

SNC2D BIOLOGY

TISSUES, ORGANS & SYSTEMS OF ...
✦ The Hierarchy of Structure
(P.??-??)

Cells Working Together

Single-celled organisms, such as bacteria and yeast, can survive on their own. They do not depend on any other cells. Animal cells, however, cannot survive independently for long. A single skin cell or muscle cell quickly dies if it is separated from the cells that surround it. These cells live and work as part of a much larger group of cells. Together, the various cells make up the body of the animal.

NOTE!

To understand how specialized cells work together, think about the many major tasks that animal bodies must carry out in order for them to survive – eating, breathing, moving, reproducing, ...

Cells Working Together

*Yet all animals are made up of cells that are organized in a way that allows them to perform all of life's functions. These levels of organization form a **hierarchy**, with the "most complex" at the top and the "least complex" at the bottom.*

HIERARCHY

- ✦ levels of organization

The Hierarchy of Structure in Animals

THE HIERARCHY OF STRUCTURE

*Level 5 – **organism** (many different organ systems working together)*

*Level 4 – **organ system** (one or more organs that work together to perform a body function)*

*Level 3 – **organ** (structure made of two or more types of tissue that work together to do a specific task)*

*Level 2 – **tissue** (group of similar cells that perform the same function)*

*Level 1 – **cells** (the most basic unit of living things)*

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The Hierarchy of Structure in Plants

NOTE!

*Plants have a similar hierarchy of structure to animals except that the plant body can be divided into two main **organ systems** – the root system and the shoot system. This contrasts strikingly with animals, which are made up of many organ systems including the respiratory system, the circulatory system, the urinary system, the nervous system, the digestive system, the reproductive system, and the musculoskeletal system.*

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The Hierarchy of Structure in Animals & Plants

PRACTICE

1. Why don't plants have as many organ systems?

Since plants use photosynthesis to make their own food they do not need to move around in search of food. As a result they do not need the complex organ systems found in animals. However, plants do have to perform many of the same functions as animals.

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 **The Hierarchy of Structure in Animals & Plants**

PRACTICE

2. List three functions that plants and animals share.

- they need to exchange gases with their surroundings
- they need an internal transportation system to move water and nutrients around their bodies
- they need a way to reproduce

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 **The Hierarchy of Structure in Animals & Plants**


ANIMAL/PLANT CELLS

- ❖ cannot survive independently
- ❖ live and work as part of a much larger group
- ❖ organized in a hierarchy

cell → tissue → organ → organ system → organism

cell	basic building block of life
tissue	cells working together to carry out a specific function
organ	tissues working together to carry out a complex task
organ system	organs working together to perform a vital body function
organism	different organ systems working together


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 **✓ Check Your Learning**

1. How are tissues and organs related?

organs are made up of tissues working together


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 **Check Your Learning**

2. How are organ systems more complex than specialized cells?

organ systems perform vital body functions whereas specialized cells perform single very specialized functions


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 **Check Your Learning**






3. Most animals have the same kinds of organ systems. Why do you think there are not dozens or even hundreds of completely different kinds of organ systems?

since the required body functions are similar the organ systems needed are similar as well (i.e. circulation, digestion, reproduction, ...)

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 **Check Your Learning**

4. Draw a diagram to show the levels of organization in the human body. Use the heart as the organ in your example.

(a)	(b)	(c)	(d)	(e)
				
cell heart cell	tissue heart muscle	organ heart	organ system circulatory system	organism human

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