

Animal Reproduction

Most animals can reproduce both **asexually** and **sexually**.

Asexual reproduction produces genetically identical copies (ie. clones) while sexual reproduction produces genetically unique offspring.

There are advantages and disadvantages to both types of reproduction:

Asexual reproduction

makes identical copies (clones) of the parent.

Only a single parent is required

the process is much quicker than in sexual reproduction.

Asexual reproduction is beneficial when resources are abundant.

Sexual reproduction

involves the fertilization of a female's egg by a male's sperm

takes more time to find a mate, requires courtship rituals, nesting, parenting skills, etc

results in genetically unique individuals or offspring

Sexual reproduction provides much of the genetic variation required for evolution and adaptation.

Examples of Asexual Reproduction

Budding: A very common type of asexual reproduction especially in **colonial** animals

In budding a new offspring begins as an outgrowth of the parent and may either remain attached and form a colony or break away and begin an independent life.

Fragmentation: Some animals spontaneously break into many separate pieces which then regrow into a complete animal.

Polyembryony (twinning): A type of asexual reproduction in which the embryo or larva (resulting from sexual reproduction) then clones itself into separate individuals.

For example armadillos typically produce 4 identical offspring from a single fertilized egg.

In some parasitic animals each different larva is able to clone copies of itself. This allows a single egg to produce 100's of potential offspring and enhances chances that at least a few will be able to find a new host to complete their life cycle. In humans this process occurs occasionally to produce identical twins.

Regeneration: This process is most commonly used not as a form of reproduction but to replace missing or damaged parts.

Some organisms have great powers of regeneration while others can only regenerate simple cells and tissues.

Humans for example regenerate all their bone tissue about every 7 years and all their blood cells about every 4 months.

In other animals, such as lizards and arthropods, tails or whole limbs can be replaced. Starfish can regenerate new "arms" when one is broken off and sometimes a single arm can regenerate an entire starfish.

Examples of Sexual Reproduction

Most variations in sexual reproduction depend on where the gametes come from or whether the developing egg has been fertilized or not.

Monoecious Animals (Hermaphrodites):

Monoecious organisms are those containing both male and female reproductive organs.

About 15% of animals, especially those that are sessile (nonmotile) or parasitic, tend to be hermaphrodites.

Dioecious Animals: These are organisms that produce *either* male *or* female reproductive organs and gametes but never both at the same time.

Protandry: is the ability in some animals to switch their sex based on environmental cues such as changes in temperature.

Sexual Dimorphism: Sometimes it is impossible to distinguish the male from the female of a species by outward appearance.

In other dioecious animals the males and females are not identical, but differ in appearance, thus showing dimorphism.

For example, in most invertebrates the male is usually smaller than the female, while in vertebrates the female is usually the smaller one.

In addition to size, dimorphism may also result in differences in structures and color between genders.

In birds the male is usually more brightly colored.

Parthenogenesis ('virgin birth'): this process only regularly occurs in nonhuman animals, both vertebrates and invertebrates.

In these cases the unfertilized egg is able to develop even though it has not been fertilized by a sperm.

Most rotifers, brine shrimp and some social insects such as bees and ants regularly reproduce this way.

Some higher animals such as fish and frogs can also sometimes reproduce in this way.