What is Biology?
This assignment is for college introductory biology students in their first week of class. It asks students to apply the definition of biology to categorize and rank topics described in the video below. Instructors can use all questions below, but there is some redundancy. It may be more appropriate to pick which questions are best for your class.

Watch the video below (it will open in your browser)

http://youtu.be/6Ni5HOdGtzM

Assessment questions

General questions about biology

1. Determine which topics discussed in the video have to do with biology. Briefly describe each biologically related fact.

- Cashews grow on apples. The apple is an accessory fruit.
- Mushrooms are more closely related to animals than to plants; the common ancestor of mushrooms and animals occurred more recently than the common ancestor of mushrooms and plants.
- Trees grow out of the air; carbon dioxide from the air becomes the carbon of the tree.

- The brain has more synapses in its cerebral cortex than the milky way galaxy has stars.
- Your body replaces itself every 10 years. Body cells are constantly being replaced.
- The human body has more bacterial cells than body cells.
- Dragonflies can't walk, even though they have legs.
- Clownfish can change sex. A dominant male becomes a female if the female dies.
- Tyrannosaurus lived closer to today than to the stegosaurus.
- You are now breathing manually. Breathing becomes conscious when someone mentions it.

2. Rank order these claims from what you perceive as most important or the biggest ideas to the least important or smallest ideas. Give a short explanation for why you ranked each idea as you did. [Below is an example answer, which probably includes more specific details than many first-week students could provide. Other orders could be justified. The idea is to get students thinking about big concepts rather than memorizing facts.]

- Mushrooms are more closely related to animals than to plants. (This topic describes the evolutionary relatedness of many organisms, explaining similarities in their genetics and physiology.)
- Tyrannosaurus lived closer to today than to the stegosaurus. (The concept of time is important for understanding similarities between organisms.)
- Clownfish can change sex. (This adaptation increases the clownfish's reproductive success.)
- Trees grow out of the air. (This ecosystem level interaction explains an organism's growth.)
- Your body replaces itself every 10 years. Body cells are constantly being replaced. (Mitosis allows multicellular organisms, like humans, to live longer than the individual cells that they're composed of. Many organisms undergo mitosis.)
- The brain has more synapses in its cerebral cortex than the milky way galaxy has stars. (Human brain connections are numerous, allowing complex motor functions and thoughts. Other organisms have brains too, but the connections aren't as numerous.)
- The human body has more bacterial cells than body cells. (Organism communities are everywhere, including in and on us.)
- You are now breathing manually. Breathing becomes conscious when someone mentions it. (This fact exploits our conscious minds.)
- Cashews grow on apples. The apple is an accessory fruit. (This describes plant structures. It is specific to only a few types of plants.)
- Dragonflies can't walk, even though they have legs. (While interesting, this fact is specific to dragonflies and does little to inform about other organisms.)

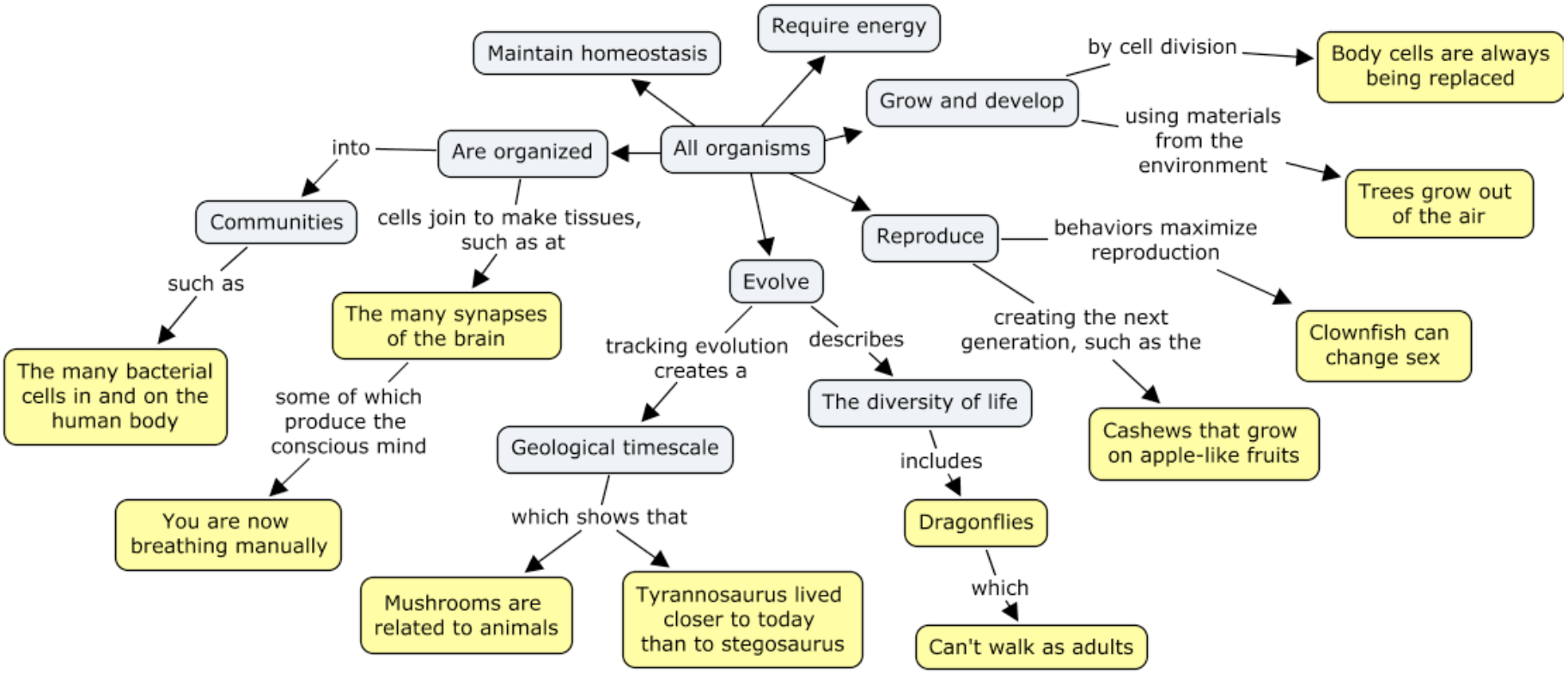
Here is a book and/or syllabus orientation exercise:

3. Match each of the topics that you chose in question 1 with the book chapter that is most closely related to it. (This question can also be about the syllabus: Match each of the topics you chose in the previous question with the unit of the course when we will discuss it.)

- Cashews grow on apples: Chapter 23 (Concepts 2e); Chapter 22 (Essentials)
- Mushrooms are more closely related to animals than to plants: Chapters 1 and 14 (Concepts 2e); Chapters 1 and 15 (Essentials)
- Trees grow out of the air: Chapter 5 (both Concepts 2e and Essentials)
- The brain has many synapses: Chapter 25 (Concepts 2e); Chapter 24 (Essentials)
- Body cells are constantly being replaced: Chapter 8 (both Concepts 2e and Essentials)
- The human body has more bacterial cells than body cells: Chapter 3 (both Concepts 2e and Essentials)
- Dragonflies can't walk, even though they have legs: Chapter 20 (Concepts 2e); chapter 17 (Essentials)
- Clownfish can change sex: Chapter 34 and 35 (Concepts 2e); Chapter 30 (Essentials)
- Tyrannosaurus lived closer to today than to the stegosaurus: Chapter 12 (Concepts 2e); Chapter 13 (Essentials)
- You are now breathing manually. Chapters 25 and 30 (Concepts 2e); Chapters 24 and 27 (Essentials)

And finally, a concept map

4. Build a concept map linking all of the biology-related ideas together. You can add boxes and connecting phrases. [A student's answer does not need to be sophisticated. This exercise should help students realize that everything in biology is related. Below is an example answer.]


All organisms
Require energy
Maintain homeostasis
Are organized
into
Communities
such as
The many bacterial cells in and on the human body
cells join to make tissues, such as at
The many synapses of the brain
some of which produce the conscious mind
You are now breathing manually
Grow and develop
by cell division
Body cells are always being replaced
using materials from the environment
Trees grow out of the air
Reproduce
behaviors maximize reproduction
Clownfish can change sex
creating the next generation, such as the
Cashews that grow on apple-like fruits
Evolve
tracking evolution creates a
Geological timescale
which shows that
Mushrooms are related to animals
Tyrannosaurus lived closer to today than to stegosaurus
describes
The diversity of life
includes
Dragonflies
which
Can't walk as adults