

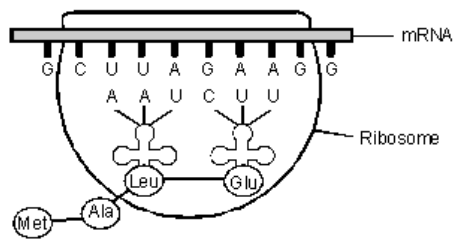
Middle Level Science (Grades 5–8)

Subtest 2 Sample Items

1. Single cell animals respire by exchanging gases with the surrounding environment across their cell membranes. The evolution of more sophisticated respiratory systems was necessary in multicellular organisms because as the size of an organism increases:

- the synthesis of ATP requires more steps.
- surface area increases more slowly than volume.
- replication of large amounts of DNA requires more oxygen.
- production of waste gases increases exponentially.

2. The diagram below shows a strand of a ribosome and its mRNA.

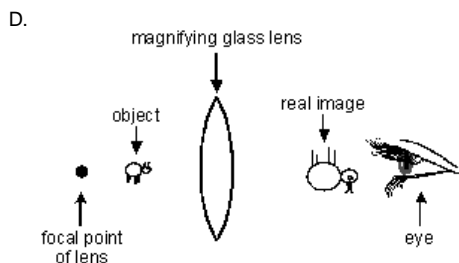
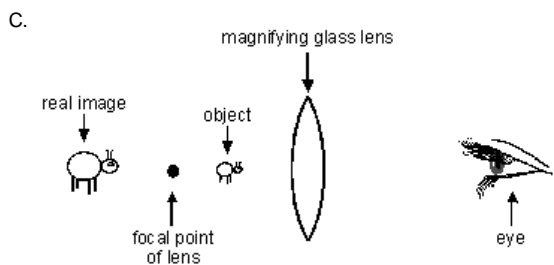


Which of the following processes does this diagram best represent?

- RNA transcription
- active transport
- DNA replication
- protein synthesis

3. Each of the diagrams below illustrates an object between a magnifying glass and the focal point of the lens. The eye represents an observer looking at the object through the lens. Which of the following diagrams correctly shows the type of image formed and its position and orientation?

- Diagram A shows a magnifying glass lens. An object is placed between the lens and its focal point. A virtual, upright, and magnified image is formed on the same side of the lens as the object. An eye is shown looking through the lens at the object.
- Diagram B shows a magnifying glass lens. An object is placed between the lens and its focal point. A virtual, inverted, and magnified image is formed on the opposite side of the lens from the object. An eye is shown looking through the lens at the object.



4. During a unit on crime scene chemistry, students find a message written in blue ink on a piece of white paper. There are three different brands of blue-ink pens at the scene, and the students need to figure out which pen may have written the message. Which of the following techniques would be most appropriate for this activity?

- A. titration
- B. chromatography
- C. distillation
- D. electrophoresis

5. A chemical substance with which of the following properties would be classified as a base?

- A. an aqueous substance that can accept hydrogen ions
- B. a substance that produces hydrogen ions during a reaction
- C. an ionic compound with a positive charge
- D. an element that reacts with negative ions to produce a neutral compound

Answer Key

Item Number	Correct Response	Subarea	Objective
1	B	I. Life Science	0008
2	D	I. Life Science	0009
3	A	II. Physical Science	0013
4	B	II. Physical Science	0015
5	A	II. Physical Science	0016

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