





Grade 8 General Science EOT1 Practice Questions

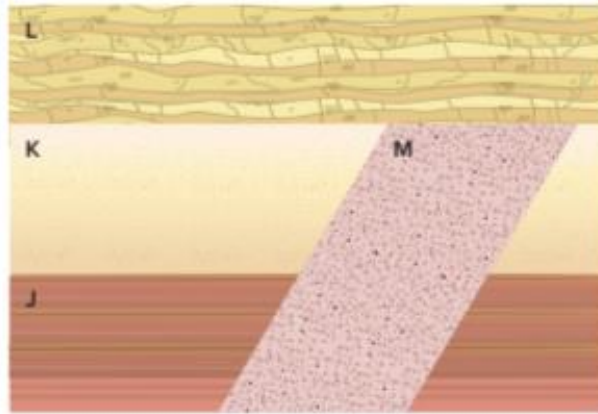
No.	Example
MCQ	
1	<p>The Present Is the Key to the Past</p> <p>Compare the images of erosion below.</p> <div style="display: flex; justify-content: space-around;">   </div> <p>1. Do you think the processes that form and shape the small stream bed are similar to those that form and shape the Grand Canyon? Why or why not?</p>
2	<div style="display: flex; align-items: flex-start;">  <div style="margin-left: 10px;"> <p>THREE-DIMENSIONAL THINKING</p> <p>Scientists use the principle of uniformitarianism to interpret Earth's history. Suppose you discover a rock from an ancient beach. Now imagine you are standing on that ancient beach. What do you think you would see?</p> <p>Explain how your answer relates to the principle of uniformitarianism.</p> </div> </div>
3	 <p>5. Notice the large fault cutting across the rock layers. Do you think the fault and the rock layers are the same age? Why or why not?</p> <hr style="border: 0.5px solid #ADD8E6; margin-top: 10px;"/>

4



Three-Dimensional Thinking

Imagine you are a geologist. You have been asked to analyze and interpret the rock sequence below. Your task is to determine the relative ages of the rocks.



2. Order the features in the illustration from oldest to youngest.

- A JKLM
- B MJKL
- C JKML
- D MLKJ

5

The Structure of DNA Cells put molecules together by following codes, or a set of directions. Where do those directions come from? Genes provide directions for a cell to assemble molecules that express traits. You might recall that a gene is a section of a chromosome. Chromosomes are made of proteins and **DNA**—an organism's genetic material. A gene is a segment of DNA on a chromosome.

What is the importance of **DNA**?

6

Transcription RNA, like DNA, is made of nucleotides. However, there are key differences between DNA and RNA. DNA is double-stranded, but RNA is single-stranded. RNA has the nitrogen base uracil (U) instead of thymine (T) and the sugar ribose instead of deoxyribose. The first step in making a protein is to make messenger RNA (mRNA) from DNA. Messenger RNA transfers the genetic code from DNA in the cell's nucleus to ribosomes in the cytoplasm for protein synthesis. The process of making mRNA from DNA is called **transcription**. How does this happen? Let's find out.

Types of RNA You just read about messenger RNA (mRNA). There are two other types of RNA, transfer RNA (tRNA) and ribosomal RNA (rRNA). The three types of RNA work together to make proteins. The process of making a protein from RNA is called **translation**. Translation occurs in ribosomes, cell organelles that are attached to the rough endoplasmic reticulum (rough ER), as shown below. Ribosomes are also in a cell's cytoplasm.

What is **transcription**?

What is **translation**?

7

MATH Connection The motion of a person or object can be explained by examining how the position changes over time. Practice using the mathematical model, the average speed equation.

1. A truck driver makes a trip that covers 2,380 km in 28 hours. What is the driver's average speed in km/h?



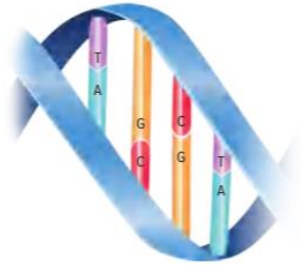
2. What is the average speed of a soccer ball that travels 34 m in 2.0 s?

3. How long would it take a bus traveling at 52 km/h to travel 130 km?

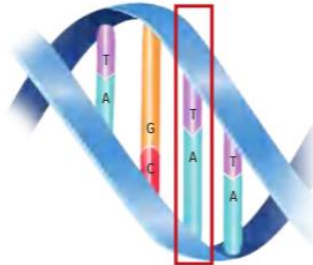


Three-Dimensional Thinking

Use the diagram below to answer the following questions.



Before Replication



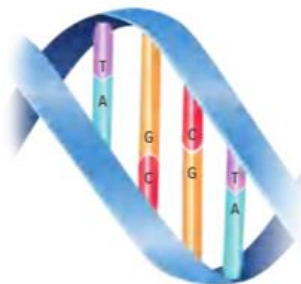
After Replication

2. The diagram above shows a segment of DNA before and after replication. Which could have occurred as a result of this change in structure?
- A changes to the genotype of the organism
 - B changes to the traits of the organism
 - C changes in the production of proteins
 - D all of the above

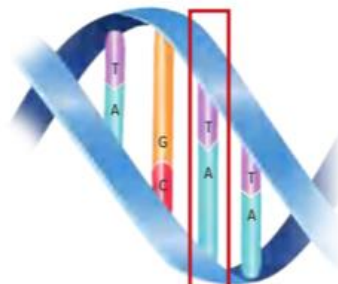


Three-Dimensional Thinking

Use the diagram below to answer the following questions.



Before Replication



After Replication

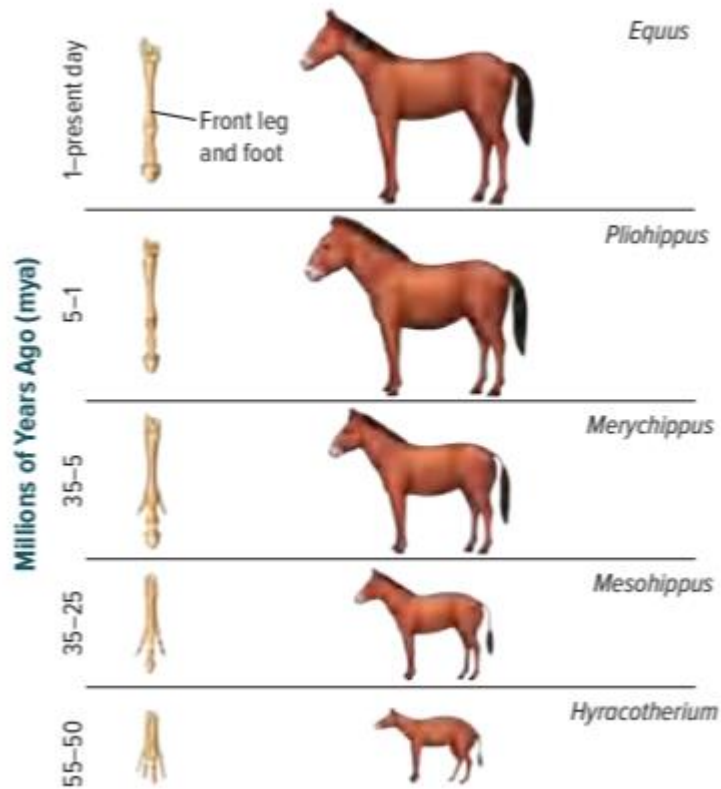
3. The mutation shown above resulted in muscle degeneration. The effect of this mutation is that muscles become progressively weaker. What type of mutation is this?
- A positive
 - B neutral
 - C negative
 - D none of the above

10

Real-World Connection

4. **Write** Your English teacher has asked you to write a short story about a superhero with a mutation that causes powers, using a real factor that causes mutations. Identify your character below, and describe the cause and effects of the mutation. Explain how your superhero models a negative, positive, or neutral mutation.

11

**THREE-DIMENSIONAL THINKING**

Examine the chart of the evolution of horses above. What **patterns** of **change** have occurred over 55 million years?

12



ENCOUNTER THE PHENOMENON

Why do all of these dogs look different?

13

How can humans influence traits of organisms, such as dogs, through selective breeding?

14

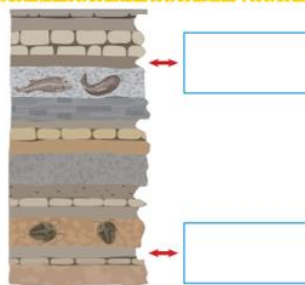
What can fossils tell us about time?

INVESTIGATION

Analyze the Age

In the image you can see fossils buried in rock layers. Examine the image and answer the questions below.

1. If the topmost rock layer of the image is present day, then what is the relative age of the areas that are indicated by the arrows to each other? Infer the age of the areas by writing *older* or *younger* in the boxes provided.



2. Why did you place the words *older* or *younger* in those locations?

3. What do you think the placement of fossils in the rock layers above can tell us about time?

15



THREE-DIMENSIONAL THINKING

What **patterns** exist between all forces that you apply to objects or **systems** of objects?

16



COLLECT EVIDENCE


How does modeling Newton's third law help explain what happens when an airboat pushes on the air?

17



Identify each image as either representing camouflage or mimicry

18	<div data-bbox="233 302 310 386" data-label="Image"></div> <div data-bbox="321 302 764 344" data-label="Section-Header"><h2>COLLECT EVIDENCE</h2></div> <div data-bbox="321 348 1083 382" data-label="Text"><p>How do adaptations affect organisms, such as orchid plants?</p></div>														
19	<div data-bbox="233 558 586 592" data-label="Section-Header"><h3>Real-World Connection</h3></div> <div data-bbox="233 619 1114 753" data-label="List-Group"> <p>5. Brainstorm Do you own clothes with a camouflage pattern? These are designed to help you blend in outdoors. What other organisms can you think of that use camouflage? Explain the benefit(s) that this provides the organism.</p> </div>														
20	<div data-bbox="233 1041 586 1075" data-label="Section-Header"><h3>Real-World Connection</h3></div> <div data-bbox="233 1096 1092 1157" data-label="List-Group"> <p>4. Interpret Data The plot below shows the motion of an elevator. Explain its motion.</p> </div> <div data-bbox="462 1163 1114 1522" data-label="Figure"> <table border="1"> <caption>Elevator Motion Data</caption> <thead> <tr> <th>Time (min)</th> <th>Distance (m)</th> </tr> </thead> <tbody> <tr><td>0</td><td>10</td></tr> <tr><td>1</td><td>6</td></tr> <tr><td>2</td><td>6</td></tr> <tr><td>3</td><td>2</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>0</td></tr> </tbody> </table> </div>	Time (min)	Distance (m)	0	10	1	6	2	6	3	2	4	2	5	0
Time (min)	Distance (m)														
0	10														
1	6														
2	6														
3	2														
4	2														
5	0														
21	<div data-bbox="233 1612 1136 1675" data-label="List-Group"> <p>5. Calculate A driver travels 55 km in 1 hour. He then drives at a speed of 35 km/h for 2 hours. Next, he drives 175 km in 3 hours. What was his average speed?</p> </div>														
22	<div data-bbox="233 1761 545 1831" data-label="Section-Header"><h2>ENCOUNTER THE PHENOMENON</h2></div> <div data-bbox="589 1761 1146 1831" data-label="Text"><p>What happens to the motion of the water tube when it's pushed or pulled?</p></div>														

23	<div>COLLECT EVIDENCE</div> <p>How does friction's effect on motion help explain what happens when you push or pull a water tube?</p>
24	<div>COLLECT EVIDENCE</div> <p>How does modeling Newton's third law help explain what happens when an airboat pushes on the air?</p>
25	<p>Real-World Connection</p> <p>5. Explain When you run, your feet are pushing you forward. Friction keeps your foot in contact with the ground. According to Newton's third law, you are pushing the ground back. Construct an explanation for why Earth is not changing its motion.</p>
26	<div>COLLECT EVIDENCE</div> <p>How does the relationship between mass and gravity and the relationship between distance and gravity explain why the skydiver fell as she did?</p>
27	<p>Real-World Connection</p> <p>5. Predict If an astronaut moved away from Earth in the direction of the Moon, how would the gravitational force between Earth and the astronaut change? How would the gravitational force between the Moon and the astronaut change?</p>
<div>Paper Part FRQ</div>	
28	 <p>1. Do you think all of the rock layers in the picture formed at the same time? Why or why not?</p>

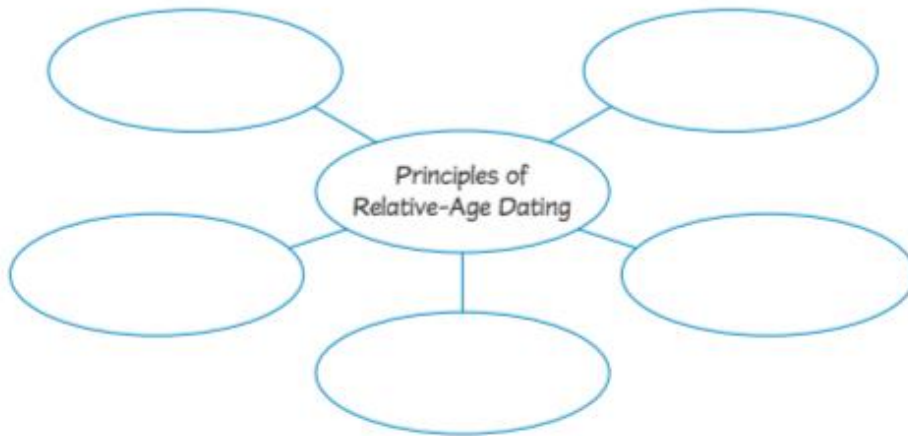
29



2. If you think the rocks formed at different times, which layers are the oldest and which are the youngest? Explain.

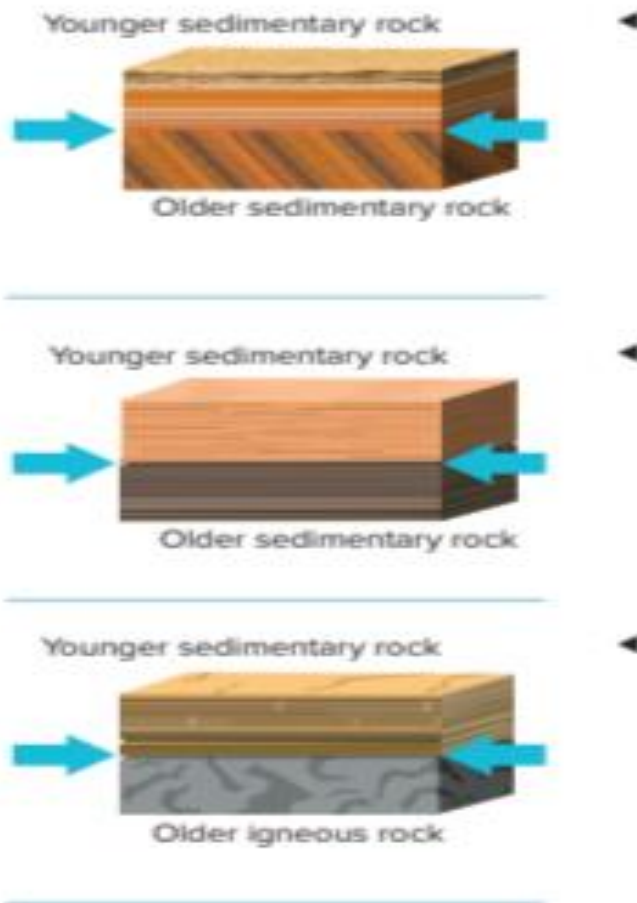
30

7. What are the principles of relative-age dating?



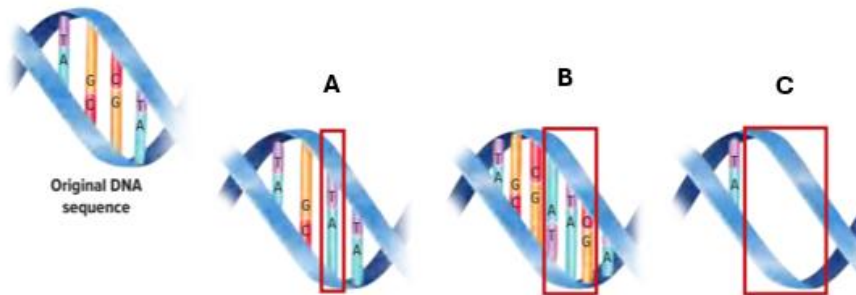
31

Identify the unconformities in the image below:




32



Study the original DNA sequence, then name the type of mutations present in A, B, and C.



33

COLLECT EVIDENCE
How do adaptations affect organisms, such as orchid plants?

34	<p>4. Which structural genetic change in the finches can be identified as the one most influenced by feeding habits, as proposed by Charles Darwin?</p> <p>A ability to fly from island to island to find the food they prefer</p> <p>B beak size and shape to take advantage of the food they had</p> <p>C claw shapes for perching on limbs while catching insects in their beaks</p> <p>D cooperative behavior so they could share limited seeds and nectar</p>
35	<p>Construct an explanation for how blending in enables an organism to survive in its environment.</p>
36	 <p>Three friends were working on their history homework together when they noticed that the corn in an image in their textbook looked a lot different than what corn looks like today. Here are their thoughts:</p> <p>Deidra: I think the corn from the history book is a different species than the corn we eat today.</p> <p>Jayden: I think that the corn is the same species, but it has changed over time.</p> <p>Natalia: It think the corn looks different because we grow it differently today. If we grew it the same way, it would look the same.</p> <p>Circle the student you agree with most. Explain your choice.</p>
37	<div data-bbox="233 1591 298 1659"> </div> <p>THREE-DIMENSIONAL THINKING</p> <p>Can traits of organisms always be predicted with selective breeding? Explain how multiple causes can influence the traits of an organism.</p> <hr/> <hr/> <hr/>

38	<p>WRITING Connection Write a paragraph explaining how natural selection and artificial selection are related. Include a main idea, supporting details, and a concluding sentence.</p>
39	<div data-bbox="386 338 979 672">  </div> <p>Four friends were comparing their ideas about fossils. This is what they said:</p> <p>Emma: I think fossils are pieces of dead animals and plants, and tell us little about the animal or plant.</p> <p>Aidan: I think fossils only come from bones of extinct animals that lived millions of years ago.</p> <p>Ethan: I think fossils are the evidence of the existence of organisms seen in the remains of bones, shells, or even impressions of rock layers.</p> <p>Madison: Fossils are the remains of plants and animals that have recently died. Their remains cannot be preserved for very long.</p> <p>With whom do you agree most? Explain why you agree with that person.</p>
40	<p>ENCOUNTER How do fossils, such as <i>Tiktaalik</i>, provide evidence of evolution? THE PHENOMENON</p>
41	<p>Use the figure below to answer question 2.</p> <div data-bbox="443 1375 993 1606">  </div> <p>2. What method can scientists use to analyze and interpret when the fossils in the bottom of the figure appeared on Earth?</p> <p>A relative-age dating</p> <p>B trace fossils</p> <p>C mineralization</p> <p>D carbonization</p>

42

3. What pattern can scientists use to interpret the information about the fossils shown in the rock layers?

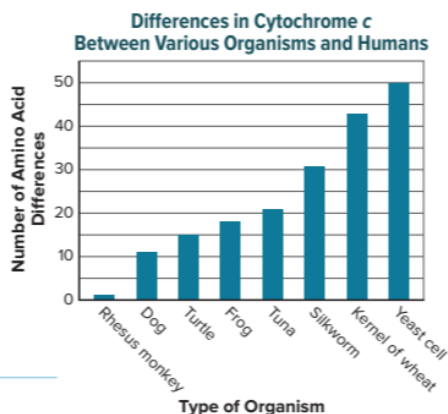
- A Rock layers all contain different sets of fossils.
- B Older fossils are located closest to Earth's surface.
- C Fossils are younger the closer they are to the surface.
- D Each fossil is younger than the rock layer in which it is found.

43

Evolving Your Knowledge

Proteins, such as cytochrome c, are made from combinations of 20 amino acids. The graph to the right shows the number of amino acid differences in cytochrome c between humans and other organisms. Use the graph to answer the questions.

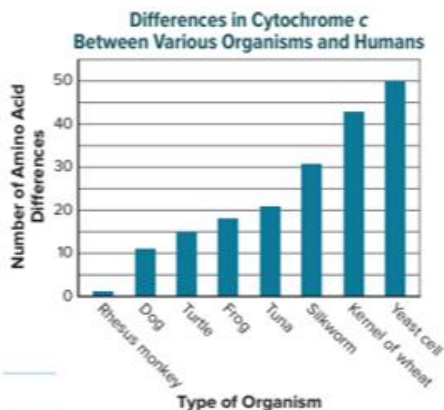
1. Which organisms do you think might be more closely related to each other: a dog and a turtle or a dog and a silkworm? Explain your answer.



44

Evolving Your Knowledge

Proteins, such as cytochrome c, are made from combinations of 20 amino acids. The graph to the right shows the number of amino acid differences in cytochrome c between humans and other organisms. Use the graph to answer the questions.



2. Which organism has the least differences in the number of amino acids in cytochrome c compared to humans? Which organism has the greatest difference?

45	<p>Evolving Your Knowledge</p> <p>Proteins, such as cytochrome c, are made from combinations of 20 amino acids. The graph to the right shows the number of amino acid differences in cytochrome c between humans and other organisms. Use the graph to answer the questions.</p> <div data-bbox="678 212 1133 632"> <p style="text-align: center;">Differences in Cytochrome c Between Various Organisms and Humans</p> <table border="1"> <thead> <tr> <th>Type of Organism</th> <th>Number of Amino Acid Differences</th> </tr> </thead> <tbody> <tr> <td>Rhesus monkey</td> <td>1</td> </tr> <tr> <td>Dog</td> <td>10</td> </tr> <tr> <td>Turtle</td> <td>15</td> </tr> <tr> <td>Frog</td> <td>18</td> </tr> <tr> <td>Tuna</td> <td>20</td> </tr> <tr> <td>Silkworm</td> <td>30</td> </tr> <tr> <td>Kernel of wheat</td> <td>42</td> </tr> <tr> <td>Yeast cell</td> <td>48</td> </tr> </tbody> </table> </div> <p>3. Notice the number of differences of amino acids in cytochrome c between each organism and humans. How might these differences explain the relatedness of each organism to humans?</p>	Type of Organism	Number of Amino Acid Differences	Rhesus monkey	1	Dog	10	Turtle	15	Frog	18	Tuna	20	Silkworm	30	Kernel of wheat	42	Yeast cell	48
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46	<p>ENCOUNTER THE PHENOMENON</p> <p>How can you describe the position and motion of the train outside the window?</p>																		
47	<p>The reference point in the image is East.</p> <p>Abdulrahman move from the bus stop to the museum. Has he moved positive or negative to the reference point?</p> <div data-bbox="228 1083 1162 1362"> </div>																		
48	<div data-bbox="224 1444 987 1822"> </div> <p>a. What is the total distance covered by the player from points A to D to C to B?</p> <p>b. What is the magnitude of the displacement of the player from A to B?</p>																		

49

MATH Connection The motion of a person or object can be explained by examining how the position changes over time. Practice using the mathematical model, the average speed equation.



1. A truck driver makes a trip that covers 2,380 km in 28 hours. What is the driver's average speed in km/h?

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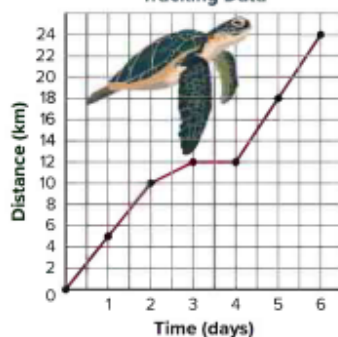
50



THREE-DIMENSIONAL THINKING

Analyze the data on the plot below. Determine the speed of the hawksbill sea turtle during each interval listed below.

**Hawksbill Sea Turtle
Tracking Data**



Day 0 to day 2: _____

Day 2 to day 3: _____

Day 3 to day 4: _____

Day 4 to day 6: _____

Acceleration Equation

$$\text{acceleration (in m/s}^2\text{)} = \frac{\text{force (in N)}}{\text{mass (in kg)}}$$
$$a = \frac{F}{m}$$

MATH Connection In the PhET interactive simulation, a force of 100 N is applied to the wrapped present, giving it an acceleration of 2 m/s². What is the mass of the object?

What is the acceleration when a force of 2.0 N is applied to a ball that has a mass of 0.60 kg?

