

Key Exam Review Cell Theory / Function / Structure / Comp.

- ④ Responses will vary. Plant and animal cells have many components in common: nuclei, ribosomes, rough ER, smooth ER, mitochondria, cytoskeleton, cell membrane, cell junctions. Only plants have a cell wall and chloroplasts.

Parts of a Eukaryotic Cell, pages 58-62

- ⑤ The RER is covered in ribosomes, which synthesize proteins. The SER is not covered with nearly so many ribosomes, and instead synthesizes lipids and carbohydrates.
- ⑥ The Golgi apparatus stores, modifies, and ships proteins manufactured by the ribosomes on the RER and other molecules produced by the SER.
- ⑦ Lysosomes and peroxisomes both contain enzymes that digest compounds. Peroxisomes break down hydrogen peroxide, and lysosomes do not.
- ⑧ Animals get their sugar molecules from eating other organisms.
- ⑨ Chloroplasts and mitochondria are both membrane-bound organelles. They both process sugar molecules. Only the chloroplasts contain chlorophyll, which captures sunlight and converts it to sugar molecules. Only the mitochondria decompose the sugars to make ATP. Plants have both chloroplasts and mitochondria; animals have only mitochondria.
- Plant cells have cell walls; animal cells do not. Animal cells have centrioles; plant cells do not.
- ⑩ Explanations will vary. The concentration of water molecules is greater outside the bacteria than inside. To equalize this gradient, water molecules continually enter the bacteria. Under normal circumstances, the bacteria's cell walls prevent them from swelling to the bursting point. Cell walls

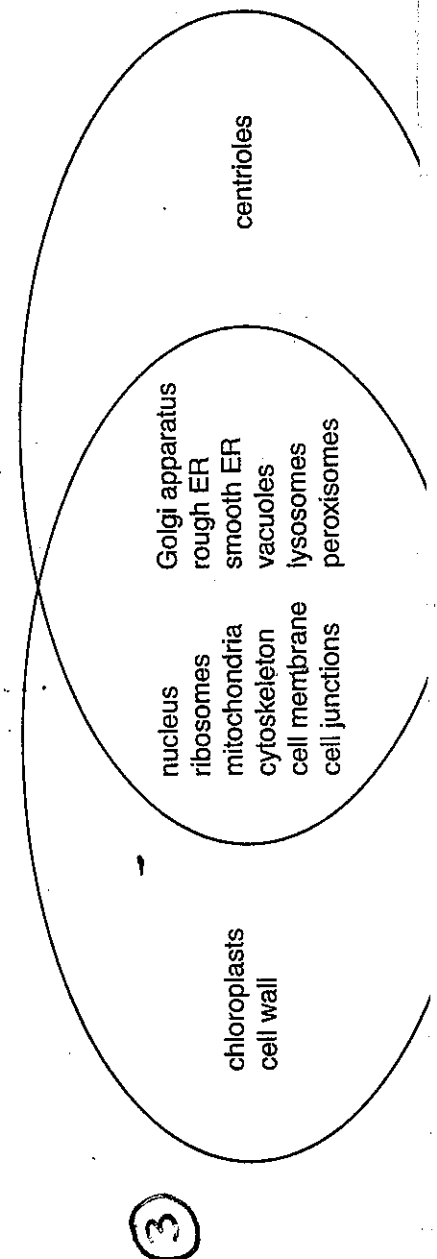
weakened by penicillin cannot perform this function, so the bacteria swell with water molecules until they burst.

Cells, Tissues, Organs, Organ Systems, pages 62 and 63

- ⑪ mitochondria

Eukaryotic and Prokaryotic Cells, pages 56-58

- ① • a eukaryotic cell
- ② • a eukaryotic cell



Energy & Ecosystems Key

Review 13: Energy and Ecosystems

Hierarchy in Ecosystems, page 200

- ① Producers get their energy from the Sun to manufacture food. The energy from the foods they make then travels through the food chain until it reaches secondary consumers such as an eagle. Thus, the energy travels from the Sun through the producers to a consumer such as an eagle.
- ② Responses will vary. In a forest, a producer might be a shrub. A mouse that eats the shrub would be a primary consumer, and an owl that eats the mouse would be a secondary consumer.

The Movement of Energy in an Ecosystem, pages 201 and 202

- ③ Responses will vary. Much of the chemical energy is lost as heat as soon as the gasoline is burned. Some of the gasoline's chemical energy becomes the car's kinetic energy (energy of motion). Some of the chemical energy is also turned into electrical energy to power the headlights, the horn, the radio, and so on.
- ④ 30,000,000; 30,000,000; 3,000,000
- ⑤ Responses will vary. More energy is available to the trophic level at which the rabbits live than is available to the trophic level at which the wolves live. What's more, rabbits are smaller than wolves, so the energy needs of rabbits are less than wolves. For these reasons, an ecosystem can sustain many more rabbits than wolves.

Models of Ecosystems, pages 202-204

- ⑥ Yes. Students should be able to show through simple calculations that this biomass pyramid follows the ten percent rule. Point out that not all biomass pyramids follow the ten percent rule.

Food Webs, pages 204 and 205

- ⑦ The bear has a diet most similar to that of a typical human. As a high-level omnivore, it eats large fish and berries.
- ⑧ Responses will vary. Simplifications include that most organisms in the food web have a more varied diet than indicated, different types of insects may feed on other insects, and so on.
- ⑨ Two: The pike and the heron use the minnow for food.

Relationships in an Ecosystem, pages 205 and 206

- ⑩ Responses will vary. Symbiosis is more than just physical proximity between two species; it is a relationship in which at least one of the species benefits.

Review 14: Populations

Population, Community, Habitat, pages 213 and 214

- ① Responses will vary. The natural habitat of the bison is prairie. The abiotic factors of a prairie include considerable sunlight throughout the year, regular precipitation, and summer and winter seasons. Biotic factors include grasses and shrubs to graze on.
- ② Responses will vary. Bison are grazers, and feed primarily on grasses and sagebrush. In the past, huge populations of bison roamed the grasslands of North America. Their grazing influenced the composition of plant and animal communities.

Limiting Factors, pages 214 and 215

- ③ Responses will vary. The government's elimination of the wolf population caused the deer population in the Grand Canyon to increase rapidly. This led to overpopulation, increasing incidents of disease and starvation among the deer.

Population Density, pages 215 and 216

- ④ The population density is 50 caterpillars per square meter.
- ⑤ Responses will vary. The size of a population is the absolute number of individuals within the habitat. The population density is the number of individuals per unit of area. In the previous question, the size of the population was 2,500 caterpillars, and the population density was 50 caterpillars per square meter.
- ⑥ Responses will vary. Predation of rabbits by foxes increases only when the number of rabbits per unit of area increases. In other words, predation is a density-dependent factor because the foxes start preying on rabbits only when the population density of the rabbits increases.

Populations Key

Changes in Population Size, pages 216 and 217

- ⑦ increasing
- ⑧ Responses will vary. Students may point out that immigration to the United States is also causing the population to increase.
- ⑨ The rabbit population did not change at all during the year.

Graphing Populations, pages 218-220

- ⑩ Responses will vary. Estimating the size of a population is a good strategy when there are so many individuals in a population that counting them all would take far too much time.

- ⑪ Responses will vary. Some ecologists argue that technological advances (techniques for growing greater numbers of crops, better methods of controlling contagious diseases) will assure the larger carrying capacity of 50 billion humans. Other ecologists claim that even with technological advances, the total resources of the Earth cannot sustain even the present human population.
- ⑫ Responses will vary.
- ⑬ Responses will vary. A graph of a population in such an environment would oscillate fairly wildly around the carrying capacity.