**Multicellular Organisms**

Multicellular organisms have more working parts (cells) than unicellular organisms. The Douglas fir tree is one of the largest organisms on Earth. It is 76 metres high and almost 3 metres in diameter! This giant tree is made up of many cells, which form the trunk, branches, leaves, and so on. Multicellular organisms use all of their cells to perform life processes and meet their needs.

**Specialization and Differentiation**

All multicellular organisms start as a single cell. When the cell divides, the new cells do not move away from each other, but stay close to one another. The number of cells formed determines the size of the organism

 

This tiny *Hydra* (a) is made up of several thousand cells, whereas a Canada goose (b) is made up of trillions of cells.

b)

a)

As the number of cells increases, each cell becomes better able to perform one particular function within the organism. Imagine the town or city you live in. People have been trained to do one job well. We take our cars to a mechanic for repairs, but we do not go to that mechanic if we are sick. Another person has the training needed to take care of sick people. By doing one job well, a community is more efficient. Multicellular organisms work in the same way. Instead of every cell trying to do every job, groups of cells are specialized to do one job very well. Multicellular organisms benefit from cell specialization—your heart is very good at pumping blood, but not good at digesting food. Multicellular organisms may seem simple, but they are very complex systems. The *Hydra*(a) in the picture above has specialized tentacles that catch food, but it also has different cells to digest that food. The goose(b) in the picture above has wings for flying and webbed feet for swimming. Different parts are made up of different specialized cells. In complex multicellular organisms, cells are organized into groups that work together to perform specific jobs. When cells work together to perform one specific function, they are generally more efficient than one cell working on its own.

Cell specialization takes place early in the development of a multicellular organism. Each cell undergoes changes and develops characteristics that make it unique from other cells. We call this process **cellular differentiation**. Once a cell has differentiated, it performs a very specific function within the organism. For example, muscle cells are differentiated cells that contract. They are specialized to work with other muscle cells to move certain parts of a body. Other important differentiated cells include skin cells, fat cells, and nerve cells.