Planetary Motion Unit

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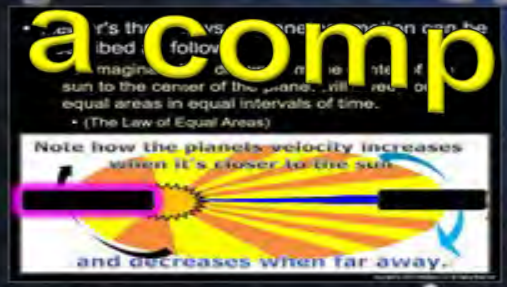
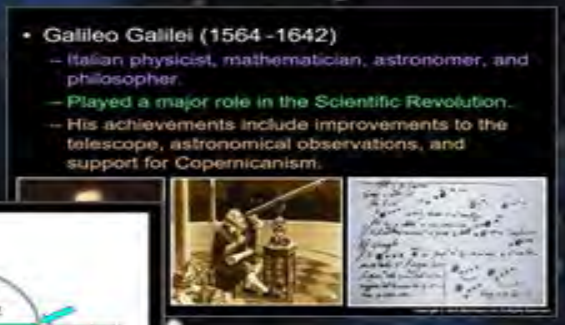
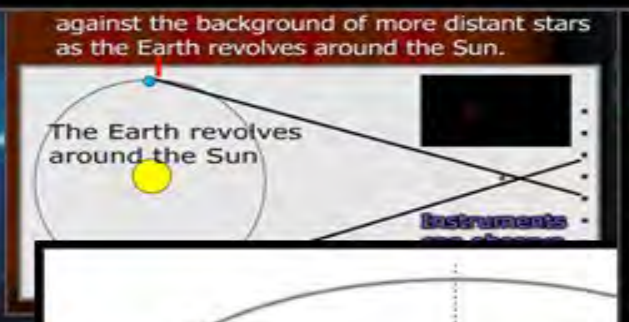
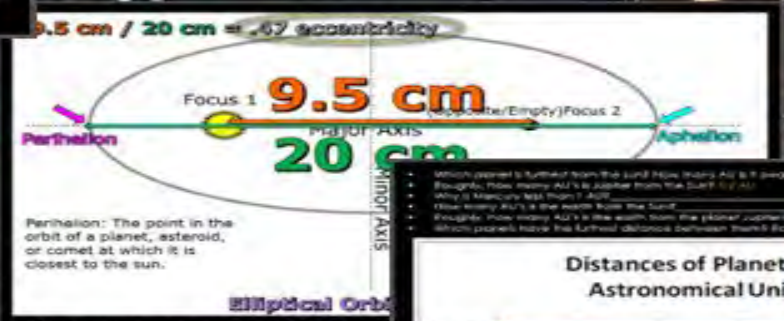
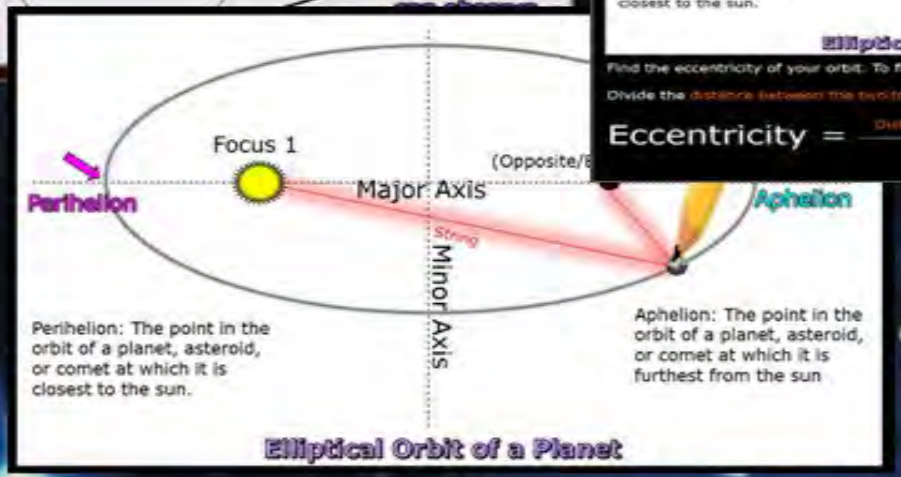
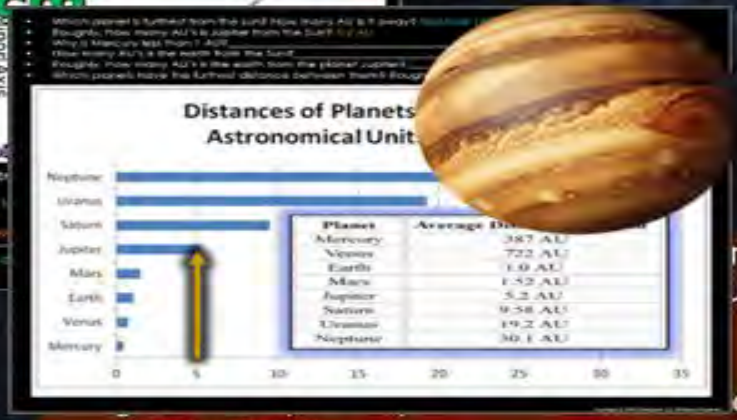




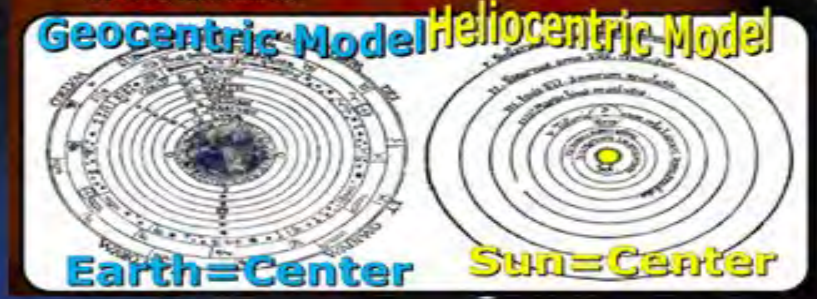






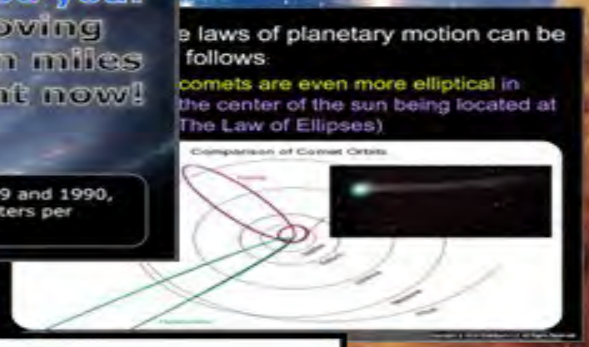


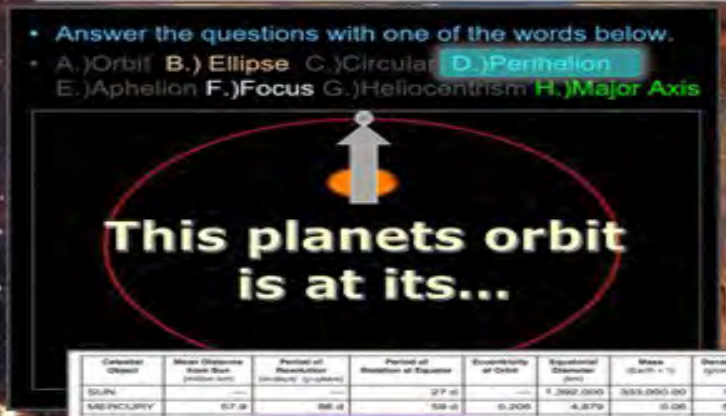
of the universe.

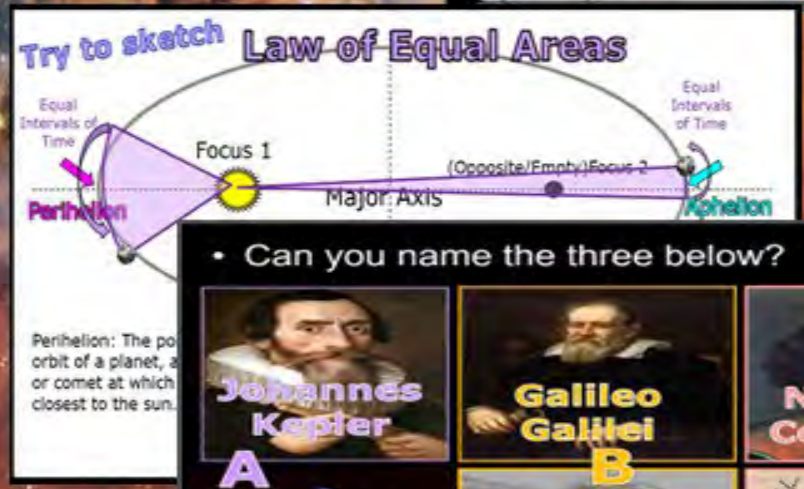


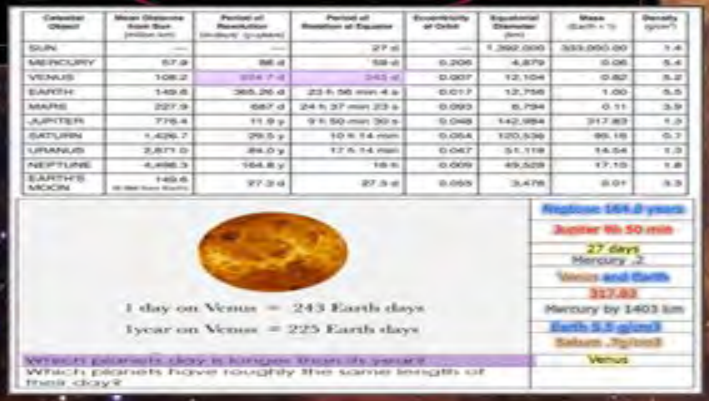
6 Lessons

Interactive Slideshows

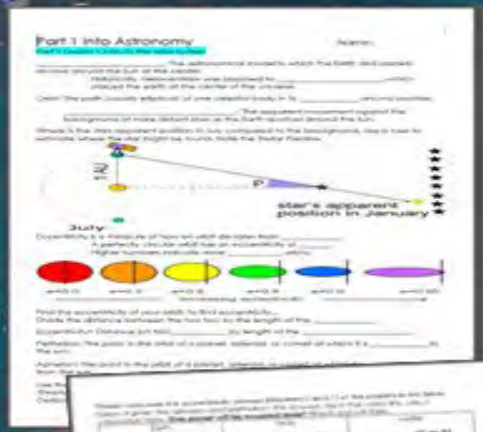


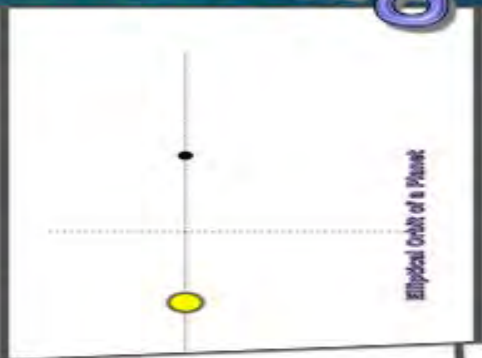


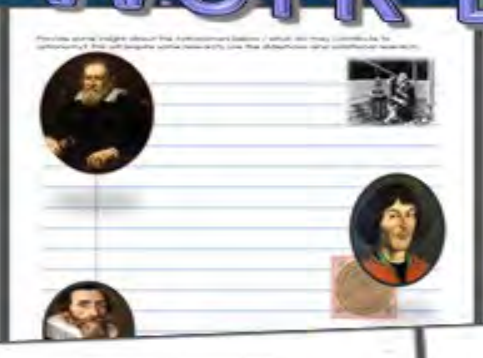


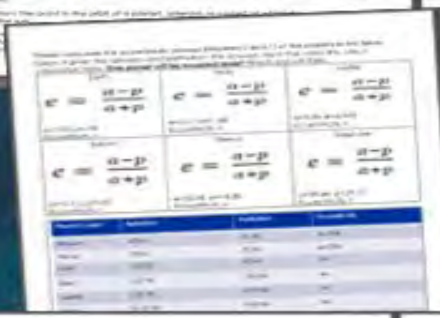


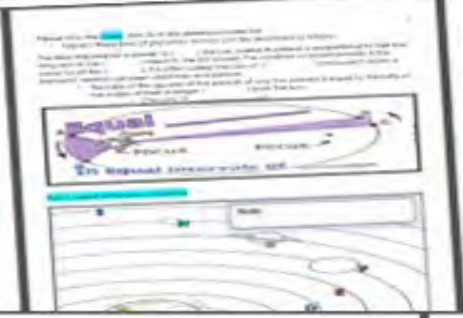
Follow Along Work Bundle

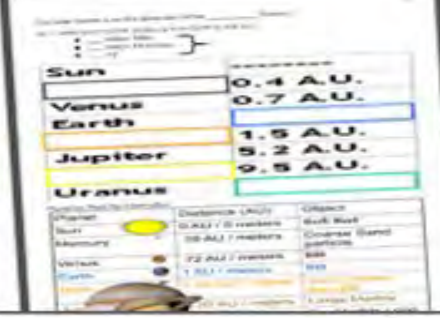


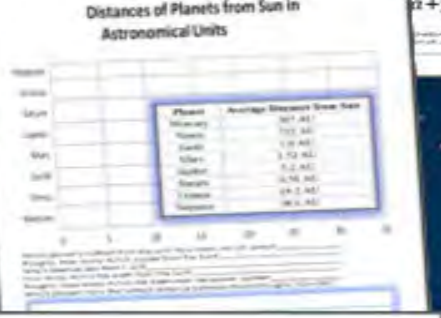


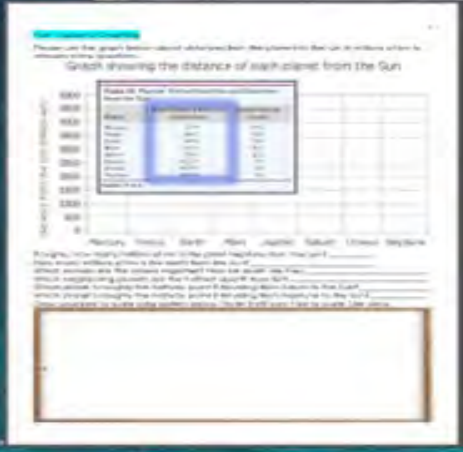


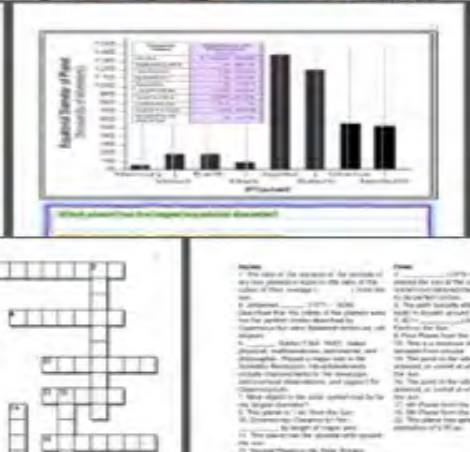


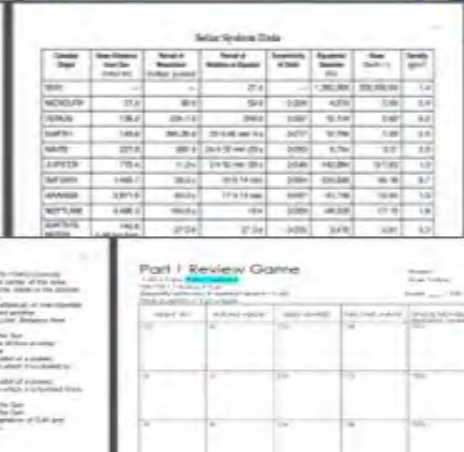


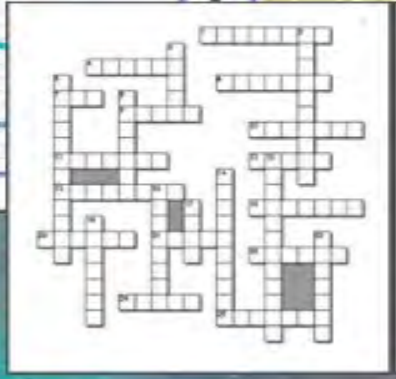






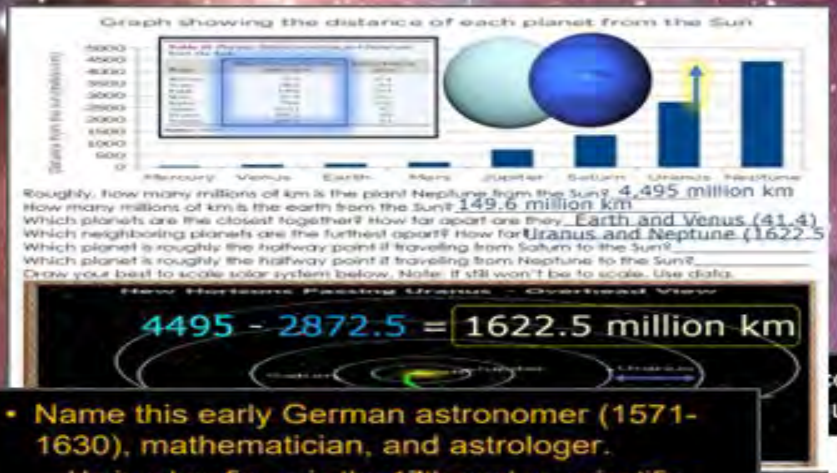


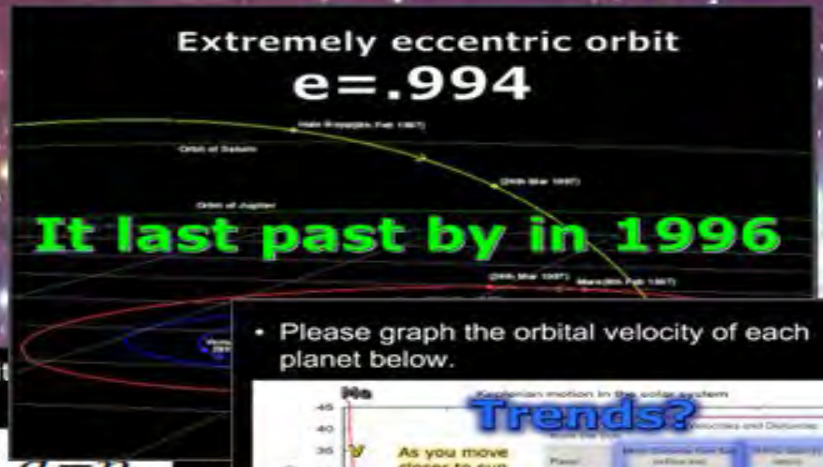




15 Pages

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





- Name this early German astronomer (1571-1630), mathematician, and astrologer.
  - He is a key figure in the 17th-century scientific revolution
  - Best known for his laws of planetary motion.

6

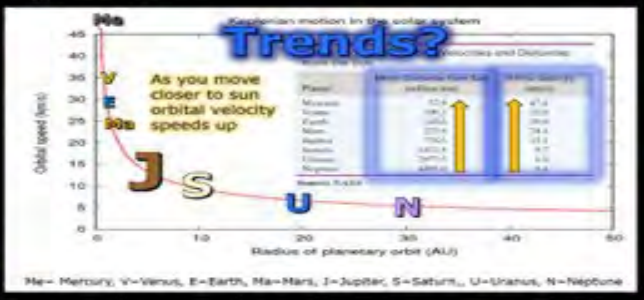
$$e = \frac{a-p}{a+p}$$

.78 au

Mercury has an aphelion of .31 au. .16 / .78 = .20

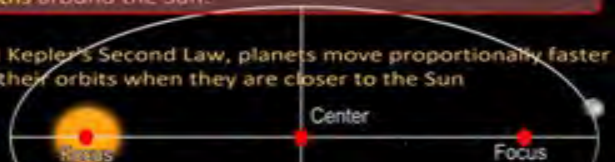
What's the eccentricity of Merc
(note: it will always be between 0 and 1)

- Please graph the orbital velocity of each planet below.



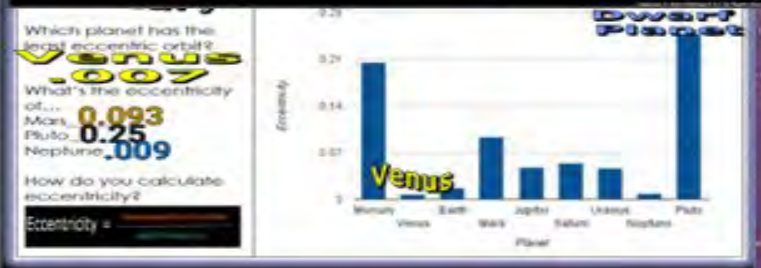
Kepler used simple mathematics to formulate three laws of planetary motion.

A.) Kepler's First Law stated that planets move in elliptical paths around the Sun.



B.) Kepler's Second Law, planets move proportionally faster in their orbits when they are closer to the Sun

C.) Kepler's Third Law explained the relationship between the distance of a planet from the Sun and the amount of time it took to orbit the Sun. Together these laws of celestial mechanics revolutionized astronomy.



Eccentricity = Distance between the two Focus Points / Length of the major axis

Planet	Aphelion
Mercury	.47
Venus	.73
Earth	1.02
Mars	1.67
Jupiter	5.46
Saturn	10.12
Uranus	20.08
Neptune	30.44

$$e = \frac{a-p}{a+p}$$

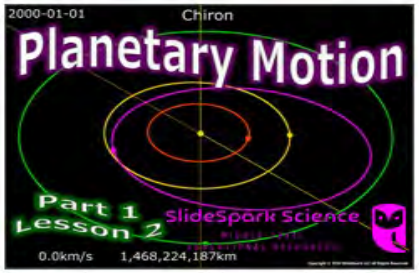
Aphelion: The point in the orbit of a planet, asteroid, or comet at which it is furthest from the sun

Perihelion: The point in the orbit of a planet, asteroid, or comet at which it is closest to the sun.

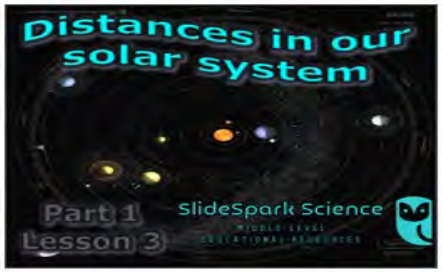
Introduction to Astronomy, Copernicus, Heliocentrism, Galileo, Kepler's Laws of Planetary Motion, Ellipse, Perihelion, Aphelion, Orbits, Orbital Velocities, Eccentricity, Calculating Eccentricity, Astronomical Units, Distances in the Solar System, Graphing Planetary Data, Order of the Planets, Box Game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

Part 1: Astronomy Unit

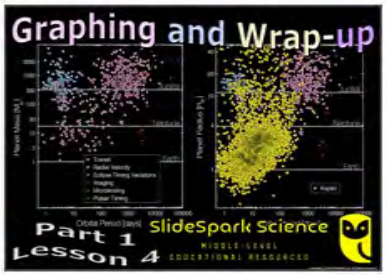
Part 1 Lesson 1 Introduction Kepler



Part 1 Lesson 2 Planetary Motion



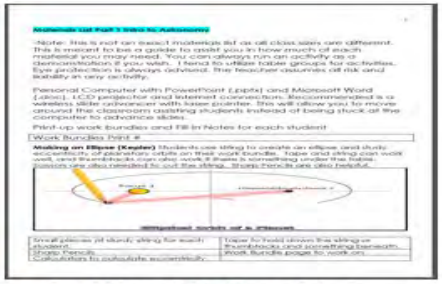
Part 1 Lesson 3 Distances Solar System

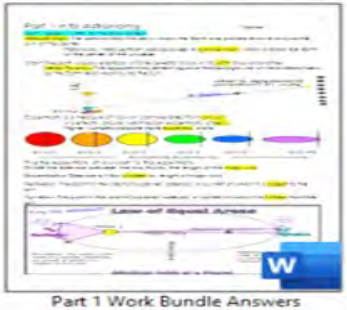


Part 1 Lesson 4 Graphing Wrap Up

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

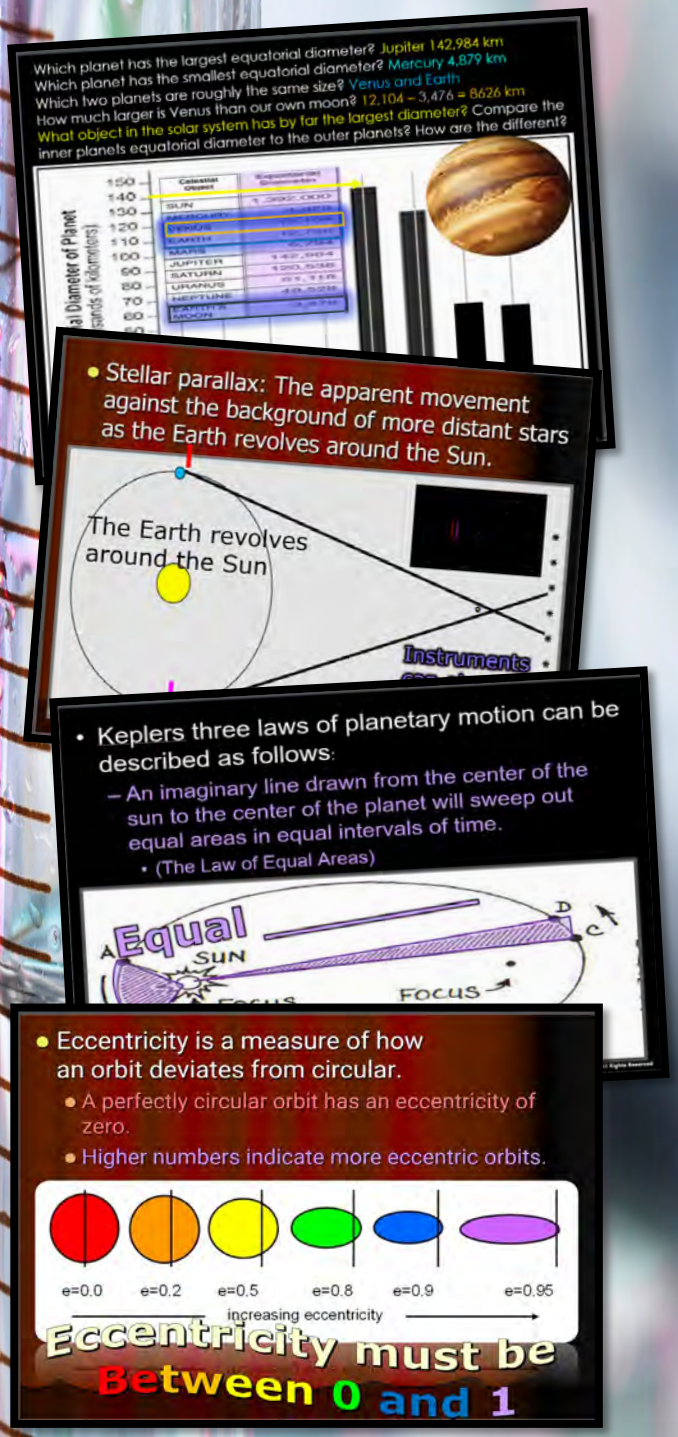

Part 1 Work Bundle Writable pdf

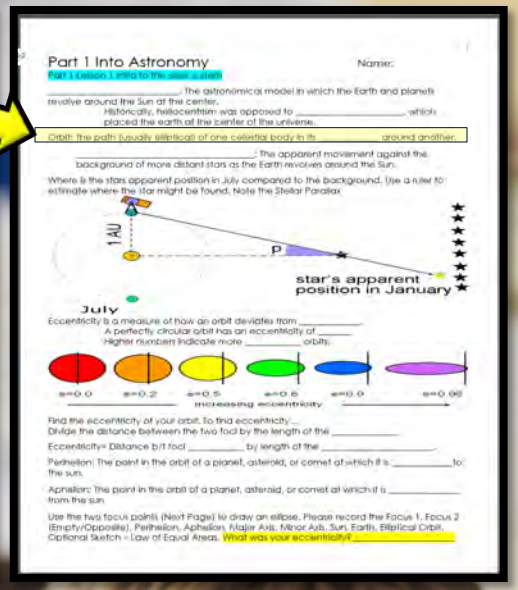
SlideSpark Science

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.

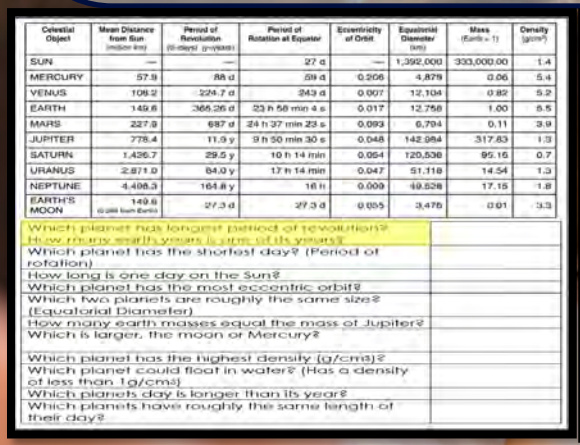
Each unit in the curriculum is designed to help teachers deliver the best possible learning experience for their students. Our interactive science slideshows are filled with questions and answers, important fill-in notes, hands-on activities, projects, games, built-in quizzes, and end of the unit assessment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





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.



Celestial Object	Mean Distance from Sun (million km)	Period of Revolution (d=days) (y=years)	Period of Rotation at Equator	Eccentricity of Orbit	Equatorial Diameter (km)	Mass (Earth = 1)	Density (g/cm³)
SUN	—	—	27 d	—	1,392,000	333,000.00	1.4
MERCURY	57.9	88 d	59 d	0.206	4,879	0.06	5.4
VENUS	108.2	224.7 d	243 d	0.007	12,104	0.82	5.2
EARTH	149.6	365.26 d	23 h 56 min 4 s	0.017	12,756	1.00	5.5
MARS	227.9	687 d	24 h 37 min 23 s	0.093	6,794	0.11	3.9
JUPITER	778.4	11.9 y	9 h 50 min 30 s	0.048	142,984	317.83	1.3
SATURN	1,426.7	29.5 y	10 h 14 min	0.054	120,536	95.16	0.7
URANUS	2,871.0	84.0 y	17 h 14 min	0.047	51,118	14.54	1.3
NEPTUNE	4,498.3	164.8 y	16 h	0.009	49,528	17.15	1.8
EARTH'S MOON	149.6 (0.386 from Earth)	27.3 d	27.3 d	0.055	3,476	0.01	3.3

Which planet has longest period of revolution? How many earth years is one of its years?
Which planet has the shortest day? (Period of rotation)
How long is one day on the Sun?
Which planet has the most eccentric orbit?
Which two planets are roughly the same size? (Equatorial Diameter)
How many earth masses equal the mass of Jupiter?
Which is larger, the moon or Mercury?
Which planet has the highest density (g/cm3)?
Which planet could float in water? (Has a density of less than 1g/cm3)
Which planets day is longer than its year?
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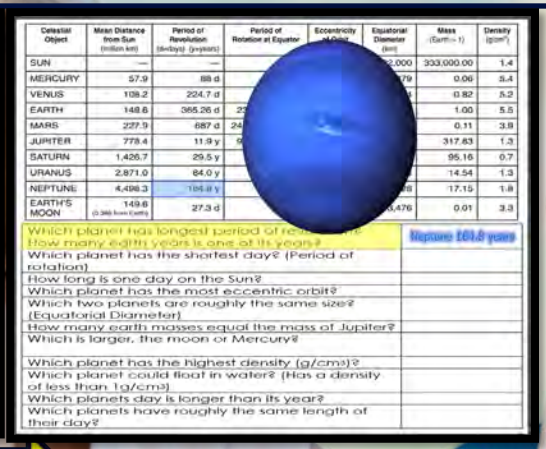

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SUN	—	—			2,000	333,000.00	1.4
MERCURY	57.9	88 d			79	0.06	5.4
VENUS	108.2	224.7 d				0.82	5.2
EARTH	149.6	365.26 d	23			1.00	5.5
MARS	227.9	687 d	24			0.11	3.9
JUPITER	778.4	11.9 y	9			317.83	1.3
SATURN	1,426.7	29.5 y				95.16	0.7
URANUS	2,871.0	84.0 y				14.54	1.3
NEPTUNE	4,498.3	164.8 y				17.15	1.8
EARTH'S MOON	149.6 (0.386 from Earth)	27.3 d	27.3 d		8,476	0.01	3.3

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Which planet has the shortest day? (Period of rotation)
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Which planet has the most eccentric orbit?
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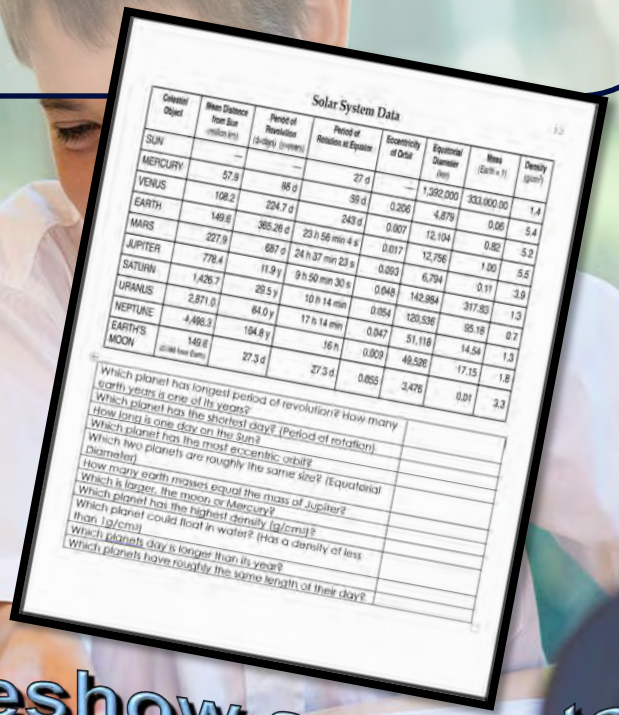
Neptune 164.8 years



Solar System Data

Celestial Object	Mean Distance from Sun (million km)	Period of Revolution (d=days) (y=years)	Period of Rotation at Equator	Eccentricity of Orbit	Equatorial Diameter (km)	Mass (Earth = 1)	Density (g/cm³)
SUN	—	—	27 d	—	1,392,000	333,000.00	1.4
MERCURY	57.9	88 d	59 d	0.206	4,879	0.06	5.4
VENUS	108.2	224.7 d	243 d	0.007	12,104	0.82	5.2
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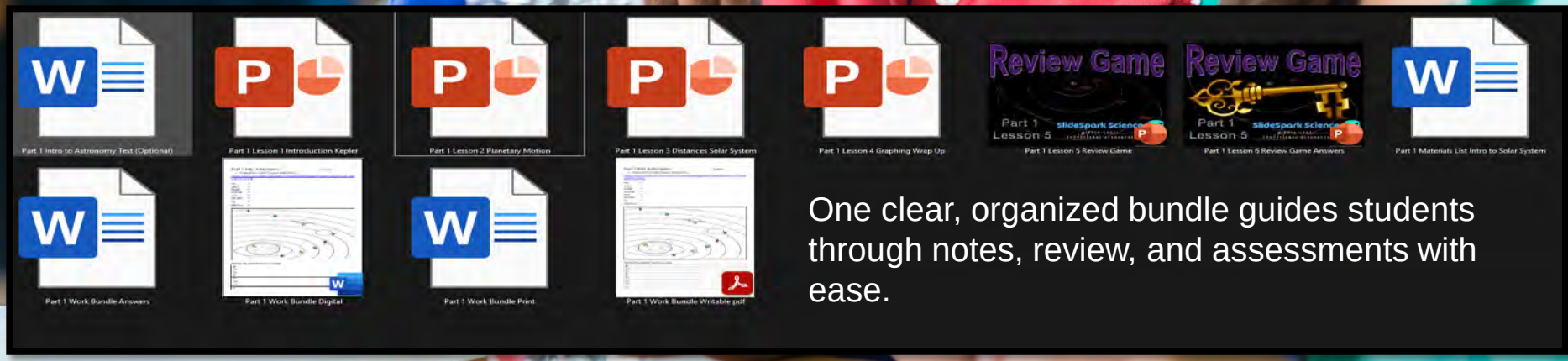
Which planets day is longer than its year?
Which planets have roughly the same length of their day?

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.

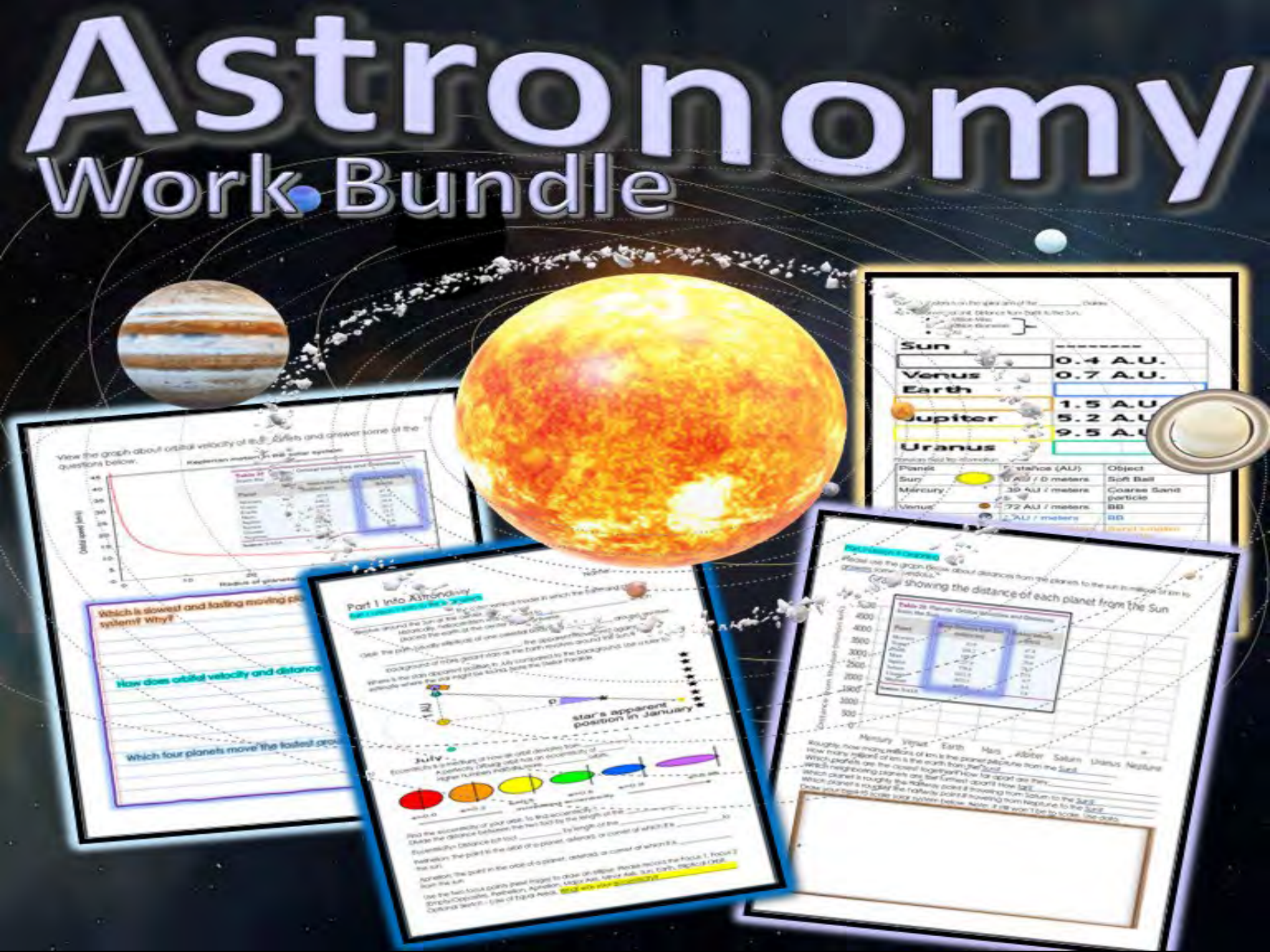


One clear, organized bundle guides students through notes, review, and assessments with ease.

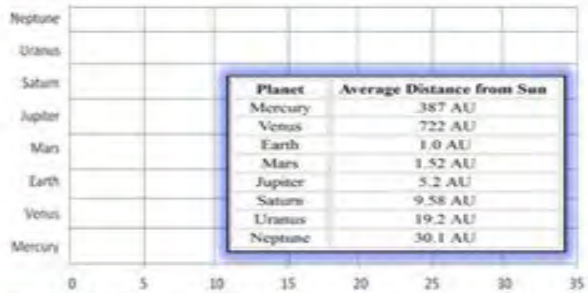
Follow Along Work Bundle

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 that 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.

Astronomy Work Bundle



Distances of Planets from Sun in Astronomical Units



Planet	Average Distance from Sun
Mercury	.387 AU
Venus	.722 AU
Earth	1.0 AU
Mars	1.52 AU
Jupiter	5.2 AU
Saturn	9.58 AU
Uranus	19.2 AU
Neptune	30.1 AU

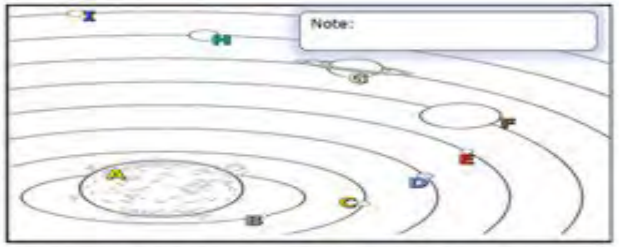
Which planet is furthest from the sun? How many AU is it away?
Roughly, How many AU's is Jupiter from the Sun?
Why is Mercury less than 1 AU?
How many AU's is the earth from the Sun?
Roughly, How many AU's is the earth from the planet Jupiter?
Which planets have the furthest distance between them? Roughly, how far?

Solar System Data

Celestial Object	Mean Distance from Sun (million km)	Period of Revolution (d=days; y=years)	Period of Rotation at Equator	Eccentricity of Orbit	Equatorial Diameter (km)	Mass (Earth = 1)	Density (g/cm³)
SUN	—	—	27 d	—	1,392,000	333,000.00	1.4
MERCURY	57.9	88 d	59 d	0.206	4,879	0.06	5.4
VENUS	108.2	224.7 d	243 d	0.007	12,104	0.82	5.2
EARTH	149.6	365.26 d	23 h 56 min 4 s	0.017	12,756	1.00	5.5
MARS	227.9	687 d	24 h 37 min 23 s	0.093	6,794	0.11	3.9
JUPITER	778.4	11.9 y	9 h 50 min 30 s	0.048	142,984	317.83	1.3
SATURN	1,426.7	29.5 y	10 h 14 min	0.054	120,536	95.16	0.7
URANUS	2,871.0	84.0 y	17 h 14 min	0.047	51,118	14.54	1.3
NEPTUNE	4,498.3	164.8 y	16 h	0.009	49,528	17.15	1.8
EARTH'S MOON	149.6 (0.386 from Earth)	27.3 d	27.3 d	0.055	3,476	0.01	3.3

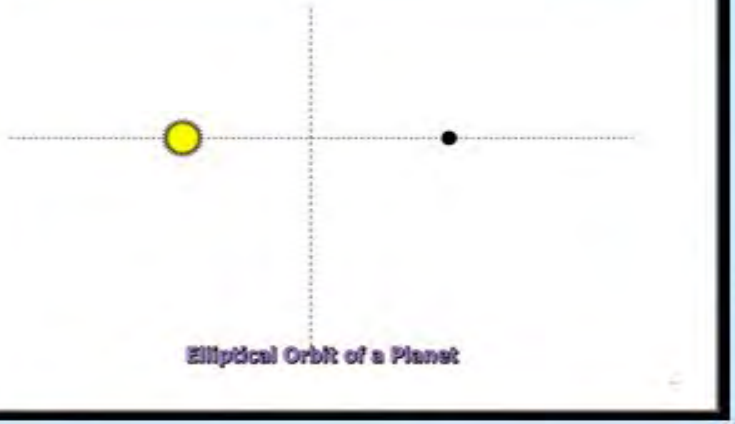
Which planet has longest period of revolution? How many earth years is one of its years?	
Which planet has the shortest day? (Period of rotation)	
How long is one day on the Sun?	
Which planet has the most eccentric orbit?	
Which two planets are roughly the same size? (Equatorial Diameter)	
How many earth masses equal the mass of Jupiter?	
Which is larger, the moon or Mercury?	
Which planet has the highest density (g/cm³)?	
Which planet could float in water? (Has a density of less than 1g/cm³)	
Which planets day is longer than its year?	
Which planets have roughly the same length of their day?	

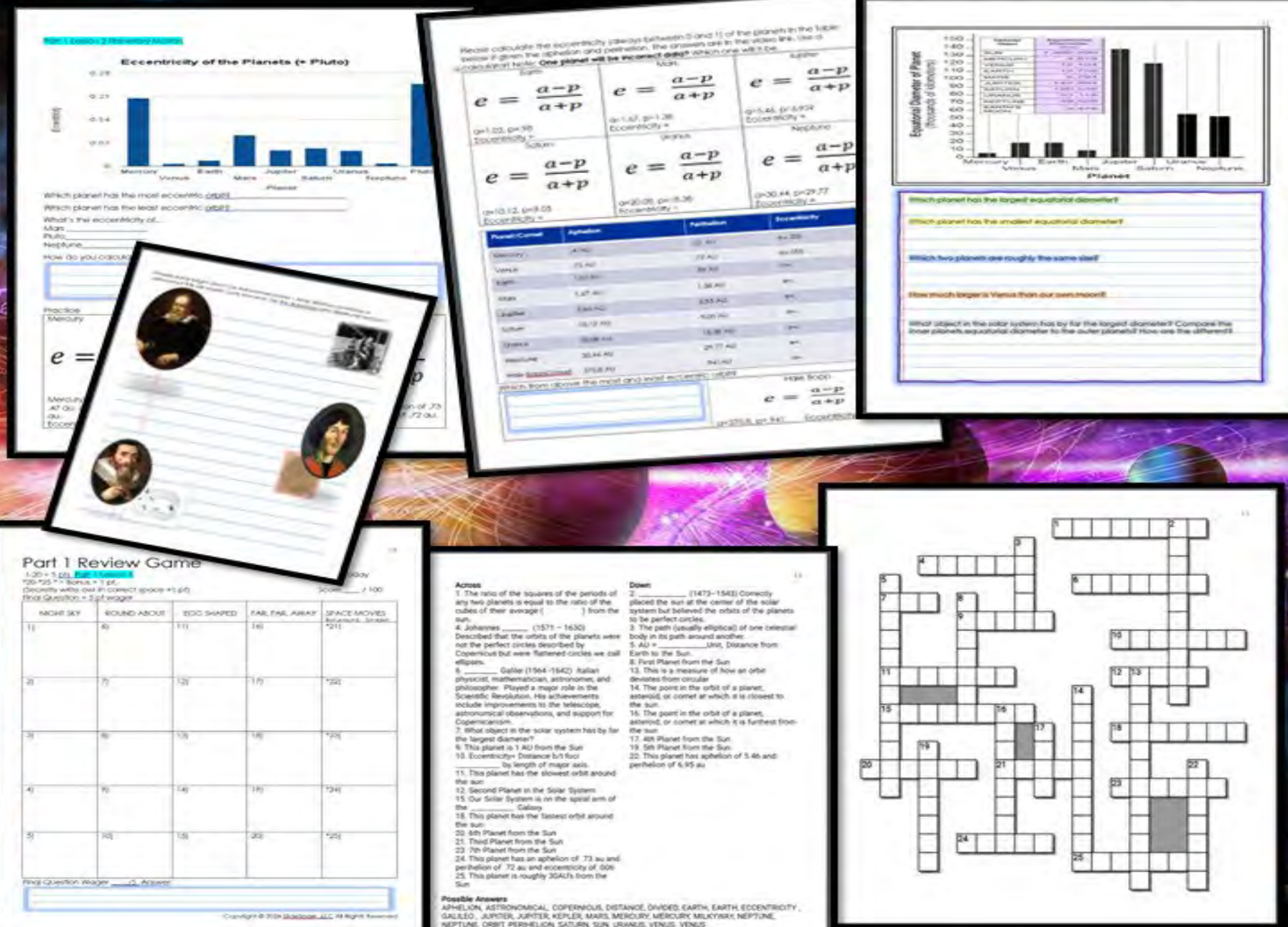
Part 1 Lesson 3 Planetary Dynamics

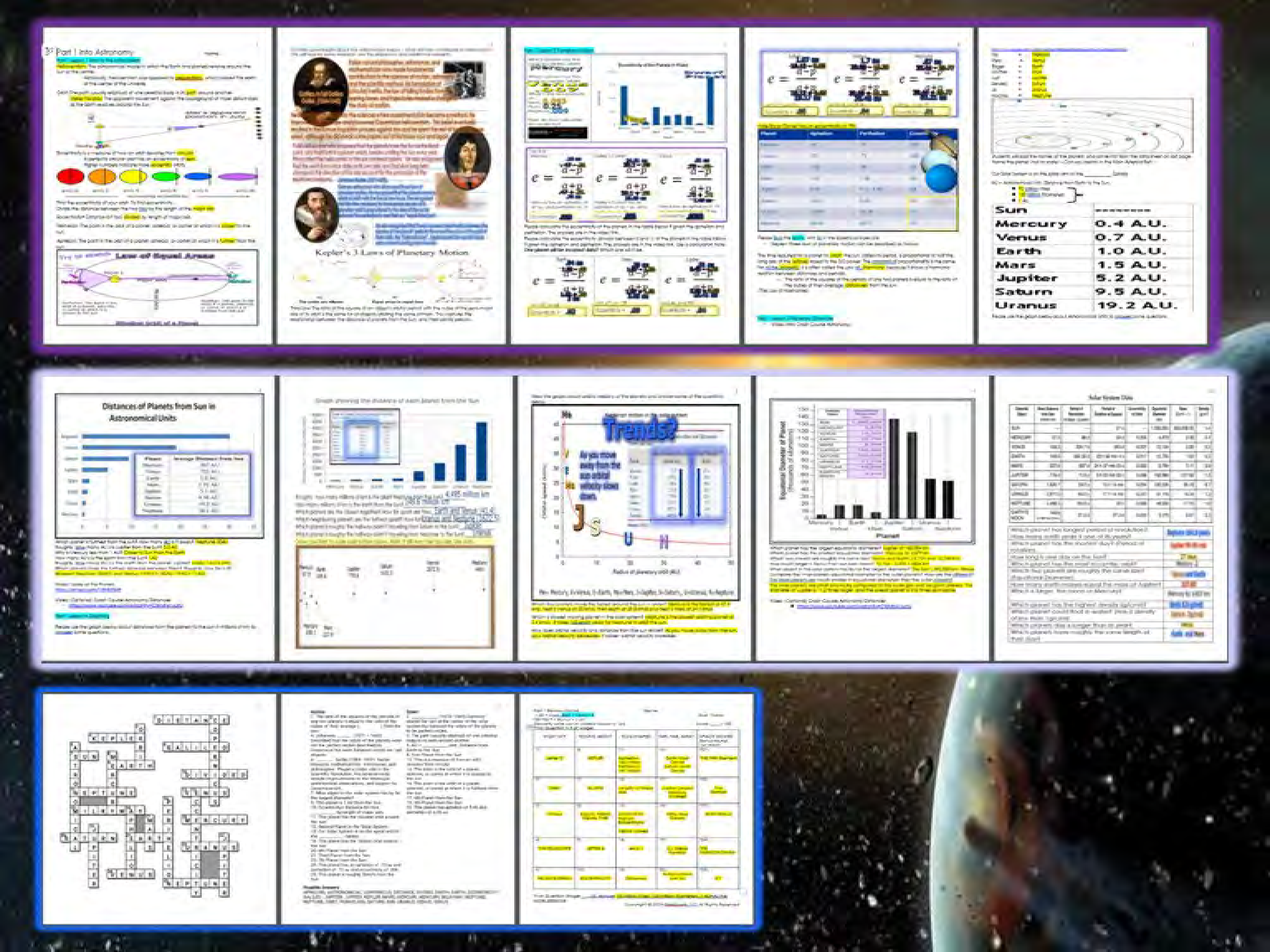


Name the planet / other (not to scale) Can you sketch in the Main Asteroid Belt? Feel free to add in more details as we explore the solar system and learn more.

Please use the data sheet to graph the distances of the planets from the Sun in AU's, and at least one other form of data from the data sheet.

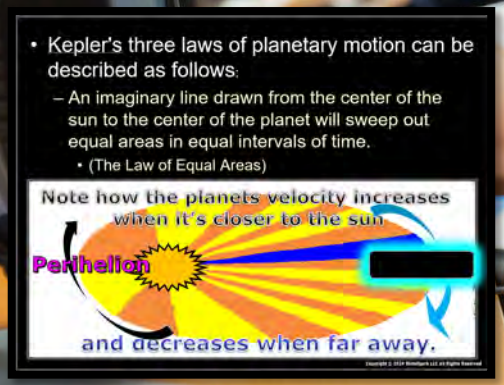


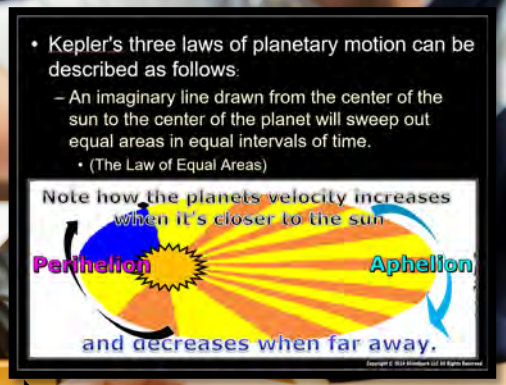

Eccentricity of the Planets (+ Pluto)
Eccentricity
Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Planet
Which planet has the most eccentric orbit?
Which planet has the least eccentric orbit?
What's the eccentricity of...
Mars
Pluto
Neptune
How do you calcul
Practice
Mercury
Equatorial Diameter of Planet (thousands of kilometers)
Which planet has the largest equatorial diameter?
Which planet has the smallest equatorial diameter?
Which two planets are roughly the same size?
How much larger is Venus than our own moon?
What object in the solar system has by far the largest diameter? Compare the inner planets equatorial diameter to the outer planets? How are the different?
Part 1 Review Game
NIGHT SKY
ROUND ABOUT
EGG SHAPED
FAR, FAR, AWAY
SPACE MOVIES
Final Question Wager
Final Question: Answer
Across
Down
Possible Answers
APHELION, ASTRONOMICAL, COPERNICUS, DISTANCE, DIVIDED, EARTH, EARTH, ECCENTRICITY, GALILEO, JUPITER, JUPITER, KEPLER, MARS, MERCURY, MERCURY, MILKYWAY, NEPTUNE, NEPTUNE, ORBIT, PERIHELION, SATURN, SUN, URANUS, VENUS, VENUS

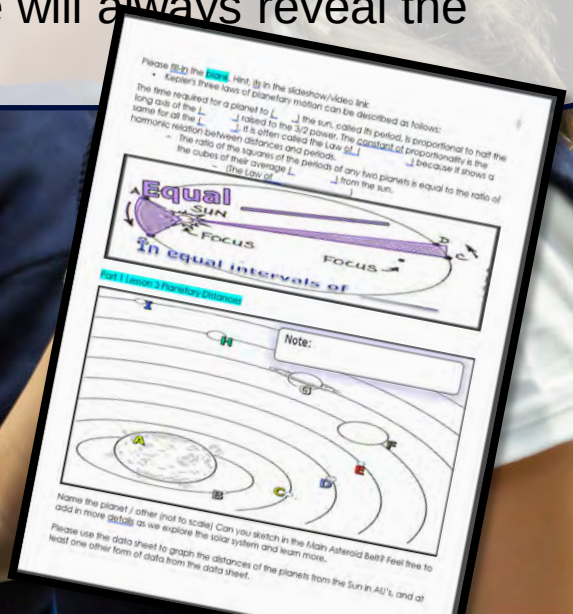

Part 1 Intro Astronomy
Law of Equal Areas
Kepler's 3 Laws of Planetary Motion
Sun
Mercury 0.4 A.U.
Venus 0.7 A.U.
Earth 1.0 A.U.
Mars 1.5 A.U.
Jupiter 5.2 A.U.
Saturn 9.5 A.U.
Uranus 19.2 A.U.
Distances of Planets from Sun in Astronomical Units
Trends?
Solar System Data

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.

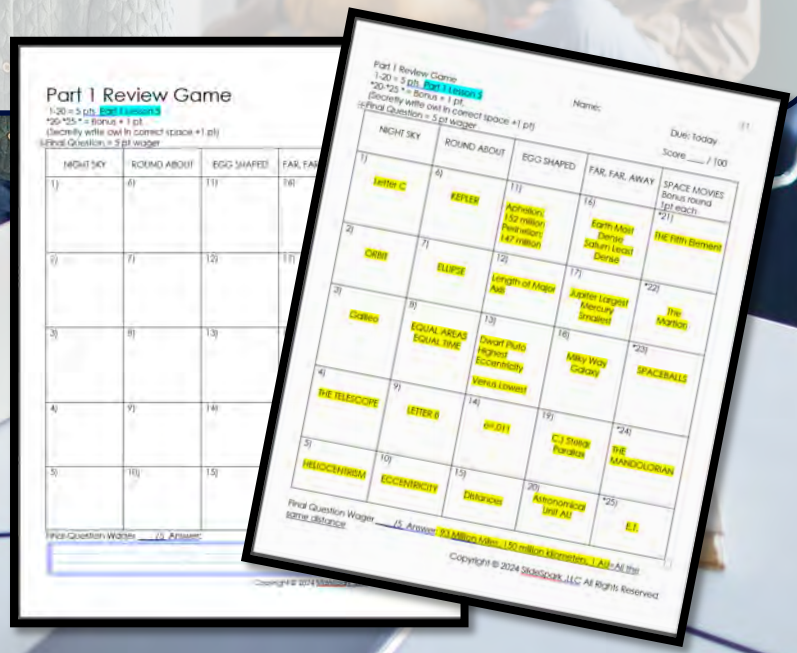






Review Game / Assessments

Each of the 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.

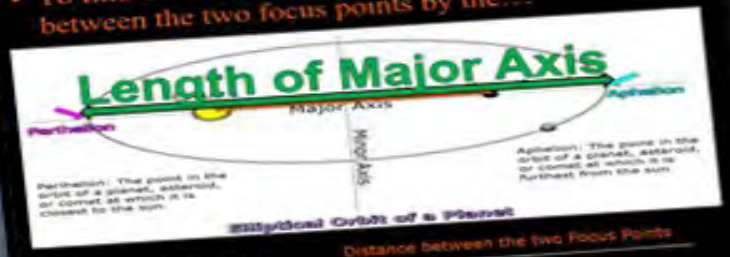


Astronomy

Quiz Game

- To find eccentricity, you divide the distance between the two focus points by the...

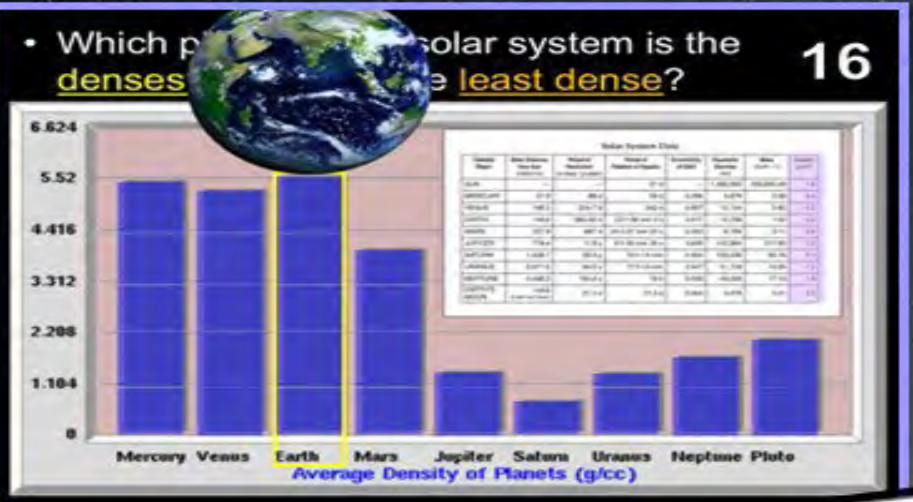
12



$$\text{Eccentricity} = \frac{\text{Distance between the two Focus Points}}{\text{Length of the major axis}}$$

- Which p... solar system is the denses... e least dense?

16



- The terms below are a measurement of how an orbit deviates from circular.
  - A perfectly circular orbit has an eccentricity of zero.
  - Higher numbers indicate more eccentric orbits.

- This is the name for the path (usually... one celestial body in it... revolution ar...

Orbit

What's the perihelion and aphelion of planet earth?

Aphelion: Furthest from sun
152 million

Perihelion: Closest to the sun
147 million

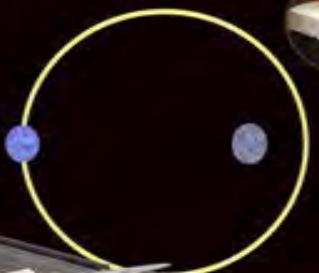
11

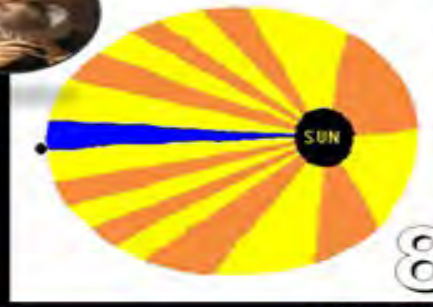
- Which is not one of Kepler's three laws of planetary motion?
  - A.) The path of the planets about the sun is elliptical in shape, with the center of the sun being located at one focus. (The Law of Ellipses)
  - B.) A planetary body will always have a highly [illegible]cal orbit as it travels around the sun. (The Law Ec[illegible]city)

The planets in our solar systems are only slightly elliptical. Most have eccentricity of less tha[illegible] (Mercury has the m[illegible]

9

- Planetary motion.
  - A line between a planet and the Sun covers equal areas in equal times.





8

- Name this Italian physicist (1564 -1642), mathematician, astronomer, and philosopher.
  - Played a major role in the Scientific Revolution.
  - His achievements include improvements to the telescope, astronomical observations, and support for Copernicanism.

3

Galileo helped improve this device?

- Originally invented by Spectacle makers Hans Lippershey & Zacharias Janssen and Jacob Metius in the Netherlands (1608).

4

the idea of heliocentrism that around a stationary sun.

ecant his beliefs and spent the under house arrest.

5

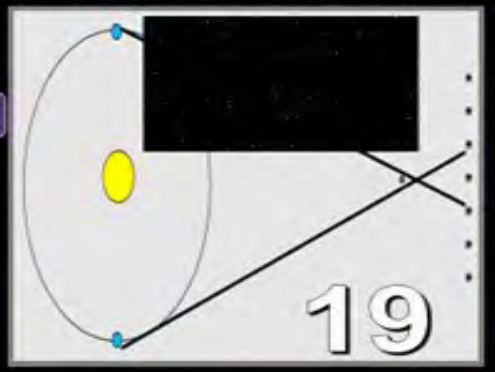
- Planetary motion.
  - Planets move in orbits shaped like an ellipse.
  - A.) Circle
  - B.) Orbit
  - C.) Ellipse
  - D.) Egg
  - E.) Perihelion

7

- Our solar system (The Sol System) is on the on spiral arm of this galaxy?

18

- This is the name for the apparent movement against the background of more distant stars as the Earth revolves around the Sun.
  - A.) Equinox
  - B.) Aphelion
  - C.) Stellar Parallax
  - D.) Perihelion
  - E.) Harmonic Function



19

- The earth is approximately this far from the sun?
  - 93 Million Miles
  - 150 Million Kilometers
  - 1 AU

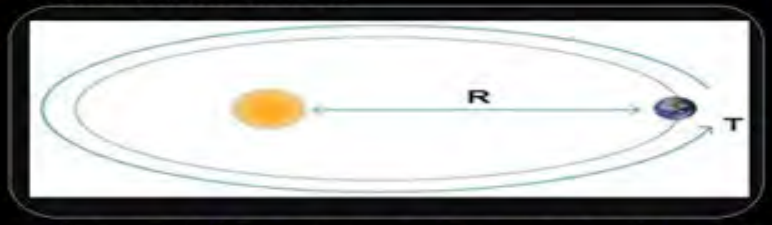
Same

Final Question

- This is a unit of measurement, it's the distance from The Sun to Earth.
  It equals= 149,598,000 kilometers

20

- Kepler's three laws of planetary motion can be described as follows:



  - The ratio of the squares of the periods of any two planets is equal to the ratio of the cubes of their average distances from the sun.
    - (The Law of Harmonies)

15

- Eccentricity can also be calculated by this equation.

$$e = \frac{a - p}{a + p}$$

$$\frac{30.44 - 29.77 \text{ au}}{30.44 + 29.77 \text{ au}} = \frac{.67}{60.21}$$

a= aphelion
b= perihelion

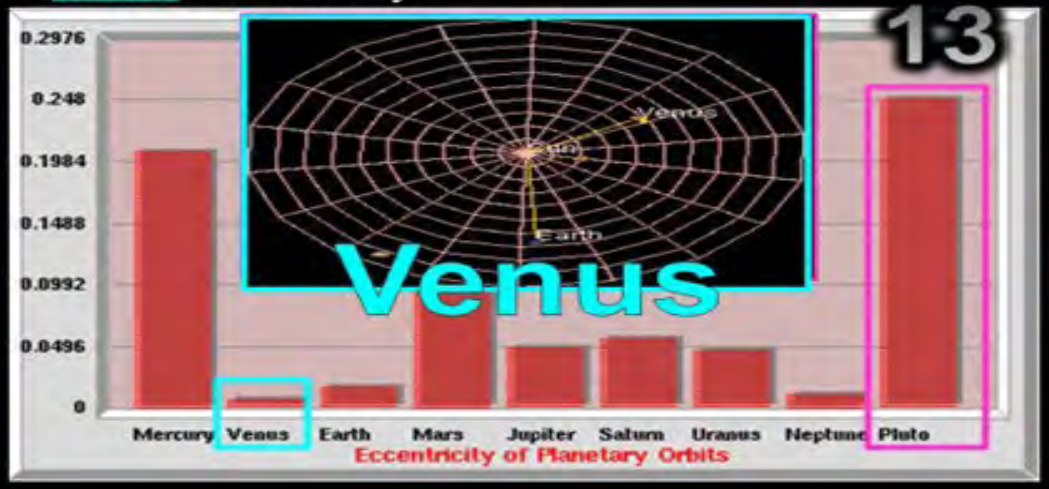
Neptune has an aphelion of 30.44 au, and perihelion of 29.77 au. .67 / 60.21 = .011

What's the eccentricity of Neptune? e=.011
(note: It will always be between 0 and 1)

14

- Which planet / dwarf planet has the highest and lowest eccentricity?

13

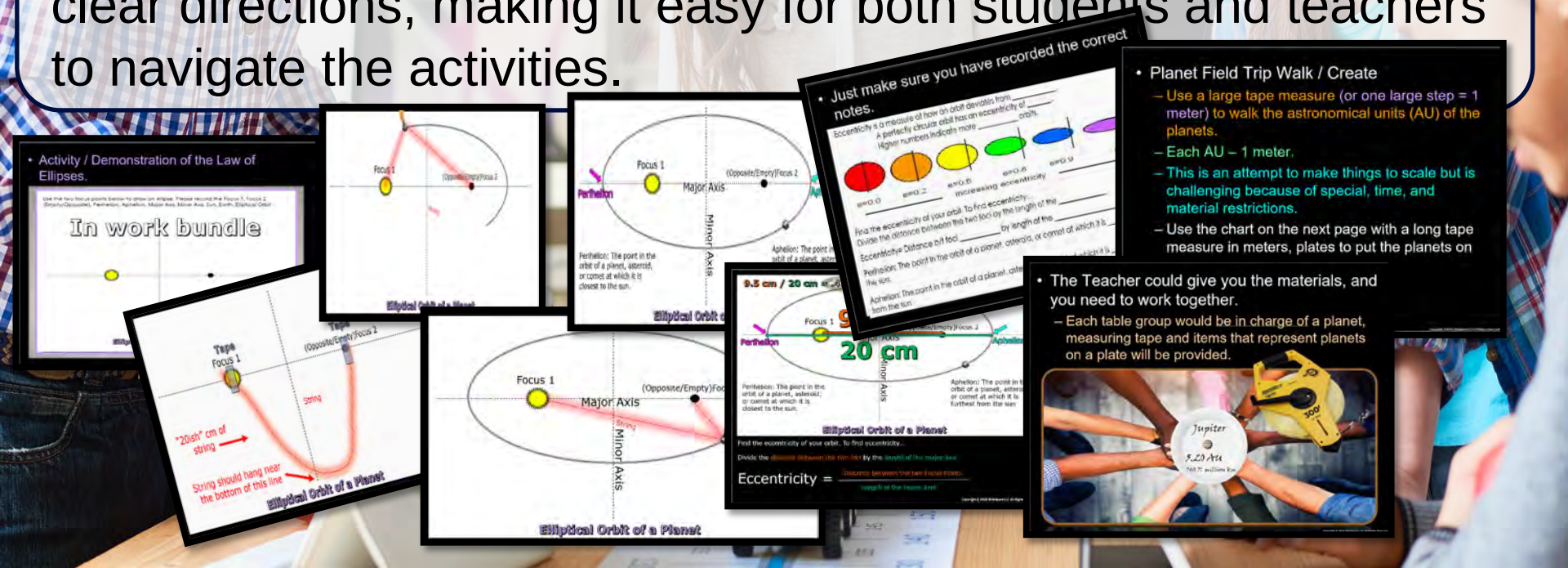


- Which letter below is the correct order of the planets in our solar system from the Sun outward?
  - A.) Mercury, Venus, Mars, Earth, Saturn, Jupiter, Neptune, Uranus
  - B.) Venus, Mercury, Earth, Mars, Saturn, Jupiter, Neptune, Uranus
  - C.) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
  - D.) Mars, Mercury, Venus, Earth, Jupiter, Saturn, Uranus, Neptune
  - E.) Mercury, Venus, Earth, Jupiter, Xena, Uranus, Neptune

1

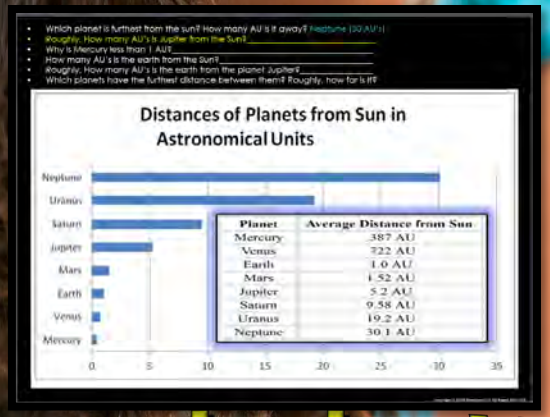
Activities / Labs

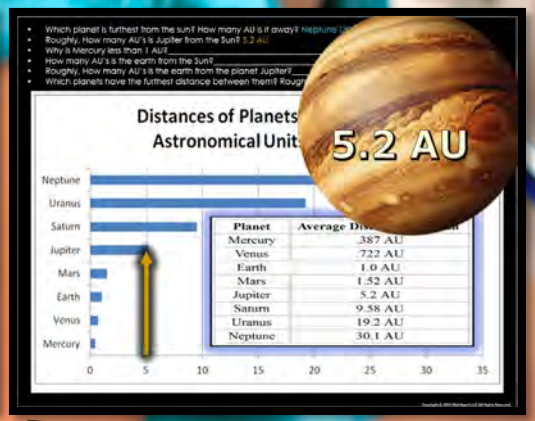
Our science activities are designed to help students explore and understand complex scientific concepts in an engaging and interactive way. Each science unit includes several hands-on activities that encourage students to collect data and think critically about the world around them. Our easy-to-follow slideshow provides detailed visuals, simple materials, and clear directions, making it easy for both students and teachers to navigate the activities.

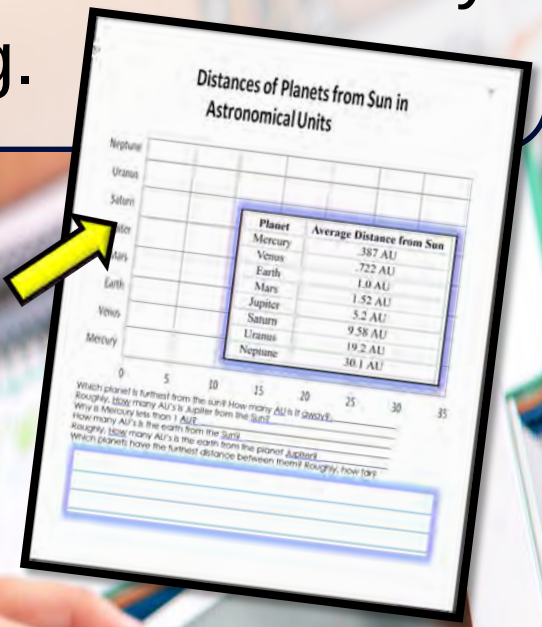


Built-in Graphing

This unit contains built-in graphing opportunities 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.



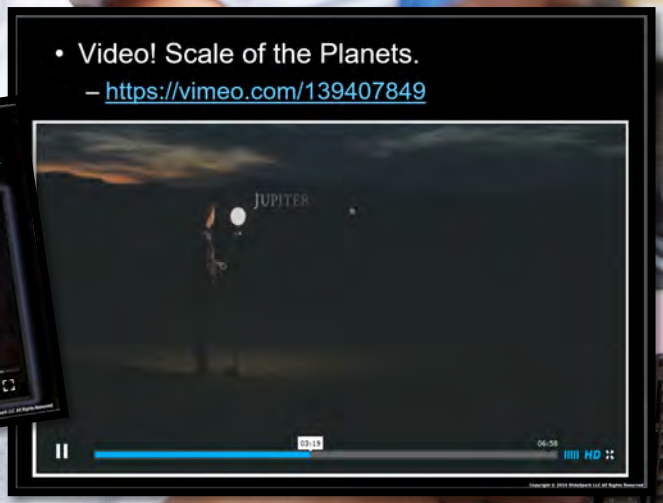




Quiz in Work Bundle

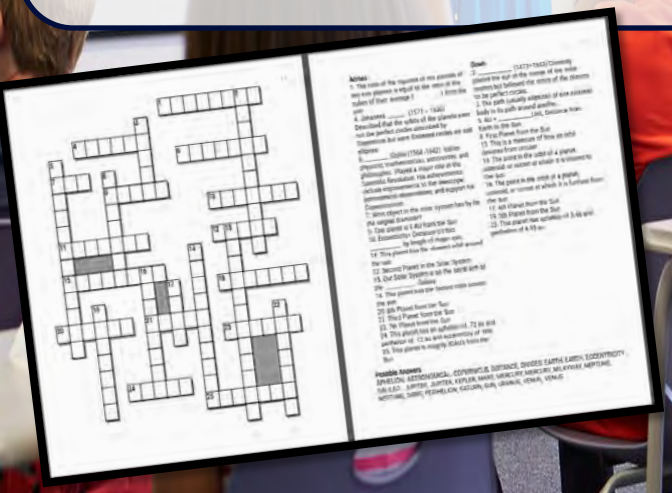
Built-in Video Links

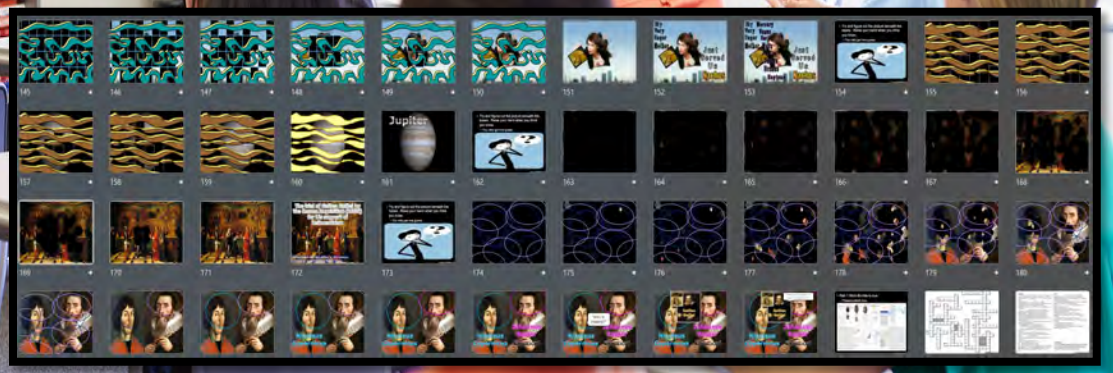
Our science education program is designed with the modern, multimedia learner in mind, and our video links are a perfect complement to our educational materials. These short clips are embedded into the slideshow at just the right places for a fantastic review. Whether you're studying biology, chemistry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



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.

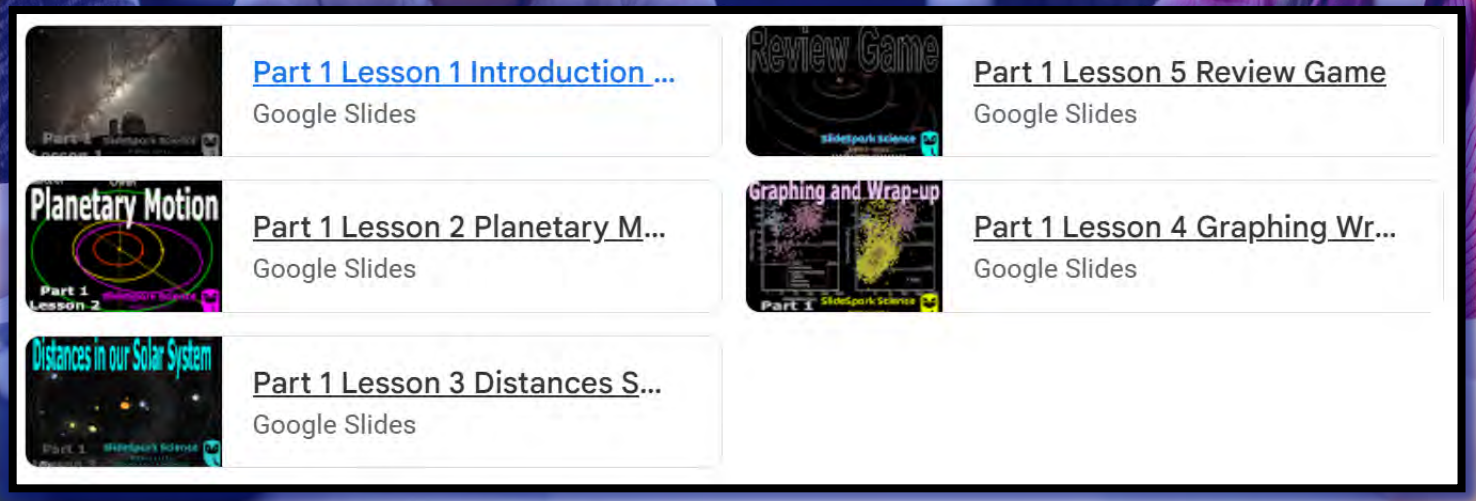




The Owl - Each Part of the slideshow has a small clipart Owl hiding somewhere in a slide. The owl is incredibly small and blended into just the right slide. If a student spots the “Owl” they can raise their hand high into the air. When you call upon the student they can say “Owl" and be the student who 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.



Astronomy Unit

Astronomy Unit

60 Lessons (6^{th} -8^{th} 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

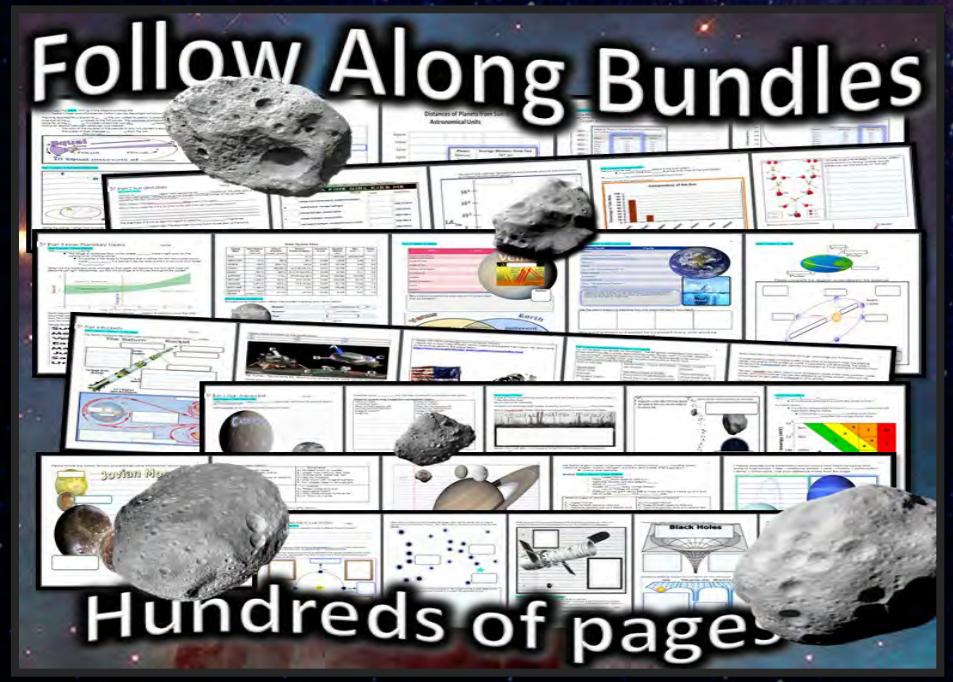
Part 5: Astronomy Unit : Main Asteroid Belt, protoplanet Ceres, Vesta, Meteors, Meteorites, Asteroids, Bolides, Chicxulub Crater, Tunguska Event, Chelyabinsk meteor, Craters, Parts of a Crater, Crater Impact Activity, NEO's, Torino Scale, Box Game Review, Crossword Puzzle, End Unit Assessment with Answer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


Astronomy
Mega Bundle
Neutron Star
The Habitable Zone
Penumbra
Cooler
Warmer
Really Hot
7 Units


INTERACTIVE
SLIDESHOWS
Barred
Irregular
Elliptical
Neutron Star
NEBULA
Venus
Earth
Olympus Mons
Name A,B,C,D?
Equinox March 20th
Equinox September 20th
Secure with Duct Tape

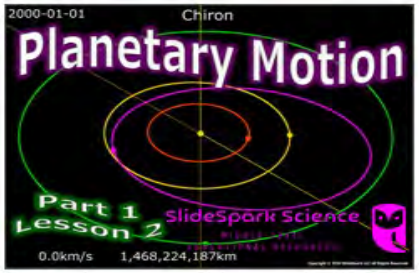

Follow Along Bundles
Hundreds of pages


Activities, Projects,
Assessments, All Built-in
Our Sun
The size and color tell us where the star is in its life cycle.
Johannes Kepler
Galileo Galilei
Nicholaus Copernicus
Eccentricity
Cooler
Warmer
Really Hot

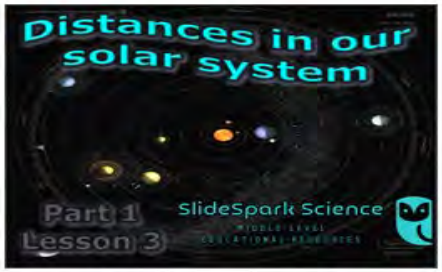
Introduction to Astronomy, Copernicus, Heliocentrism, Galileo, Kepler's Laws of Planetary Motion, Ellipse, Perihelion, Aphelion, Orbits, Orbital Velocities, Eccentricity, Calculating Eccentricity, Astronomical Units, Distances in the Solar System, Graphing Planetary Data, Order of the Planets, Box Game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

Part 1: Astronomy Unit

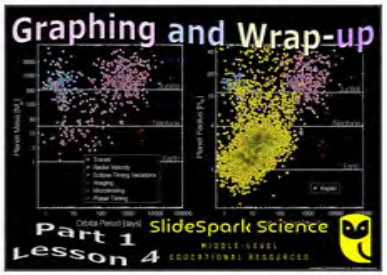
Part 1 Lesson 1 Introduction Kepler



Part 1 Lesson 2 Planetary Motion



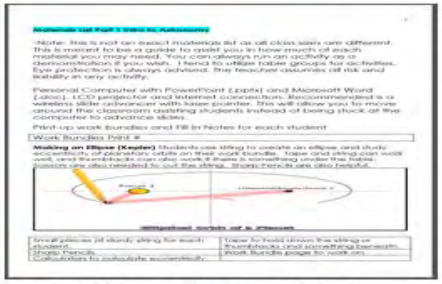
Part 1 Lesson 3 Distances Solar System

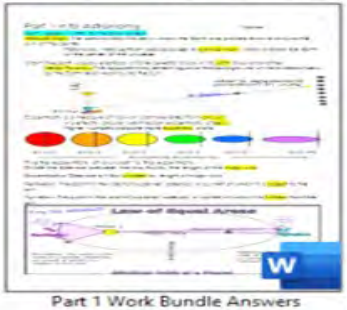


Part 1 Lesson 4 Graphing Wrap Up

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

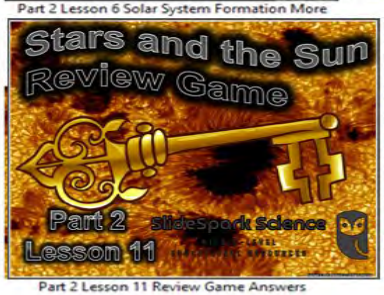
Part 2 Lesson 6 Solar System Formation More

Part 2 Lesson 7 Optional Sun Song

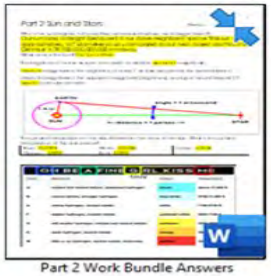
Part 2 Lesson 8 Shadows Sun Dials

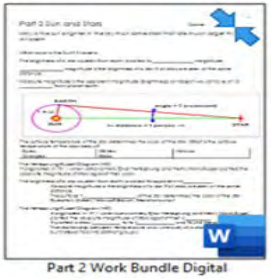
Part 2 Lesson 9 Solar Lunar Eclipse

Part 2 Lesson 10 Review Game



Part 2 Lesson 11 Review Game Answers


Part 2 Work Bundle Answers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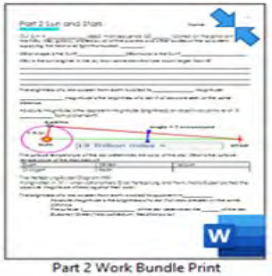

Part 2 Work Bundle Print


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

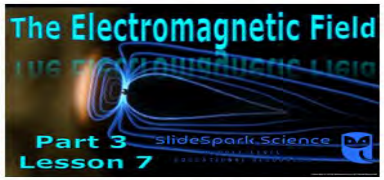
Part 3 Lesson 2 Mercury

Part 3 Lesson 3 Venus

Part 3 Lesson 4 Earth and Moon

Part 3 Lesson 5 Axial Tilt

Part 3 Lesson 6 Solstice Equinox



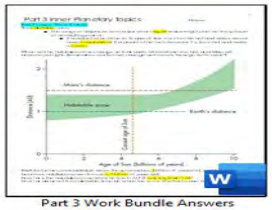
Part 3 Lesson 7 EM Field

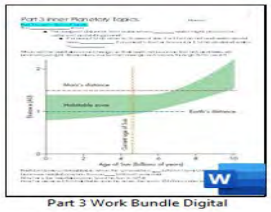
Part 3 Lesson 8 Phases of Moon 1

Part 3 Lesson 9 Phases of Moon 2

Part 3 Lesson 10 Phases Quiz


Part 3 Materials List


Part 3 Work Bundle Answers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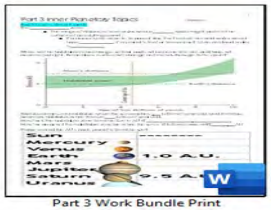

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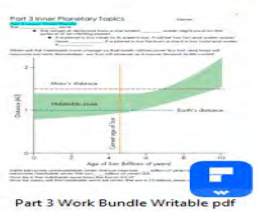

Part 3 Work Bundle Writable pdf

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

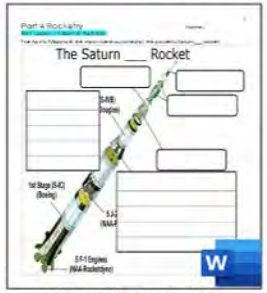
Part 4 Lesson 9 Review Game

Part 4 Lesson 10 Review Game Answers

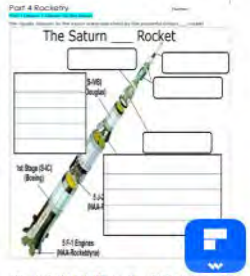

Part 4 Materials List


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 NEOs

Part 5 Lesson 4 Impact Lab

Part 5 Lesson 5 Research and Wrap Up

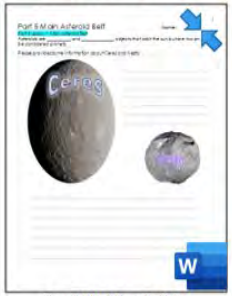
Part 5 Lesson 6 Review Game

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

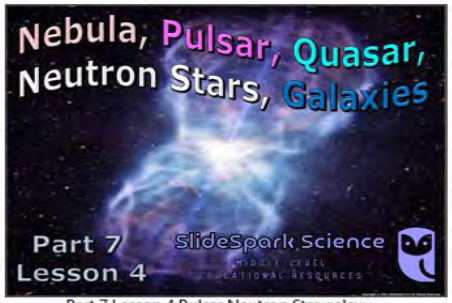
Astronomy Unit Part 7: Constellations, Hubble Space Telescope, Spitzer Space Telescope, Speed of Light, Nebulas, Types of Nebulas, Galaxies , Type of Galaxies, Gravity, The Special Theory of Relativity , Blackholes, Neutron Stars, Spacetime, Pulsars, Quasars, Exoplanets, Hubble Deep Field, Beyond the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

Part 7: Astronomy Unit

Part 7 Lesson 1 Constellations Hubble

Part 7 Lesson 2 Speed of Light More

Part 7 Lesson 3 Spacetime



Part 7 Lesson 4 Pulsar Neutron Star galaxy

Part 7 Lesson 5 Galaxies

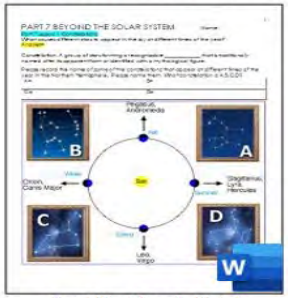
Part 7 Lesson 6 Exoplanets

Part 7 Lesson 7 Big Bang

Part 7 Lesson 8 Review Game

Part 7 Lesson 9 Review Game Answers


Part 7 Work Bundle Answers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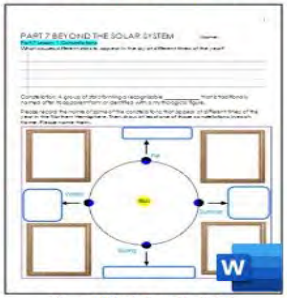

Part 7 Work Bundle Print

Curriculum Guide

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

=Easier,


= More difficult,


=Most difficult

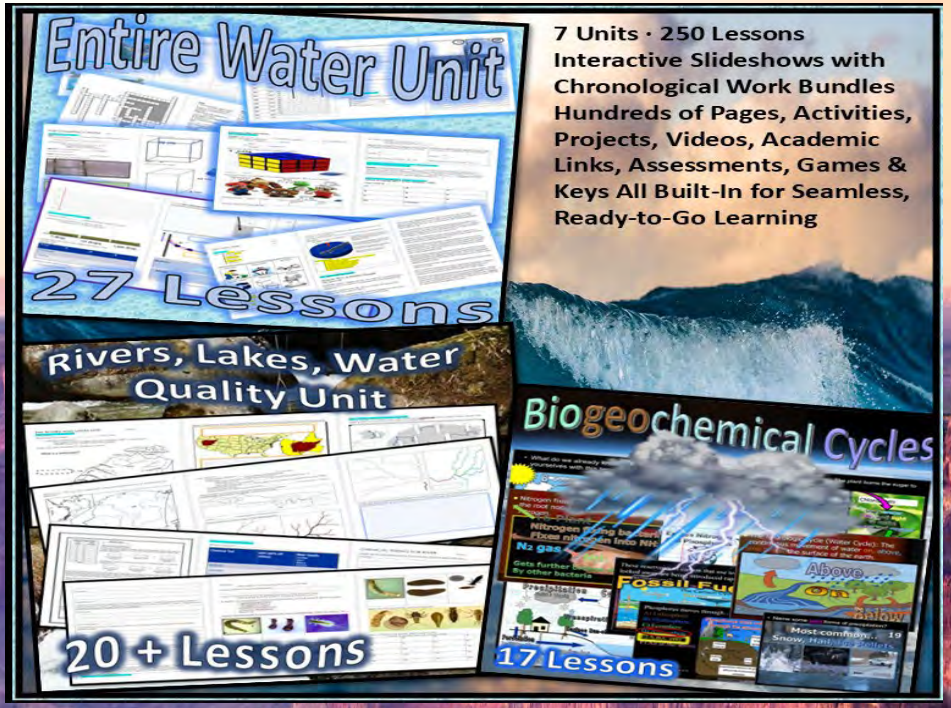
Earth Science Units	Daily Lessons	Intended Grade	
Geology Topics Unit	60 Lessons	6-8 medium difficulty	MORE DIFFICULT
Weather and Climate Unit	40 Lessons	6-8 medium difficulty	MORE DIFFICULT
Astronomy Unit	60 Lessons	6-8 medium difficulty	MORE DIFFICULT
Weathering, Soil Sciences	28 Lessons	5-7 easier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

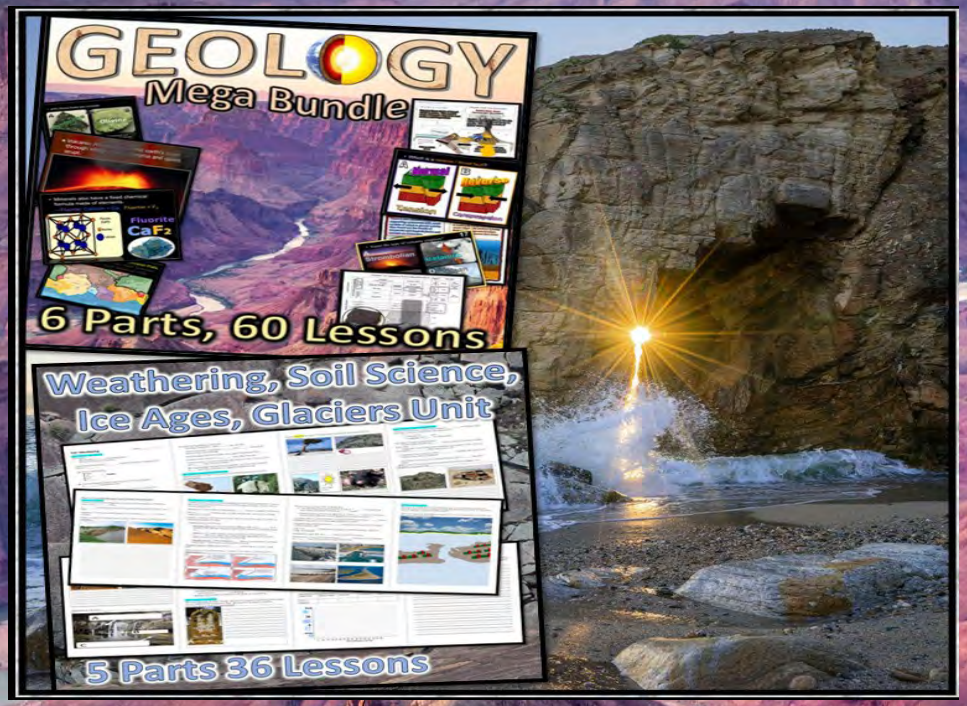
Earth Science Curriculum

Earth Science Curriculum

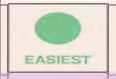
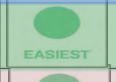
SlideSpark Science

MIDDLE-LEVEL EDUCATIONAL RESOURCES



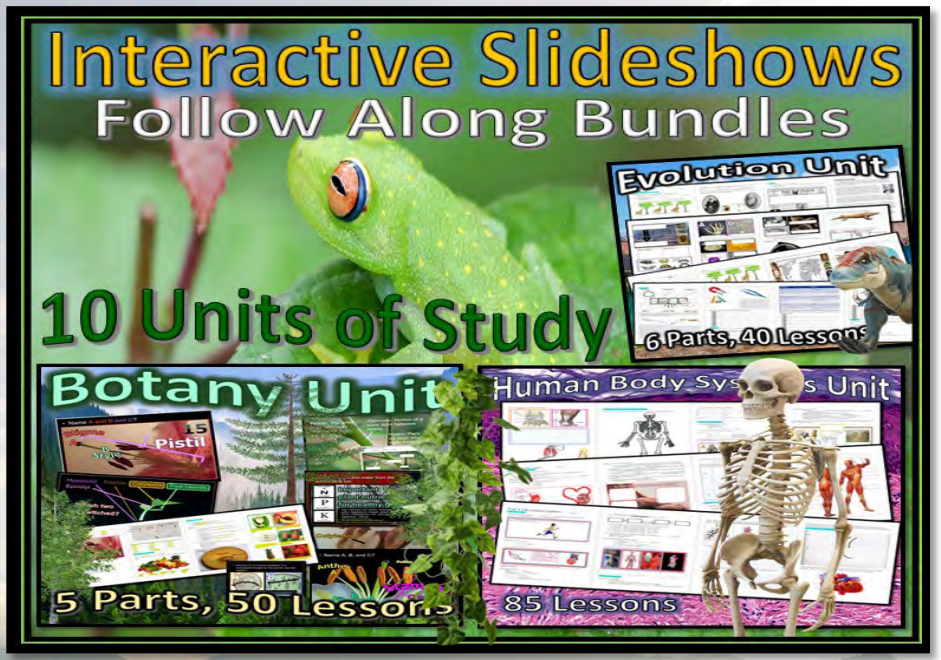


Life Science Units

	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


Life
Science
Curriculum
SlideSpark Science
MIDDLE-LEVEL
EDUCATIONAL RESOURCES


Interactive Slideshows
Follow Along Bundles
10 Units of Study
Evolution Unit
6 Parts, 40 Lessons
Botany Unit
5 Parts, 50 Lessons
Human Body Sys s Unit
85 Lessons


Cellular Biology Unit
Form Follows Function
30 Lessons of 50 minutes
DNA and Genetics Unit
40 Lessons
Infectious Diseases
30 Lessons


Taxonomy and Classification Unit
6 Parts
50 Lessons
Ecology Interactions Unit
30 Lessons
Ecology Feeding Le
Full Unit
Ecology Abiotic Factors Unit
27 Lessons

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	

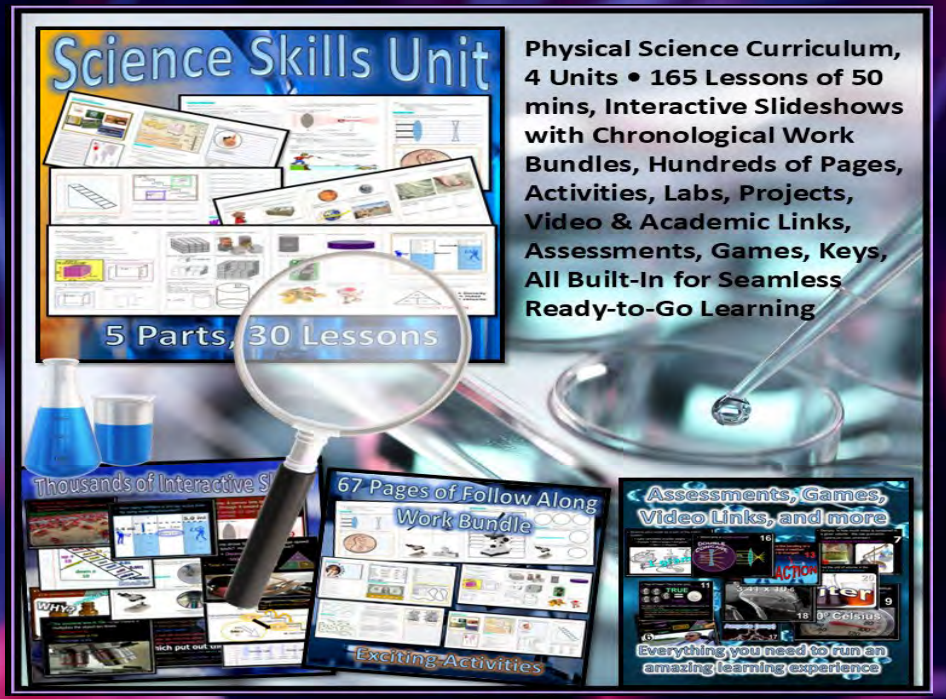
Physical Science Curriculum

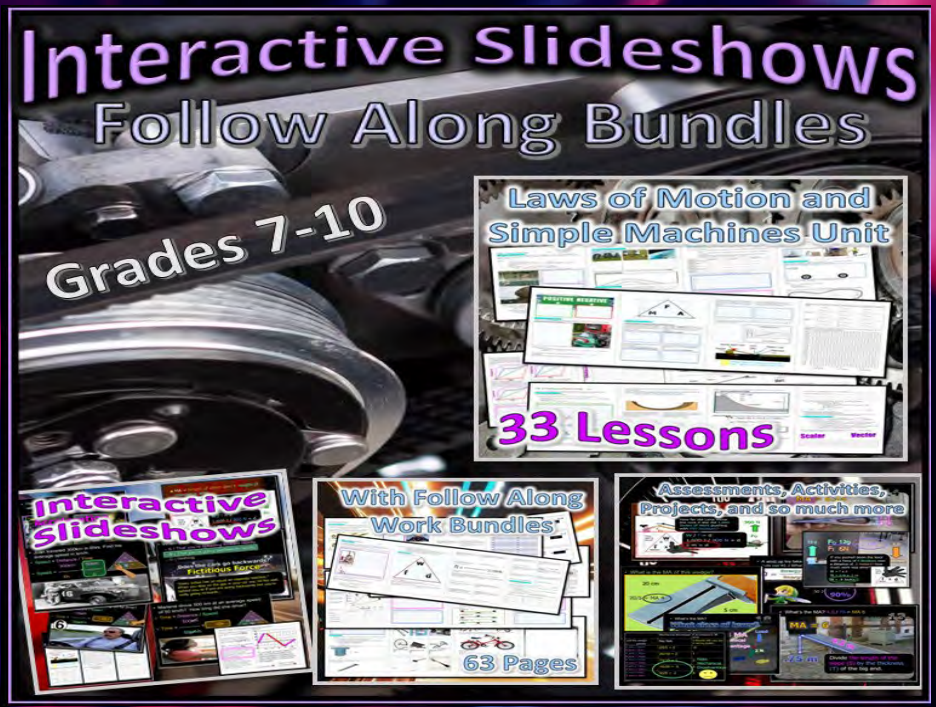
Entire SlideSpark Science Curriculum

Physical Science Curriculum

SlideSpark Science

MIDDLE-LEVEL EDUCATIONAL RESOURCES





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Sincerely,

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SlideSpark Science

MIDDLE-LEVEL

EDUCATIONAL RESOURCES

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