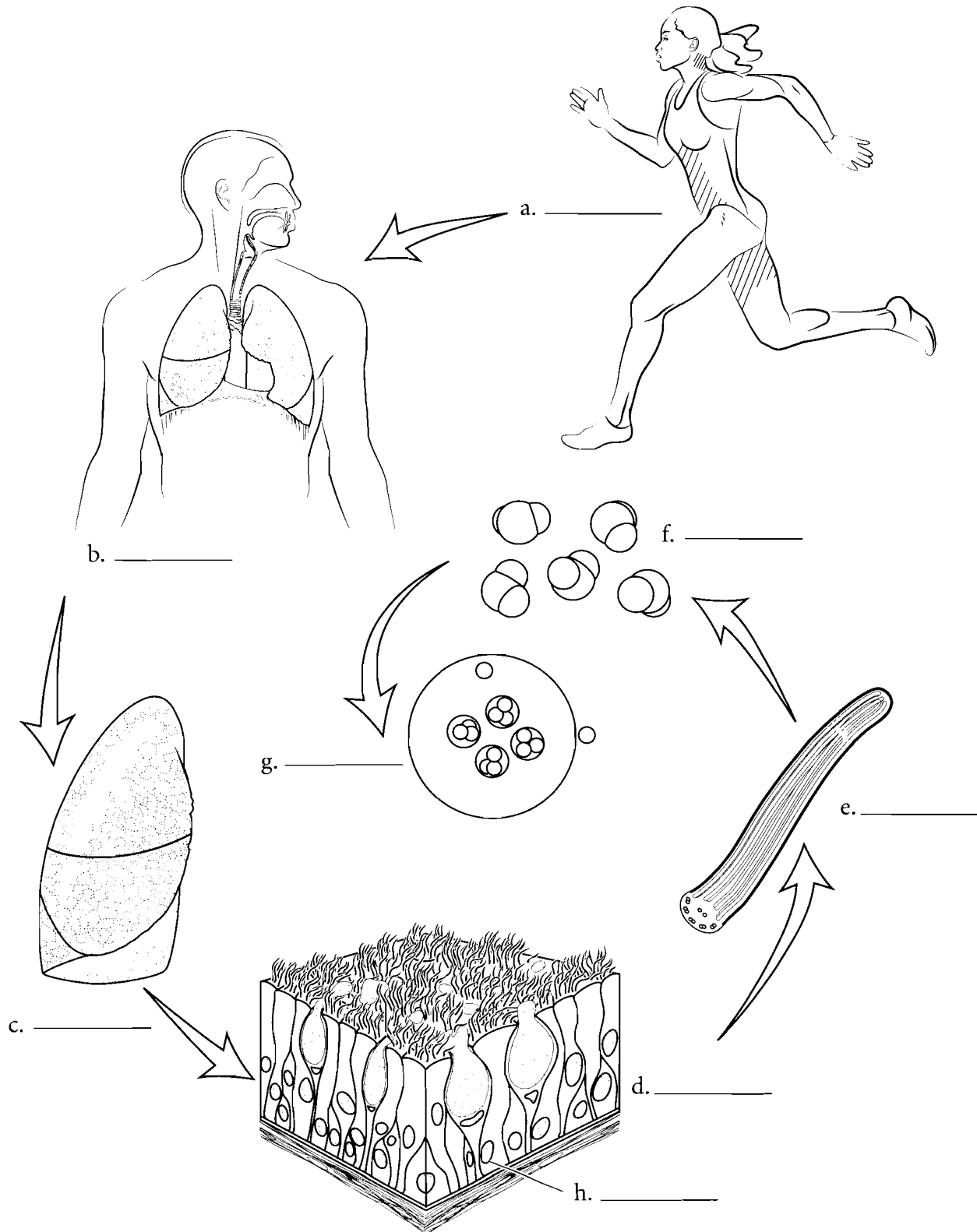


HIERARCHY OF THE BODY

The human body can be studied at different levels. Organs such as the stomach can be grouped into organ systems (digestive system) or can be studied on a smaller scale like the cellular level. The ranking of these levels is called a **hierarchy**. The smallest organizational unit is the **atom**. Individual atoms are grouped into larger structures called **molecules**.

These in turn make up **organelles**, which are part of a larger, more complicated systems called **cells**. Cells are the structural and functional units of life. Cells are clustered into **tissues**. **Organs** are discrete units made up of two or more tissues and organs are grouped into **organ systems** that compose the **organism**. Label the levels of the hierarchy and color each item a different color.



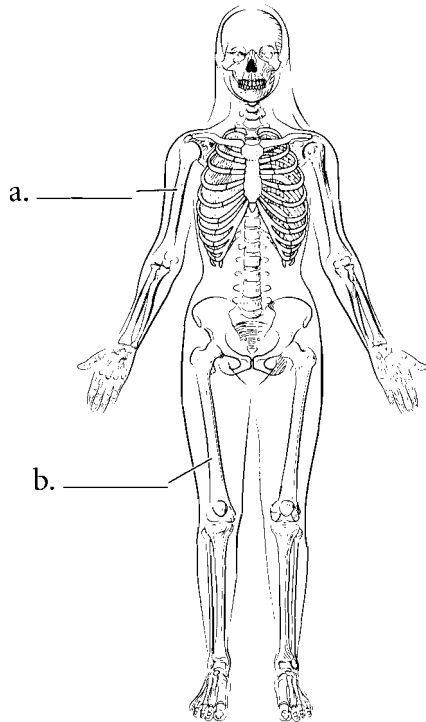
Answer Key: a. Organism (human), b. Organ system (respiratory system) c. Organ (lung), d. Tissue (epithelium), e. Organelle (cilium), f. Molecule, g. Atom, h. cells

ORGAN SYSTEMS

The human body is either studied by regions or by organs systems. This book uses the organ system approach in which individual organs (such as bones) are grouped into the larger organ system (for example, the skeletal system). Typically eleven organ systems are described. The **skeletal system** consists of all of the bones of the body. Examples are the **femur** and the **humerus**. The **nervous system** consists of the **nerves**, **spinal cord**, and **brain** while the **lymphatic system** consists of **lymph glands**, conducting tubes called **lymphatics**, and organs such as the **spleen**. The term immune system is more of a functional classification

and will not be treated as a separate system here. The **muscular system** consists of individual skeletal muscles as organs such as the **pectoralis major** and **deltoid**. Label the organ systems underneath each illustration and label the selected organs by using the terms available. When you finish, select different colors for each organ system and color them in.

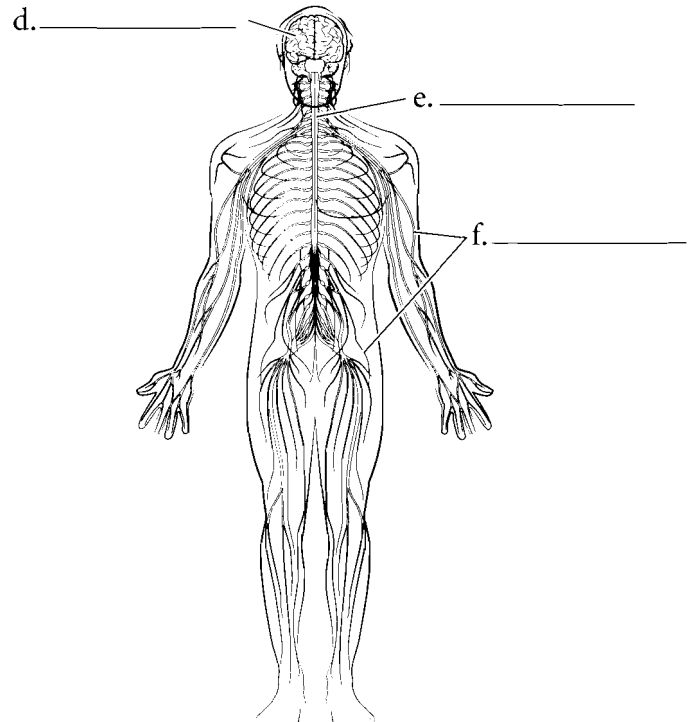
Organ System	Organ	Organ	Organ
Skeletal system	Femur	Humerus	
Nervous system	Nerves	Spinal cord	Brain
Lymphatic system	Lymph glands	Spleen	
Muscular system	Pectoralis major	Deltoid	



a. _____

b. _____

c. _____

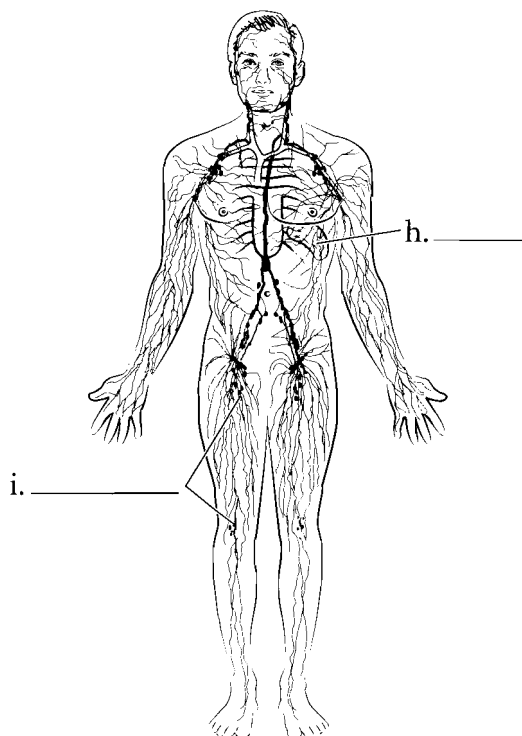


d. _____

e. _____

f. _____

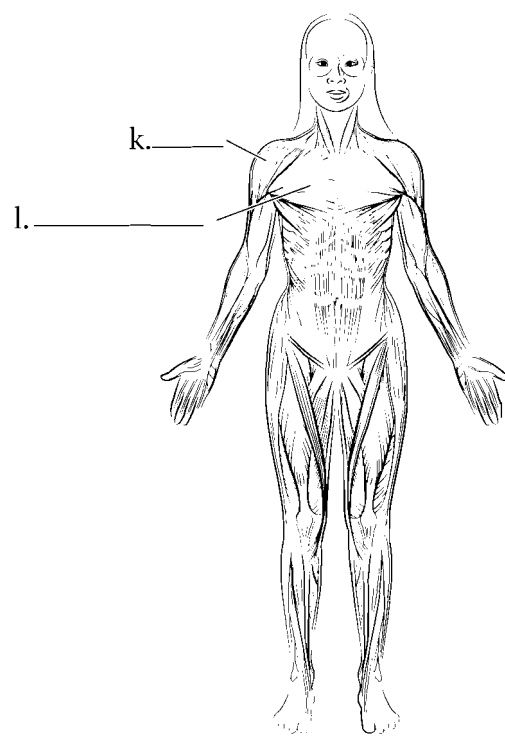
g. _____



h. _____

i. _____

j. _____



l. _____

k. _____

m. _____

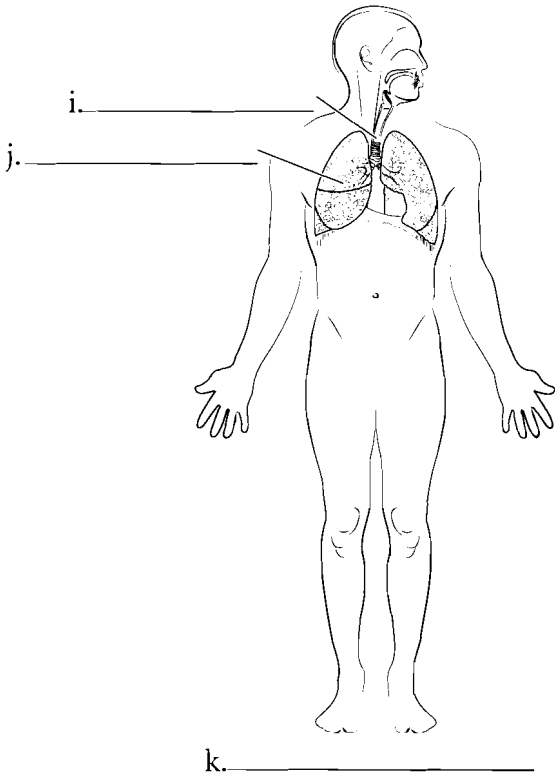
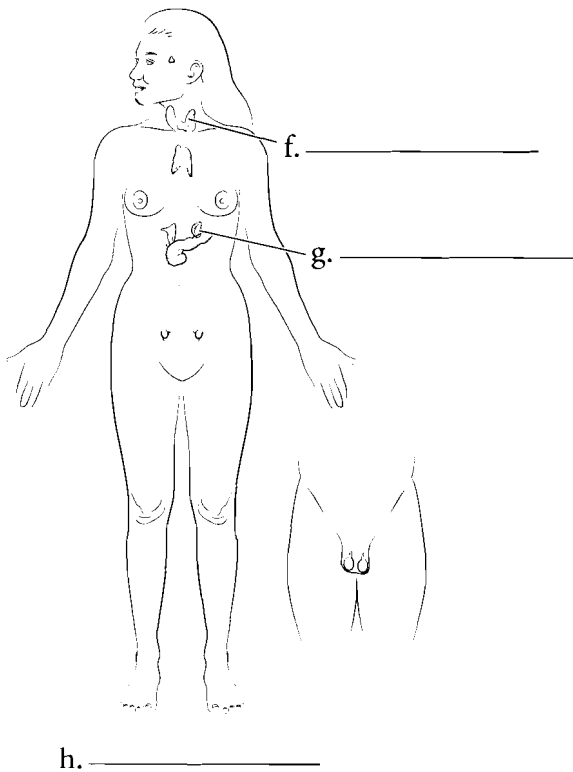
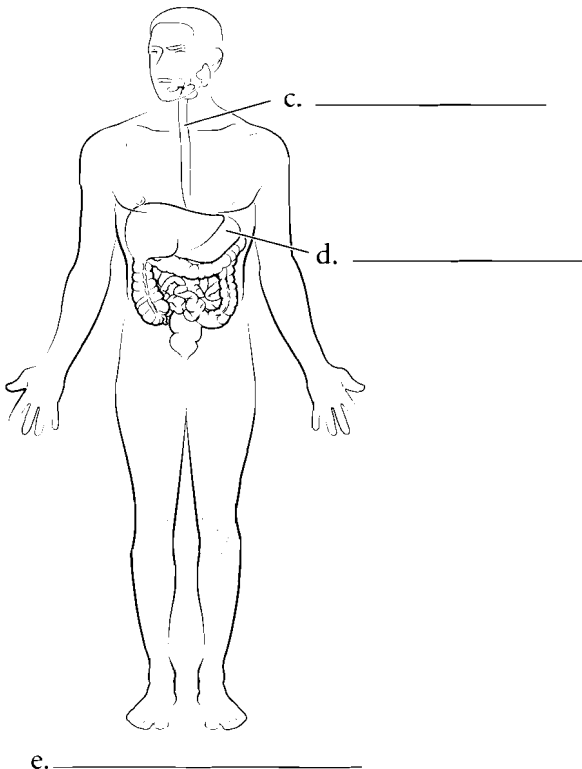
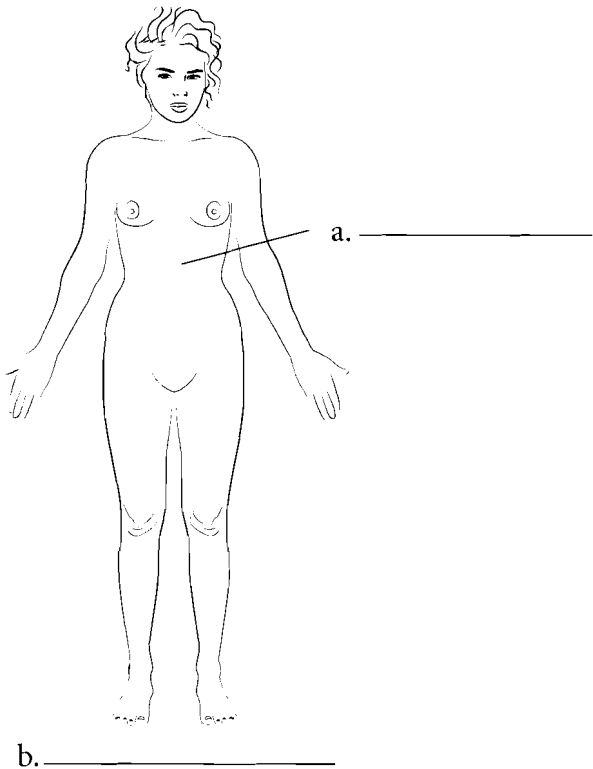
Answer Key:
a. Humerus,
b. Femur, c. Skeletal,
d. Brain, e. Spinal
cord, f. Nerves,
g. Nervous,
h. Spleen, i. Lymph
nodes, j. Lymphatic,
k. Deltoid,
l. Pectoralis major,
m. Muscular

ORGAN SYSTEMS (CONTINUED)

The **skin** and other structures are in the **integumentary system** and the **digestive system** involves the breakdown and absorption of food with organs such as the **esophagus** and **stomach**. The **endocrine system** is made of the glands that secrete hormones such as the **thyroid gland** and the **adrenal glands**. The **respiratory system** involves the transfer of oxygen and carbon dioxide between the air and the blood. The respiratory system consists of organs such as the **trachea** and **lungs**.

Label the organ systems underneath each illustration and label the selected organs by using the terms available. When you finish, select different colors for each organ system and color them in.

Organ System	Organ	Organ
Integumentary system	Skin	
Digestive system	Esophagus	Stomach
Endocrine system	Thyroid gland	Adrenal glands
Respiratory system	Trachea	Lungs

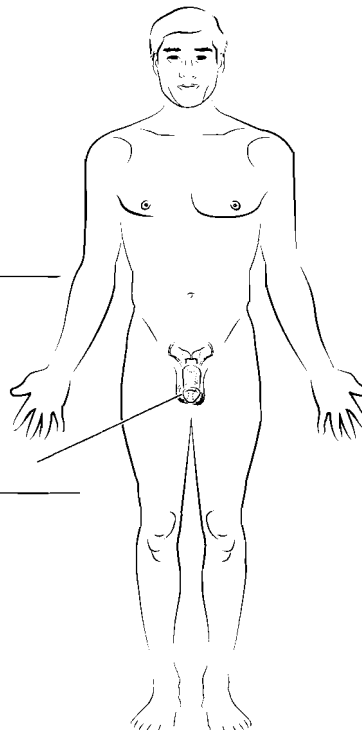
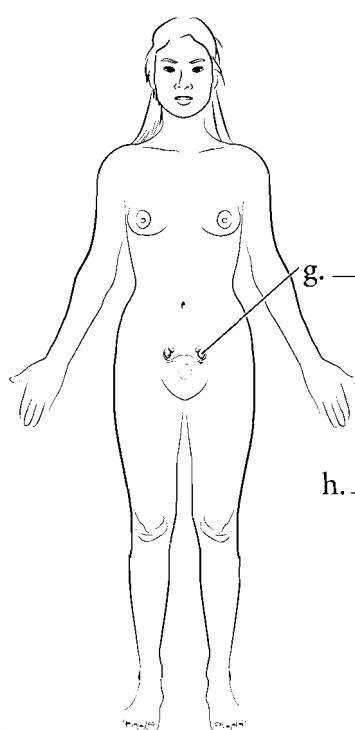
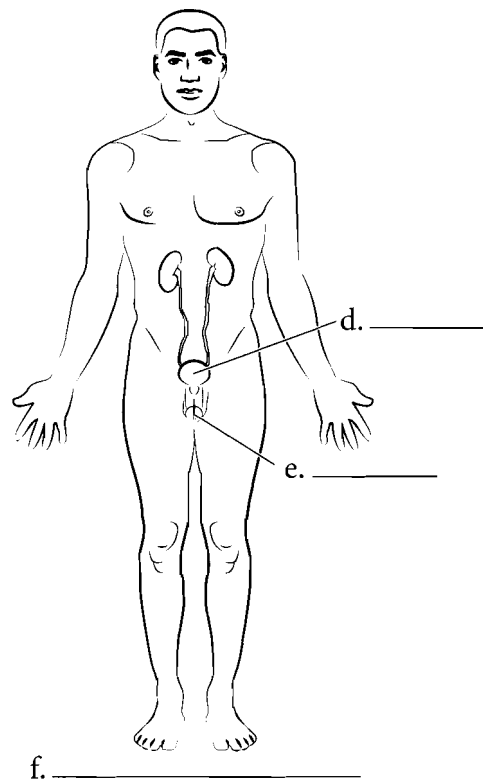
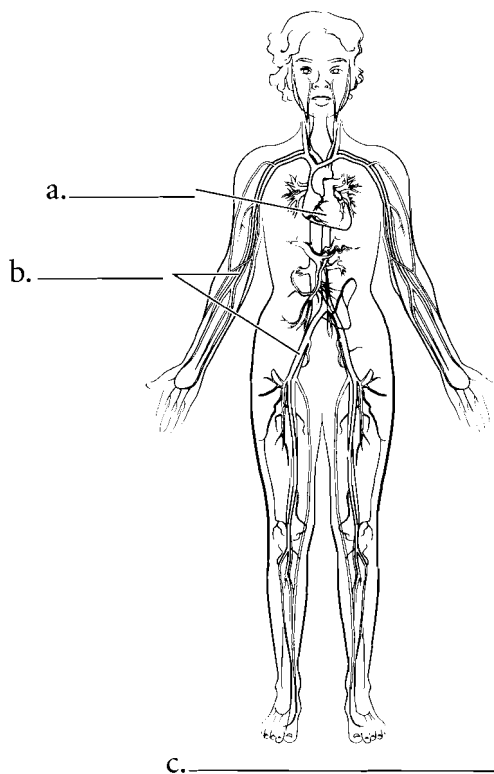


ORGAN SYSTEMS (CONTINUED)

The **heart** and associated **blood vessels** compose the **cardiovascular system** which circulates blood throughout the body. The **urinary system** filters, stores, and conducts some wastes from the body. The **bladder** and **urethra** are part of the **urinary system**. The **testes** and **ovaries** are part of the **reproductive system** and this system perpetuates the species. The differentiation of male and female systems makes this organ system unique among the other systems. These eleven organ systems can be remembered by the memory clue **LN Cries Drum**. Each letter represents

the first letter of a name of an organ system. Label the organ systems underneath each illustration and label the selected organs by using the terms available. When you finish, select different colors for each organ system and color them in.

Organ System	Organ	Organ
Cardiovascular system	Heart	Blood vessels
Urinary system	Bladder	Urethra
Reproductive system	Testes	Ovaries



Answer Key: a. Heart, b. Blood vessels, c. Cardiovascular, d. Bladder, e. Urethra, f. Urinary, g. Ovary, h. Testis, i. Reproductive

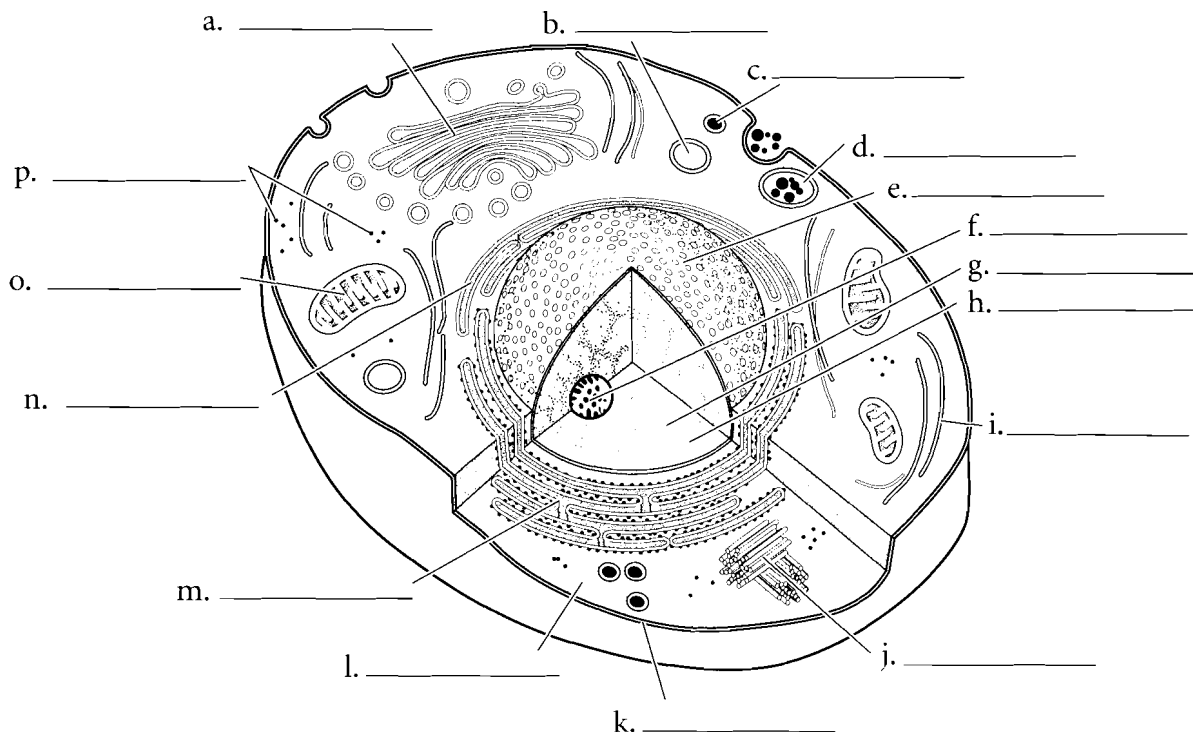
OVERVIEW OF CELL AND CELL MEMBRANE

Cells consist of an enclosing **plasma membrane**, an inner **cytoplasm** with numerous **organelles**, and other cellular structures. The fluid portion of the cell is called the **cytosol**. Color the cytosol in last after you color the rest of the cellular structures. One of the major structures in the cell is the **nucleus**. It is the genetic center of the cell and consists of fluid **karyoplasm**, **chromatin** (containing DNA), and the **nucleolus**. Color these features and label them on the illustration.

The **cytoskeleton** consists of microtubules, intermediate filaments and microfilaments. It is involved in maintaining cell shape, fixing organelles, and directing some cellular activity.

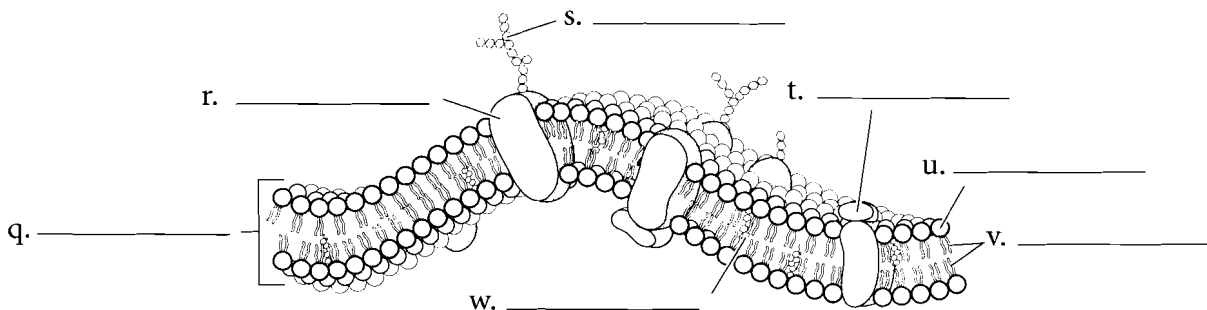
Label the organelles of the cell and use a different color for each one. The **mitochondria** are the energy-producing structures of the cell while the

Golgi apparatus assembles complex biomolecules and transports them out of the cell. Proteins are made in the cell by ribosomes. If the ribosomes are found by themselves in the cytoplasm, they are called **free ribosomes**. If they are attached to the **rough endoplasmic reticulum**, they are called **bound ribosomes**. The **smooth endoplasmic reticulum** manufactures lipids and helps in breaking down toxic materials in the cell. Other structures in the cell are **vesicles** (sacs that hold liquids). **Phagocytic vesicles** ingest material into the cell. **Lysosomes** contain digestive enzymes while **peroxisomes** degrade hydrogen peroxide in the cell. After you label and color the organelles make sure to go back and shade in the cytosol. **Centrioles** are microtubules grouped together and are involved in cell division.



The **plasma membrane** is composed of a **phospholipid bilayer**. Color the **phosphate molecules** on the outside and inside of the membrane one color and the **lipid layer** another color. **Cholesterol molecules** occur in the membrane and, depending on their concentration, can make the membrane stiff or more fluid. Proteins that are found on the outside of the membrane are called **peripheral proteins** while proteins that pass

through the membrane are called **integral proteins**. Frequently these make up gates or channels that allow material to pass through the membrane. Attached to proteins on the cell membrane are **carbohydrate chains**. These provide cellular identity. Label and color the cell membrane structures.



Answer Key: a. Golgi apparatus, b. Lysosome, c. Peroxisome, d. Phagocytic vesicle, e. Nucleus, f. Nucleolus, g. Chromatin, h. Karyoplasm, i. Cytoskeleton, j. Centrioles, k. Plasma membrane, l. Cytoplasm, m. Rough endoplasmic reticulum, n. Smooth endoplasmic reticulum, o. Mitochondrion, p. Free ribosomes, q. Phospholipid bilayer, r. Integral protein, s. Carbohydrate chain, t. Peripheral protein, u. Phosphate molecule, v. Lipid layer, w. Cholesterol molecule