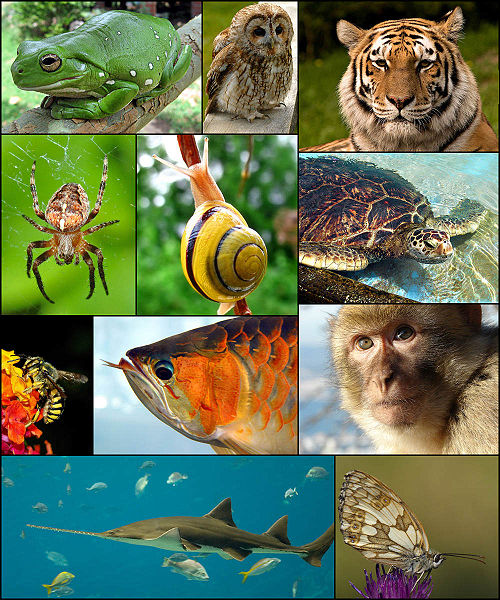
**Animal**

Adapted from: <http://en.citizendium.org/wiki/Animal>

**Animals** (from the Latin *animale* and *animalis*, meaning "living") are those [organisms](http://en.citizendium.org/wiki/Organism) classified into the [kingdom](http://en.citizendium.org/wiki/Kingdom_%28biology%29) [**Animalia**](http://en.citizendium.org/wiki/Animalia). They make up a wide segment of [life](http://en.citizendium.org/wiki/Life) and include an incredibly [diverse array](http://en.citizendium.org/wiki/Biodiversity) of both familiar and strange creatures, ranging from [hawks](http://en.citizendium.org/wiki/Hawk) to [humans](http://en.citizendium.org/wiki/Human) and from [sea slugs](http://en.citizendium.org/wiki?title=Sea_slug&action=edit&redlink=1) to [spiders](http://en.citizendium.org/wiki?title=Spider&action=edit&redlink=1). Nevertheless, they all share certain characteristics: all animals are [multicellular](http://en.citizendium.org/wiki?title=Multicellularity&action=edit&redlink=1) [eukaryotes](http://en.citizendium.org/wiki/Eukaryote), [ingest their food](http://en.citizendium.org/wiki?title=Heterotrophism&action=edit&redlink=1), and [move](http://en.citizendium.org/wiki/Locomotion) by their own power at some point in their [life cycle](http://en.citizendium.org/wiki/Life_cycle). Animals are essential [consumers](http://en.citizendium.org/wiki?title=Consumer&action=edit&redlink=1) in many [ecosystems](http://en.citizendium.org/wiki/Ecosystem) and many are also important in [human](http://en.citizendium.org/wiki/Human) [societies](http://en.citizendium.org/wiki/Society) and [economies](http://en.citizendium.org/wiki/Economy).

Like "[plant](http://en.citizendium.org/wiki/Plant)", the term "animal" has gone through several definitions along history. Animals—moving life—were distinguished from plants—unmoving life—by Aristotle. Later, Carl Linnaeus divided all life into the two kingdoms: Carl Linnaeus divided all life into the two kingdoms Animalia and Vegetabilia Animalia and Vegetabilia. Some animals such as [coral](http://en.citizendium.org/wiki?title=Coral&action=edit&redlink=1) were considered plants because they appeared sessile and similar to plants' branches. In addition, many [protists](http://en.citizendium.org/wiki/Protist) were formerly classified as "microscopic animals" because, like animals, they actively moved and ate other organisms. Today, "animal" can specifically refer to a member of the kingdom Animalia. However, the word is still sometimes used to include the [protists](http://en.citizendium.org/wiki/Protist), in which case they are called "unicellular animals".

Animals share many characteristics—some of which are common to all animals and others to only a group. Despite the number of these shared characteristics, there is an incredible [diversity](http://en.citizendium.org/wiki/Biodiversity) of them.

**Cells and tissues**

This [nematode](http://en.citizendium.org/wiki?title=Nematode&action=edit&redlink=1)'s cells are [stained](http://en.citizendium.org/wiki?title=Stain&action=edit&redlink=1) so that their [nuclei](http://en.citizendium.org/wiki/Cell_nucleus) glow red. Animals are made of cells ranging in number from dozens in some [rotifers](http://en.citizendium.org/wiki?title=Rotifer&action=edit&redlink=1) to hundreds of quadrillions in [blue whales](http://en.citizendium.org/wiki?title=Blue_whale&action=edit&redlink=1).

Like [plants](http://en.citizendium.org/wiki/Plant_%28organism%29) and [fungi](http://en.citizendium.org/wiki/Fungi), all animals are [eukaryotic](http://en.citizendium.org/wiki/Eukaryotic): they are comprised of [cells](http://en.citizendium.org/wiki/Cell) which contain a [cell nucleus](http://en.citizendium.org/wiki/Cell_nucleus). However, their cells lack [cell walls](http://en.citizendium.org/wiki/Cell_wall) that surround the cells of plants and fungi. Unlike [bacteria](http://en.citizendium.org/wiki/Bacteria), [archaea](http://en.citizendium.org/wiki/Archaea) and most [protists](http://en.citizendium.org/wiki/Protist), they are also multicellular: their bodies are made of many cells attached to one another.

Animal cells are organized into specialized, integrated arrangements called [tissues](http://en.citizendium.org/wiki/Tissue), which may in turn be organized into larger structures called [organs](http://en.citizendium.org/wiki?title=Organ&action=edit&redlink=1). All animals have a tissue type called [epithelium](http://en.citizendium.org/wiki?title=Epithelium&action=edit&redlink=1), a protective layer of cells covering their bodies' surfaces. Many animals also share other structures such as [guts](http://en.citizendium.org/wiki?title=Gut&action=edit&redlink=1) ([chambers](http://en.citizendium.org/wiki?title=Chambers&action=edit&redlink=1) with one or more openings for [digestion](http://en.citizendium.org/wiki?title=Digestion&action=edit&redlink=1)), [muscles](http://en.citizendium.org/wiki/Muscle) (organs which contract for [locomotion](http://en.citizendium.org/wiki/Locomotion)), and [nerves](http://en.citizendium.org/wiki/Nerve) (tissues which transmit electrical signals between cells).

All of an animal's tissues originally develop from one, two, or three [tissue layers](http://en.citizendium.org/wiki?title=Germ_layer&action=edit&redlink=1) in the [embryo](http://en.citizendium.org/wiki/Embryo) stage, depending upon the kind of animal it is. [Sponge](http://en.citizendium.org/wiki?title=Sponge&action=edit&redlink=1) embryos have only one layer, while [diploblasts](http://en.citizendium.org/wiki?title=Diploblast&action=edit&redlink=1) and [triploblasts](http://en.citizendium.org/wiki?title=Triploblast&action=edit&redlink=1) have two or three, respectively. In diploblasts and triploblasts, the inner layer is called the [endoderm](http://en.citizendium.org/wiki?title=Endoderm&action=edit&redlink=1), which develops into the [gut](http://en.citizendium.org/wiki?title=Gut&action=edit&redlink=1) and associated tissue, and the outer layer is called the [ectoderm](http://en.citizendium.org/wiki?title=Ectoderm&action=edit&redlink=1), which develops into [skin](http://en.citizendium.org/wiki/Skin) and the [nervous system](http://en.citizendium.org/wiki/Nervous_system). Triploblasts also have an additional layer in between the endoderm and ectoderm called the [mesoderm](http://en.citizendium.org/wiki?title=Mesoderm&action=edit&redlink=1), which develops into many internal organs such as the [circulatory system](http://en.citizendium.org/wiki/Circulatory_system), [muscle](http://en.citizendium.org/wiki/Muscle), and [bone](http://en.citizendium.org/wiki/Bone).

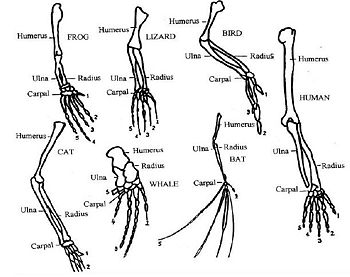
**Food and energy**

Another trait common to all animals is that they are [heterotrophs](http://en.citizendium.org/wiki?title=Heterotroph&action=edit&redlink=1): they obtain nutrients by ingesting [food](http://en.citizendium.org/wiki/Food) from outside, generally [digesting](http://en.citizendium.org/wiki?title=Digestion&action=edit&redlink=1) food in an [internal chamber](http://en.citizendium.org/wiki?title=Internal_digestion&action=edit&redlink=1). This separates them from plants, algae, and other [autotrophs](http://en.citizendium.org/wiki?title=Autotroph&action=edit&redlink=1), which do not ingest food. They are [consumers](http://en.citizendium.org/wiki?title=Consumers&action=edit&redlink=1) that often occupy the higher levels of [food chains](http://en.citizendium.org/wiki?title=Food_chain&action=edit&redlink=1) in many [ecosystems](http://en.citizendium.org/wiki?title=Ecosystems&action=edit&redlink=1).

In one of the many unique ways animals obtain food, [rancher ants](http://en.citizendium.org/wiki?title=Rancher_ant&action=edit&redlink=1) drink [sugary](http://en.citizendium.org/wiki/Sugar) juice from [aphids](http://en.citizendium.org/wiki/Aphid) in return for the aphids' protection.

Animals obtain food in many ways, but most can be grouped into two types. The first, [predation](http://en.citizendium.org/wiki?title=Predation&action=edit&redlink=1) is a [biological interaction](http://en.citizendium.org/wiki?title=Biological_interaction&action=edit&redlink=1) where a heterotroph, called the predator, obtains food by consuming the cells of another organism, called the prey. Predators are further split into three groups. [Herbivores](http://en.citizendium.org/wiki?title=Herbivore&action=edit&redlink=1) are predators that primarily consume autotrophs, [carnivores](http://en.citizendium.org/wiki/Carnivore) are predators that primarily consume heterotrophs, and [omnivores](http://en.citizendium.org/wiki?title=Omnivore&action=edit&redlink=1) are predators that consume both autotrophs and heterotrophs. Many animals also practice [detritivory](http://en.citizendium.org/wiki?title=Detritivory&action=edit&redlink=1), where an animal consumes food from [detritus](http://en.citizendium.org/wiki?title=Detritus&action=edit&redlink=1): dead [organic matter](http://en.citizendium.org/wiki?title=Organic_matter&action=edit&redlink=1). Like detritivore [bacteria](http://en.citizendium.org/wiki/Bacteria) and [fungi](http://en.citizendium.org/wiki/Fungi), detritivore animals recycle nutrients and are thus important in [decomposition](http://en.citizendium.org/wiki?title=Decomposition&action=edit&redlink=1).

The ways that animals [feed](http://en.citizendium.org/wiki?title=Feeding&action=edit&redlink=1) on the food they obtain may be grouped into four general tactics. [Suspension feeding](http://en.citizendium.org/wiki?title=Suspension_feeding&action=edit&redlink=1), or [filter feeding](http://en.citizendium.org/wiki?title=Filter_feeding&action=edit&redlink=1), filters out and concentrates food particles suspended in [water](http://en.citizendium.org/wiki/Water) or [air](http://en.citizendium.org/wiki/Air). [Deposit feeding](http://en.citizendium.org/wiki?title=Deposit_feeding&action=edit&redlink=1) swallows a [substrate](http://en.citizendium.org/wiki?title=Substrate&action=edit&redlink=1) and ingests the [microorganisms](http://en.citizendium.org/wiki/Microorganism), [detritus](http://en.citizendium.org/wiki?title=Detritus&action=edit&redlink=1), and other cells within the substrate. [Fluid feeding](http://en.citizendium.org/wiki?title=Fluid_feeding&action=edit&redlink=1) sucks fluids such as [body fluids](http://en.citizendium.org/wiki?title=Body_fluid&action=edit&redlink=1) from plants and animals. [Mass feeding](http://en.citizendium.org/wiki?title=Mass_feeding&action=edit&redlink=1), or [bulk feeding](http://en.citizendium.org/wiki?title=Bulk_feeding&action=edit&redlink=1), eats chunks of flesh from prey into the [mouth](http://en.citizendium.org/wiki?title=Mouth&action=edit&redlink=1).

**Locomotion and limbs**

Each limb is well suited to its purpose. Only the human's forelimb is not suited for locomotion, for humans walk on two legs. Also note the similarity in structure between all the limbs, despite the individually differently sized bones.

One final common trait of animals is that they are [motile](http://en.citizendium.org/wiki?title=Motile&action=edit&redlink=1) during at least one point of their life cycle. The vast majority of animals move under their own power as adults, though some adult animals, such as [sponges](http://en.citizendium.org/wiki?title=Sponge&action=edit&redlink=1) and [sea anemones](http://en.citizendium.org/wiki?title=Sea_anemone&action=edit&redlink=1), never actively move—they are sessile. Some animal predators, for instance, sit and wait for their prey to come to them—the sea anemone spends most of its life attached to a rock and captures fish and other organisms that swim by. After their larvae hatch from eggs, however, the larvae actively swim. The ability to swim away from their parents helps in the dispersal of new young across a wider space, so it is less likely that the young will [compete](http://en.citizendium.org/wiki/Competition) with their parents and each other for space and food.

Movement enables animals to actively seek out food, mates, and whatever else is desired by the animal, and escaping from predators, rather than having to stay in one place. Animals move in a large variety of ways, [burrowing](http://en.citizendium.org/wiki?title=Burrow&action=edit&redlink=1) through the [ground](http://en.citizendium.org/wiki?title=Ground&action=edit&redlink=1), slithering or crawling on a [substrate](http://en.citizendium.org/wiki?title=Substrate&action=edit&redlink=1), [swimming](http://en.citizendium.org/wiki/Swimming) through the [water](http://en.citizendium.org/wiki/Water), or flying in the [air](http://en.citizendium.org/wiki/Air). Likewise, the structures that power these movements are also numerous, including [cilia](http://en.citizendium.org/wiki?title=Cilia&action=edit&redlink=1), [flagella](http://en.citizendium.org/wiki?title=Flagella&action=edit&redlink=1), and [muscles](http://en.citizendium.org/wiki/Muscle). The last structure, muscles, can attach to two types of skeletons to enable movement: a hard [skeleton](http://en.citizendium.org/wiki/Skeleton), such as the [internal skeletons](http://en.citizendium.org/wiki?title=Internal_skeleton&action=edit&redlink=1) of the [vertebrates](http://en.citizendium.org/wiki/Vertebrate) or the [external skeleton](http://en.citizendium.org/wiki?title=External_skeleton&action=edit&redlink=1) of the [arthropods](http://en.citizendium.org/wiki/Arthropod), or a soft [hydrostatic skeleton](http://en.citizendium.org/wiki?title=Hydrostatic_skeleton&action=edit&redlink=1) made of water. The hydrostatic skeleton is unique to animals and permits the wriggling movements for those animals with wormlike bodies.

The [limb](http://en.citizendium.org/wiki?title=Limb&action=edit&redlink=1), a controllable protrusion from the body, enables many animals to move in very controlled and rapid fashions. Some [ecdysozoans](http://en.citizendium.org/wiki?title=Ecdysozoan&action=edit&redlink=1), such as [velvet worms](http://en.citizendium.org/wiki?title=Velvet_worm&action=edit&redlink=1) and [sea urchins](http://en.citizendium.org/wiki?title=Sea_urchin&action=edit&redlink=1), have either sac-like limbs or tube feet. Some [annelids](http://en.citizendium.org/wiki?title=Annelid&action=edit&redlink=1) have bristle-like limbs called [parapodia](http://en.citizendium.org/wiki?title=Parapodia&action=edit&redlink=1). [Arthropods](http://en.citizendium.org/wiki/Arthropod) and [vertebrates](http://en.citizendium.org/wiki/Vertebrate) have jointed limbs which have built-in [joints](http://en.citizendium.org/wiki?title=Joint&action=edit&redlink=1), at which the limb can bend in certain ways. [Fins](http://en.citizendium.org/wiki?title=Fin&action=edit&redlink=1), [legs](http://en.citizendium.org/wiki?title=Leg&action=edit&redlink=1), and [wings](http://en.citizendium.org/wiki?title=Wing&action=edit&redlink=1) fall into this last category.

**Body Plan**

While animals share many characteristics, their bodies come in many forms. Their overall shapes are called their [body plans](http://en.citizendium.org/wiki?title=Body_plan&action=edit&redlink=1), and to make sense of their variety, they are grouped depending on their symmetry, their gut and body cavities, and whether their bodies are segmented.

Animals, like other multicellular organisms, can be classified on their [symmetry](http://en.citizendium.org/wiki?title=Symmetry&action=edit&redlink=1): can their bodies be sliced into nearly identical pieces? Animals are symmetrical on zero, one, two, or more planes of symmetry. [Sponges](http://en.citizendium.org/wiki?title=Sponge&action=edit&redlink=1), [sea squirts](http://en.citizendium.org/wiki?title=Sea_squirt&action=edit&redlink=1), and similar animals are completely asymmetrical, but virtually every other animal is symmetrical in at least one plane. Asymmetrical animals tend to be fixed to a substrate and do not actively move; they feed passively and reproduce asexually or with external fertilization.

[Sponges](http://en.citizendium.org/wiki?title=Sponge&action=edit&redlink=1) are asymmetrical animals—they cannot be sliced in any way that produces similar sides.

Organisms symmetrical on more than two planes are radially symmetrical; most alive today float in [water](http://en.citizendium.org/wiki/Water) or attach to [substrates](http://en.citizendium.org/wiki?title=Substrates&action=edit&redlink=1). The [echinoderms](http://en.citizendium.org/wiki?title=Echinoderm&action=edit&redlink=1), such as [sea stars](http://en.citizendium.org/wiki?title=Sea_stars&action=edit&redlink=1) and [sea urchins](http://en.citizendium.org/wiki?title=Sea_urchin&action=edit&redlink=1), are radially symmetrical as adults, but as [larvae](http://en.citizendium.org/wiki?title=Larva&action=edit&redlink=1) they are bilaterally symmetric.

This [sea star](http://en.citizendium.org/wiki?title=Sea_star&action=edit&redlink=1) is an example of pentaradial symmetry: symmetry in five axes.

Organisms with only one plane are bilaterally symmetrical; they have left and right sides and two ends, and they tend to possess longer and narrower bodies. Virtually all bilaterally symmetrical animals are placed into the [clade](http://en.citizendium.org/wiki?title=Clade&action=edit&redlink=1) [Bilateria](http://en.citizendium.org/wiki?title=Bilateria&action=edit&redlink=1) and are descended from a single ancestor long ago. They also exhibit [cephalization](http://en.citizendium.org/wiki?title=Cephalization&action=edit&redlink=1): the development of a [head](http://en.citizendium.org/wiki?title=Head&action=edit&redlink=1) on one end of the body where [feeding](http://en.citizendium.org/wiki?title=Feeding&action=edit&redlink=1), [sensory](http://en.citizendium.org/wiki?title=Sense&action=edit&redlink=1), and [processing](http://en.citizendium.org/wiki/Nervous_system) organs are concentrated.

This [ant](http://en.citizendium.org/wiki/Ant) is an example of both bilateral symmetry and cephalization—it has similar left and right sides, an axis of symmetry running down its back, and a head where a [mouth](http://en.citizendium.org/wiki?title=Mouth&action=edit&redlink=1), [brain](http://en.citizendium.org/wiki/Brain), [eyes](http://en.citizendium.org/wiki/Eye), and [antennae](http://en.citizendium.org/wiki/Antenna) are located.

Animals may possess a *gut*. A gut is a long tube or chamber running through the body with one or more openings that can take in whatever food the animal consumes and [digest](http://en.citizendium.org/wiki?title=Digestion&action=edit&redlink=1)s it. The first opening, the gut's intake, is called the animal's [mouth](http://en.citizendium.org/wiki?title=Mouth&action=edit&redlink=1). If a gut has a second opening, on the other end of the tube, the opening is called an [anus](http://en.citizendium.org/wiki/Anus), and it is where [remaining, undigested food](http://en.citizendium.org/wiki/Feces) is [ejected](http://en.citizendium.org/wiki?title=Defecation&action=edit&redlink=1). In radially symmetrical animals, the mouth is often found in the center. In bilaterally symmetrical animals, the mouth is usually in the head, nearby the animal's sensory organs, and the anus is likewise found on the opposite end of the head. Animals with only a mouth have a two-way gut (also called a blind gut), because food and waste must use the same opening. Animals with both mouths and anuses have a one-way gut, which can more efficiently process food and absorb nutrients.

Animals may also contain fluid-filled [cavities](http://en.citizendium.org/wiki?title=Body_cavity&action=edit&redlink=1) inside their bodies, in which the gut and other organs may float. The cavity is called either a [coelom](http://en.citizendium.org/wiki?title=Coelom&action=edit&redlink=1) or [pseudocoelom](http://en.citizendium.org/wiki?title=Pseudocoelom&action=edit&redlink=1), depending on how it is sealed. It enables an animal's [internal organs](http://en.citizendium.org/wiki?title=Internal_organs&action=edit&redlink=1) to move independently in it, oxygen and nutrients to circulate within it, and an animal to move without [limbs](http://en.citizendium.org/wiki?title=Limb&action=edit&redlink=1) as a [hydrostatic skeleton](http://en.citizendium.org/wiki?title=Hydrostatic_skeleton&action=edit&redlink=1). Animals are often grouped by what kind of body cavity they have. Animals with [coeloms](http://en.citizendium.org/wiki?title=Coelom&action=edit&redlink=1) are called [coelomates](http://en.citizendium.org/wiki?title=Coelomates&action=edit&redlink=1), animals with pseudocoeloms are called [pseudocoelomates](http://en.citizendium.org/wiki?title=Pseudocoelomate&action=edit&redlink=1), and animals that do not have any enclosed body cavity are called [acoelomates](http://en.citizendium.org/wiki?title=Acoelomate&action=edit&redlink=1).

**Reproduction**

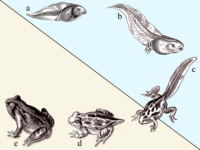
These two mating [tortoise beetles](http://en.citizendium.org/wiki?title=Tortoise_beetle&action=edit&redlink=1) give an example of [internal fertilization](http://en.citizendium.org/wiki?title=Internal_fertilization&action=edit&redlink=1).

Even though an animal may become especially efficient at moving and feeding, if it does not [reproduce](http://en.citizendium.org/wiki/Reproduction) well, it may fail to make its [traits](http://en.citizendium.org/wiki?title=Trait&action=edit&redlink=1) more common. Thus, as with their feeding, locomotion, and body structure, animals reproduce and develop in astonishingly diverse ways. Many animals use [sexual reproduction](http://en.citizendium.org/wiki?title=Sexual_reproduction&action=edit&redlink=1): they use [meiosis](http://en.citizendium.org/wiki?title=Meiosis&action=edit&redlink=1) to produce special cells called [gametes](http://en.citizendium.org/wiki?title=Gamete&action=edit&redlink=1), [mate](http://en.citizendium.org/wiki?title=Mating&action=edit&redlink=1) with another individual, and fuse their gametes together to form a new, [genetically](http://en.citizendium.org/wiki/Genetics) different individual. Some animals can also reproduce both [asexually](http://en.citizendium.org/wiki/Asexual_reproduction) (creating [clones](http://en.citizendium.org/wiki?title=Clone&action=edit&redlink=1) of themselves using [mitosis](http://en.citizendium.org/wiki/Mitosis), without any mating involved). In addition, some animals can even only reproduce asexually, and many [fish](http://en.citizendium.org/wiki/Fish), [snail](http://en.citizendium.org/wiki?title=Snail&action=edit&redlink=1), and [lizard](http://en.citizendium.org/wiki?title=Lizard&action=edit&redlink=1) species have never been observed performing sexual reproduction.

There are two types of sexual reproduction that animals may perform: [internal](http://en.citizendium.org/wiki?title=Internal_fertilization&action=edit&redlink=1) or [external fertilization](http://en.citizendium.org/wiki?title=External_fertilization&action=edit&redlink=1). A male animal performing internal fertilization usually inserts a special organ into a female animal and transfers sperm inside. In some animals, females themselves insert packets of sperm produced by males into their bodies and fertilize them. In [seahorses](http://en.citizendium.org/wiki?title=Seahorse&action=edit&redlink=1), the usual internal fertilization occurs in reverse: females insert eggs into males' bodies, and the males fertilize them inside. Animals that perform external fertilization, in contrast, send both sperm and eggs into the environment, where they fuse outside either parent.

Regardless of what kind of reproduction an animal performs, the newly formed individual starts out as one, solitary cell that divides into a new, multicellular [embryo](http://en.citizendium.org/wiki/Embryo). Either one—generally the female—or both parents care for their new embryos. The majority of animals are [*oviparous*](http://en.citizendium.org/wiki?title=Oviparous&action=edit&redlink=1) animals, such as [birds](http://en.citizendium.org/wiki/Bird), lay fertilized, protected [eggs](http://en.citizendium.org/wiki?title=Egg&action=edit&redlink=1) containing embryos, which develop independently until they hatch out of their eggs. In contrast, [*viviparous*](http://en.citizendium.org/wiki?title=Viviparous&action=edit&redlink=1) animals, such as [mammals](http://en.citizendium.org/wiki/Mammal), nourish and let their embryos [grow inside them](http://en.citizendium.org/wiki/Pregnancy) and, when they are ready, [give birth](http://en.citizendium.org/wiki/Birth) to them live. Finally, [*ovoviviparious*](http://en.citizendium.org/wiki?title=Ovoviviparious&action=edit&redlink=1) animals, such as some [insects](http://en.citizendium.org/wiki/Insect), keep independent eggs inside their body until they hatch, giving birth to well-developed young. All three types of embryonic care enable sexually reproducing animals to help their young survive; they are especially important to [land animals](http://en.citizendium.org/wiki?title=Land_animal&action=edit&redlink=1), which otherwise would not be able to reproduce without water.

**Life cycles: Metamorphosis**

Most [frogs](http://en.citizendium.org/wiki?title=Frog&action=edit&redlink=1) and [toads](http://en.citizendium.org/wiki?title=Toad&action=edit&redlink=1) undergo holometabolism: frog larvae, called [tadpoles](http://en.citizendium.org/wiki?title=Tadpole&action=edit&redlink=1), hatch from their [eggs](http://en.citizendium.org/wiki?title=Egg&action=edit&redlink=1) and change into adult frogs, which look and act differently. Tadpoles have [gills](http://en.citizendium.org/wiki?title=Gill&action=edit&redlink=1) and [fins](http://en.citizendium.org/wiki?title=Fin&action=edit&redlink=1) and completely live, breathe, and eat in [water](http://en.citizendium.org/wiki/Water). Adult frogs have [lungs](http://en.citizendium.org/wiki/Lung) and [legs](http://en.citizendium.org/wiki?title=Leg&action=edit&redlink=1) and live, breath, and eat out of water.

Animal life cycles are unique for every [species](http://en.citizendium.org/wiki/Species) of animal, but one common and striking innovation many of them share is [*metamorphosis*](http://en.citizendium.org/wiki?title=Metamorphosis&action=edit&redlink=1), where a [juvenile](http://en.citizendium.org/wiki?title=Juvenile&action=edit&redlink=1)'s body transforms in shape and size into an [adult](http://en.citizendium.org/wiki/Adult) body. There are two varieties of metamorphosis that animals carry out: holometabolism and hemimetabolism.

In [*holometabolism*](http://en.citizendium.org/wiki?title=Holometabolism&action=edit&redlink=1) (also called *complete metamorphosis*), an animal greatly changes in appearance between its juvenile form (called the [*larva*](http://en.citizendium.org/wiki?title=Larva&action=edit&redlink=1)) and its adult form—the two forms eat different prey and behave in different ways too. In many animals, a larva often matures into a [*pupa*](http://en.citizendium.org/wiki?title=Pupa&action=edit&redlink=1), another form. Pupae do not move or feed and are surrounded by protective cases. Within their case, the animal's body is reshaped into its adult form; generally, they are often the most vulnerable to death from [predation](http://en.citizendium.org/wiki?title=Predation&action=edit&redlink=1) during this time. When the animal's body is ready, it breaks the case and emerges as an adult, ready to reproduce.

In [*hemimetabolism*](http://en.citizendium.org/wiki?title=Hemimetabolism&action=edit&redlink=1) (also called *incomplete metamorphosis*), an animal grows in size from its juvenile form (called the [*nymph*](http://en.citizendium.org/wiki?title=Nymph&action=edit&redlink=1)) to its adult form without greatly changing its form. Nymphs look like miniature adults, and usually feed on the same food that adults feed on.

Most animal species carry out holometabolism rather than hemimetabolism. One explanation for this difference is that holometabolism allows larvae to feed on completely different types of food. In hemimetabolism, larvae and adults [compete](http://en.citizendium.org/wiki/Competition) for the same food. Another hypothesis suggests that holometabolism allows larvae and adults to be more specialized and efficient—the former for feeding, the latter for mating. Larvae indeed typically constantly eat and do not move much, while adults move great distances. Research is currently testing these two hypotheses.