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Metadata Interpretation Guide – Science ................................................................. 4

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<th><strong>Item Information</strong></th>
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<tr>
<td><strong>Item Code:</strong> Unique letter/number code used to identify the item.</td>
<td><strong>Passage Title:</strong> (if listed): Title of the passage(s) associated with this item.</td>
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<td><strong>Standard Code:</strong> Primary educational standard assessed.</td>
<td><strong>Passage Code:</strong> (if listed): Unique letter/number code used to identify the passage(s) that go with this item.</td>
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<td><strong>Standard Text:</strong> Text of the educational standard assessed.</td>
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<td><strong>Reporting Category:</strong> Text of the Reporting Category the standard assesses.</td>
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<td><strong>Correct Answer:</strong> Correct answer. This may be blank for constructed response items where students write or type their responses.</td>
<td><strong>DOK Level</strong> (if listed): Depth of Knowledge (cognitive complexity) is measured on a four-point scale. 1=Recall; 2=Skill/Concepts; 3=Strategic Thinking; 3-4=Strategic/Extended Thinking</td>
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</table>
What cell organelle produces energy in animal cells?

A  vacuole
B  lysosome
C  ribosome
D  mitochondrion
The illustration shows structures from certain body systems.

What is the main function of the structure labeled X?

A  moving the body
B  forming blood cells
C  supporting the body
D  transmitting nerve impulses
A system from the human body is shown in the diagram.

What is a main function of this organ system?

A  providing nutrients to cells
B  transporting oxygen to cells
C  removing wastes
D  producing offspring
The diagram shows two phases in plant cell division.

(This item continues on the next page.)
(Item 4, continued from the previous page)

Which phase occurs between the two phases shown above?

A

B

C

D
Workers need to move some heavy tools to a roof several meters above the ground. Which simple machine would best help the workers lift the tools?

A  a wedge  
B  a pulley  
C  a lever  
D  a screw
Jonas uses a pair of scissors to cut a piece of paper in half.

What simple machine is used to cut the paper?

A  pulley
B  screw
C  wedge
D  wheel and axle
A person performed 100 newton-meters of work by moving an object into a truck with a ramp 5 meters long.

\[
\text{Force } (f) = \frac{\text{Work } (w)}{\text{Distance } (d)}
\]

How much force was needed to move the object into the truck?

A  20 newtons  
B  95 newtons  
C  105 newtons  
D  500 newtons
A person sits in a chair with wheels. He pushes on a wall with his legs and applies a force directly to the wall. The push force causes an applied force in the opposite direction, as shown in the picture below.

Which scientific principle best identifies why the person moves away from the wall?

A. the law of gravity
B. the principle of inertia
C. Newton’s second law of motion
D. Newton’s third law of motion
Which wave has the greatest amplitude?

A

B

C

D
A book falls off a desk and makes a sound when it hits the floor. The sound wave that travels through the air

A is a transverse wave.

B is a longitudinal wave.

C moves in one direction from the source.

D moves faster than the speed of light.
Which statement accurately describes the relationship between photosynthesis and respiration?

A. Both processes produce water $\text{H}_2\text{O}$.

B. Both processes produce oxygen $\text{O}_2$.

C. Carbon dioxide $\text{CO}_2$ produced by respiration is needed for photosynthesis.

D. Glucose $\text{C}_6\text{H}_{12}\text{O}_6$ is a reactant for photosynthesis and a product of respiration.
The arrows in the diagram represent gases exchanged between plants and animals.

**Gas Exchange**

Which statement best explains this gas exchange?

A. Animals produce oxygen that plants release.

B. Animals release carbon dioxide that plants use in photosynthesis.

C. Plants produce carbon dioxide that animals use to produce oxygen.

D. Plants release oxygen that animals use to produce chlorophyll.
The union of a sperm and an egg during the life cycle of a jellyfish is best described as

A  sexual reproduction.
B  genetic inheritance.
C  asexual reproduction.
D  genetic engineering.
Which is the best example of sexual reproduction?

A  A new plant cell results from mitosis.

B  Offspring receive genetic material from two parents.

C  A bacterium divides into offspring identical to the parent.

D  Daughter cells receive all the genetic material of a parent cell.
The diagram shows a flower.

Which arrow points to the part of the flower where the seeds develop?

A  1
B  2
C  3
D  4
Students examine a soft, white mineral with a distinct odor. The students compare their observations with the properties in the table below.

### Physical Characteristics of Minerals

<table>
<thead>
<tr>
<th>Name</th>
<th>Hardness</th>
<th>Color</th>
<th>Odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talc</td>
<td>1</td>
<td>White</td>
<td>Earthy</td>
</tr>
<tr>
<td>Sulfur</td>
<td>2</td>
<td>Yellow</td>
<td>Rotten Eggs</td>
</tr>
<tr>
<td>Gypsum</td>
<td>2</td>
<td>Colorless</td>
<td>None</td>
</tr>
<tr>
<td>Calcite</td>
<td>3</td>
<td>White</td>
<td>None</td>
</tr>
<tr>
<td>Amethyst</td>
<td>7</td>
<td>Purple</td>
<td>None</td>
</tr>
<tr>
<td>Quartz</td>
<td>7</td>
<td>Colorless</td>
<td>None</td>
</tr>
<tr>
<td>Emerald</td>
<td>8</td>
<td>Green</td>
<td>None</td>
</tr>
<tr>
<td>Diamond</td>
<td>10</td>
<td>Colorless</td>
<td>None</td>
</tr>
</tbody>
</table>

Based on the table, which mineral did the students observe?

- **A** Talc
- **B** Sulfur
- **C** Calcite
- **D** Quartz
Which process can transform a sedimentary rock into a metamorphic rock?

A  melting and cooling  
B  deposition and cementation  
C  heat and pressure  
D  evaporation and condensation
Gneiss is a metamorphic rock that can form from granite.

What must occur in order for granite to form gneiss?

A  weathering and erosion
B  melting and cooling
C  high temperature and pressure
D  transportation and deposition
Which of these can transform metamorphic rock into igneous rock?

A  heat and pressure
B  melting and cooling
C  pressure and melting
D  deposition and cementation
Which layer of Earth has the least density?

A  inner core
B  outer core
C  mantle
D  crust
In which layer of Earth are the temperature and pressure the highest?

A  crust
B  mantle
C  inner core
D  outer core
As the Indo-Australian Plate moves toward the northeast, it collides with the Philippine Plate.

Which best describes the annual rate of movement of the Indo-Australian Plate?

A 6.7 centimeters
B 67 meters
C 6.7 millimeters
D 67 kilometers
Which human activity greatly increases the amount of carbon dioxide that is released into the atmosphere?

A  planting trees
B  composting leaves
C  draining wetlands
D  burning coal
A scientist wants to know if female guppies prefer to mate with male guppies when the males are more colorful. She divides a fish tank in half using a glass divider. She then places a female guppy in one side of the tank and takes turns placing differently-colored male guppies in the other side. She observes the response the female has to each male guppy.

What is the dependent variable in this investigation?

A. size of the male guppies
B. color of the male guppies
C. amount of time each male is in the tank
D. female response to each male in the tank
A company is manufacturing a platform to help painters reach high places. The platform is supposed to support up to 3,000 N. Which is the best way for the company to test the platform to make sure it supports the weight for which it was designed?

A  place objects on the platform that are slightly greater than 3,000 N

B  place objects on the platform that are slightly less than 3,000 N

C  release the platform holding 3,000 N from a given height

D  drop 3,000-N objects from a given height onto the platform
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