

## Errata for *Earth Science: God's World, Our Home*

Updated May 18, 2018

### Chapter 1, Learning Check 1.5

2. The answer key on the *Resource CD* repeats question 1 but gives the correct answer for question 2. The answer key should read:

#### 1.5.2 During a solar eclipse, why do people in some places see a partial eclipse, while others see a total eclipse?

This effect can be explained by the fact that there are two regions in shadows cast from light sources, the umbra and the penumbra. People located in the umbra of the moon's shadow will see a total eclipse. People located in the penumbra, where the sun is not completely dark, will see only a partial solar eclipse.

### Chapter 1 Exercises

12. The question in the text and the answer on the *Resource CD* should refer to Fig. 1.22 instead of Fig. 1.17.

### Quiz 2

5. The answer key on the *Resource CD* repeats question 4 and its answer. The correct question and answer to Question 5 are:

**“With respect to the path of the sun in the sky, what is the difference between locations in the tropics and those not in the tropics?”**

In the tropics, whether it is summer solstice, winter solstice, or an equinox, the sun climbs up high in the sky every day, and so it is generally warm year-round. In locations not in the tropics, the sun will have a different path in the sky depending on the season, traveling high in the sky during summer and low in the sky during winter.

### Chapter 2 Exercises

- 10d. The answer given on the *Resource CD* is incorrect. The correct answer is 1400 ft/mi, 480 ft/mi.

### Chapter 4, Learning Check 4.2

3. In the answer key on the *Resource CD*, the mineral group and chemical formula of sillimanite are incorrect. Sillimanite is actually a silicate-group mineral with the chemical formula  $\text{Al}_2\text{SiO}_5$ .

### Quiz 7

3. There is a typo in the question on both the quiz itself and in the answer key. The correct question is: **“With respect to the path of the sun in the sky, what is the difference between locations in the tropics and those not in the tropics?”**



**Quiz 8**

5. In the answer key on the *Resource CD*, orthoclase ( $\text{KAlSi}_3\text{O}_8$ ) is listed as being an oxide-group mineral. It is actually a silicate-group mineral, as listed in the textbook.

**Quiz 9**

4.b. The answer given on the *Resource CD* is 297 ft/mi. The correct answer is 292 ft/mi.

**Chapter 6 Text**

pg. 139, 2nd paragraph: The second sentence should read: “Beyond this, the seafloor drops more steeply down to depths that are generally **3,000 m (10,000 ft)** or greater.”

**Chapter 6 Exercises**

11. The answer on the *Resource CD* mistakenly repeats the answer from question 9. In addition, the equation given below that answer is incorrect. The correct equation is:

$$2500 \text{ km} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{100 \text{ cm}}{1 \text{ m}} \cdot \frac{1 \text{ yr}}{3.5 \text{ cm}}$$

The answer given below the equation is approximately correct. It would take 71,428,571 years for California to move this far.

**Chapter 7 Exercises**

5a. The answer given on the *Resource CD* is incorrect. The correct answer is 400 km

5b. The answer given on the *Resource CD* is incorrect. The correct answer is 2800 km

**Chapter 11 Exercises**

5. The answer given on the *Resource CD* for plutonium lists 120 neutrons. The correct answer is 150 neutrons.

**Chapter 14: Experimental Investigation 8**

pg. 417: There is an error on the weather map for Experimental Investigation 8: Weather Maps. On the cold front curve that stretches from Kansas up to Ohio, the blue flags are pointing the wrong way. The flags should be pointing south. A corrected map is provided on pg. 31 of the “Experiment Resource Manual” on the *Resource CD*.



## Errata for the 2017 Edition of the *Resource CD*

In the 2017 edition of the *Resource CD*, several Quiz and Exam answers are misnumbered or omitted. The corrections below do not apply if you are using a different edition of the *Resource CD*.

### Answers to Quiz 13

2. A different question and answer are mistakenly printed in the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Explain how volcanic arcs form along convergent plate boundaries.**

As oceanic plates push beneath other plates, their temperature increases, and eventually the subducted oceanic crust begins partially to melt. The molten portion gathers together, and being less dense than the surrounding rocks, begins to rise up into the crust, forming magma chambers. Because the slab of oceanic crust subducts at an angle, the magma produced by the melting of subducted crust does not form directly beneath deep-ocean trenches, but farther inland, in a line parallel to the trench. The line of volcanoes formed by the magma chambers parallel to such a trench is called a volcanic arc.

3. A different question and answer are mistakenly printed in the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**What is the “Ring of Fire”?**

The Ring of Fire is a zone around the Pacific Ocean where the majority of Earth’s volcanic eruptions and earthquakes occur.

### Answers to the Fall Term Exam

8. This question and answer was mistakenly omitted from the answer key on the *Resource CD*, and the numbering for all subsequent questions is incorrect because of this omission (see below). Here is the question that appears on the exam, with the correct answer:

**What is the “Ring of Fire”?**

The Ring of Fire is a zone around the Pacific Ocean where the majority of Earth’s volcanic eruptions and earthquakes occur.

**Questions 9 and 10:** The questions and answers for Questions 9 and 10 are mislabeled as the questions and answers for Questions 8 and 9.

11. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the exam, with the correct answer:

**Describe the three main types of volcanoes.**

*Shield volcanoes* are by far the largest type of volcanoes and are spread out over large areas due to the basalt lava. They are gently sloped and horseshoe-shaped, and the lava is basalt lava.

*Composite cones* are the second largest type of volcano, although they are much smaller than shield volcanoes. They are made of alternating layers of lava flows and pyroclastic material. They have steeper slopes than shield volcanoes.

*Cinder cones* are the smallest type of volcano. They are built from loose pyroclastic material such as cinders and lapilli. Like composite cones, they are cone shaped. (The three types of volcanoes may be described in any order.)

12. The question and answer for Question 12 are mislabeled as the question and answer for Question 10.

13. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the exam, with the correct answer:

**What are calderas and how do they form?**

Calderas are volcanic craters that are at least 1 km in diameter. A caldera is formed when a volcano erupts and ejects a large amount of pyroclastic material, leaving its magma chamber partially empty. The roof of the magma chamber then collapses, forming the caldera.



### Answers to Quiz 14

1. This question and answer are mistakenly omitted from the answer key on the *Resource CD*, and the numbering for all subsequent questions is incorrect because of this omission (see below). Here is the question that appears on the quiz, with the correct answer:

**What are calderas and how do they form?**

Calderas are volcanic craters that are at least 1 km in diameter. A caldera is formed when a volcano erupts and ejects a large amount of pyroclastic material, leaving its magma chamber partially empty. The roof of the magma chamber then collapses, forming the caldera.

2. The question and answer for Question 2 are mislabeled as the question and answer for Question 1.

3. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Describe the three main types of volcanoes.**

*Shield volcanoes* are by far the largest type of volcanoes and are spread out over large areas due to the basalt lava. They are gently sloped and horseshoe-shaped, and the lava is basalt lava.

*Composite cones* are the second largest type of volcano, although they are much smaller than shield volcanoes. They are made of alternating layers of lava flows and pyroclastic material. They have steeper slopes than shield volcanoes.

*Cinder cones* are the smallest type of volcano. They are built from loose pyroclastic material such as cinders and lapilli. Like composite cones, they are cone shaped. (The three types of volcanoes may be described in any order.)

**Questions 4, 5, and 6:** The questions and answers for Questions 4, 5, and 6 are mislabeled as the questions and answers for Questions 3, 4, and 5.

### Answers to Quiz 15

1. A different question and answer are mistakenly printed in the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**In the Hawaiian Islands, the oldest islands are at the northwest end of the chain while youngest islands and the active volcanoes are in the southeast. Explain this.**

The Hawaiian Islands sit above a hotspot in Earth's mantle. As the Pacific Plate moves, the hotspot stays in one place. The islands at the northwest were over the hotspot millions of years ago, while the islands in the southeast are over the hotspot now.

2. A different question and answer are mistakenly printed in the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**What are plutons and batholiths?**

Plutons are intrusive igneous rock bodies (such as granite, diorite, or gabbro) which form within the crust and are later uplifted and exposed through weathering and erosion. Batholiths are the largest plutons, those larger than 100 sq km (40 sq mi). Most batholiths are probably the crystallized remains of magma chambers.

5. This question and answer are mistakenly omitted from the answer key on the *Resource CD*, and the numbering for this and the next question is incorrect because of this omission (see below). Here is the question that appears on the quiz, with the correct answer:

**Distinguish between a nuée ardente and a lahar.**

A nuée ardente is a mixture of pyroclastic materials, very hot steam, and other hot gases, and it moves rapidly down the slope of a volcano with very little friction. It is a fiery cloud that moves as fast as 200 km/hr (125 mph), and has great destructive power, but leaves behind only a thin deposit of pyroclastic material. A lahar is not a cloud, but rather a thick, heavy mixture of water and pyroclastic material that flows down the slope of a volcano and leaves behind a thicker deposit.

6. The question and answer for Question 6 are mislabeled as the question and answer for Question 5.



### Answers to Quiz 16

4. A different question and answer are mistakenly printed in the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Describe the three main regions in the Earth's interior.**

The *crust* is the outermost layer of the solid Earth and the only part that we have direct access to. It is exceptionally thin compared to the rest of the planet. The *mantle* is the thick layer between the crust and the core. It is composed of dense iron-rich and magnesium-rich silicate rocks. It is almost entirely solid, though some upper portions are partially molten. The *core* is divided into a liquid outer core and a solid inner core. Both parts are composed largely of iron.

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Briefly explain why basaltic lava produces long, fast-moving lava flows.**

Basaltic lava produces long, fast-moving lava flows because of its low viscosity, which is a result of its low silica content.

### Answers to Quiz 17

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**How do the Richter and Mercalli scales each classify earthquakes?**

The Richter scale classifies earthquakes by magnitude, a measure of the amount of energy released by an earthquake. The Mercalli scale classifies earthquakes by intensity, a measure of the amount of damage caused by an earthquake.

### Answers to Quiz 18

3. A different question and answer are mistakenly printed in the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Describe the three main types of volcanoes.**

*Shield volcanoes* are by far the largest type of volcanoes and are spread out over large areas due to the basalt lava. They are gently sloped and horseshoe-shaped, and the lava is basalt lava.

*Composite cones* are the second largest type of volcano, although they are much smaller than shield volcanoes. They are made of alternating layers of lava flows and pyroclastic material. They have steeper slopes than shield volcanoes.

*Cinder cones* are the smallest type of volcano. They are built from loose pyroclastic material such as cinders and lapilli. Like composite cones, they are cone shaped. (The three types of volcanoes may be described in any order.)

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**What characteristic of seismic waves allows geophysicists to determine the location of an earthquake's epicenter?**

Because different kinds of waves travel through Earth's crust at different speeds, P waves and S waves arrive at a seismometer at different times. The epicenter may be determined by measuring the time difference between the arrival of the P and S waves and using a seismic travel time curve based on seismometers in three different locations.



**Answers to Quiz 19**

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Describe the three types of seismic waves.**

*P (or primary) waves* are essentially sound waves that travel through Earth's interior rather than through the atmosphere. A P wave involves compression and expansion of the material it passes through.

*S (or secondary) waves* cause particles in rocks to move back and forth in a direction perpendicular to the direction in which the wave is traveling.

*Surface waves* travel along Earth's surface and are similar to waves on bodies of water, so particles move up and down as well as back and forth.

**Answers to Quiz 20**

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Explain how volcanic arcs form along convergent plate boundaries.**

As oceanic plates push beneath other plates, their temperature increases, and eventually the subducted oceanic crust begins partially to melt. The molten portion gathers together, and being less dense than the surrounding rocks, begins to rise up into the crust, forming magma chambers. Because the slab of oceanic crust subducts at an angle, the magma produced by the melting of subducted crust does not form directly beneath deep-ocean trenches, but farther inland, in a line parallel to the trench. The line of volcanoes formed by the magma chambers parallel to such a trench is called a volcanic arc.

**Answers to Quiz 21**

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Describe the three main types of volcanoes.**

*Shield volcanoes* are by far the largest type of volcanoes and are spread out over large areas due to the basalt lava. They are gently sloped and horseshoe-shaped, and the lava is basalt lava.

*Composite cones* are the second largest type of volcano, although they are much smaller than shield volcanoes. They are made of alternating layers of lava flows and pyroclastic material. They have steeper slopes than shield volcanoes.

*Cinder cones* are the smallest type of volcano. They are built from loose pyroclastic material such as cinders and lapilli. Like composite cones, they are cone shaped.

**Answers to Quiz 22**

4. This question and answer are mistakenly omitted from the answer key on the *Resource CD*, and the numbering for all subsequent questions is incorrect because of this omission (see below). Here is the question that appears on the quiz, with the correct answer:

**Describe the three main regions in the Earth's interior.**

The *crust* is the outermost layer of the solid Earth and the only part that we have direct access to. It is exceptionally thin compared to the rest of the planet. The *mantle* is the thick layer between the crust and the core. It is composed of dense iron-rich and magnesium-rich silicate rocks. It is almost entirely solid, though some upper portions are partially molten. The *core* is divided into a liquid outer core and a solid inner core. Both parts are composed largely of iron.

**Questions 5 and 6:** The questions and answers for Questions 5 and 6 are mislabeled as the questions and answers for Questions 4 and 5.



**Answers to Quiz 23**

2. This question and answer are mistakenly omitted from the answer key on the *Resource CD*, and the numbering for all subsequent questions is incorrect because of this omission (see below). Here is the question that appears on the quiz, with the correct answer:

**What is the “Ring of Fire”?**

The Ring of Fire is a zone around the Pacific Ocean where the majority of Earth’s volcanic eruptions and earthquakes occur.

**Questions 3, 4, 5, and 6:** The questions and answers for Questions 3, 4, 5, and 6 are mislabeled as the questions and answers for Questions 2, 3, 4, and 5.

**Answers to Quiz 26**

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**Describe the three main regions in the Earth’s interior.**

The *crust* is the outermost layer of the solid Earth and the only part that we have direct access to. It is exceptionally thin compared to the rest of the planet. The *mantle* is the thick layer between the crust and the core. It is composed of dense iron-rich and magnesium-rich silicate rocks. It is almost entirely solid, though some upper portions are partially molten. The *core* is divided into a liquid outer core and a solid inner core. Both parts are composed largely of iron.

**Answers to Quiz 27**

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*, and the numbering for this and the next question is incorrect because of this omission (see below). Here is the question that appears on the quiz, with the correct answer:

**Describe the three main types of volcanoes.**

*Shield volcanoes* are by far the largest type of volcanoes and are spread out over large areas due to the basalt lava. They are gently sloped and horseshoe-shaped, and the lava is basalt lava.

*Composite cones* are the second largest type of volcano, although they are much smaller than shield volcanoes. They are made of alternating layers of lava flows and pyroclastic material. They have steeper slopes than shield volcanoes.

*Cinder cones* are the smallest type of volcano. They are built from loose pyroclastic material such as cinders and lapilli. Like composite cones, they are cone shaped.

7. The question and answer for Question 7 are mislabeled as the question and answer for Question 6.

**Answers to Quiz 29**

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the quiz, with the correct answer:

**In the Hawaiian Islands, the oldest islands are at the northwest end of the chain while youngest islands and the active volcanoes are in the southeast. Explain this.**

The Hawaiian Islands sit above a hotspot in Earth’s mantle. As the Pacific Plate moves, the hotspot stays in one place. The islands at the northwest were over the hotspot millions of years ago, while the islands in the southeast are over the hotspot now.



### Answers to Spring Term Exam

2. This question and answer are mistakenly omitted from the answer key on the *Resource CD*, and the numbering for all subsequent questions is incorrect because of this omission (see below). Here is the question that appears on the exam, with the correct answer:

**Explain how volcanic arcs form along convergent plate boundaries.**

As oceanic plates push beneath other plates, their temperature increases, and eventually the subducted oceanic crust begins partially to melt. The molten portion gather together, and being less dense than the surrounding rocks, begins to rise up into the crust, forming magma chambers. Because the slab of oceanic crust subducts at an angle, the magma produced by the melting of subducted crust does not form directly beneath deep-ocean trenches, but farther inland, in a line parallel to the trench. The line of volcanoes formed by the magma chambers parallel to such a trench is called a volcanic arc.

**Questions 3, 4, and 5:** The questions and answers for Questions 3, 4, and 5 are mislabeled as the questions and answers for Questions 2, 3, and 4.

6. This question and answer are mistakenly omitted from the answer key on the *Resource CD*. Here is the question that appears on the exam, with the correct answer:

**Describe the three main regions in the Earth's interior.**

The *crust* is the outermost layer of the solid Earth and the only part that we have direct access to. It is exceptionally thin compared to the rest of the planet. The *mantle* is the thick layer between the crust and the core. It is composed of dense iron-rich and magnesium-rich silicate rocks. It is almost entirely solid, though some upper portions are partially molten. The *core* is divided into a liquid outer core and a solid inner core. Both parts are composed largely of iron.

**Questions 7, 8, 9, 10, 11, and 12:** The questions and answers for Questions 7, 8, 9, 10, 11, and 12 are mislabeled as the questions and answers for Questions 5, 6, 7, 8, 9, and 10.

