VIRGINIA STANDARDS OF LEARNING

Spring 2005 Released Test

END OF COURSE EARTH SCIENCE

CORE 1

Property of the Virginia Department of Education

Copyright © 2006 by the Commonwealth of Virginia Department of Education, James Monroe Building, 101 N. 14th Street, Richmond, Virginia, 23219. All rights reserved. Except as permitted by law, this material may not be reproduced or used in any form or by any means electronic or mechanical, including photocopying or recording, or by any information storage and retrieval system, without written permission from the copyright owner. Please contact the Commonwealth of Virginia Department of Education at (804) 225-2102, Division of Assessment and Reporting, to request written permission.

Printed in the United States of America

DIRECTIONS
Read each question carefully and choose the best answer. Then mark the space on the answer sheet for the answer you have chosen.

SAMPLE

Which of these can be used to measure atmospheric pressure?

A An anemometer
B A barometer
C A thermometer
D A seismometer

1 A major problem with depending on fossil fuels as primary energy sources is that they are —

A overabundant
B nonpolluting
C nonrenewable
D deep underground

2

1. Propose an outcome
2. State the problem
3. Make a Conclusion
4. Gather Data

Which of the following puts the steps of a scientific experiment in the correct order?

F 2, 1, 3, 4
G 4, 2, 3, 1
H 2, 1, 4, 3
J 2, 3, 1, 4

3 Most modern geologists have argued that a global catastrophe may have caused the extinction of the dinosaurs. According to these scientists, what was this catastrophe?

A An asteroid impact with the Earth
B Melting of the polar ice caps
C A shift in the tilt of the Earth
D Earthquakes and volcanoes

4 What is the approximate percentage of the Earth that is illuminated by the sun at any given time?

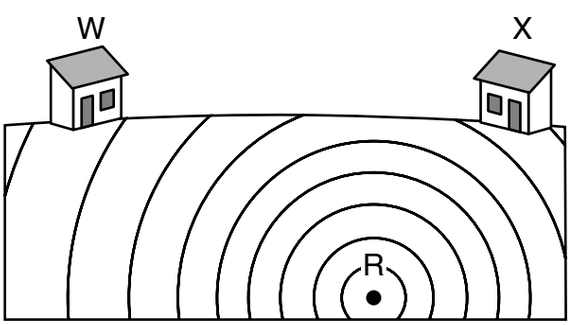
F 10%
G 25%
H 50%
J 90%

5 Compared to the Rocky Mountains, the Appalachian Mountains are much —

A older
B less eroded
C higher
D thicker

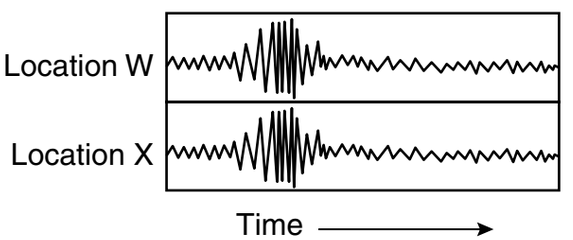
GO ON

6

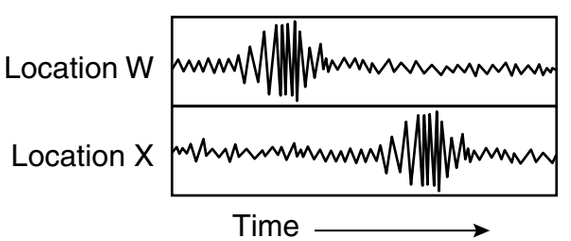


Seismic waves generated by an earthquake at point R are recorded at locations W and X. Which pair of seismographs is more accurate?

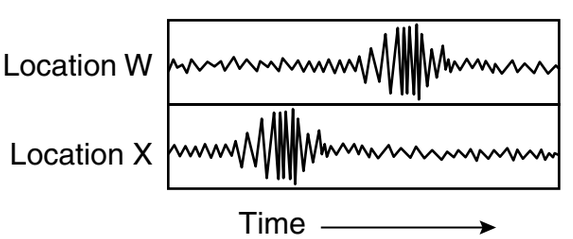
F



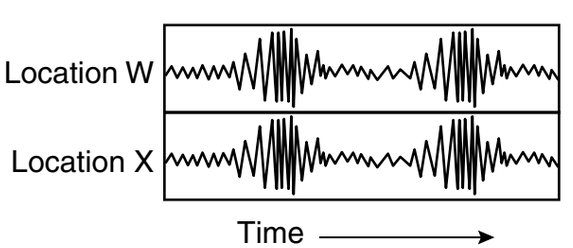
G



H



J



7 A volcanic eruption can affect the atmosphere by —

A reducing the amount of water vapor in the atmosphere

B adding large quantities of several gases, such as sulfur dioxide, to the atmosphere

C clearing away nearby clouds, increasing the amount of sunshine

D increasing the amount of oxygen due to escaping gases

8 Which of these will cause the greatest high tides?

F

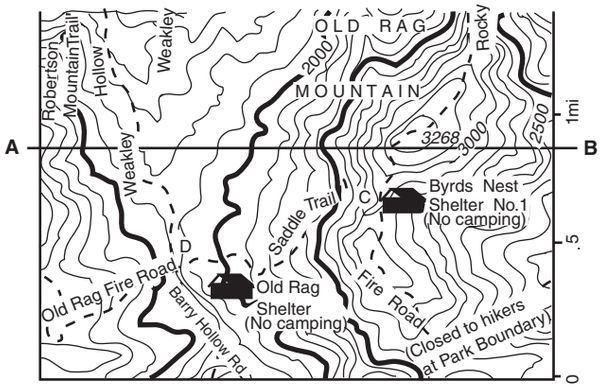
G

H

J

GO ON

9



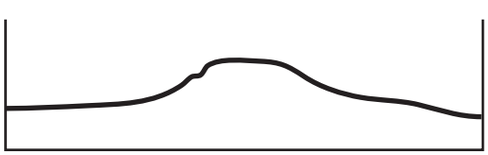
Which profile *best* represents the contour map along the line AB?

A

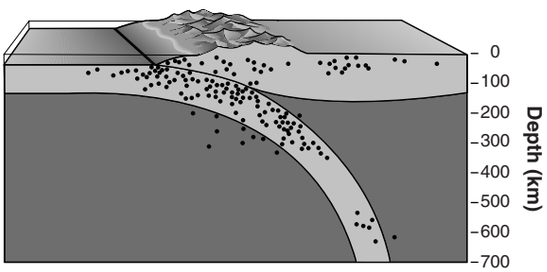
B

C

D



10 **Locations of Earthquake Origins**



Each dot on the above diagram marks the origin of an earthquake. The area with the *highest* concentration of earthquake origins marks —

F a line of Earth's magnetic field

G a seam of soft rock, such as limestone

H the path of the subducting tectonic plate

J the location of a developing igneous intrusion

11 **Which of these is the *best* indication of the relative age of a rock layer?**

A The thickness of the layer

B The chemical makeup of the layer

C The position of the layer compared to other layers

D The distance the layer extends over the Earth

GO ON

12 Which mineral is easily identified by smell?

F Galena
G Pyrite
H Quartz
J Sulfur

13 Which of these pieces of basalt rock has probably been in a river the longest?

A

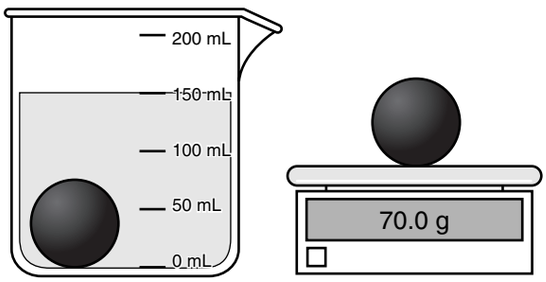
B

C

D

14

Measuring Density



Sphere in 100 mL of water

Sphere on balance

In the first picture, the sphere is in a beaker with 100 mL of water. In the second picture, the dry sphere is being massed. Which of the values listed is closest to the density of the black sphere?

F 0.5 g/mL
G 0.7 g/mL
H 1.4 g/mL
J 2.1 g/mL

15 Scientists use the rock cycle to describe the processes by which —

A all different types of fossils were transformed into rock
B one type of rock can be changed into another type of rock
C tectonic plates shift around the earth's surface
D mineral crystals and compositions are identified

GO ON

16

Mohs Hardness Scale

Mineral	Scale Numbers
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Orthoclase	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Key :

Fingernail	= 2.5
Penny	= 3.5
Common nail	= 4.5
Glass plate	= 5.5
Steel file	= 6.5

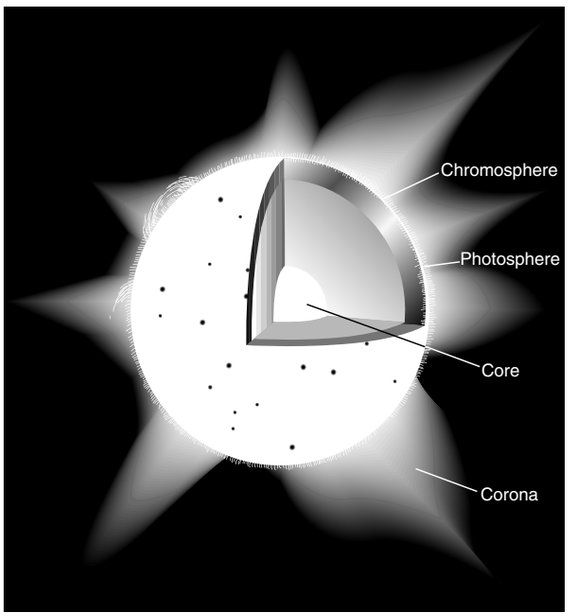
According to Mohs Hardness Scale, which of these groups of minerals can scratch fluorite?

F Talc, gypsum, and calcite
G Calcite, quartz, and topaz
H Apatite, orthoclase, and corundum
J Diamond, gypsum, and quartz

17 **The Earth's mantle is made up of very hot material that rises to the top of the mantle, cools, then sinks, reheats, and rises again, constantly repeating the cycle. This action, which causes the Earth's crust to move, is known as —**

A convection currents
B magnetic fields
C hot spots
D advection forces

18



Which layer of the sun is seen during a total solar eclipse?

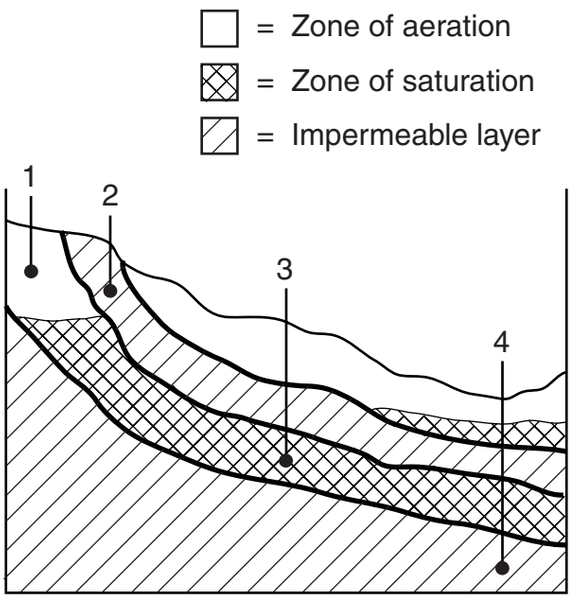
F Chromosphere
G Photosphere
H Core
J Corona

19 **Barrier islands are low and narrow sandy islands that form a rim offshore from a coastline. These islands protect inland shores from the surf, especially during storms. These islands are becoming increasingly developed because people want to live by the open ocean, yet the islands themselves are not permanent. Why aren't the islands permanent?**

A People develop the islands and remove sand during housing construction.
B Offshore earthquakes cause the islands to sink below sea level.
C The wind and the waves are constantly redistributing the sand.
D Development companies mine the sand for use in inland construction projects.

GO ON

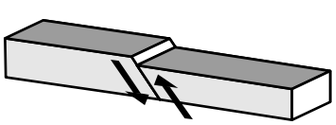
20



According to the above diagram, the water supply will be *most* consistent in well —

F 1
G 2
H 3
J 4

21



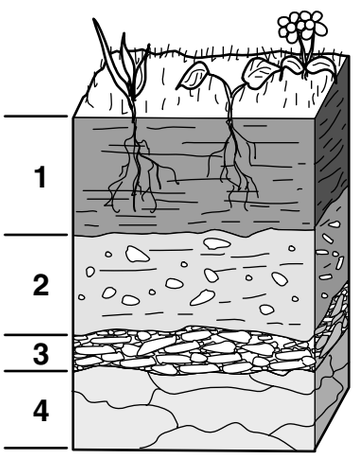
The diagram shown illustrates which geological process?

A Faulting
B Folding
C Weathering
D Metamorphism

22 In which type of rock are fossils *most* likely to be found?

F Igneous intrusive
G Igneous extrusive
H Sedimentary
J Metamorphic

23



The layer in the above soil profile that has the *most* humus is —

A 1
B 2
C 3
D 4

GO ON

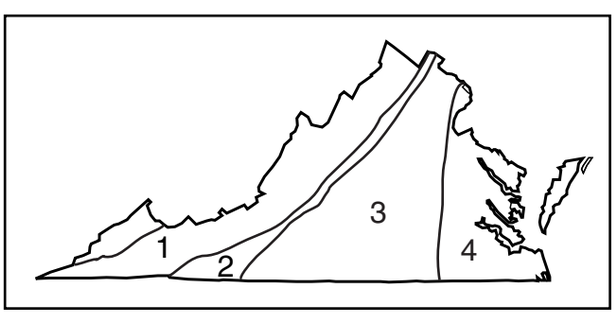
24

Ocean Dimensions		
Ocean	Area (million sq km)	Average Depth (km)
Pacific	165	4.3
Atlantic	82	3.9

The table shows the area and average depth of the Pacific and Atlantic Oceans. Approximately how many times greater is the volume of water in the Pacific Ocean than in the Atlantic Ocean?

F 2 times
G 20 times
H 2,000 times
J 2,000,000 times

25



Which region of Virginia is classified as the Piedmont?

A 1
B 2
C 3
D 4

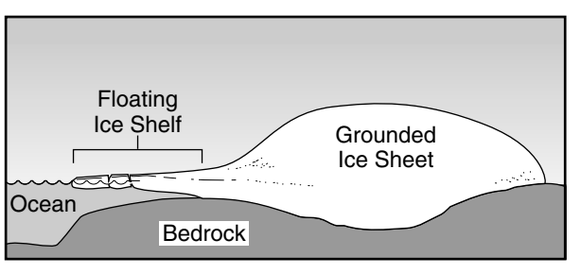
26

Planet	Period of Rotation	Diameter (kilometers)	Relative Mass (Earth = 1)	Period of Revolution
Mercury	59 days	4,878	0.056	88 days
Venus	243 days	12,104	0.820	224.70 days
Jupiter	9 hours 48 minutes	143,884	317.869	11.86 years
Saturn	10 hours 15 minutes	120,536	95.143	29.46 years

Which planet has the shortest day?

F Mercury
G Venus
H Jupiter
J Saturn

27



Why is the ice shelf floating?

A The ice is melting faster than it can sink.
B The ice is less dense than the ocean water.
C The ice is warmer than the ocean water.
D The ocean water is filled with vegetation that keeps the ice from sinking.

28 Which of the following natural resources makes the largest contribution to Virginia's economy?

F Plutonium
G Aluminum
H Coal
J Feldspar

29 While on vacation, a student visits the area around a volcano that has recently erupted. The student can expect to find samples of —

A clastic sedimentary rock
B nonfoliated metamorphic rock
C chemically formed sedimentary rock
D extrusive igneous rock

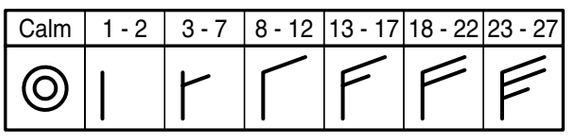
30

The picture shows an infrared composite of the Earth as seen by a weather satellite system. What does the dark shaded area on this map represent?

F The moon's shadow
G Thick cloud cover
H Nighttime
J Ocean currents

31

Wind Speed
(in knots)



Based on the above symbols, which of the following represents a wind speed of 30 knots?

A

B

C

D

32 Gas and dust in interstellar nebulae can form —

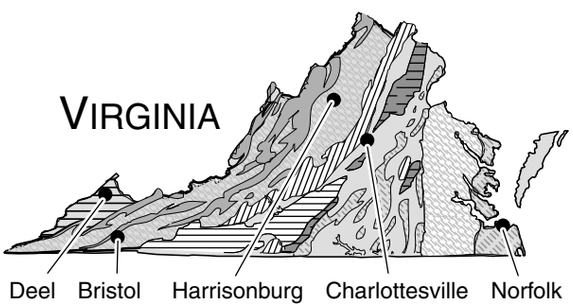
F stars
G comets
H meteors
J asteroids

GO ON

33 Which of the following best describes Earth's orbital position in our solar system?

A Outside of three smaller planets
B Outside of the gas giants
C An outer planet
D An inner planet

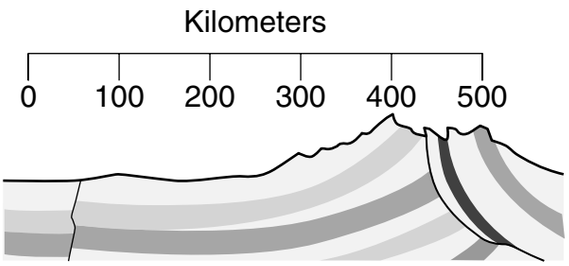
34



The map shows the ages of the exposed bedrock in Virginia. Which city sits on exposed bedrock that is the same age as the rock in Bristol?

F Deel
G Harrisonburg
H Charlottesville
J Norfolk

35



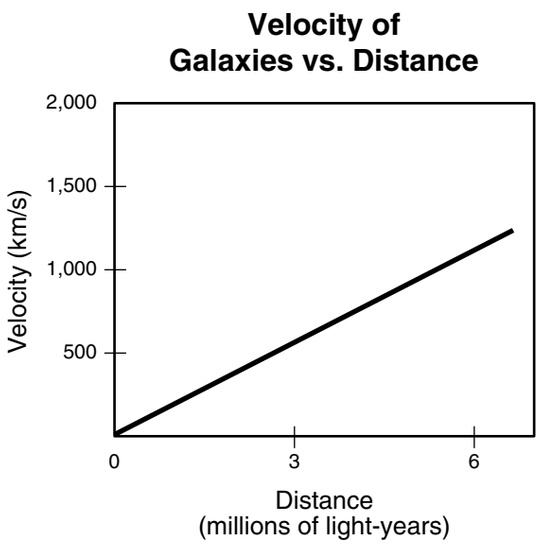
The mountain shown is composed of deformed sedimentary layers. They are located near a tectonic plate boundary and are still increasing in elevation due to —

A colliding tectonic plates
B seafloor spreading of tectonic plates
C subduction of a tectonic plate
D transform faulting of a tectonic plate

36 Release of CFCs and similar compounds are a possible cause of —

F destruction of ozone in the upper atmosphere
G acid rain in the northeast U.S.
H greenhouse gas build-up in the lower atmosphere
J increase in atmospheric carbon dioxide concentration

37



In the late 1920s, Edwin Hubble and Milton Humason determined the distance to a number of galaxies and the velocity of those galaxies relative to the Earth. The graph shows the early results that were obtained. What approximate ratio did the scientists calculate between velocity and distance based on these early findings?

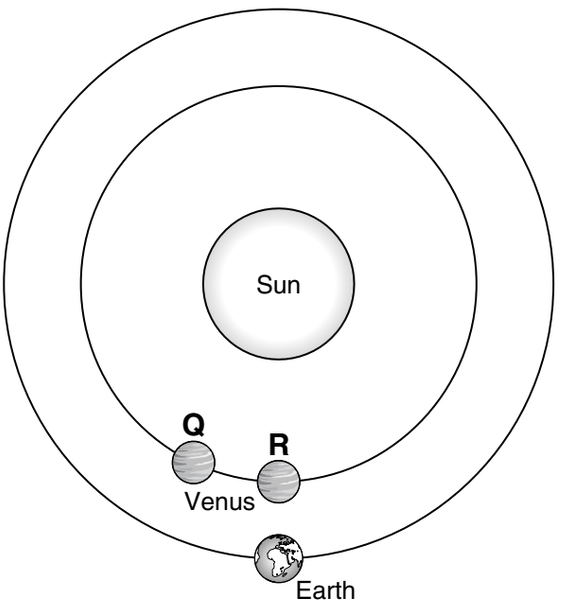
A 150 kilometers per second per one million light years

B 300 kilometers per second per one million light years

C 450 kilometers per second per one million light years

D 600 kilometers per second per one million light years

38



Based on the drawing above, what is the main reason that Venus would appear brighter at point Q rather than at point R as seen from the Earth?

F The planet is closer to the Earth at point Q than at point R.

G More of the visible side of the planet is illuminated at point Q than at point R.

H The planet appears overhead against a dark sky when it is at point Q but not at point R.

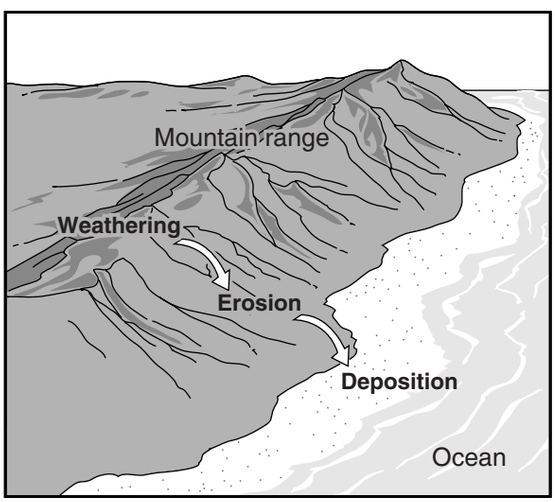
J Light from the planet at point Q is less affected by the sun's gravity than at point R.

GO ON

39 Wind power is not typically used to generate all of the electricity needed for large cities because the —

A energy source is inconsistent
B waste products are unsafe
C fuel expenses are too great
D energy produced is not in a usable form

40



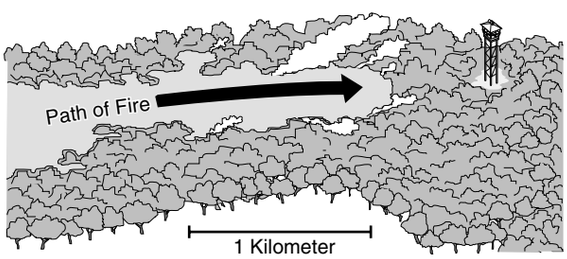
Which kind of rock is formed by the processes shown?

F Basaltic
G Sedimentary
H Igneous
J Metamorphic

41 People have tried many methods to artificially produce rain. One method, called cloud seeding, involves airplanes dropping particles of silver iodide onto clouds to help the clouds produce rain droplets. These silver iodide particles act as —

A hailstones
B dew points
C electrical charges
D condensation nuclei

42



The picture shows the path of a forest fire that started at 5:30 A.M. It travels at 1 km/h. About how long will it be before the fire reaches the ranger station?

F 30 minutes
G 1 hour
H 2 hours
J 5 hours

GO ON

43 Which of the following *most* likely results in the formation of a fossil?

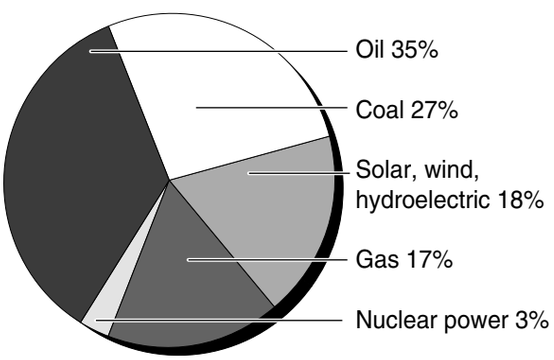
A A Mesozoic clam lies exposed on the surface of the sea floor.

B A Mesozoic clam is washed up onto the beach.

C A Mesozoic clam is eaten by a large predatory fish.

D A Mesozoic clam is buried by a mudslide.

44



The chart above shows different sources of energy. Which conclusion can be made based on this chart?

F Coal is the main source of energy.

G Use of nuclear power is increasing.

H Fossil fuels make up over three-quarters of our energy consumption.

J Renewable energy sources are predominantly used.

45 What is the greatest environmental cost of hydroelectric power?

A Increased flooding downstream

B Fish kills due to the turbines

C Decreased species diversity in the new lake

D Destruction of free-running rivers and their ecosystems

46 Which of these mineral properties *cannot* be used to identify a mineral?

F Luster

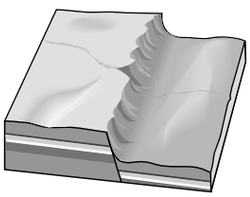
G Hardness

H Mass

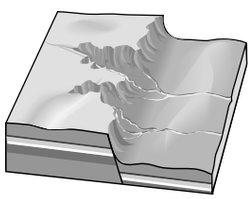
J Streak

47 The pictures show different stages in the development of a river valley. Which picture shows the first stage of development?

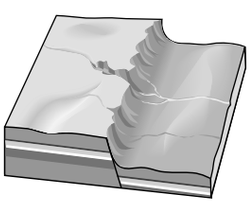
A



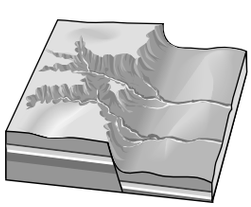
B



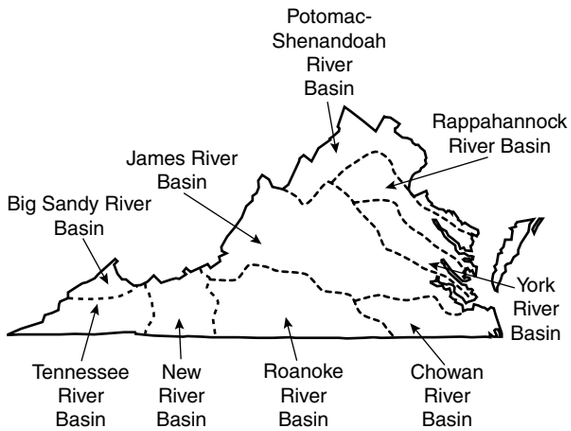
C



D



48 Simplified Map of Virginia River Basins



According to the above map, the largest river basin in Virginia is drained by the —

F Potomac-Shenandoah Rivers

G York River

H James River

J Roanoke River

49 Ozone molecules protect Earth from the harmful effects of the sun by —

A insulating the temperature at the poles
B condensing water particles in clouds
C regulating the heat from the sun
D absorbing ultraviolet radiation

50 Which image below *best* represents our galaxy?

F

G

H

J

Answer Key

Test Sequence	Correct Answer	Reporting Category	Reporting Category Description
1	C	002	Geology
2	H	001	Scientific Investigation
3	A	002	Geology
4	H	004	Astronomy and Space Science
5	A	002	Geology
6	H	001	Scientific Investigation
7	B	003	Meteorology, Oceanography, and Groundwater
8	F	003	Meteorology, Oceanography, and Groundwater
9	B	001	Scientific Investigation
10	H	002	Geology
11	C	002	Geology
12	J	002	Geology
13	C	002	Geology
14	H	001	Scientific Investigation
15	B	002	Geology
16	H	002	Geology
17	A	003	Meteorology, Oceanography, and Groundwater
18	J	004	Astronomy and Space Science
19	C	003	Meteorology, Oceanography, and Groundwater
20	H	003	Meteorology, Oceanography, and Groundwater
21	A	002	Geology
22	H	002	Geology
23	A	002	Geology
24	F	001	Scientific Investigation
25	C	002	Geology
26	H	004	Astronomy and Space Science
27	B	003	Meteorology, Oceanography, and Groundwater
28	H	002	Geology
29	D	002	Geology
30	H	001	Scientific Investigation
31	A	003	Meteorology, Oceanography, and Groundwater
32	F	004	Astronomy and Space Science
33	D	004	Astronomy and Space Science
34	G	002	Geology
35	A	002	Geology
36	F	003	Meteorology, Oceanography, and Groundwater
37	A	004	Astronomy and Space Science
38	G	004	Astronomy and Space Science
39	A	002	Geology
40	G	002	Geology
41	D	003	Meteorology, Oceanography, and Groundwater
42	F	001	Scientific Investigation
43	D	002	Geology
44	H	002	Geology
45	D	002	Geology
46	H	002	Geology
47	A	002	Geology
48	H	001	Scientific Investigation
49	D	003	Meteorology, Oceanography, and Groundwater
50	F	004	Astronomy and Space Science