilted at an angle of about 2.5 degrees relative to the plane of the planet's orbit around the Sun.



de clients, el qual genera un efecte molt més immediat i més eficaç que les accions de caràcter social, i que, a més, permet aconseguir un efecte més durador i més sostenible.

[illegible]

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**Moons Info**

There are 27 moons in the solar system. Most are spherical and have atmospheres. The largest moon is Jupiter's Ganymede, which is larger than the planet Mercury. The smallest is the asteroid 243 Ida's moon, Dactyl, which is only 1.4 km across. Moons are found around all the planets except Mercury and Venus. They are also found around some dwarf planets and some exoplanets.

[illegible]

| Year | Number of Publications |
|------|------------------------|
| 2000 | ~100                   |
| 2001 | ~150                   |
| 2002 | ~200                   |
| 2003 | ~250                   |
| 2004 | ~350                   |
| 2005 | ~500                   |
| 2006 | ~700                   |



Diagram illustrating the digestive system of a horse, showing the path of food from the mouth to the stomach and intestines.



Diagram illustrating the circulatory system of a horse, showing the flow of blood between the heart, lungs, and body.



2. A gas sufficient may be passing hydrocarbon, sufficient as nearly inert, dry air.

2. A gas, filtered the neighborhood, amount to 1000.

Total gas, 1000, 1000.

[illegible]

the 1990s, the number of people in the world who are undernourished has declined from 760 million to 530 million. The number of people who are malnourished has declined from 1.1 billion to 800 million. The number of people who are obese has increased from 100 million to 300 million. The number of people who are overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million. The number of people who are obese and overweight has increased from 100 million to 300 million.

**Neptune**



The diagram shows a hierarchical or interconnected network of nodes. At the top center is a box labeled "D.C. CASE". Below it are several boxes arranged in a branching pattern. On the left side, there's a vertical column of boxes, some containing numbers like "10", "11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22", "23", "24", "25", "26", "27", "28", "29", "30", "31", "32", "33", "34", "35", "36", "37", "38", "39", "40", "41", "42", "43", "44", "45", "46", "47", "48", "49", "50", "51", "52", "53", "54", "55", "56", "57", "58", "59", "60", "61", "62", "63", "64", "65", "66", "67", "68", "69", "70", "71", "72", "73", "74", "75", "76", "77", "78", "79", "80", "81", "82", "83", "84", "85", "86", "87", "88", "89", "90", "91", "92", "93", "94", "95", "96", "97", "98", "99", "100".

[illegible]

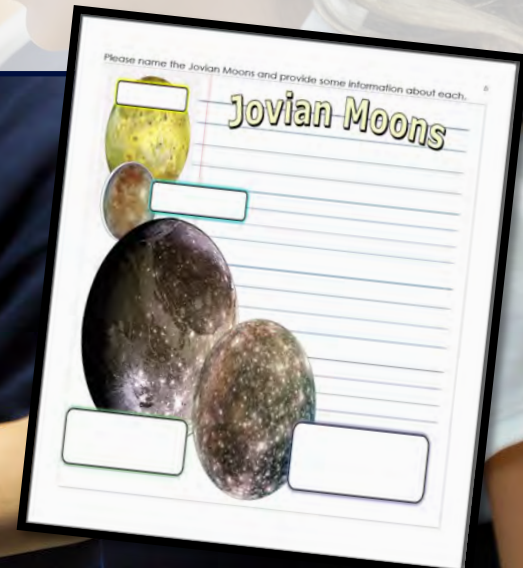
mentary of *Staphylococcus aureus* (1971).  
 1. *Staphylococcus aureus* is a Gram-positive bacterium, which is spherical in shape (cocci).  
 2. It is a facultative anaerobe, meaning it can grow in the presence or absence of oxygen.  
 3. It is a highly contagious bacterium, often found on the skin and in the nose.  
 4. It is a common cause of skin infections, such as boils and abscesses.  
 5. It is also a common cause of food poisoning.  
 6. It is a highly resistant bacterium, capable of surviving in harsh environments.  
 7. It is a highly adaptable bacterium, capable of forming spores.  
 8. It is a highly virulent bacterium, capable of causing severe infections.  
 9. It is a highly contagious bacterium, capable of spreading easily between individuals.  
 10. It is a highly resistant bacterium, capable of surviving in harsh environments.



1. I am a \_\_\_\_\_ (male/female) \_\_\_\_\_ (single/married/divorced/widowed) \_\_\_\_\_ (his/hers/our) \_\_\_\_\_ (husband/wife/partner) \_\_\_\_\_ (son/daughter/sister/brother) \_\_\_\_\_ (nephew/niece) \_\_\_\_\_ (grandson/granddaughter) \_\_\_\_\_ (other) \_\_\_\_\_ (please specify) \_\_\_\_\_.

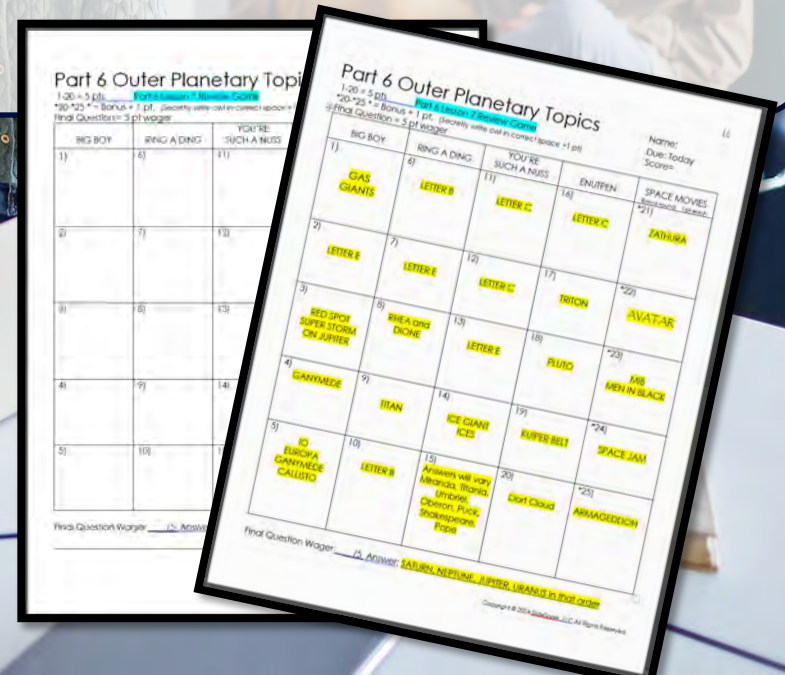
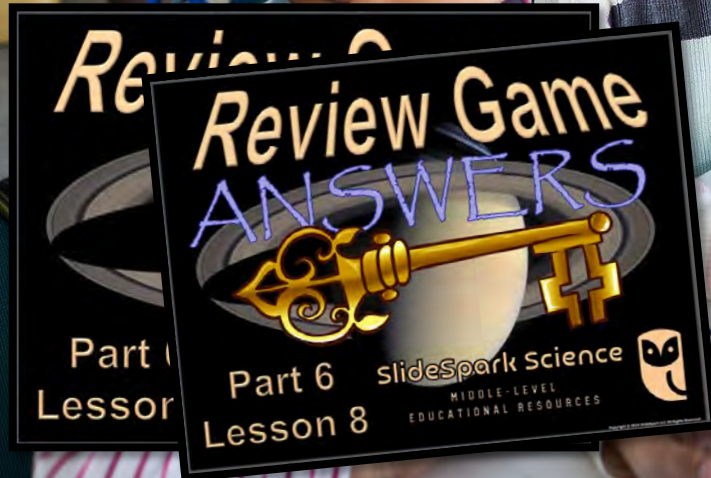
# Built-in Questions and Assessments

Many slides will have relevant terms covered with a box. When advancing through the slideshow an outline around the box will glow with a bright color. The next slide will make the box disappear. These slides allow the teacher to call upon students or table groups / check for understanding before advancing. The team at SlideSpark has found that using this technique helps to keep the students focused. Constantly recalling and reviewing information learned is necessary when moving through a large unit. The slideshows don't just give everything away for free. Students should be able to demonstrate knowledge before moving on. Some slides have full questions instead of just covered terms. In these slides, the teacher should encourage small group work. The teacher can then call upon one or two groups to share before advancing the slide. The next slide will always reveal the correct answer.



# Review Game / Assessments

Each of the 11 Units concludes with a review quiz. Answers are provided in slideshow form so students can self assess. A blank template sheet is provided in the work bundle. Students can benefit from working together in small table groups with quiet communication. You can decide if you want to allow the use of work bundles or not. These are a nice review opportunity and get the students looking through their work bundles for the answers.



# OUTER PLANETS

## Quiz Game

• Saturn's core is...

- A.) Very cold
- B.) Extremely Hot

10

• Saturn's interior, reaching 11,700 °C radiates 2.5 times more energy into space than it receives from the Sun.



• Name this moon on Jupiter?

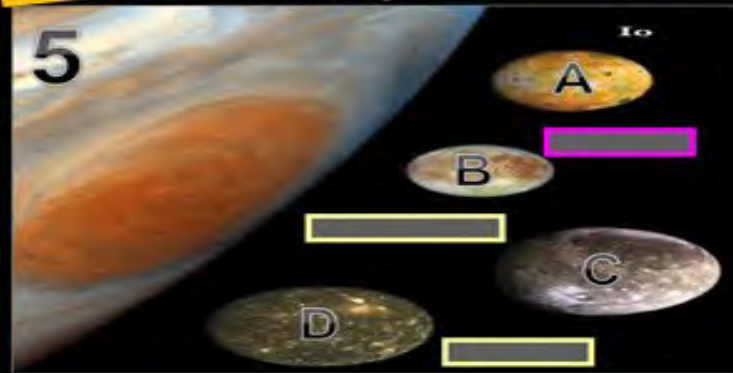
4

- Largest moon in solar system
- Larger than Mercury, less mass
- Solid rock, water ice core
- Heavily cratered
- Only moon with magnetosphere
- Thin oxygen layer in atmosphere

Ganymede

These moons of Jupiter?

5



Part 4 Outer Planetary Topics

| Topic                                                  | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|--------------------------------------------------------|----|----|----|----|----|----|----|----|----|-----|
| 1. Name the planet with the most moons.                |    |    |    |    |    |    |    |    |    |     |
| 2. Which planet has the Great Red Spot?                |    |    |    |    |    |    |    |    |    |     |
| 3. Which planet is known as the Ringed Planet?         |    |    |    |    |    |    |    |    |    |     |
| 4. Which planet has the most prominent rings?          |    |    |    |    |    |    |    |    |    |     |
| 5. Which planet has the most intense magnetic field?   |    |    |    |    |    |    |    |    |    |     |
| 6. Which planet has the most extreme weather?          |    |    |    |    |    |    |    |    |    |     |
| 7. Which planet has the most prominent auroras?        |    |    |    |    |    |    |    |    |    |     |
| 8. Which planet has the most prominent lightning?      |    |    |    |    |    |    |    |    |    |     |
| 9. Which planet has the most prominent magnetic field? |    |    |    |    |    |    |    |    |    |     |
| 10. Which planet has the most prominent auroras?       |    |    |    |    |    |    |    |    |    |     |

Part 5 Outer Planetary Topics

| Topic                                                  | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|--------------------------------------------------------|----|----|----|----|----|----|----|----|----|-----|
| 1. Name the planet with the most moons.                |    |    |    |    |    |    |    |    |    |     |
| 2. Which planet has the Great Red Spot?                |    |    |    |    |    |    |    |    |    |     |
| 3. Which planet is known as the Ringed Planet?         |    |    |    |    |    |    |    |    |    |     |
| 4. Which planet has the most prominent rings?          |    |    |    |    |    |    |    |    |    |     |
| 5. Which planet has the most intense magnetic field?   |    |    |    |    |    |    |    |    |    |     |
| 6. Which planet has the most extreme weather?          |    |    |    |    |    |    |    |    |    |     |
| 7. Which planet has the most prominent auroras?        |    |    |    |    |    |    |    |    |    |     |
| 8. Which planet has the most prominent lightning?      |    |    |    |    |    |    |    |    |    |     |
| 9. Which planet has the most prominent magnetic field? |    |    |    |    |    |    |    |    |    |     |
| 10. Which planet has the most prominent auroras?       |    |    |    |    |    |    |    |    |    |     |

• This is the name for a large, low-density planet, composed primarily of hydrogen, helium, methane, and ammonia, in either gaseous or liquid state.

Gas Giant

1



Please record 2 solid pieces of information about Jupiter's Red Spot

- 2 Earth's would fit inside
- Storm has been raging for 400 years.
- It's a storm that becomes larger by consuming other storms.

3



- Name these two moons of Saturn?

8

Rhea

Dione



- What is the density of Saturn?

6

- A.) 5.52 g/cm<sup>3</sup> Earth
- B.) 0.687 g/cm<sup>3</sup> Saturn
- C.) 1.638 g/cm<sup>3</sup> Neptune
- D.) 1.326 g/cm<sup>3</sup> Jupiter
- E.) 17 AU's ?



- Which of the choices below is a bogus fact about Jupiter? Bogus answer is...

- A.) Twice as massive as all other planets combined.
- B.) Fourth brightest object in sky.
- C.) Gas Giant (Gets denser as you go down)
- D.) May have a small rocky core.
- E.) Mostly Hydrogen and Helium.
- F.) High Velocity Winds cause bandings
- G.) Red Spot (Giant Storm)
- H.) 79+? Moons or Satellites

2

- Saturn's rings are primarily composed of...

- A.) Hydrogen and Helium
- B.) All Rocks and Debris
- C.) Methane Gas
- D.) Tidally Active Sulfur
- E.) Mostly Ice

7



THE ICE IS VERY REFLECTIVE

- This moon has liquid lakes of methane on it.
- The only known place in our solar system.

9



Titan

- What famous person characters are the moons of Uranus named after? (Just one needed)

– Also name at least one moon of Uranus.

15



- Which is not correct of Uranus?

A.) Winds of 700 km/hr.

B.) 27 moons

C.) Has Methane which absorbs red and reflects blue.

D.) Tipped on side (Early Comet Strike) which creates extreme seasons.

E.) The first planet observed by Ancient Greeks.

13

Discovered  
March 13, 1781

- It takes Uranus \_\_\_\_ years to orbit the sun?

– A.) 1 Earth year

– B.) 7 Earth years

– C.) 84 Earth years

– D.) 798 Earth years

– E.) 100,000,000 Earth years

12



- Uranus is sometimes dubbed a **Ice Giant** since 80 percent or more of its mass is made up of a fluid mix of water, methane, and ammonia **ices**.

14

Ice Giant

- Uranus the \_\_\_\_ largest planet

– A.) 1<sup>st</sup> Largest planet

– B.) 2<sup>nd</sup> Largest planet

– C.) 3<sup>rd</sup> Largest Planet

– D.) 5<sup>th</sup> Largest planet

– E.) Cannot be determined



- Name each planet based on its symbol below?

A



**Saturn**

B



**Neptune**

C



**Jupiter**

D



**Uranus**

Name this demoted planet and reclassified Dwarf Planet?

**Pluto**

18

- Name the disk-shaped region beyond the orbit of Neptune.

- Much larger and more massive than the asteroid belt.
- Objects are made of mostly frozen water, methane, and ammonia.

**Kuiper Belt**

19

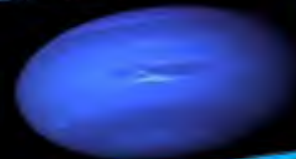
- Name this region of space beyond the Solar System that theoretically contains about one trillion inactive comets.

**20 Oort Cloud**

- Which fact is bogus from the list below about Neptune?

- A.) Outermost gas planet.
- B.) Orbits sun 165 Earth Years.
- C.) Softest winds in the solar system at 12 mph.
- D.) 4 faint rings.
- E.) 13+2 Moons.

16



Composition of Neptune is....

- Coldest place in solar system -391 degrees F
- Rotates opposite of planet, only place in SS
- Has an atmosphere (Nitrogen)

17

**Triton**



# Built-in Assessment

This unit contains built-in assessment questions that students answer in their work bundle. With the question revealed before the answer, the teacher can easily call on individual students or table groups to respond. These provide an effective and efficient way for teachers to assess student learning.

• Which of the choices below is a bogus fact about Jupiter?

- A.) Twice as massive as all other planets combined.
- B.) Fourth brightest object in sky.
- C.) Gas Giant (Gets denser as you go down)
- D.) May have a small rocky core.
- E.) Mostly Nitrogen and a bit of Oxygen.
- F.) High Velocity Winds cause bandings
- G.) Red Spot (Giant Storm)
- H.) 79+? Moons or Satellites

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- F.) High Velocity Winds cause bandings
- G.) Red Spot (Giant Storm)
- H.) 79+? Moons or Satellites

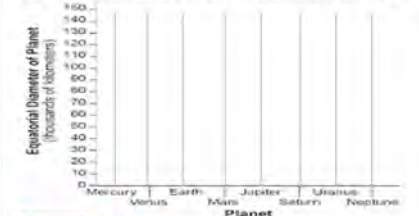
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- G.) Red Spot (Giant Storm)
- H.) 79+? Moons or Satellites

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Graph the Equatorial Diameter of the Outer Planets below. Data table 1<sup>st</sup> page



## Chapter 2: Jupiter

Some facts about Jupiter:

- Twice as massive as all other planets combined.
- Fourth brightest object in sky.
- Gas Giant (Gets denser as you go down)
- May have a small rocky core.
- Mostly Hydrogen and a bit of Helium.
- High Velocity Winds cause bandings.
- Red Spot (Giant Storm)
- 79+ Moons or Satellites (2011)

Which of the choices below is a bogus fact about Jupiter?

- A.) Twice as massive as all other planets combined.
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- C.) Gas Giant (Gets denser as you go down)
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Which of the choices below is a bogus fact about Jupiter?

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- D.) May have a small rocky core.
- E.) Mostly Hydrogen and Helium.
- F.) High Velocity Winds cause bandings.
- G.) Red Spot (Giant Storm)
- H.) 5 Moons or Satellites

# Quiz in Work Bundle



# Built-in Video Links

Our science education program is designed with the modern, multimedia learner in mind, and our video and academic links are a perfect complement to our educational materials. These short clips are embedded into the slideshow at just the right places for a fantastic review. Whether you're studying biology, chemistry or physics, our video links are an excellent way to reinforce your learning.

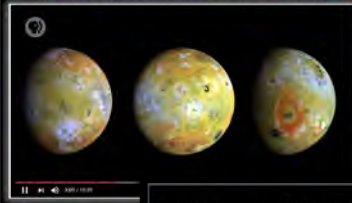
- What would the planets look like in the sky if they were at same distance from earth as the moon?

– [https://www.youtube.com/watch?v=usYC\\_Z36rHw](https://www.youtube.com/watch?v=usYC_Z36rHw)



- Video (Optional) Jupiter's Moons Crash Course

– <https://www.youtube.com/watch?v=HaFaf7vbgpE>



- Video (Optional) Saturn Crash Course.

– <https://www.youtube.com/watch?v=F8GNde5nCSg>



- Video (Optional) Crash Course Comets

– <https://www.youtube.com/watch?v=yB9HtVpKds>



- Video Link! (Optional) Titar

– <http://www.youtube.com/watch?v=...>



- Video Link! Jupiter

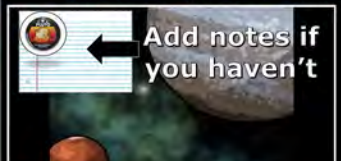
– Pause video when it reaches Jupiter's Moons. Continue with slideshow (moons) and finish video when you see this slide again.

• <https://www.youtube.com/watch?v=s56pxa9lcv0>



- Video Link! Pluto's Demotion

– <http://www.youtube.com/watch?v=9b25dPQ9ORY>



- Reading Link! Pluto's Demotion

• <http://www.universetoday.com/13573/why-pluto-is-no-longer-a-planet/>

**Pluto loses status as a planet**  
Astronomers have voted to strip Pluto of its status as a planet.

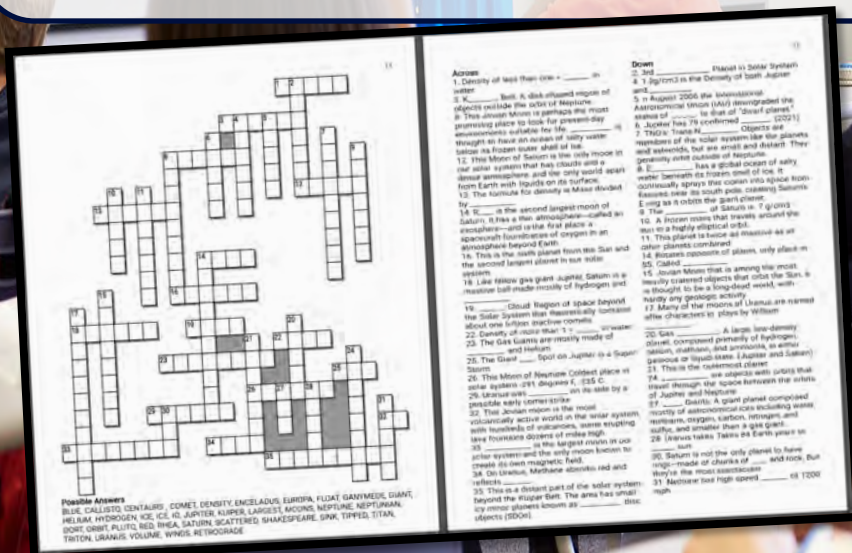
About 2,500 scientists meeting in Prague have adopted historic new guidelines that see the small, distant world demoted to a secondary category.

The researchers said Pluto failed to dominate its orbit around the Sun in the same way as the other planets.



# Games and Review

Games are a fantastic way for students to learn scientific concepts while having fun. We incorporate a variety of games into our curriculum, including interactive quizzes and puzzles that challenge students to think critically about the material. Our Hidden Box Games are a particularly popular feature, which conclude each unit by revealing a picture related to the topic. Students try to guess what the picture might be, making learning an engaging experience.



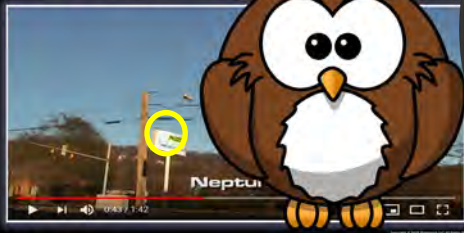
- What would the planets look like in the sky if they were at same distance from earth as the moon?

– [https://www.youtube.com/watch?v=usYC\\_Z36rHw](https://www.youtube.com/watch?v=usYC_Z36rHw)



- What would the planets look like in the sky if they were at same distance from earth as the moon?

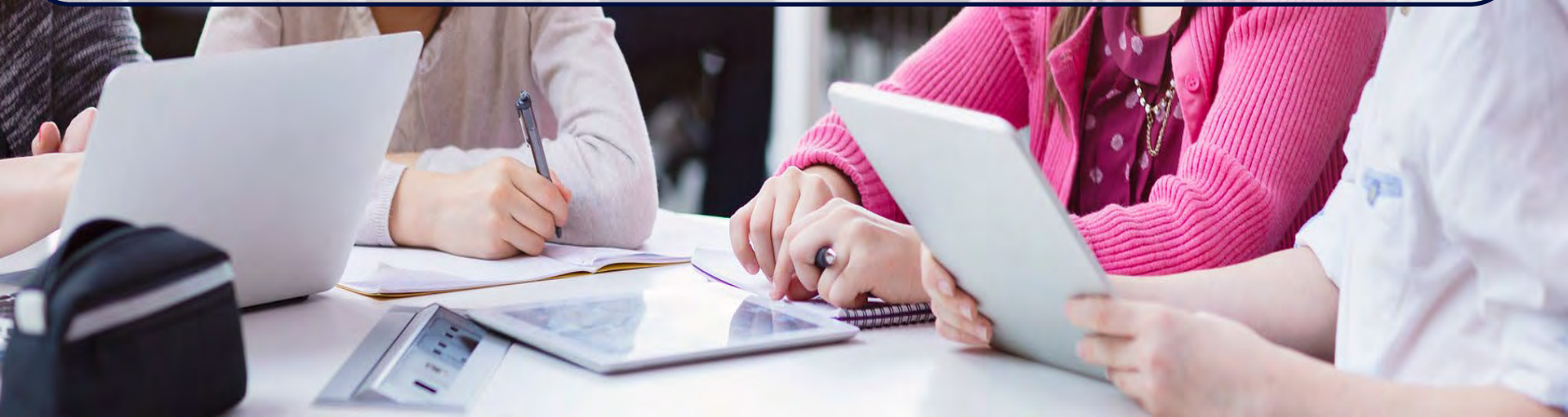
– [https://www.youtube.com/watch?v=usYC\\_Z36rHw](https://www.youtube.com/watch?v=usYC_Z36rHw)



The Owl - Each Part of the slideshow has a small clipart Owl hiding somewhere in a slide. The owl is incredibly small and blended into just the right slide. If a student spots the “Owl” they can raise their hand high into the air. When you call upon the student they can say “Owl” and be the student who spotted the Owl. Each PowerPoint Review game also has an owl hiding in it worth one point. Remind the students that they secretly write the word "owl" rather than yell it out during the review games. The Owl search is not included in every lesson. A slide at the beginning of the lesson will alert the students that today is an “Owl” day. Everything arrives editable so delete if you wish. You will find that some students will become the expert owl hunters in the group.

# Google Classroom Compatible

Our digital learning programs are designed for students to learn science in a flexible and engaging environment. Our Google Classroom-compatible units provide a seamless learning experience whether your students are in the classroom or learning from home. Our step-by-step slideshows and student work bundles ensure that students can complete their work independently. The PowerPoint Slideshows and step-by-step work bundles can easily be loaded to your Google Drive and posted in your Google Classroom. These are great for daily lessons, students who need additional time, and for a student who was absent and looking to catch up in their work bundle.





### Part 6 Lesson 3 Jovian Moons

Google Slides



### Part 6 Lesson 1 Gas Giants

Google Slides



### Part 6 Lesson 5 Ice Giants

Google Slides



### Part 6 Lesson 4 Saturn

Google Slides



### Part 6 Lesson 7 Review Game

Google Slides



### Part 6 Lesson 6 Outer Solar ...

Google Slides



### Part 6 Lesson 2 Jupiter

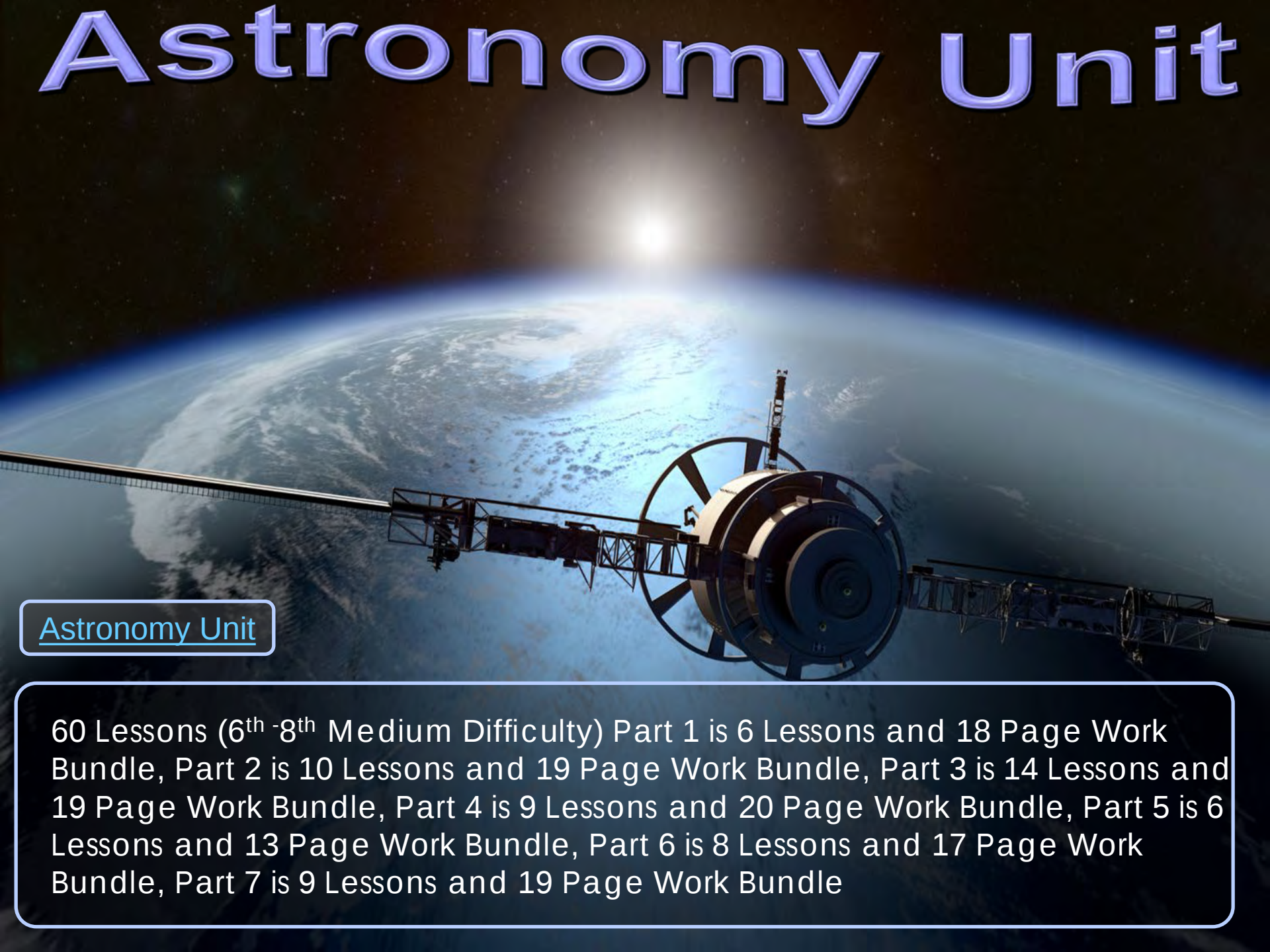
Google Slides



### Part 6 Lesson 7 Review Game

Google Slides

# Astronomy Unit

The background of the slide is a photograph of the Earth from space, showing the blue horizon and white clouds. A bright sun is visible in the upper center, creating a lens flare effect. A large satellite or space station is visible in the lower right, with a long boom extending towards the left. The title 'Astronomy Unit' is written in a large, blue, 3D-style font at the top.

## Astronomy Unit

60 Lessons (6<sup>th</sup> -8<sup>th</sup> Medium Difficulty) Part 1 is 6 Lessons and 18 Page Work Bundle, Part 2 is 10 Lessons and 19 Page Work Bundle, Part 3 is 14 Lessons and 19 Page Work Bundle, Part 4 is 9 Lessons and 20 Page Work Bundle, Part 5 is 6 Lessons and 13 Page Work Bundle, Part 6 is 8 Lessons and 17 Page Work Bundle, Part 7 is 9 Lessons and 19 Page Work Bundle

**Part 1: Astronomy Unit** : Introduction to Astronomy, Copernicus, Heliocentrism, Galileo, Kepler's Laws of Planetary Motion, Ellipse, Perihelion, Aphelion, Orbits, Orbital Velocities, Eccentricity, Calculating Eccentricity, Astronomical Units, Distances in the Solar System, Graphing Planetary Data, Order of the Planets, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess.

**Part 2: Astronomy Unit**: The Sun, Absolute Magnitude, Apparent Magnitude, Parsec, Stellar Classification / Spectra, Hertzsprung Russell Diagram, Composition of the Sun, Nuclear Synthesis, Layers of the Sun, Solar Flares, Coronal Mass Ejections, Carrington Event, Life Cycle of a Star, Blackhole, Neutron Star, Solar System Formation, Shadows, Sun Dials, Eratosthenes, Graphing Shadow length, Solar Eclipse, Lunar Eclipse, Path of Totality, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess

**Part 3: Astronomy Unit**: The Habitable Zone, Important data about Mercury, Venus, Earth, Venn Diagram of Earth and Venus, Moon Formation Theories, Earth's Axial Tilt, Seasons on Earth, Equinox, Solstice, Earth's EM Field, Aurora borealis, Synchronous Orbit of the moon, Features of the moon, Phases of the Moon (with OREOS), Tides, Neap Tide, Spring Tide, Tidal Cycle, Reading a Tide Chart, Mars, Features on Mars, Moons of Mars, Rover Exploration, Missions Past and Future, End Unit Assessment with Answer Version so Students can Self-Assess

**Part 4: Astronomy Unit**: Rocketry, Apollo Missions, Parts of the Saturn V Rocket, Apollo Modules, Parts of a Rocket, Water Bottle Rockets, Newton's Laws, Lift, Drag, Thrust, Weight, Law of Gravitation, Einstein and Gravity, Spacetime, Space Shuttle Program, International Space Station, Future in Space, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess

**Part 5: Astronomy Unit** : Main Asteroid Belt, protoplanet Ceres, Vesta, Meteors, Meteorites, Asteroids, Bolides, Chicxulub Crater, Tunguska Event, Chelyabinsk meteor, Craters, Parts of a Crater, Crater Impact Activity, NEO's, Torino Scale, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess

**Part 6 Astronomy Unit**: The Outer Planets, Gas Giants, Ice Giants, Density of Outer Planets, Jupiter, Red Spot, Composition of Outer Planets, Jovian Moons, Saturn and its Moons, Uranus and its Moons, Neptune and its Moons, The Kuiper Belt, Demotion of Pluto, Oort Cloud, Comets, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess

**Part 7: Astronomy Unit**: Constellations, Hubble Space Telescope, Spitzer Space Telescope, Speed of Light, Nebulas, Types of Nebulas, Galaxy, Type of Galaxies, Gravity, The Special Theory of Relativity , Blackholes, Neutron Stars, Spacetime, Pulsars, Quasars, Exoplanets, Hubble Deep Field, Beyond the Solar System, Black holes, Exoplanets, The Big Bang, Evidence for the Big Bang, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess

**Neutron Star**  
Super-dense ball of neutrons

- What are two possible outcomes if a massive star collapses?

**During powered flight, the propellants of the reaction system are constantly being exhausted from the nozzle. This creates a:**

**Penumbra**  
The region of partial shadow is called the penumbra. It is contained by the opposing body's atmosphere.

**Eccentricity**  
Eccentricity is a measure of how an orbit deviates from circular. Eccentricity circular orbits are an eccentricity of 0. Higher numbers indicate more eccentric orbits.

**The Habitable Zone**  
The relationship between temperature and luminosity of a star was not random but instead fell into distinct groups.

**Linear Module (LM)**  
Service Module  
Nail Armstrong  
2nd

**Cooler Warmer Really Hot**  
Colors are arranged

**7 Units**

• Name the types of galaxies below? 10

A Barred B Irregular C Elliptical D Spiral

• Neutron Star 10

What is a neutron star?

Neutron stars are the densest objects in the universe. They are made of neutrons and are about the size of a city. They are formed when a massive star collapses and its core is crushed together. The resulting neutron star is so dense that a teaspoon of its material would weigh about a billion tons.

Properties of Neutron Stars:

- Mass: 1.4 to 2.1 times the mass of the Sun
- Radius: 10 to 15 km
- Temperature: 100 million to 1 billion K
- Surface: Composed of neutrons and a thin layer of protons and electrons
- Rotation: Can rotate up to 1000 times per second
- Magnetic Field: Can be as strong as 10<sup>14</sup> Gauss

• NEBULA 5

What is the name for a large cloud of gas and dust which can form stars and galaxies?

• Which two should be switched between Earth and Venus? 6

Jupiter Earth

Characteristics of Jupiter:

- Gas Giant
- Large size
- Many moons
- Great Red Spot

Characteristics of Earth:

- Rocky planet
- Thin atmosphere
- One moon
- Life

• Olympus Mons 17

What is the name of this extinct volcano on Mars that's one of the largest mountains in the solar system?

• Name A,B,C,D? 12

Winter Solstice (Northern Hemisphere) Summer Solstice (Northern Hemisphere) Equinox (March 20th) Equinox (September 20th)

• Secure with Duct Tape 1

Fins need to be above nozzle, their bases should be parallel, organized a distance apart. Need 3+ fins, and limit their size to avoid unnecessary drag.

• Tape Right Fins. Make them perpendicular to the nozzle. evenly spaced

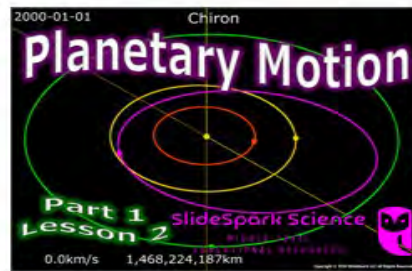
[illegible]

# Introduction to Astronomy, Copernicus, Heliocentrism, Galileo, Kepler's Laws of Planetary Motion, Ellipse, Perihelion, Aphelion, Orbits, Orbital Velocities, Eccentricity, Calculating Eccentricity, Astronomical Units, Distances in the Solar System, Graphing Planetary Data, Order of the Planets, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess

## Part 1: Astronomy Unit



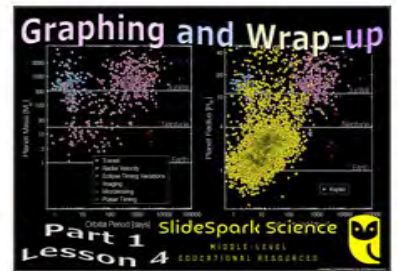
Part 1 Lesson 1 Introduction Kepler



Part 1 Lesson 2 Planetary Motion



Part 1 Lesson 3 Distances Solar System



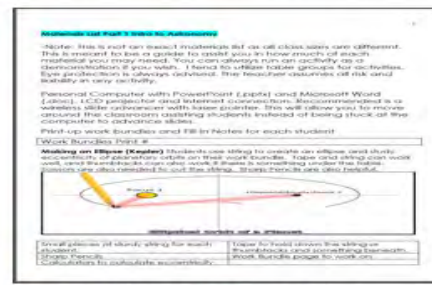
Part 1 Lesson 4 Graphing Wrap Up



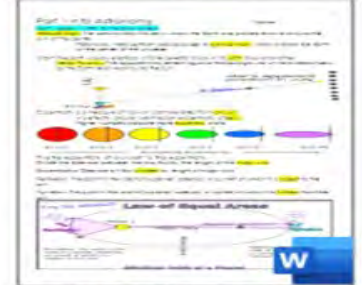
Part 1 Lesson 5 Review Game



Part 1 Lesson 6 Review Game Answers



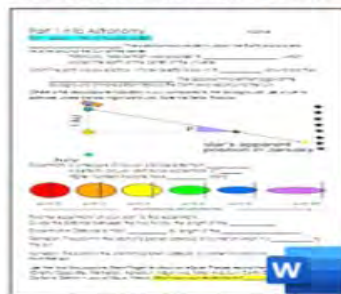
Part 1 Materials List Intro to Solar System



Part 1 Work Bundle Answers



Part 1 Work Bundle Digital



Part 1 Work Bundle Print



Part 1 Work Bundle Writable pdf

Part 2: The Sun, Absolute Magnitude, Apparent Magnitude, Parsec, Stellar Classification / Spectra, Hertzsprung Russell Diagram, Composition of the Sun, Nuclear Synthesis, Layers of the Sun, Solar Flares, Coronal Mass Ejections, Carrington Event, Life Cycle of a Star, Blackhole, Neutron Star, Solar System Formation, Shadows, Sun Dials, Eratosthenes, Graphing Shadow length, Solar Eclipse, Lunar Eclipse, Path of Totality, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer Version so Students can Self-Assess

## Part 2: Astronomy Unit



Part 2 Lesson 1 The Sun



Part 2 Lesson 2 HR Diagram



Part 2 Lesson 3 Inside the Sun



Part 2 Lesson 4 Solar Flares



Part 2 Lesson 5 Life Cycle of Stars



Part 2 Lesson 6 Solar System Formation More



Part 2 Lesson 7 Optional Sun Song



Part 2 Lesson 8 Shadows Sun Dials



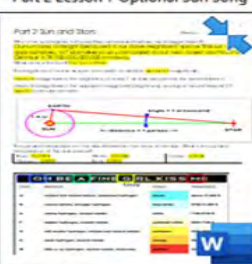
Part 2 Lesson 9 Solar Lunar Eclipse



Part 2 Lesson 10 Review Game



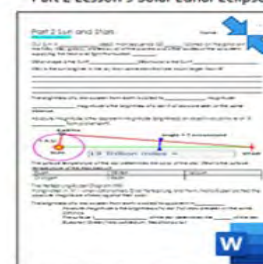
Part 2 Lesson 11 Review Game Answers



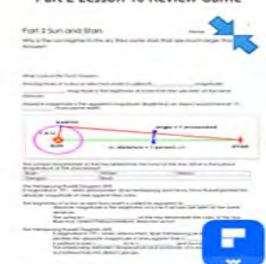
Part 2 Work Bundle Answers



Part 2 Work Bundle Digital



Part 2 Work Bundle Print



Part 2 Work Bundle Writable pdf

# Part 3: The Habitable Zone, Important data about Mercury, Venus, Earth, Venn Diagram of Earth and Venus, Moon Formation Theories, Earth's Axial Tilt, Seasons on Earth, Equinox, Solstice, Earth's EM Field, Aurora borealis, Synchronous Orbit of the moon, Features of the moon, Phases of the Moon (with OREOS), Tides, Neap Tide, Spring Tide, Tidal Cycle, Reading a Tide Chart, Mars, Features on Mars, Moons of Mars, Rover Exploration Missions Past and Future

## Part 3: Astronomy Unit



Part 3 Lesson 1 Inner Planets



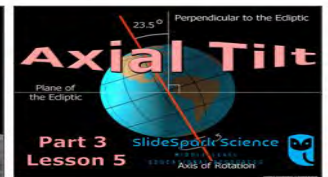
Part 3 Lesson 2 Mercury



Part 3 Lesson 3 Venus



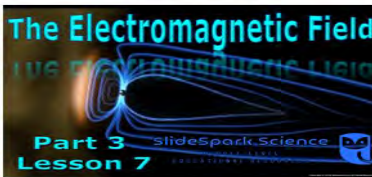
Part 3 Lesson 4 Earth and Moon



Part 3 Lesson 5 Axial Tilt



Part 3 Lesson 6 Solstice Equinox



Part 3 Lesson 7 EM Field



Part 3 Lesson 8 Phases of Moon 1



Part 3 Lesson 9 Phases of Moon 2



Part 3 Lesson 10 Phases Quiz



Part 3 Lesson 11



Part 3 Lesson 12



Part 3 Lesson 13



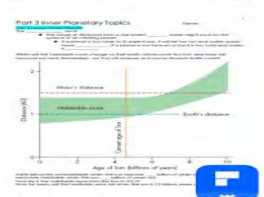
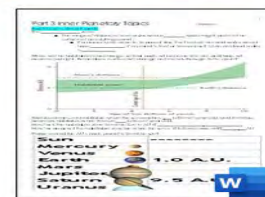
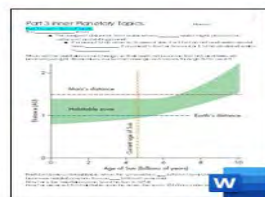
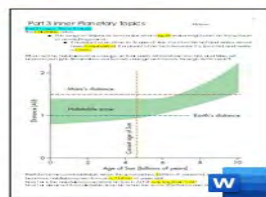
Part 3 Lesson 14



Part 3 Lesson 15



Part 3 Materials List



# Astronomy Unit Part 4: Rocketry, Apollo Missions, Parts of the Saturn V Rocket, Apollo Modules, Parts of a Rocket, Water Bottle Rockets, Newton's Laws, Lift, Drag, Thrust, Weight, Law of Gravitation, Einstein and Gravity, Spacetime, Space Shuttle Program, International Space Station, Future in Space

## Part 4: Astronomy Unit



Part 4 Lesson 1 Mission to the Moon



Part 4 Lesson 2 Water Rockets Gravity



Part 4 Lesson 3 Gravity Rocket Built Cont



Part 4 Lesson 4 Space Shuttle ISS



Part 4 Lesson 5 Newtons 1st Law



Part 4 Lesson 6 2nd Law of Motion



Part 4 Lesson 7 3rd Law of Motion



Part 4 Lesson 8 Rocketry Wrap Up



Part 4 Lesson 9 Review Game



Part 4 Lesson 10 Review Game Answers



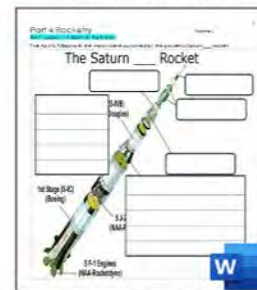
Part 4 Materials List



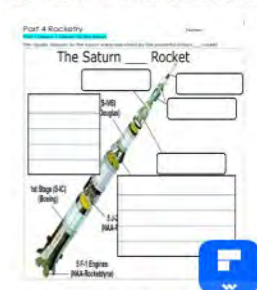
Part 4 Work Bundle Answers



Part 4 Work Bundle Digital



Part 4 Work Bundle Print



Part 4 Work Bundle Writable pdf

# Part 5: Main Asteroid Belt, protoplanet Ceres, Vesta, Meteors, Meteorites, Asteroids, Bolides, Chicxulub Crater, Tunguska Event, Chelyabinsk meteor, Craters, Parts of a Crater, Crater Impact Activity, NEO's, Torino Scale,

## Part 5: Astronomy Unit



Part 5 Lesson 1 Main Asteroid Belt



Part 5 Lesson 2 Tunguska Event



Part 5 Lesson 3 NEO's



Part 5 Lesson 4 Impact Lab



Part 5 Lesson 5 Research and Wrap Up



Part 5 Lesson 6 Review Game



Part 5 Lesson 7 Review Game Answers



Part 5 Materials List



Part 5 Work Bundle Answers



Part 5 Work Bundle Digital



Part 5 Work Bundle Print



Part 5 Work Bundle Writable pdf

Part 6 of Astronomy Unit: The Outer Planets, Gas Giants, Ice Giants, Density of Outer Planets, Jupiter, Red Spot, Composition of Outer Planets, Jovian Moons, Saturn and its Moons, Uranus and its Moons, Neptune and its Moons, The Kuiper Belt, Demotion of Pluto, Oort Cloud, Comets

## Part 6 Astronomy Unit



Part 6 Lesson 1 Gas Giants



Part 6 Lesson 2 Jupiter



Part 6 Lesson 3 Jovian Moons



Part 6 Lesson 4 Saturn



## Part 6 Lesson 5 Ice Giants



Part 6 Lesson 6 Outer Solar System



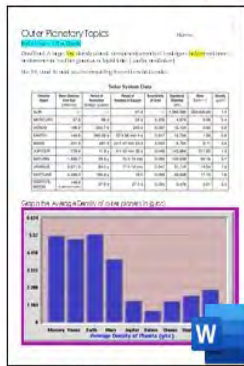
Part 6 Lesson 7 Review Game



Part 6 Lesson 8 Review Game Answers



## Part 6 Lesson 9 Space Expo Project



Part 6 Work Bundle Answers



Part 6 Work Bundle Digital



Part 6 Work Bundle Print

# Astronomy Unit Part 7: Constellations, Hubble Space Telescope, Spitzer Space Telescope, Speed of Light, Nebulas, Types of Nebulas, Galaxies, Type of Galaxies, Gravity, The Special Theory of Relativity, Blackholes, Neutron Stars, Spacetime, Pulsars, Quasars, Exoplanets, Hubble Deep Field, Beyond the Solar System, Black holes, Exoplanets, The Big Bang, Evidence for the Big Bang

## Part 7: Astronomy Unit

### Beyond the Solar System



Part 7 Lesson 1 Constellations Hubble

### Light, Gravity, Blackholes, spacetime



Part 7 Lesson 2 Speed of Light More

### spacetime, Gravity, and more



Part 7 Lesson 3 Spacetime

### Nebula, Pulsar, Quasar, Neutron Stars, Galaxies



Part 7 Lesson 4 Pulsar Neutron Star galaxy

### Galaxies



Part 7 Lesson 5 Galaxies

### Exoplanets



Part 7 Lesson 6 Exoplanets

### Big Bang



Part 7 Lesson 7 Big Bang

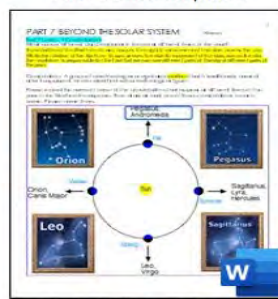
### Review Game



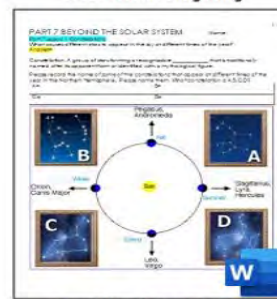
Part 7 Lesson 8 Review Game



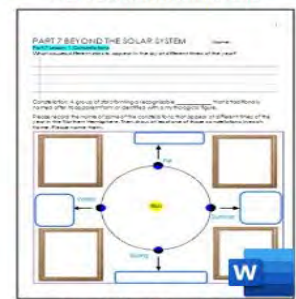
Part 7 Lesson 9 Review Game Answers



Part 7 Work Bundle Answers



Part 7 Work Bundle Digital



Part 7 Work Bundle Print

# Curriculum Guide

Number of Lessons in each unit (50 min, daily lessons) and difficult rating scale / intended grade level.

 =Easier,

 = More difficult,

 =Most difficult

| Earth Science Units        | Daily Lessons | Intended Grade        |                                                                                       |
|----------------------------|---------------|-----------------------|---------------------------------------------------------------------------------------|
| Geology Topics Unit        | 60 Lessons    | 6-8 medium difficulty |    |
| Weather and Climate Unit   | 40 Lessons    | 6-8 medium difficulty |    |
| Astronomy Unit             | 60 Lessons    | 6-8 medium difficulty |    |
| Weathering, Soil Sciences  | 28 Lessons    | 5-7 easier            |   |
| Rivers and Water Quality   | 25 Lessons    | 5-7 easier            |  |
| Water Molecule Unit        | 20 Lessons    | 5-7 easier            |  |
| Biogeochemical Cycles Unit | 16 Lessons    | 5-7 easier            |  |

# Earth Science Curriculum

SlideSpark Science

MIDDLE-LEVEL  
EDUCATIONAL RESOURCES



## Entire Water Unit

27 Lessons

Rivers, Lakes, Water Quality Unit

20+ Lessons

7 Units • 250 Lessons

Interactive Slideshows with Chronological Work Bundles  
Hundreds of Pages, Activities, Projects, Videos, Academic Links, Assessments, Games & Keys All Built-In for Seamless, Ready-to-Go Learning

## Biogeochemical Cycles

17 Lessons

## GEOLOGY Mega Bundle

6 Parts, 60 Lessons

Weathering, Soil Science, Ice Ages, Glaciers Unit

5 Parts 36 Lessons

## Interactive Slideshows Follow Along Bundles

### Weather and Climate Mega Bundle

40 Lessons

7 Units

### Astronomy Mega Bundle

60 Lessons

7 Units

Grades 5-10

# Life Science Units

| Life Science Units              | Daily Lessons | Intended Grade        |                                                                                       |
|---------------------------------|---------------|-----------------------|---------------------------------------------------------------------------------------|
| Ecology Feeding Levels Unit     | 13 Lessons    | 5-6 easier            |    |
| Ecology Interactions Unit       | 30 Lessons    | 5-6 easier            |    |
| Ecology Abiotic Factors Unit    | 13 Lessons    | 5-6 easier            |    |
| Botany Unit                     | 50 Lessons    | 5-7 easier            |    |
| Evolution and Natural Selection | 40 Lessons    | 5-7 easier            |    |
| Taxonomy and Classification     | 50 Lessons    | 6-8 medium difficulty |    |
| Infectious Diseases Unit        | 30 Lessons    | 7-9 more difficult    |    |
| DNA and Genetics Unit           | 42 Lessons    | 8-10 most difficult   |    |
| Human Body Systems Unit         | 85 Lessons    | 6-8 medium difficulty |   |
| Cell Biology Unit               | 30 Lessons    | 8-10 most difficult   |  |

# Life Science Curriculum

SlideSpark Science

MIDDLE-LEVEL  
EDUCATIONAL RESOURCES



## Interactive Slideshows Follow Along Bundles

10 Units of Study



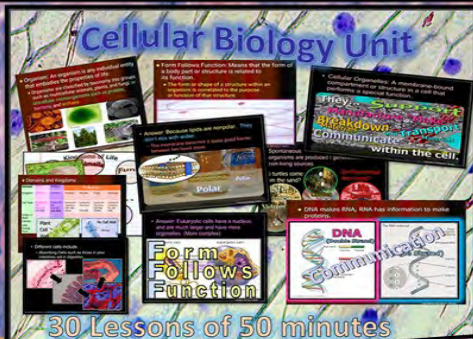
### Botany Unit



### Human Body Systems Unit



### Cellular Biology Unit



### Infectious Diseases



### DNA and Genetics Unit



### Taxonomy and Classification Unit



### Ecology Interactions Unit



### Ecology Feeding Level Full Unit



### Ecology Abiotic Factors Unit



# Physical Science

|                                   | Daily Lessons | Intended Grade         |                                                                                     |
|-----------------------------------|---------------|------------------------|-------------------------------------------------------------------------------------|
| Laws of Motion and Machines Unit  | 33 Lessons    | 8-10 most difficult    |  |
| Matter Energy and the Environment | 58 Lessons    | 7-10 medium difficulty |  |
| Atoms and Periodic Table Unit     | 44 Lessons    | 8-10 most difficult    |  |
| Science Skills Unit               | 30 Lessons    | 5-7 medium difficulty  |  |

[Physical Science Curriculum](#)

[Entire SlideSpark Science Curriculum](#)



# Physical Science Curriculum

SlideSpark Science

MIDDLE-LEVEL  
EDUCATIONAL RESOURCES



## Science Skills Unit

5 Parts, 30 Lessons

Physical Science Curriculum,  
4 Units • 165 Lessons of 50  
mins, Interactive Slideshows  
with Chronological Work  
Bundles, Hundreds of Pages,  
Activities, Labs, Projects,  
Video & Academic Links,  
Assessments, Games, Keys,  
All Built-In for Seamless  
Ready-to-Go Learning

Thousands of Interactive Slides

67 Pages of Follow Along  
Work Bundle

Assessments, Games,  
Video Links, and more

Everything you need to run an  
amazing learning experience

## Interactive Slideshows Follow Along Bundles

Grades 7-10

Laws of Motion and  
Simple Machines Unit

33 Lessons

With Follow Along  
Work Bundles

63 Pages

Assessments, Activities,  
Projects, and so much more

## Atoms and Periodic Table Unit

6 Parts, 44 Lessons

Thousands of Interactive Slides

Follow Along Work Bundle

108 Pages, with Labs,  
Quizzes, more, all built-in

Exciting Activities, Questions,  
Videos, All built-in

## Matter and Energy and the Environment Unit

58 Lessons

Interactive Slideshows

with Follow Along Work Bundles

Activities, Assessments,  
and more, all built-in

125 Pages

Dear Valued Educator,

Our fully editable .pptx and .doc resources are perfect for educators looking to bring enthusiasm and creativity to their lessons. We encourage you to make changes to fit your needs and style. As science educators, we're committed to providing students with the tools they need to succeed in the classroom and beyond. Each unit in the curriculum includes a range of resources that have been developed through extensive research and use in a busy classroom. Our teaching approach is designed to make science education engaging and exciting for learners of all ages. We offer a one-of-a-kind science curriculum that will challenge, inspire, and educate students to become tomorrow's scientists and leaders. Join us today and learn more about how our program can help you achieve your classroom goals.

With appreciation,

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Sincerely,

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# SlideSpark Science

MIDDLE-LEVEL  
EDUCATIONAL RESOURCES



[SlideSpark Science on TpT](#)