STAAR Review – Most Commonly Missed Concepts

6.5C – Difference between Elements & Compounds

\[ \text{CaCO}_3 \xrightarrow{\text{heat}} \text{CaO} + \text{CO}_2 \]

In the chemical reaction shown above, the products are best classified as —

A. two elements
B. one element and one compound
C. two compounds
D. two compounds and one element

Which of these data tables correctly classifies the given substances?

A. | Substance | Classification |
   | NaCl     | compound      |
   | Si       | element       |
   | H₂O      | compound      |

B. | Substance | Classification |
   | NaCl     | element       |
   | Si       | element       |
   | H₂O      | element       |

C. | Substance | Classification |
   | NaCl     | element       |
   | Si       | element       |
   | H₂O      | compound      |

D. | Substance | Classification |
   | NaCl     | compound      |
   | Si       | compound      |
   | H₂O      | compound      |

6.5C The chemical equation shown below represents a reaction that produces fuel for certain cars.

\[ \text{CO} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{H}_2 \]

Which substance represented in this equation is classified as an element?

A. CO
B. H₂O
C. CO₂
D. H₂

6.8C – Calculating average speed

A toy car rolls 8 meters in 2 seconds. What is the average speed of the toy car?

A. 16 m/s
B. 10 m/s
C. 6 m/s
D. 4 m/s
Students begin to measure the speed of a ball rolling down a ramp. The graph below shows their results.

![Graph](image)

What is the average speed of the ball?

A. 4 m/s  
B. 5 m/s  
C. 14 m/s  
D. 20 m/s

Some students were investigating the speed of a toy car they built. They performed two trials and recorded their data in the table below.

**Toy-Car Trials**

<table>
<thead>
<tr>
<th></th>
<th>Trial 1</th>
<th>Trial 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Distance (m)</td>
<td>Time (s)</td>
</tr>
<tr>
<td>4.0 s</td>
<td>5.6 m</td>
<td>5.0 s</td>
</tr>
</tbody>
</table>

What was the average speed of the toy car during the two trials to the nearest tenth of a m/s?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

**6.8D – Graphing Changes in Motion**

Which graph shows an object moving forward at a constant speed?

![Graphs](image)
8 (5:30) The graph below represents the motion of a car.

![Motion of a Car graph]

During what time was the car moving the fastest?

A. From 0 to 2 minutes  
B. From 2 to 4 minutes  
C. From 4 to 6 minutes  
D. From 6 to 8 minutes

9  
The graph below shows distance over time.

![Distance over time graph]

Which of these situations could be represented by this graph?

A. A student walks 1.5 km to a friend’s house in 40 minutes. The two students then walk another 1.5 km to school in 20 minutes.  
B. A student walks 1.5 km to a friend’s house in 20 minutes. The two students then walk another 1.5 km to school in 40 minutes.  
C. A student walks 1.5 km to a friend’s house in 30 minutes. The two students then walk another 1.5 km to school in 30 minutes.  
D. A student walks 1.5 km to a friend’s house in 20 minutes. The two students then walk another 1.5 km to school in 60 minutes.

7.6A – Identifying Organic Compounds  
10  
Based on its chemical formula, which of the following substances is an organic compound?

A. Urea, \( \text{CH}_2\text{N}_2\text{O} \)  
B. Ammonium sulfide, \( (\text{NH}_4)_2\text{S} \)  
C. Silane, \( \text{SiH}_4 \)  
D. Sodium chloride, \( \text{NaCl} \)
Scientists are always trying to create new medicines. Which of the following would be the best combination of materials to make an organic molecule?

A. carbon, hydrogen, oxygen, phosphorus, nitrogen, sulfur
B. chlorine, hydrogen, oxygen, potassium, neon, sulfur
C. chlorine, helium, oxygen, phosphorus, neon, sodium
D. carbon, helium, oxygen, phosphorus, nitrogen, sodium

The table below shows the elemental composition of three different types of organisms.

<table>
<thead>
<tr>
<th>Element</th>
<th>Human</th>
<th>Alfalfa</th>
<th>E. coli Bacterium</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>65.0</td>
<td>77.9</td>
<td>73.7</td>
</tr>
<tr>
<td>C</td>
<td>18.5</td>
<td>11.3</td>
<td>12.1</td>
</tr>
<tr>
<td>H</td>
<td>9.5</td>
<td>8.7</td>
<td>9.9</td>
</tr>
<tr>
<td>X</td>
<td>3.3</td>
<td>0.8</td>
<td>3.0</td>
</tr>
<tr>
<td>P</td>
<td>1.0</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>S</td>
<td>0.3</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>97.6%</td>
<td>99.5%</td>
<td>99.6%</td>
</tr>
</tbody>
</table>

The X in the table represents which of the following elements?

A. Calcium (Ca)
B. Iron (Fe)
C. Nitrogen (N)
D. Sodium (Na)

7.12B – Identify Organ Systems and their function

When people run long distances, their muscles require increased amounts of oxygen. Which system is responsible for carrying this oxygen to the muscles?

A. Nervous
B. Respiratory
C. Digestive
D. Circulatory
14 (7.12F) Based on the functions in the table below, which system is the skeletal system?

<table>
<thead>
<tr>
<th>System W</th>
<th>System X</th>
<th>System Y</th>
<th>System Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moves nutrients to cells</td>
<td>Absorbs nutrients</td>
<td>Protects vital organs and tissues</td>
<td>Produces chemicals that regulate bone growth</td>
</tr>
<tr>
<td>Distributes oxygen to all parts of the body</td>
<td>Mechanically and chemically breaks down food</td>
<td>Provides framework for mobility</td>
<td>Stabilizes blood sugar levels</td>
</tr>
<tr>
<td>Aids in the removal of wastes from cells</td>
<td>Converts food to energy</td>
<td>Produces new red blood cells</td>
<td>Aids in the regulation of mood</td>
</tr>
</tbody>
</table>

A. System W  
B. System X  
C. System Y  
D. System Z

15 (7.12F) Devon has cystic fibrosis or CF. It is an inherited condition that causes his body to produce excess mucus and lower than normal levels of digestive enzymes. A person with CF often experiences the following symptoms:

- frequent lung infections  
- poor energy level  
- low appetite

Although all of Devon’s body systems are affected by cystic fibrosis, it is mainly a disorder of which two body systems?

A. Circulatory and Digestive  
B. Digestive and Skeletal  
C. Digestive and Respiratory  
D. Circulatory and Respiratory

7.12F – Cell Theory

16 In 1838 botanist Matthias Schleiden determined that all plants are composed of cells. In 1839 anatomist Theodor Schwann proposed that all animals are composed of cells. In 1855 biologist Rudolph Virchow added to Schleiden’s and Schwann’s observations and proposed that all living things are composed of cells. Which statement is also part of Virchow’s cell theory?

F. All cells have a cell wall.  
G. All cells arise from pre-existing cells.  
H. All cells are capable of photosynthesis.  
J. All cells can develop into any other type of cell.
17. Which of the following characteristics are shared by all organisms?
   A. All organisms contain tissues.
   B. All organisms have organ systems.
   C. All organisms have nuclei and chloroplasts
   D. All organisms are composed of at least one cell.

18. Which microscopic structure carries out the major life functions in all organisms?
   A. Chloroplasts
   B. Cells
   C. Wings
   D. Antennae

8.7A – Results of Earth’s Rotation & Revolution

19. At which point on the diagram below is the number of hours of daylight shortest in North America?

   A. Point A
   B. Point B
   C. Point C
   D. Point D
A student draws the model shown below.

Which of these best compares the conditions at Location X and Location Y?

F  It is day at Location X and night at Location Y.
G  It is winter at Location X and summer at Location Y.
H  There are more hours of daylight at Location X than at Location Y.
J  The moon is brighter when viewed from Location X than when viewed from Location Y.

The diagram below shows four positions in Earth’s orbit around the sun.

The Northern Hemisphere experiences the beginning of spring when Earth is in —

F  Position 1
G  Position 2
H  Position 3
J  Position 4
8.7B – Predict Sequence of Lunar Cycle

According to the diagram below, which lunar phase would an observer on Earth see?

A. New Moon  B. Waning Crescent

C. Waxing Gibbous  D. First Quarter

Some students used records from the U.S. Naval Observatory to make the table below of the percent of the moon that was visible on each night in January 2011.

<table>
<thead>
<tr>
<th>Date</th>
<th>Moon Visible (%)</th>
<th>Date</th>
<th>Moon Visible (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>11</td>
<td>38</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>13</td>
<td>57</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>14</td>
<td>67</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>15</td>
<td>76</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>16</td>
<td>84</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>17</td>
<td>91</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>18</td>
<td>96</td>
</tr>
<tr>
<td>9</td>
<td>21</td>
<td>19</td>
<td>99</td>
</tr>
<tr>
<td>10</td>
<td>29</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>21</td>
<td>97</td>
<td>22</td>
<td>92</td>
</tr>
<tr>
<td>23</td>
<td>85</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td>25</td>
<td>65</td>
<td>26</td>
<td>54</td>
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<td>27</td>
<td>43</td>
<td>28</td>
<td>32</td>
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<td>29</td>
<td>23</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>31</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. Naval Observatory

Based on these data, what part of the lunar cycle occurred between January 5 and January 7?

F. Waxing crescent moon  
G. Waning crescent moon  
H. Full moon  
J. New moon
The moon reflects different amounts of sunlight onto Earth at different times. This reflected sunlight is commonly called moonlight. The graph below shows the intensity of moonlight at different times in a lunar cycle.

![Graph of Intensity of Moonlight During a Lunar Cycle]

Which moon phase most likely occurs at the time in the cycle represented by an X on the graph?

- A
- B
- C
- D

**8.9C – Topographic Maps & Weathering on Satellite Views**

A section of a topographic map is shown below.

![Topographic Map]

What is the difference in elevation in meters between Point X and Point Y on the map? Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.
The satellite image below shows a ship channel between South Padre Island and Boca Chica beach in South Texas.

Send is sometimes removed from the ship channel through a process called dredging to make it easier for ships to travel through. Recently sand from the bottom of the channel was moved to area beaches. Without this transfer of sand, what would most likely occur in this area in the future?

A. The ship channel would become deeper, and the island would move west toward the mainland.
B. The ship channel would become shallower, and the beach would become narrower.
C. The ship channel would become narrower, and the island would become completely covered with water.
D. The ship channel would become wider, and the island would sink into the Gulf of Mexico.

The points labeled W and Y on the topographic map below show the campsites of two families. Each family hiked to the elevation on the map marked X. The arrows show the paths taken by both families.

What was the change in elevation, to the nearest ten meters, for the family that took the steepest path to Point X?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.
8.2E – Analyze DATA

The Prairies Region and the Cross Timbers are located in north-central Texas. The graph below shows information about eating habits of white-tailed deer in these regions.

Typical Diet of White-Tailed Deer in the Prairies Region and the Cross Timbers of Texas

- **Grass** 12%
- **Seeds and fruit** 20%
- **Weeds** 20%
- **Crops** 7%
- **Shrubs, vines** 36%
- **Feed** 5%

Source: Texas Parks and Wildlife Department

A Cross Timbers rancher is concerned about competition between the ranch animals and the deer. Based on the graph, which ranch animals compete for the most food with white-tailed deer?

A  Cattle that eat grass and feed
B  Goats that eat weeds and shrubs
C  Turkeys that eat seeds and fruit
D  Hogs that eat fruit, seeds, and feed

Fish in a lake have to compete for space. Different fish have different optimal temperature ranges. The graph below shows the temperature ranges of four fish species.

Optimal Temperature Ranges of Four Fish Species

- **Lake trout**
- **Largemouth bass**
- **Sunfish**
- **Bullhead**

At which temperature range will there be the most competition for space among these fish species?

F  5°C to 10°C
G  10°C to 15°C
H  15°C to 20°C
J  25°C to 30°C
The types of small organisms that live on the bottom of streams can be good indicators of water pollution. The table below groups some organisms by their tolerance of pollution.

### Stream Organisms

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Tolerance of Water Pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riffle beetles</td>
<td>Cannot tolerate pollution</td>
</tr>
<tr>
<td>Stone flies</td>
<td></td>
</tr>
<tr>
<td>Mayflies</td>
<td></td>
</tr>
<tr>
<td>Dragonflies</td>
<td>Can tolerate pollution</td>
</tr>
<tr>
<td>Sow bugs</td>
<td></td>
</tr>
<tr>
<td>Crayfish</td>
<td></td>
</tr>
<tr>
<td>Nudges</td>
<td></td>
</tr>
<tr>
<td>Pouched snails</td>
<td></td>
</tr>
<tr>
<td>Aquatic worms</td>
<td></td>
</tr>
</tbody>
</table>

A certain stream that was historically clear and clean has become increasingly polluted with fertilizer waste over the years. Which of these describes a likely result of this pollution?

- F Mayflies that were previously abundant are no longer present in the stream.
- G Stone flies and midges thrive and compete for the same food source.
- H Large numbers of crayfish have suddenly died.
- J Riffle beetles have become more abundant in the stream.

### 8.3B – Use Models

Before the Industrial Revolution in England, the peppered moth was commonly found on tree trunks that had light-colored lichen on the bark. Most of the peppered moths were a light gray-brown color similar to that of the lichen. A few of the moths had a mutation that made them a dark gray-brown color.

![Image of light and dark trees with moths]

During the Industrial Revolution, coal-burning factories produced black soot that covered the trees and killed the lichen in and near cities. In these areas the number of dark peppered moths increased, while the number of light peppered moths decreased. What contributed to this change?

- A The soot-covered trees camouflaged the dark moths.
- B The dark moths preyed on the light moths.
- C Bird populations increased in the areas near the factories.
- D The dark moths laid fewer eggs than the light moths.
When Charles Darwin visited the Galápagos Islands in the 1800s, he observed many types of organisms that were similar but lived on different islands. The four species of mockingbirds found on the Galápagos Islands are shown below. Each species lives on a different island.

These species are very similar, but the Hood mockingbird has a longer beak than the other three species. Which of the following best explains this difference?

A  The Hood mockingbird needs a longer beak for defense against predators.
B  The Hood mockingbird originated from a different type of bird than the other species.
C  The Hood mockingbird’s longer beak is an adaptation to the food available in the bird’s habitat.
D  The Hood mockingbird’s beak stretched to reach its food, and the longer beak was passed down to its offspring.

The diagram below shows a sled moving along a smooth, frictionless track.

In which sections of the track will the sled experience an unbalanced force?

A  Sections 1 and 3
B  Sections 2 and 3
C  Sections 2 and 4
D  Sections 3 and 4
8.6A – Calculating Unbalanced Forces

34 When a space shuttle was launched, the astronauts onboard experienced an acceleration of 29.0 m/s\(^2\). If one of the astronauts had a mass of 60.0 kg, what net force in newtons did the astronaut experience?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

35 A student uses a magnet to move a 0.025 kg metal ball. The magnet exerts a force of 5 N, which causes the ball to begin moving. What is the acceleration of the ball when it begins to move?

A  200 m/s\(^2\)
B  0.125 m/s\(^2\)
C  5 m/s\(^2\)
D  5.025 m/s\(^2\)

36 (8.6c) A spring scale is used to pull a block across the surface of an ice rink.

If the block has a mass of 7.0 kg, what is the acceleration of the block in meters per second squared?

Record your answer and fill in the bubbles on your answer document.
<table>
<thead>
<tr>
<th>Category</th>
<th># of Questions</th>
<th>Will be TESTED</th>
<th>Could Be tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1 (Chemistry) Matter &amp; Energy</td>
<td>14</td>
<td>8.5A – Atomic Structure (Triple Bubble)  8.5B – Valence Electrons (Reactivity)  8.5C – Periodic Table (groups/periods &amp; Big Box)  8.5D – Chemical Formulas (subscripts/elements)  8.5E – Chemical Reactions (PECSB)</td>
<td>8.5F – Chemical Equation  7.5C – Food webs/chains  7.6A – Organic Compound (C)  7.6B – Phys./Chem. In Digestion  6.5C – Element or Compound  6.6A – Phys. Prop. Metals/Non  6.6B – Calculate Density</td>
</tr>
<tr>
<td>Category 2 (Physics) Force, Motion, &amp; Energy</td>
<td>12</td>
<td>8.6A – Calculating Unbalanced Forces  8.6C – Newton’s Laws of Motion (Law Triangle)</td>
<td>8.6B – Speed/Velocity/Accel.  7.7A – Work w/force &amp; ramp  6.8A – Potential/Kinetic Energy  6.8C – Calculate Average Speed  6.8D – Graphing Motion  6.9C – Energy transformations</td>
</tr>
<tr>
<td>Process Standards Investigation &amp; Reasoning</td>
<td>≥40% of Test</td>
<td>8.2E – Analyzing Data &amp; Charts/Graphs  8.3B – Using Models or Pictures</td>
<td>60% 40%</td>
</tr>
<tr>
<td>Category</td>
<td>OBJECTIVES Vocab. (Classroom)</td>
<td>STAAR Vocab. (Prior tests)</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>Category 1 (Chemistry) Matter &amp; Energy</td>
<td>Atom Mass Proton Neutron</td>
<td>Particle Cloud Charge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nucleus Electron Structure Model</td>
<td>Positive Negative Neutral Charge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electron Cloud Electrical Charge Chemical Property Valence Electron</td>
<td>React Reactive Atom</td>
<td></td>
</tr>
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<td></td>
<td>Reactivity Group Period Property</td>
<td>Element Nucleus Property</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Periodic Table Chemical Formula Chemical Reactions Subscript</td>
<td>Mass Number Chemical Reactivity Atomic Mass</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Molecule Mixture Solid</td>
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<tr>
<td></td>
<td>Speed Direction Motion</td>
<td>Frictionless Friction Speed</td>
<td></td>
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<tr>
<td></td>
<td>Force Newton Tectonic</td>
<td>Unbalanced Force Applied Force Ramp</td>
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<td></td>
<td>Inertia Acceleration Unbalanced</td>
<td>Net Force Tension Velocity</td>
<td></td>
</tr>
<tr>
<td>Category 3 (Astronomy) Earth &amp; Space</td>
<td>Rotate Axis Day</td>
<td>Constant Speed Exert Increase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Night Revolve Seasons</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Lunar Cycle Universe Star</td>
<td>Orbit Tilt Equator</td>
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<td>Satellite View Erosional Features Hertzsprung-Russell Diagram</td>
<td>Northern Hemisphere Daylight Hours New Moon</td>
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<td>Plate Tectonics Crustal Features Topographic Map</td>
<td>Waning Gibbous Waxing Crescent</td>
<td></td>
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<td>Nebula Galaxy Weathering</td>
<td>First Quarter Moon Third Quarter Moon Waxing Gibbous Full moon Phase Revolve</td>
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<tr>
<td>Category 4 (Ecology) Organism &amp; Environment</td>
<td>Producer Consumer Predator</td>
<td>Carnivore Herbivore Photosynthetic</td>
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<td>Prey Parasite Host</td>
<td>Relationship Nutrients Aquatic</td>
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<tr>
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<td>Food Webs Marine Ecosystem Freshwater Ecosystem</td>
<td>Organism Competition Species</td>
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<tr>
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<td>Terrestrial Ecosystem Soil Composition Short-Term Enviro. Effect</td>
<td>Resources Food Web Environment</td>
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<tr>
<td></td>
<td>Organisms Populations Ecosystem</td>
<td>Adapt Space Scarce</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compete Biotic factors Abiotic factor</td>
<td>Camouflage Abundant Adaptation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long-Term Eviro. Effect Subsequent Populations Traits</td>
<td>Population Mutation Tolerance</td>
<td></td>
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