Chapter 8 Study Guide
The outer core of the Earth extends out to a little over halfway to the surface of the Earth. The volume of the core is therefore about _________ the volume of the Earth.

1/64

1/8

1/4

1/2
The outer core of the Earth extends out to a little over halfway to the surface of the Earth. The volume of the core is therefore about \[ \frac{1}{8} \] the volume of the Earth.
Carbon 13 is a radioactive isotope. About half of a sample decays in 6000 years. After how long would only 1/8 of the original carbon 13 be left?

6,000 years
12,000 years
18,000 years
24,000 years
30,000 years
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12,000 years
→ 18,000 years
24,000 years
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- 6,000 years
- 12,000 years
- 18,000 years
- 24,000 years
- 30,000 years
_______ and _________ are common in region...
_______ and _________ are common in regions where subduction occurs.

Rifts; polarity shifts
Volcanoes; plate spreading
Auroras; the Coriolis effect
Mountains; earthquakes
_________ and ___________ are common in region...

_________ and ___________ are common in regions where subduction occurs.

Rifts; polarity shifts
Volcanoes; plate spreading
Auroras; the Coriolis effect

→ Mountains; earthquakes
Analysis of volcanic emissions suggests that eruptions could be the source of all but which of the following gases in our atmosphere?

- Oxygen
- Nitrogen
- Water
- Carbon dioxide
Analysis of volcanic emissions suggests that eruptions could be the source of all but which of the following gases in our atmosphere?

→ Oxygen
Nitrogen
Water
Carbon dioxide
Ozone

Is an element.

Is a molecule consisting of two oxygen atoms and a hydrogen atom.

Is a molecule consisting of three oxygen atoms.

Is a molecule consisting of two oxygen atoms and a nitrogen atom.
Ozone

Is an element.

Is a molecule consisting of two oxygen atoms and a hydrogen atom.

→ Is a molecule consisting of three oxygen atoms.

Is a molecule consisting of two oxygen atoms and a nitrogen atom.
The composition of the Earth's atmosphere today is about 78% _____, 21% _____, and much less than 1% _____.

Oxygen; nitrogen; carbon dioxide and other gases
Nitrogen; carbon dioxide; oxygen and other gases
Oxygen; carbon dioxide; nitrogen and other gases
Nitrogen; oxygen; carbon dioxide and other gases
The composition of the Earth's atmosphere today is about 78% _____, 21% _____, and much less than 1% _____.

- Oxygen; nitrogen; carbon dioxide and other gases
- Nitrogen; carbon dioxide; oxygen and other gases
- Oxygen; carbon dioxide; nitrogen and other gases
→ Nitrogen; oxygen; carbon dioxide and other gases
A spherical rock has a density of 3 g/cm³. If another rock has the same mass but is twice as wide, its density must be _____ g/cm³.

3/8
3/4
3/2
6
A spherical rock has a density of 3 g/cm³. If another rock has the same mass but is twice as wide, its density must be _____ g/cm³.

→ 3/8

3/4

3/2

6
The radius of the Earth is
- Larger at the poles.
- Larger at the equator.
- The same everywhere.
- Not known.
The radius of the Earth is
Larger at the poles.
→ Larger at the equator.
The same everywhere.
Not known.
The most abundant element in the Earth's core is __________.

- Nitrogen
- Oxygen
- Hydrogen
- Iron
The most abundant element in the Earth's core is __________.

- Nitrogen
- Oxygen
- Hydrogen

→ Iron
Density is calculated as
Mass times volume.
Mass divided by volume.
Volume divided by mass.
Mass times gravity.
Density is calculated as:

- Mass times volume.
- Mass divided by volume.
- Volume divided by mass.
- Mass times gravity.
After an earthquake, an S-type seismic wave travels with a velocity of about 10 km/s and reaches another part of the Earth in about 10 minutes. How far has the S-type wave traveled?

- 6000 km
- 1000 km
- 600 km
- 100 km
- 60 km
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→ 6000 km
   1000 km
   600 km
   100 km
   60 km
The interior layer just below the crust of the Earth is called the _______.

- Inner core
- Outer core
- Mantle
- Troposphere
The interior layer just below the crust of the Earth is called the _______.

- Inner core
- Outer core
- Mantle
- Troposphere
The hotter inner core of the Earth is _______ and the relatively cooler outer core is _______.
Solid; also solid
Liquid; also liquid
Liquid; solid
Solid; liquid
The hotter inner core of the Earth is _______ and the relatively cooler outer core is _______.

Solid; also solid
Liquid; also liquid
Liquid; solid
→ Solid; liquid
Why is the Earth's inner core solid?
    Due to extremely high temperature.
    Due to the tremendous pressure of overlying material.
    Due to the spinning of the Earth.
    The Earth formed by liquid material piling on top of a solid sphere.
Why is the Earth's inner core solid?

- Due to extremely high temperature.
- Due to the tremendous pressure of overlying material.
- The Earth formed by liquid material piling on top of a solid sphere.
How is the age of a rock determined?
  By determining the ratio of argon to potassium.
  By counting the number of circles just like the circles on the trunk of a tree.
  By measuring the temperature of the rock.
  By measuring the amount of calcium it contains.
How is the age of a rock determined?

→ By determining the ratio of argon to potassium.

  By counting the number of circles just like the circles on the trunk of a tree.
  By measuring the temperature of the rock.
  By measuring the amount of calcium it contains.
What is the approximate age of the Earth?

6000 years.
1,000,000 years.
4.6 million years.
4.6 billion years.
13.7 billion years.
What is the approximate age of the Earth?

- 6000 years.
- 1,000,000 years.
- 4.6 million years.
- 4.6 billion years.
- 13.7 billion years.
The process in which two tectonic plates meet and one slips beneath another is called _____.

Convection
Pangea
Subduction
Rifting
The process in which two tectonic plates meet and one slips beneath another is called _____.

- Convection
- Pangea
- Subduction
- Rifting
Van Allen belts exist in the Earth's ______________.

Troposphere
Core
Mantle
Magnetosphere
Van Allen belts exist in the Earth's _________.

- Troposphere
- Core
- Mantle

→ Magnetosphere
In about 14,000 A.D., the North Pole of the Earth will point at star ________.

- Polaris
- Antares
- Vega
- Thuban
In about 14,000 A.D., the North Pole of the Earth will point at star ________.

- Polaris
- Antares
- Vega
- Thuban
The ___-type seismic waves can travel through liquids and solids. The ___-type seismic waves can travel through solids only.

S; P
S; S
P; S
P; P
The ___-type seismic waves can travel through liquids and solids. The ___-type seismic waves can travel through solids only.

\[ S; P \]

\[ S; S \]

\[ \rightarrow P; S \]

\[ \rightarrow P; P \]
The average density of the Earth is _____.

About 5.5 g/cm³
About 5.5 cm³/g
About 1 g/cm³
About 1 cm³/g
The average density of the Earth is _____.
→ About 5.5 g/cm³
About 5.5 cm³/g
About 1 g/cm³
About 1 cm³/g
Suppose that we have a sample of 20 atoms of radioactive potassium which decays by half every 1.3 billion years into calcium and argon at ratios of 9:1 respectively. How many atoms of calcium do you expect to find in this sample after 1.3 billion years?

18
1
9
2
Suppose that we have a sample of 20 atoms of radioactive potassium which decays by half every 1.3 billion years into calcium and argon at ratios of 9:1 respectively. How many atoms of calcium do you expect to find in this sample after 1.3 billion years?

18
→ 9
1
→ 2
How fast are the Earth's plates moving due to tectonic motion?

A few kilometers per year.
A meters per year.
A few centimeters per year.
A few centimeters per century.
How fast are the Earth's plates moving due to tectonic motion?

A few kilometers per year.
A meters per year.

→ A few centimeters per year.
A few centimeters per century.
Scientists refer to the Earth as a differentiated planet because ______.

- The temperature in the core is higher than the temperature on the surface
- The material in the interior of the Earth is arranged by density
- Iron is more dense than silicate material
- The Earth's structure is different from the other planets
Scientists refer to the Earth as a differentiated planet because ______.

The temperature in the core is higher than the temperature on the surface

→ The material in the interior of the Earth is arranged by density

→ Iron is more dense than silicate material

→ The Earth's structure is different from the other planets
The _______ are two doughnut-shaped rings of charged particles trapped by the Earth's magnetic field.

Aurora Borealis and the Aurora Australis
Van Allen radiation belts
Jet streams
Convection cells
The ______ are two doughnut-shaped rings of charged particles trapped by the Earth's magnetic field.

- Aurora Borealis and the Aurora Australis
- Van Allen radiation belts
- Jet streams
- Convection cells
The typical density for a rock found on the surface of the Earth is ________ the average density of the Earth overall.

  Greater than

  Less than

  About equal to
The typical density for a rock found on the surface of the Earth is ________ the average density of the Earth overall.

Greater than

→ Less than

About equal to
Some anthropological evidence for the precession of the Earth's tilt is that the passage into the Great Pyramid in Egypt points at the star Thuban, which was the pole star about 6000 years ago.

True
False
Some anthropological evidence for the precession of the Earth's tilt is that the passage into the Great Pyramid in Egypt points at the star Thuban, which was the pole star about 6000 years ago.

→ True

False
Knowledge of the Earth's interior comes primarily from returning samples of material deep with the Earth.

True

False
Knowledge of the Earth's interior comes primarily from returning samples of material deep with the Earth.

True

→ False
The Earth's magnetic poles will eventually reverse. This shift will also cause the seasons to reverse.

True
False
The Earth's magnetic poles will eventually reverse. This shift will also cause the seasons to reverse.

True

→ False
The Atlantic Ocean has existed for most of the time since the Earth's crust cooled.

True
False
The Atlantic Ocean has existed for most of the time since the Earth's crust cooled.

True

→ False
Water vapor in the atmosphere can cause a greenhouse effect.

True
False
Water vapor in the atmosphere can cause a greenhouse effect.

→ True
False
The jet stream is a result of the Coriolis effect.

True
False
The jet stream is a result of the Coriolis effect.

→ True

False
Silicates are minerals composed of silicon and oxygen.

True
False
Silicates are minerals composed of silicon and oxygen.

→ True

False
The Earth's core is slightly hotter than the surface of the Sun.

True
False
The Earth's core is slightly hotter than the surface of the Sun.

→ True

   False
Oxygen is the most common element in minerals in the Earth's crust, which is why the release of gases from the crust over time has produced an atmosphere rich in oxygen today.

True
False
Oxygen is the most common element in minerals in the Earth's crust, which is why the release of gases from the crust over time has produced an atmosphere rich in oxygen today.

True

→ False
he Earth's magnetic axis is the same as its rotation axis.

True
False
The Earth's magnetic axis is the same as its rotation axis.

True

→ False
If Earth did not spin, the magnetic field around it would not exist.

True
False
If Earth did not spin, the magnetic field around it would not exist.

→ True
False
The Earth's spin creates the day and night cycle, but does not affect the weather pattern.

True

False
The Earth's spin creates the day and night cycle, but does not affect the weather pattern.

True

→ False
Polaris is always the pole star.

True
False
Polaris is always the pole star.

True

→ False
Greenhouse gases (water molecules and carbon dioxide) generate heat to make our Earth warm.

True
False
Greenhouse gases (water molecules and carbon dioxide) generate heat to make our Earth warm.

True

→ False
The heavier elements like iron and nickel are abundant on the Earth's surface and the silicates dominate at the center of the Earth.

True
False
The heavier elements like iron and nickel are abundant on the Earth's surface and the silicates dominate at the center of the Earth.

True

→ False
Olivine is the most common mineral in the Earth's mantle.

True
False
Olivine is the most common mineral in the Earth's mantle.

→ True
False
The Coriolis effect demonstrates that the Earth spins.

True
False
The Coriolis effect demonstrates that the Earth spins.
→ True
  False
The central part of the Earth's core consists of iron-rich liquid.

True
False
The central part of the Earth's core consists of iron-rich liquid.

True

→ False
The amount of oxygen in the Earth's atmosphere has gradually grown over the last few billion years.

True
False
The amount of oxygen in the Earth's atmosphere has gradually grown over the last few billion years.

→ True

False
The composition of the Earth's atmosphere has not changed since its formation.

True
False
The composition of the Earth's atmosphere has not changed since its formation.

True → False
Precession is the slow change in direction of the Earth's rotation axis due to the gravitational interaction of the Sun and of the Moon with the Earth's equatorial bulge.

True
False
Precession is the slow change in direction of the Earth's rotation axis due to the gravitational interaction of the Sun and of the Moon with the Earth's equatorial bulge.

→ True

False
A compass needle points to the North Star.

True

False
A compass needle points to the North Star.

True

→ False
Magnetic fields are created by moving charged particles.

True
False
Magnetic fields are created by moving charged particles.

→ True
   False
Scientists think the Earth's core is composed mainly of
(a) silicate rocks.
(b) uranium.
(c) lead.
(d) sulfur.
(e) iron.
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(a) silicate rocks.
(b) uranium.
(c) lead.
(d) sulfur.
(e) iron.
What evidence indicates that part of the Earth's interior is liquid?

(a) With sensitive microphones, sloshing sounds can be heard.

(b) We know the core is lead, and we know the core's temperature is far above lead's melting point.

(c) Deep bore holes have brought up liquid from a depth of about 4000 kilometers.

(d) No S-type seismic waves are detectable at some locations after an earthquake.

(e) S-type waves are especially pronounced at all locations around the Earth after an earthquake.
What evidence indicates that part of the Earth's interior is liquid?
(a) With sensitive microphones, sloshing sounds can be heard.
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(d) No S-type seismic waves are detectable at some locations after an earthquake.
(e) S-type waves are especially pronounced at all locations around the Earth after an earthquake.
Scientists use radioactivity in rock samples to measure
(a) the temperature in the Earth's core.
(b) the depth of the oceans.
(c) the Earth's age.
(d) the composition of the mantle.
(e) the composition of the inner core.
Scientists use radioactivity in rock samples to measure
(a)
the temperature in the Earth's core.
(b)
the depth of the oceans.
(c)
the Earth's age.
(d)
the composition of the mantle.
(e)
the composition of the inner core.
The slow shifts of our planet's crust are believed to arise from
(a) the gravitational force of the Moon pulling on the crust.
(b) the gravitational force of the Sun pulling on our planet's crust.
(c) the Earth's magnetic field drawing iron in crustal rocks toward the poles.
(d) heat from the interior causing convective motion, which pushes on the crust.
(e) the great weight of mountain ranges forcing the crust down and outward from their bases.
The slow shifts of our planet's crust are believed to arise from
(a) the gravitational force of the Moon pulling on the crust.
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(c) the Earth's magnetic field drawing iron in crustal rocks toward the poles.
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(e) the great weight of mountain ranges forcing the crust down and outward from their bases.
Plate motion at subduction zones can cause (more than one answer may be correct)

(a) earthquakes.
(b) convection currents in the Earth's mantle.
(c) plates to grow larger.
(d) volcanic activity.
(e) the creation of mountains.
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(a) earthquakes.
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The presence of a strong magnetic field around a planet like the Earth is evidence for
(a) rotational and convective motion in a liquid core.
(b) the presence of an atmosphere.
(c) a slow rotational period.
(d) intense heat in the core.
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(a) rotational and convective motion in a liquid core.
(b) the presence of an atmosphere.
(c) a slow rotational period.
(d) intense heat in the core.
Why is carbon dioxide called a “greenhouse gas”?  
(a) it is generated when plants are burned.  
(b) it is needed by plants to grow.  
(c) it absorbs infrared light.  
(d) it appears greenish when concentrated.  
(e) All of the above.
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(b) it is needed by plants to grow.
(c) it absorbs infrared light.
(d) it appears greenish when concentrated.
(e) All of the above.

All of the above.
The layer of the Earth's atmosphere in which weather occurs is the
(a) stratosphere.
(b) troposphere.
(c) ionosphere.
(d) hydrosphere.
The layer of the Earth's atmosphere in which weather occurs is the

(a) stratosphere.

(b) troposphere.

(c) ionosphere.

(d) hydrosphere.
At what location would a pendulum's direction appear to change the most over a day?

(a) On the ice at the North Pole.
(b) On a high mountain at midlatitude.
(c) On an island at the equator.
(d) On the ice at the north magnetic pole.
(e) It would change the same amount at all locations.
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(a) On the ice at the North Pole.
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