Cells to Tissues to Organs to Organ Systems

http://staff.norman.k12.ok.us/~amcamis/Cells%20Tissues%20Etc.htm

Cells - the basic unit of life
http://learn.genetics.utah.edu/content/cells/insideacell/

Tissues: a group of similar cells working together to perform a job

- Connective Tissue - bones, cartilage, ligaments, tendons, blood
- Epithelial Tissue - skin, body coverings/openings
- Muscle Tissue - skeletal muscle, smooth muscle (digestive), cardiac muscle (heart)
- Nervous Tissue - nerves, brain, spinal cord

Mike the Microscope will show you the 4 tissue types
Levels of Organization in the Body: Cells < Tissues < Organs < Organ Systems

Connect the cells to their corresponding tissue and organ, then name the organ system.

**Cells**

**Tissue**

**Organs of the Organ System**

- Skin of the **Integumentary** System
- Brain of the **Nervous** System
- Muscles of the **Muscular** System
- Heart of the **Circulatory** System
- Stomach of the **Digestive** System
- Bone of the **Skeletal** System

©Everything Kids Human Body Book by Sheri Amsel www.exploringnature.org
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.
Fig. 7. The human body and types of tissue cells (cells greatly enlarged). Upper left, nerve cell and its fibers; below, in order, muscle cells of the arm, connective tissue surrounding muscle, tough fibrous connective tissue of a tendon. Upper right, cells of cartilage; below, in order, outer cells of skin, structure of bone, cells of fatty tissue.
<table>
<thead>
<tr>
<th>Level of Organization</th>
<th>Explanation</th>
<th>Example</th>
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<tbody>
<tr>
<td><strong>Atomic Level</strong></td>
<td>Atoms are defined as the smallest unit of an element that still maintains the property of that element.</td>
<td>Carbon, Hydrogen, Oxygen</td>
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<tr>
<td><strong>Molecular Level</strong></td>
<td>Atoms combine to form molecules which can have entirely different properties than the atoms they contain.</td>
<td>Water, DNA, Carbohydrates</td>
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<tr>
<td><strong>Cellular Level</strong></td>
<td>Cells are the smallest unit of life. Cells are enclosed by a membrane or cell wall and in multicellular organisms often perform specific functions.</td>
<td>Muscle cell, Skin cell, Neuron</td>
</tr>
<tr>
<td><strong>Tissue Level</strong></td>
<td>Tissues are groups of cells with similar functions</td>
<td>Muscle, Epithelial, Connective</td>
</tr>
<tr>
<td><strong>Organ Level</strong></td>
<td>Organs are two or more types of tissues that work together to complete a specific task.</td>
<td>Heart, Liver, Stomach</td>
</tr>
<tr>
<td><strong>Organ System Level</strong></td>
<td>An organ system is group of organs that carries out more generalized set of functions.</td>
<td>Digestive System, Circulatory System</td>
</tr>
<tr>
<td><strong>Organismal Level</strong></td>
<td>An organism has several organ systems that function together.</td>
<td>Human</td>
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</table>
A blow that does not cut the skin may break blood vessels underneath. That causes blood to pool and form a bruise. A blow that does cut the skin sets certain bodily defenses in motion.

1. Blood forms a clot, to prevent further bleeding.
2. Blood and skin both release chemicals that pull the edges of the wound together and form a scab.
3. Blood also releases chemicals to attack bacteria and to stimulate new skin growth.
4. A layer of skin forms under the scab, allowing it to finally flake or drop off. The skin underneath looks pinkish because blood is still bringing nutrients and oxygen to help it grow.

Yeah, this is Frank in sector 12, and we need help down here! Some of my guys are getting away.

Tuck me in?

Zap!

Pore guy...
Muscle

**cardiac muscle**
(striated muscle of heart under involuntary control)

[skeletal muscle](#)
(striated muscles of arms, legs, neck, head, and torso under voluntary control)

**smooth muscle**
(non-striated muscles of the blood vessels, digestive system, respiratory system, urinary tract and reproductive system under involuntary control)

**cardiac muscle cell**

**skeletal muscle cell**

**smooth muscle cell**