

# **EARTH SCIENCE** Lesson Plan

Quarter 4, Week 5, Day 1



## **Outcomes for Today**

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Standard Focus: Earth Sciences 1.d *“students know the evidence indicating that the planets are much closer to Earth than are the stars”*

### **PREPARE**

#### **1. Background knowledge necessary for today’s reading.**

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Born in Poland in 1473, Nicolas Copernicus studied law and medicine, but was also interested in mathematics and astronomy. At that time in history most astronomers believed in the theory that Greek astronomer Ptolemy developed, that the Earth was motionless and the center of the universe. Making his observations with the naked eye, Copernicus proposed the idea of heliocentric astronomy, but didn’t have the tools to prove it. He died in 1543.

#### **2. Vocabulary Word Wall.**

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Introduce 3-5 important words from today’s reading

**geocentric**

**retrograde motion**

**heliocentric**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

### **READ**

#### **3. Review the vocabulary and concepts previously covered in this chapter.**

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#### **4. Read directions for investigation/activity.**

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#### **5. Read text.**

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Ch. 29.1, pp. 775-776

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- The planets of our solar system have various sizes, surface conditions, and internal structures.
- Early astronomers assumed that the Sun, the planets, and the stars orbited Earth.
- In 1543 Copernicus suggested that the Sun was the center of the universe.

### 7. Post information on the billboard. Add new information to ongoing projects on the wall.

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## EXPLORE

### 8. Explore today's investigation with inquiry activities.

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### 9. Explore today's simulation with inquiry activities.

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### 10. Collect data and post.

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**One possible activity:** Geocentric vs. Heliocentric

**Procedure:** Students read the NASA explores article "Was Galileo Wrong?"

**Discussion:** Discuss the article

**Key question:** What questions do the students have?

**Source:** [http://www.nasaexplorations.com/lessons/04-210/5-8\\_2.pdf](http://www.nasaexplorations.com/lessons/04-210/5-8_2.pdf)

## EXTEND

### 11. Prompt every student to write a short product tied to today's reading.

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### 12. Close with a short summary.

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Extend the reading to the students' lives or to the world

# **EARTH SCIENCE** Lesson Plan

## Quarter 4, Week 5, Day 2



### **Outcomes for Today**

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Standard Focus

#### **PREPARE**

##### **1. Background knowledge necessary for today's reading.**

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Johannes Kepler was born in 1571 and studied for the ministry, as well as mathematics and astronomy. In 1596, he wrote a defense of Copernicus' theory. Later after working with Danish astronomer Tycho Brahe, he used Tycho's data to discover that the orbit of Mars was an ellipse. Kepler published his first two laws in a book in 1609. The third law was published in 1619.

##### **2. Vocabulary Word Wall.**

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Introduce 3-5 important words from today's reading

**ellipse**

**astronomical unit**

**perihelion**

**aphelion**

**Kepler's laws**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

#### **READ**

##### **3. Review the vocabulary and concepts previously covered in this chapter.**

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##### **4. Read directions for investigation/activity.**

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##### **5. Read text.**

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Ch. 29.1, pp 776-778

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- In an elliptical orbit, a planet is not at a constant distance from the sun.
- Each planet's elliptical orbit is a different size and shape.
- Galileo was the first person to use a telescope to observe the sky.

### 7. Post information on the billboard. Add new information to ongoing projects on the wall.

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## EXPLORE

### 8. Explore today's investigation with inquiry activities.

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### 9. Explore today's simulation with inquiry activities.

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### 10. Collect data and

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**One possible activity:** Geocentric versus Heliocentric

**Procedure:** Students research both theories using library resources or the internet and construct models

**Discussion:** Discuss information found and questions they may still have

**Key question:** Why do we accept the heliocentric model as the one that is correct?

**Source:** <http://www.nasaexplores.com/lessons>

## EXTEND

### 11. Prompt every student to write a short product tied to today's reading.

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### 12. Close with a short summary.

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Extend the reading to the students' lives or to the world

# **EARTH SCIENCE** Lesson Plan

## Quarter 4, Week 5, Day 3



### **Outcomes for Today**

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Standard Focus

#### **PREPARE**

##### **1. Background knowledge necessary for today's reading.**

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Isaac Newton was born in 1642. He was an English physicist, mathematician, and astronomer. Besides his contribution to astronomy, he invented a new type of mathematics, calculus. He was interested in planetary orbits and formulated three laws of motion. Applying them to Kepler's three laws, he came up with the law of universal gravitation. His inspiration is said to be an apple falling from a tree.

##### **2. Vocabulary Word Wall.**

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Introduce 3-5 important words from today's reading

**gravity**

**law of universal gravitation**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

#### **READ**

##### **3. Review the vocabulary and concepts previously covered in this chapter.**

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##### **4. Read directions for investigation/activity.**

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##### **5. Read text.**

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Ch.29.1, pp. 778-779

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- Newton developed a law of gravitation that demonstrated the validity of the heliocentric theory.

### 7. Post information on the billboard. Add new information to ongoing projects on the wall.

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## EXPLORE

### 8. Explore today's investigation with inquiry activities.

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### 9. Explore today's simulation with inquiry activities.

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### 10. Collect data and post.

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**One possible activity:** Geocentric versus Heliocentric

**Procedure:** Students complete their models and shares with the class

**Discussion:** See Day 2

**Key question:** What other ideas about the world have changed over time?

**Source:** <http://www.nasaexplores.com/lessons>

## EXTEND

### 11. Prompt every student to write a short product tied to today's reading.

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### 12. Close with a short summary.

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Extend the reading to the students' lives or to the world

# **EARTH SCIENCE** Lesson Plan

## Quarter 4, Week 5, Day 4



### **Outcomes for Today**

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Standard Focus: Earth Sciences 1.f “students know the evidence for the dramatic effects that asteroid impacts have had in shaping the surfaces of planets and their moons and in the mass extinctions of life on Earth” and 4.d “students know the differing greenhouse conditions on Earth, Mars, and Venus; the origins of those conditions; and the climate consequences of each”

### **PREPARE**

#### **1. Background knowledge necessary for today’s reading.**

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Mercury and Venus are the two planets closest to the Sun and the only planets that can pass between the Sun and the Earth in what is called a transit, where they appear to move across the surface of the Sun, similar to an eclipse. Both are rocky and dense, with solid surfaces. Neither have any moons. Mercury, the closest to the Sun, has essentially no atmosphere to moderate its surface temperature which ranges from a daytime temperature of 400 degrees Celsius to well below -150 degrees Celsius. Venus is the brightest planet in the night sky, but its thick atmosphere obscures its surface. Venus spins in a clockwise motion, opposite from other planets.

#### **2. Vocabulary Word Wall.**

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Introduce 3-5 important words from today’s reading

**terrestrial planets**                      **gas giant planets**                      **scarps**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

### **READ**

#### **3. Review the vocabulary and concepts previously covered in this chapter.**

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#### **4. Read directions for investigation/activity.**

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#### **5. Read text.**

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Ch. 29.2, pp. 780-783

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- Mercury is the closest planet to the Sun and has a surface similar to the Moon.
- Venus is the hottest planet due to its efficient greenhouse effect and is closest in physical properties to the Earth.
- Neither Mercury nor Venus has any moons.

### 7. Post information on the billboard. Add new information to ongoing projects on the wall.

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## EXPLORE

### 8. Explore today's investigation with inquiry activities.

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### 9. Explore today's simulation with inquiry activities.

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### 10. Collect data

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**One possible activity:** Make a Scale model of a Venus Transit

**Procedure:** Students construct a scale model of a Venus transit

**Discussion:** Review what happens during solar and lunar eclipses

**Key question:** How much of the Sun will be covered as Venus passes between the sun and the Earth?

**Source:**

[http://www.exploratorium.edu/venus/teacher\\_downloads/model-activity.pdf](http://www.exploratorium.edu/venus/teacher_downloads/model-activity.pdf)

## EXTEND

### 11. Prompt every student to write a short product tied to today's reading.

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### 12. Close with a short summary.

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Extend the reading to the students' lives or to the world



# **EARTH SCIENCE** Lesson Plan

## Quarter 4, Week 5, Day 5



### **Outcomes for Today**

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Standard Focus: Earth Sciences 1.f and 4.d

#### **PREPARE**

##### **1. Background knowledge necessary for today's reading.**

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The third and fourth planets from the Sun are Earth and Mars. Earth is the only known planet with a surface of liquid water and an atmosphere of nitrogen and oxygen. Mars has fascinated people for years. Lines seen on its surface through telescopes led to speculation of canals and possible life on Mars. Early space probes showed Mars to be cratered and barren. Some images suggest that Mars might have had at one time liquid water on its surface. It does have two polar ice caps that shrink and expand with the seasons.

##### **2. Vocabulary Word Wall.**

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Introduce 3-5 important words from today's reading

#### **precession**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

#### **READ**

##### **3. Review the vocabulary and concepts previously covered in this chapter.**

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##### **4. Read directions for investigation/activity.**

---

##### **5. Read text.**

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Ch.29.2, pp 783-785

## RESPOND

### 6. Fix the facts. Clarify what's important.

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Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- The existence of water in three states – solid, liquid and gas – has been important to the development and existence of life on Earth.
- The high iron content in Mars' soil gives it its reddish appearance.
- Mars shows evidence of once having tectonic activity.

### 7. Post information on the billboard. Add new information to ongoing projects on the wall.

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## EXPLORE

### 8. Explore today's investigation with inquiry activities.

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### 9. Explore today's simulation with inquiry activities.

---

### 10. Collect data and post.

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**One possible activity:** Mars Landform Identification

**Procedure:** Students identify landforms on the surface of Mars using Viking Orbiter spacecraft photos

**Discussion:** Familiarize students with Mars landform terms

**Key question:** Were some landforms easier to identify than others?

**Source:** [http://spacegrant.hawaii.edu/class\\_acts/marsQuizTe.html](http://spacegrant.hawaii.edu/class_acts/marsQuizTe.html)

## EXTEND

### 11. Prompt every student to write a short product tied to today's reading.

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### 12. Close with a short summary.

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Extend the reading to the students' lives or to the world