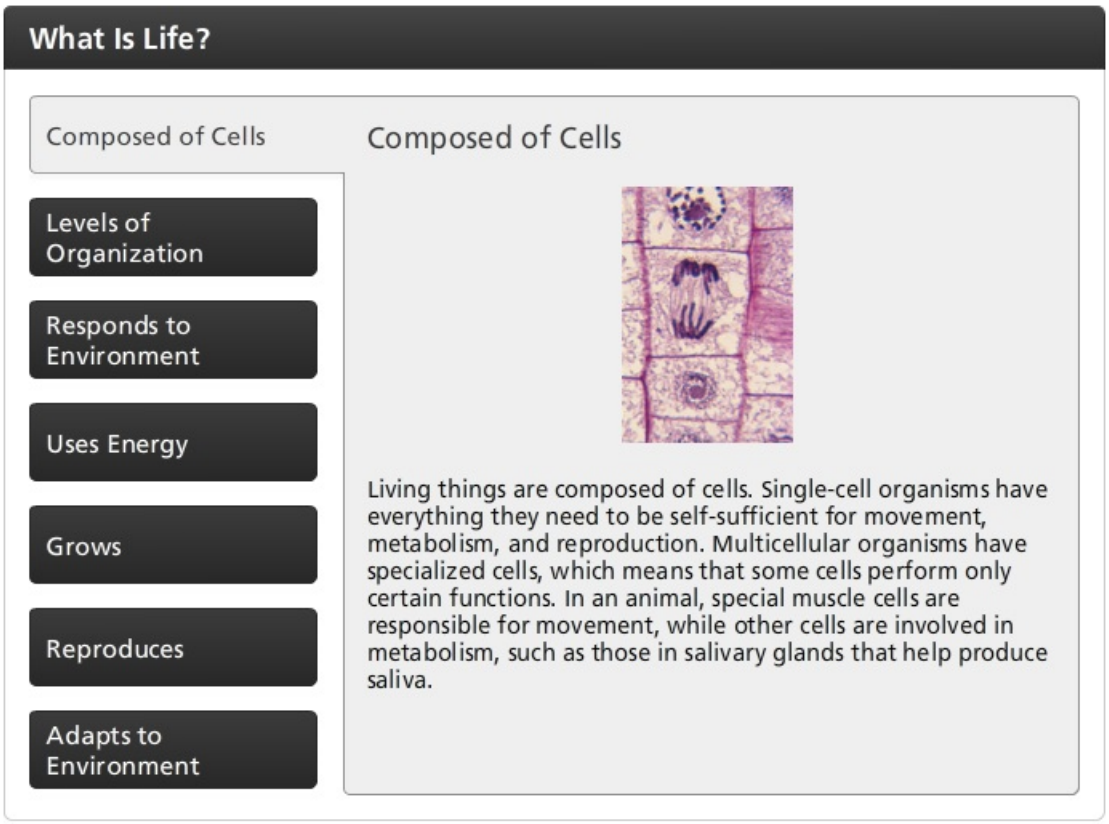
Module 8: Biological Oceanography
Topic 1 Content: What is Life? Notes

What is life? While it is difficult to come up with one singular definition, scientists use seven characteristics to classify organisms as "being alive". In this interactivity, click each tab to learn about each of these characteristics.

Module 8: Biological Oceanography
Topic 1 Content: What is Life? Notes

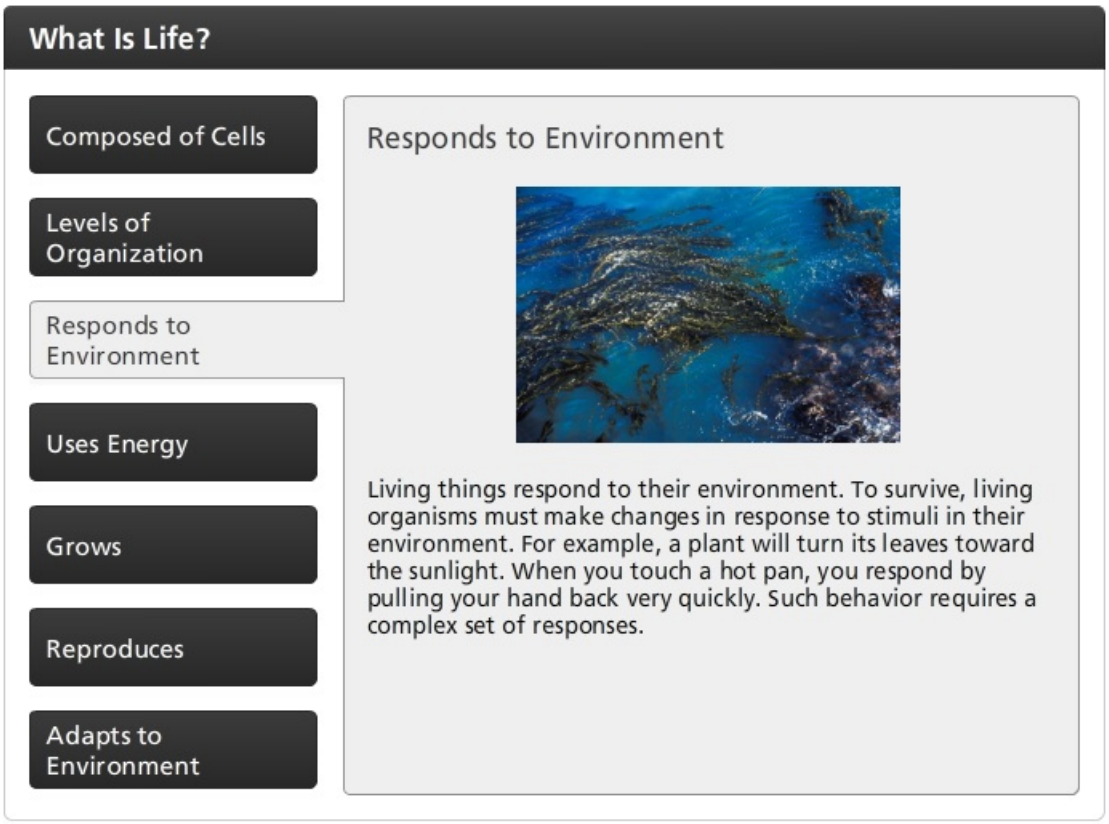


Living things are composed of cells. Single-cell organisms have everything they need to be self-sufficient for movement, metabolism, and reproduction. Multicellular organisms have specialized cells, which means that some cells perform only certain functions. In an animal, special muscle cells are responsible for movement, while other cells are involved in metabolism, such as those in salivary glands that help produce saliva.

Module 8: Biological Oceanography
Topic 1 Content: What is Life? Notes

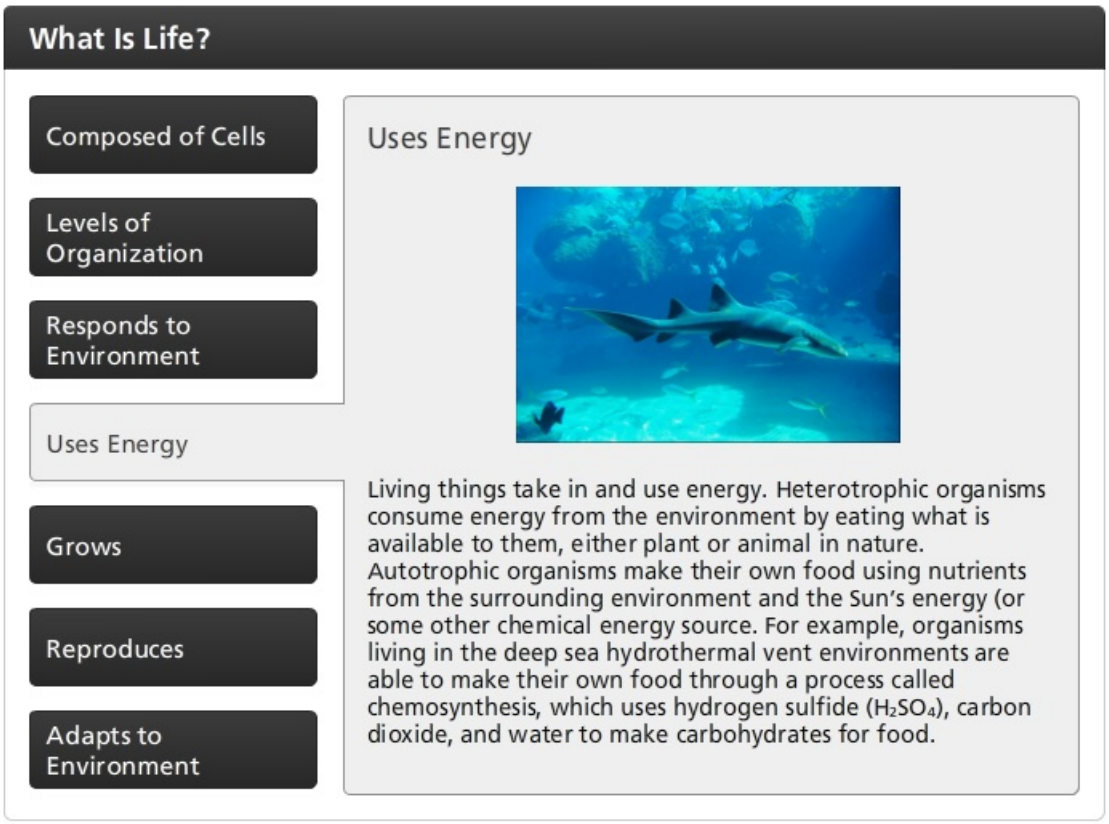
Living things have different levels of organization. At the molecular level, living things must be able to organize simple substances into complex ones, like when your body uses the nutrients it obtains from food to create proteins. In most animals, individual cells organize into tissues such as muscle tissue, which in-turn organizes into an organ such as the heart. The heart is part of an organ system called the circulatory system that includes other organs. Finally, many organ systems combine to form an organism, such as you!

Module 8: Biological Oceanography
Topic 1 Content: What is Life? Notes

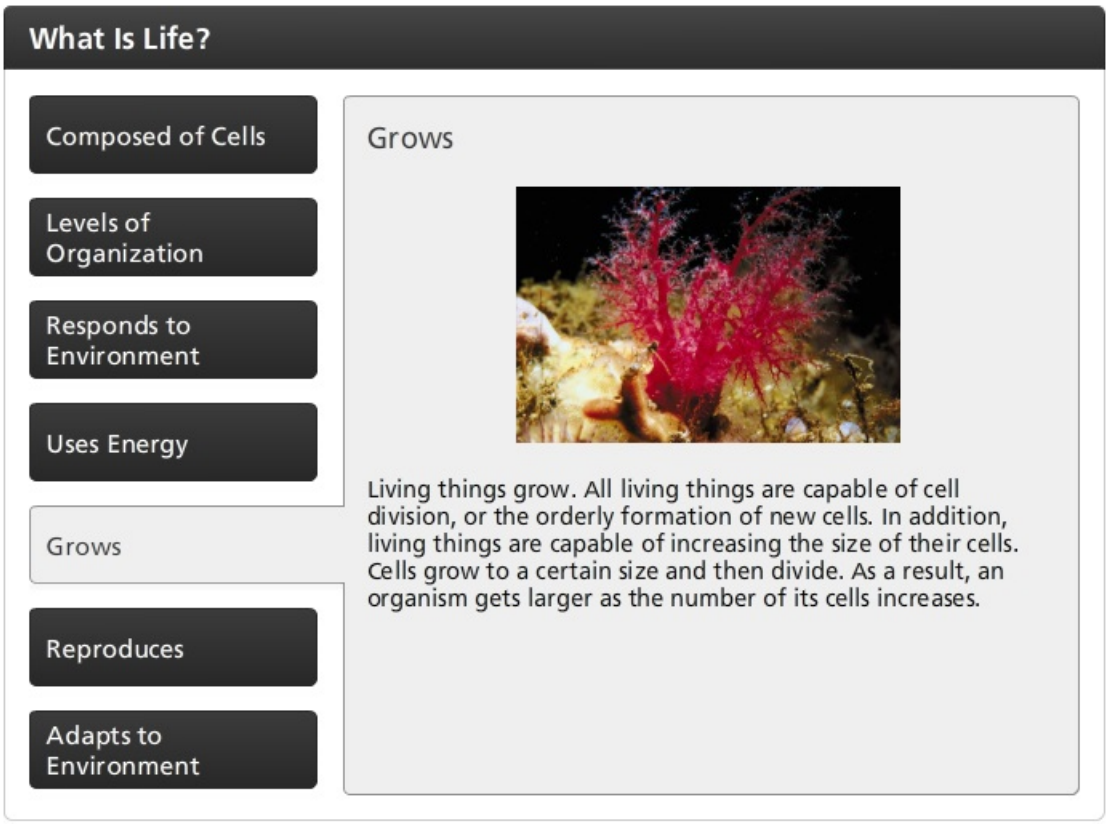


Living things respond to their environment. To survive, living organisms must make changes in response to stimuli in their environment. For example, a plant will turn its leaves toward the sunlight. When you touch a hot pan, you respond by pulling your hand back very quickly. Such behavior requires a complex set of responses.

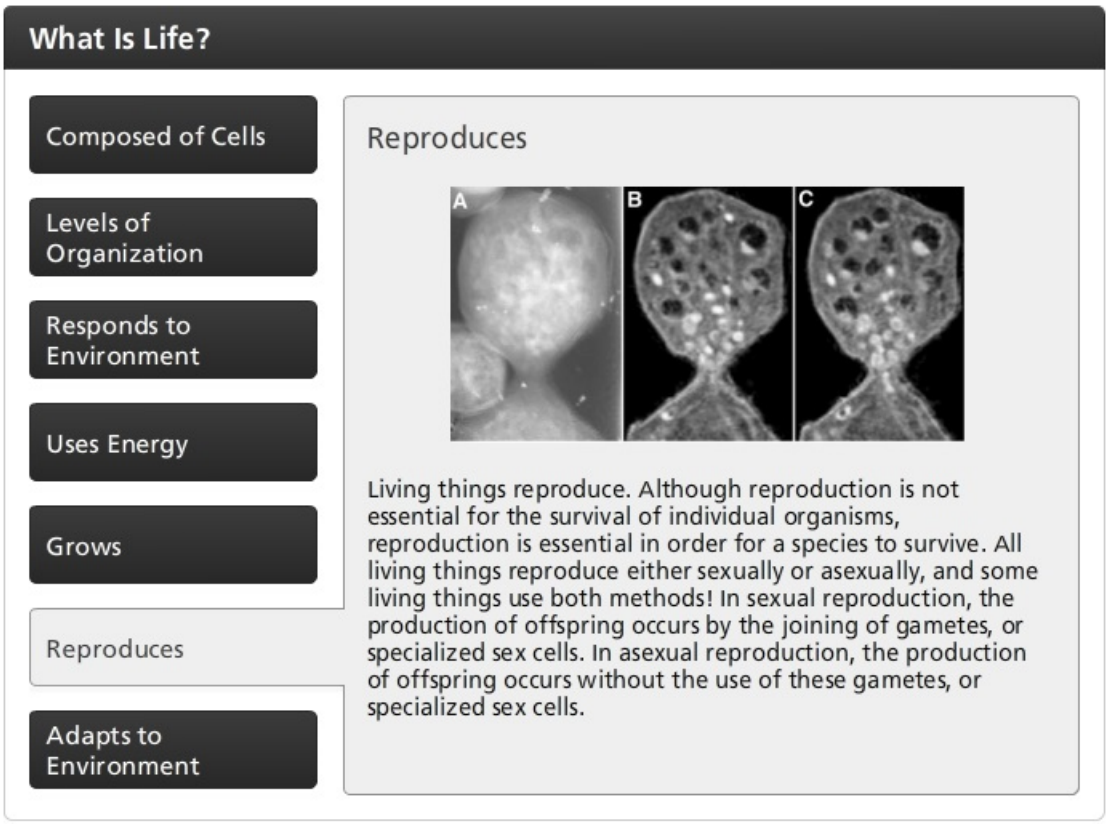
Module 8: Biological Oceanography
Topic 1 Content: What is Life? Notes



Living things take in and use energy. Heterotrophic organisms consume energy from the environment by eating what is available to them, either plant or animal in nature. Autotrophic organisms make their own food using nutrients from the surrounding environment and the Sun's energy (or some other chemical energy source. For example, organisms living in the deep sea hydrothermal vent environments are able to make their own food through a process called chemosynthesis, which uses hydrogen sulfide (H_2SO_4), carbon dioxide, and water to make carbohydrates for food.

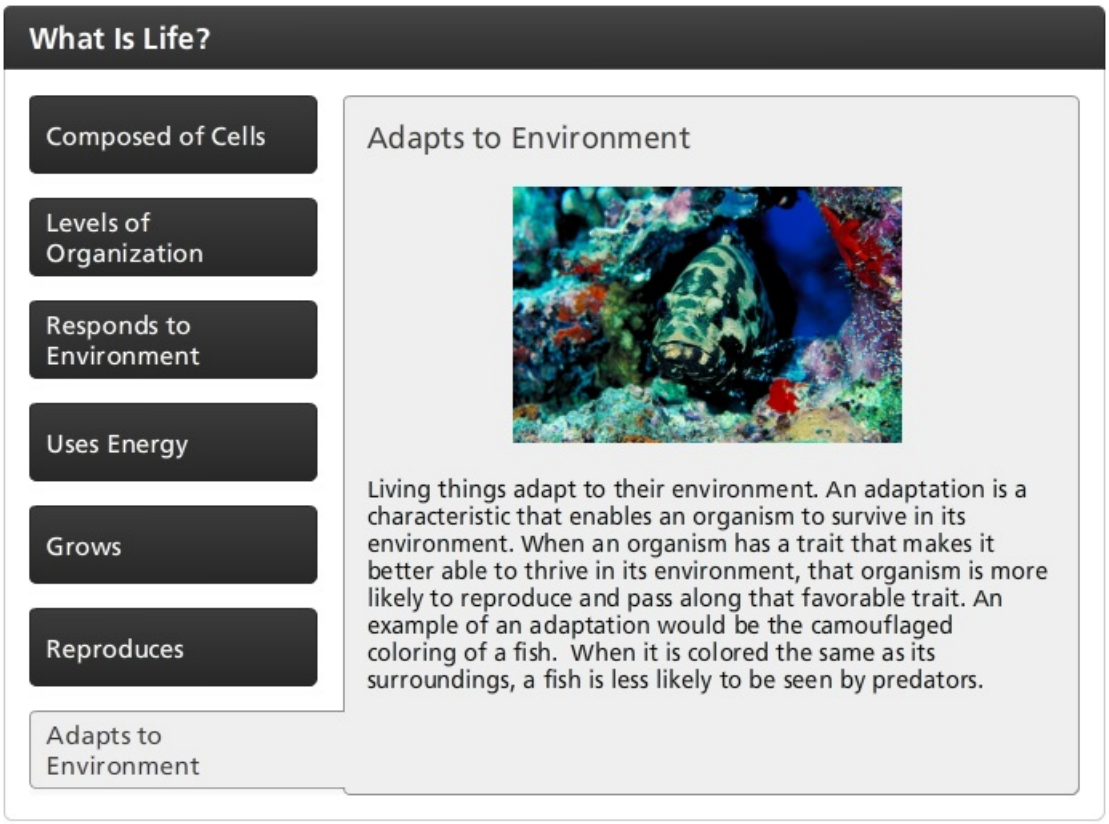


Living things grow. All living things are capable of cell division, or the orderly formation of new cells. In addition, living things are capable of increasing the size of their cells. Cells grow to a certain size and then divide. As a result, an organism gets larger as the number of its cells increases.



Living things reproduce. Although reproduction is not essential for the survival of individual organisms, reproduction is essential in order for a species to survive. All living things reproduce either sexually or asexually, and some living things use both methods! In sexual reproduction, the production of offspring occurs by the joining of gametes, or specialized sex cells. In asexual reproduction, the production of offspring occurs without the use of these gametes, or specialized sex cells.

Module 8: Biological Oceanography
Topic 1 Content: What is Life? Notes



Living things adapt to their environment. An adaptation is a characteristic that enables an organism to survive in its environment. When an organism has a trait that makes it better able to thrive in its environment, that organism is more likely to reproduce and pass along that favorable trait. An example of an adaptation would be the camouflaged coloring of a fish. When it is colored the same as its surroundings, a fish is less likely to be seen by predators.