This test was originally administered to students in May 2008.

Not all items from the May 2008 administration will be released in this document. According to Ohio Revised Code (ORC) 3301.07.11:4(b) . . . not less than forty percent of the questions on the test that are used to compute a student’s score shall be a public record. The department (of education) shall determine which questions will be needed for reuse on a future test and those questions shall not be public records and shall be redacted from the test prior to its release as public record.

This publicly released material is appropriate for use by Ohio teachers in instructional settings. This test is aligned with Ohio’s Academic Content Standards for Science.
The Ohio Department of Education does not discriminate on the basis of race, color, national origin, sex, religion, age, or disability in employment or the provision of services.
Directions:

Today you will be taking the Ohio Grade 8 Science Achievement Test. Three different types of questions appear on this test: multiple choice, short answer and extended response.

There are several important things to remember:

1. Read each question carefully. Think about what is being asked. Look carefully at graphs or diagrams because they will help you understand the question.

2. For short-answer and extended-response questions, use a pencil to write your answers neatly and clearly in the space provided in the answer document. Any answers you write in the Student Test Booklet will not be scored.

3. Short-answer questions are worth two points. Extended-response questions are worth four points. Point values are printed near each question in your Student Test Booklet. The amount of space provided for your answers is the same for two- and four-point questions.

4. For multiple-choice questions, shade in the circle next to your choice in the answer document for the test question. Mark only one choice for each question. Darken completely the circles on the answer document. If you change an answer, make sure that you erase your old answer completely.

5. Do not spend too much time on one question. Go on to the next question and return to the question skipped after answering the remaining questions.

6. Check over your work when you are finished.

7. When you finish the test, you may not go on to, or look at, the social studies section of the Student Test Booklet.
Use the following pictures to answer question 1.

1. The reproductive success of an organism depends in part on the ability of the organism to survive.

   How does the physical appearance of these organisms help them survive?

   A. Their physical appearance helps them find a habitat.
   B. Their physical appearance helps them resist parasites.
   C. Their physical appearance helps them avoid predators.
   D. Their physical appearance helps them defend a territory.
Items 2–6 have not been slated for public release in 2008.

On the May 2008 Grade 8 Science Achievement Test, items 7–12 are field-test items, which are not released.
13. Termites eat wood but cannot digest it. Protozoans live in the termites’ stomachs and use enzymes to break down the wood. The digested wood provides nutrition for both the termites and the protozoans.

What type of relationship is this?

A. mutualism
B. parasitism
C. predation
D. commensalism
Use the information in the table below to answer question 14.

14. A class is studying electricity and how it is produced in Ohio. The students make the table below to share information about energy sources.

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Where the Energy Source Comes From</th>
<th>Percentage of Total Electricity Produced From This Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass</td>
<td>Waste From Paper, Chemical and Food Processing</td>
<td>&lt;0.3%</td>
</tr>
<tr>
<td>Coal</td>
<td>Plant Material Compressed Over Millions of Years</td>
<td>90.4%</td>
</tr>
<tr>
<td>Hydroelectricity</td>
<td>Falling Water</td>
<td>0.3%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Gas Wells Associated With Petroleum Deposits</td>
<td>1.2%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>Uranium</td>
<td>7.4%</td>
</tr>
<tr>
<td>Petroleum</td>
<td>Organic Material Compressed Over Millions of Years</td>
<td>0.3%</td>
</tr>
<tr>
<td>Solar</td>
<td>Sunlight</td>
<td>&lt;0.3%</td>
</tr>
<tr>
<td>Wind</td>
<td>Movement of Air Resulting From Difference in Pressure</td>
<td>&lt;0.3%</td>
</tr>
</tbody>
</table>

U.S. DOE 2002 data

Which statement identifies a nonrenewable energy source from the table and correctly explains why this source is considered nonrenewable?

A. Biomass is nonrenewable because once the waste material is used up, there is no way to produce additional waste material.

B. Petroleum is nonrenewable because there is a fixed amount of oil underground and new petroleum takes millions of years to form.

C. Solar energy is nonrenewable because there is only one sun in the solar system and there is no replacement when the sun is used up.

D. Wind energy is nonrenewable because the air pressure difference required to produce wind is not available at all times at all locations.
15. Two galaxies are interacting with each other.

What is the force that draws these two galaxies toward each other?

A. friction  
B. gravity  
C. electricity  
D. magnetism

Use the following information to answer question 16.

16. An eighth-grade class wants to identify a representative sample of the crawling and flying insects living in the schoolyard. The students build and set five traps like the one shown below. They place the traps in the listed locations at the end of the school day and check them the following morning to see what they have caught.

Two variables in this investigation are location of trap and size of jar.

In your Answer Document, explain how each of these variables could affect the conclusions of the investigation.

Explain why the students’ collecting procedures will not allow them to collect representatives of all insects living in the schoolyard.

Describe one way the students could change their collecting procedures to correct for this weakness. (4 points)
Use the diagrams and information below to answer question 17.

17. Monte Bolca is located high in the mountains of northern Italy. This site is one of the world’s largest deposits of coral reef fish fossils. There are fossils of more than 160 fish species dating back 49 million years.

These fossils provide evidence of the environment in which the coral fish lived and died.

Which statement is consistent with this evidence and explains how ancient coral reef fossils can be found high in the mountains far from any sea?

A. A huge tidal wave pushed marine life up into the mountains.
B. Prehistoric man carried fish into the mountains from the sea.
C. Fish were thrown into the mountains by a tremendous volcanic explosion.
D. Land that was uplifted to form the mountains was once covered by the sea.
18. A student observing the sky notices that the cirrostratus clouds she saw in the morning have been replaced by cumulonimbus clouds in the afternoon.

What weather conditions can she expect for the afternoon and evening?

A. low clouds and fog with little temperature change
B. fair skies continuing with scattered puffy clouds
C. light rain, then an increase in temperature and clearing skies
D. heavy wind and rain followed by a drop in temperature and clearing skies
Use the following information and diagram to answer question 19.

19. A ball is released from rest at position 1. The diagram shows the ball in four positions as it rolls along a track from left to right.

In which position does the ball have its minimum gravitational potential energy and maximum kinetic energy?

A. 1  
B. 2  
C. 3  
D. 4

Items 20–21 have not been slated for public release in 2008.
22. What causes the streak of light observed when a meteoroid enters Earth’s atmosphere?

A. sunlight reflected from the meteoroid surface
B. energy released from radioactive materials in the meteoroid
C. lightning produced between the meteoroid and the upper atmosphere
D. visible light produced from the interaction between the meteoroid and the upper atmosphere

Items 23–28 have not been slated for public release in 2008.
29. Which explains the relationship between hours of sunlight and seasons?

A. the rotation of Earth on its axis
B. the tilt of Earth’s axis relative to the sun
C. the location of Earth’s orbit in the solar system
D. the motion of the moon as it travels around Earth
Baking Soda and Vinegar Reaction

Students perform a chemistry experiment by mixing baking soda with vinegar. They mix 4 grams of baking soda with 50 grams of vinegar in a 6-gram plastic cup as shown below. The cup is left uncovered. The students record the mass and temperature of the mixture every 5 seconds. They continue these observations until 10 seconds after they see the mixture stop bubbling. Their data are shown in the table below.

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>Mass (grams)</th>
<th>Temperature (degrees Celsius)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>60</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>58</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>57</td>
<td>18</td>
</tr>
<tr>
<td>15</td>
<td>56</td>
<td>17</td>
</tr>
<tr>
<td>20</td>
<td>55</td>
<td>17</td>
</tr>
<tr>
<td>25</td>
<td>54</td>
<td>16</td>
</tr>
<tr>
<td>30</td>
<td>54</td>
<td>16</td>
</tr>
<tr>
<td>35</td>
<td>54</td>
<td>16</td>
</tr>
</tbody>
</table>
30. Which graphs show the trends in the mass (M) and temperature (T) changes during the baking soda and vinegar reaction shown in the diagram?

A. 

B. 

C. 

D.
31. The data in the table show the temperature of the cup-baking soda-vinegar system. The temperature of the surrounding air was not measured.

Assuming that the total amount of energy remains constant, what conclusion about energy transfer does the temperature data support?

A. Thermal energy was lost from the surrounding air and the system.
B. Thermal energy was gained by the system and the surrounding air.
C. Thermal energy was transferred from the surrounding air to the system.
D. Thermal energy was transferred from the system to the surrounding air.

32. The data show that the mass of the cup and its contents decreases while the mixture is bubbling.

In your Answer Document, explain why the mass of the cup and its contents at 25 seconds is less than the initial total mass of the cup, baking soda and vinegar.

Include in your answer a valid scientific reason on which you based your explanation. (2 points)

33. What is the relationship between tissues and organs?

A. Organs are made from one type of tissue.
B. Tissues are made from one type of organ.
C. Tissues are made from different types of organs.
D. Organs are made from different types of tissues.

Item 34 has not been slated for public release in 2008.
35. Highways allow people to travel between towns and cities. These highways also divide ecosystems into smaller pieces. Animals can become separated from lakes they use for breeding. For example, tiger salamanders travel long distances to breed at lakes.

How could highway systems affect animals such as the tiger salamander?

A. Tiger salamander habitats may be exposed to less pollution.
B. Tiger salamanders may be cut off from important resources.
C. Tiger salamanders could improve their ability to remember roads.
D. Tiger salamander habitats within ecosystems could become larger.
A paleontologist was studying the evidence of extinction of organisms in the fossil record. Data were collected at several work sites. The paleontologist developed the drawing below of eight layers at one work site. Other data used included the graph below that shows changes in sea level from 490 million years ago to 60 million years ago. Asterisks on the graph indicate times of mass extinction of marine organisms.

Sea Level Changes Over Time

Used with permission from Sinaur Associates, Inc.
36. Based on observations, the paleontologist concluded that the layers had been undisturbed by geological activity.

Which layer should have the oldest fossils?

A. layer 8  
B. layer 6  
C. layer 4  
D. layer 2

37. The paleontologist collected samples from a site that has the same rock layers as the original site but is located 5 kilometers away.

Comparing the original site with the site shown above, what geologic process accounts for the difference in the arrangement of the rock layers at the two sites?

A. erosion  
B. faulting  
C. folding  
D. weathering
Science

38. The paleontologist examined 10 sites in all. She made detailed drawings of these sites and removed sample fossils. She labeled the sample fossils with the site number, location and layer in which the fossil was found. The paleontologist returned to the lab and discovered that some of the fossil samples were missing labels.

In your **Answer Document**, describe two different ways the lack of labels for these samples will affect the interpretation of the data. (2 points)

---

**Items 39–44 have not been slated for public release in 2008.**