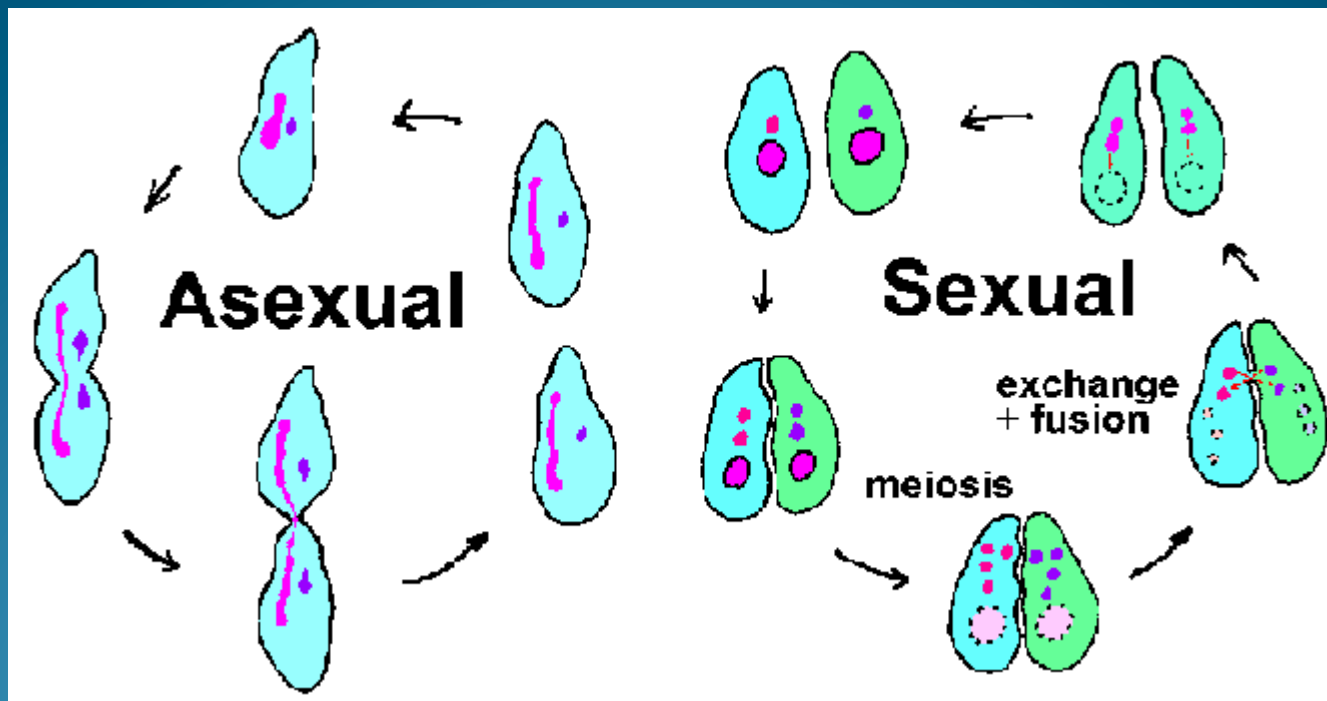
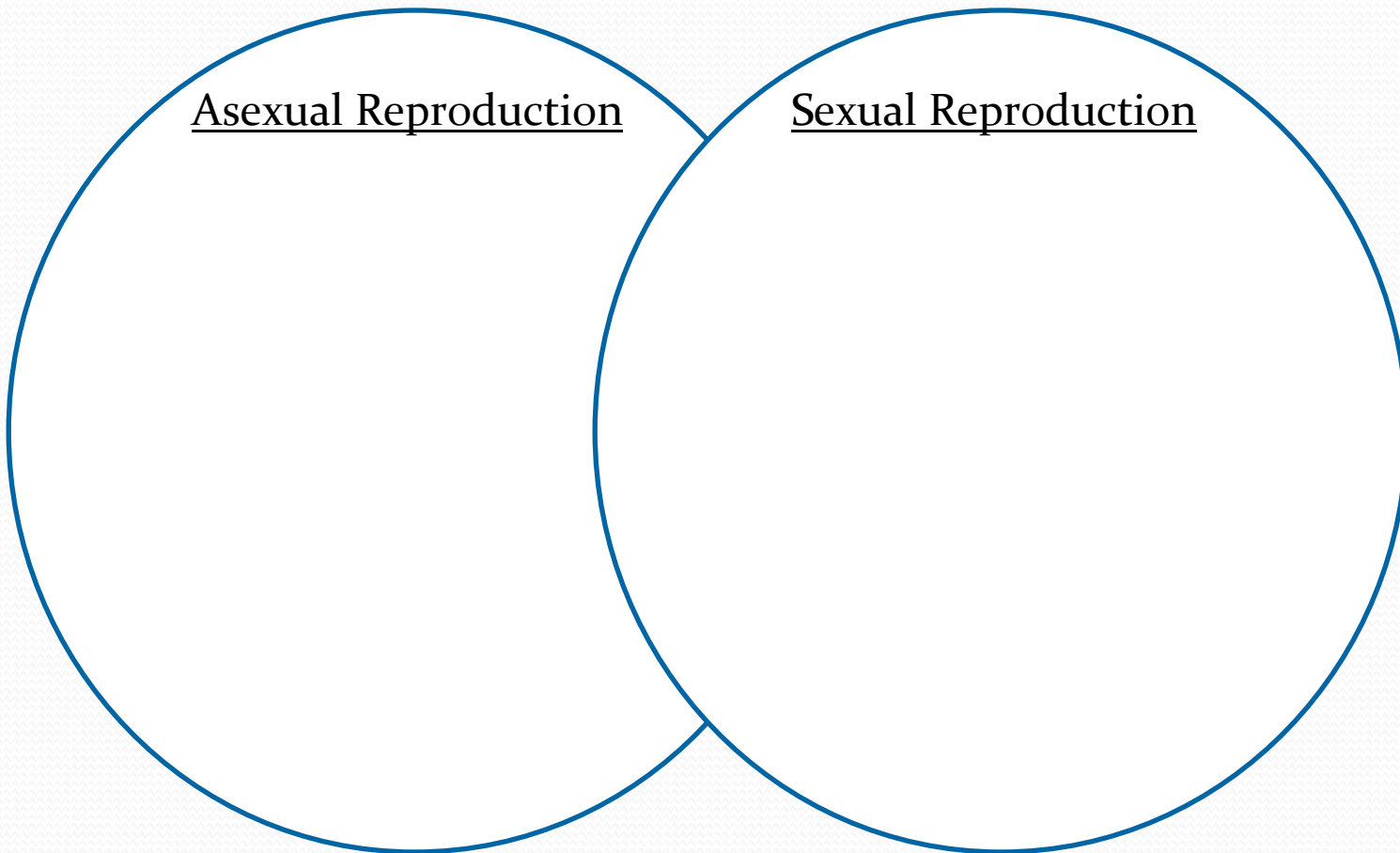


Asexual vs. Sexual Reproduction

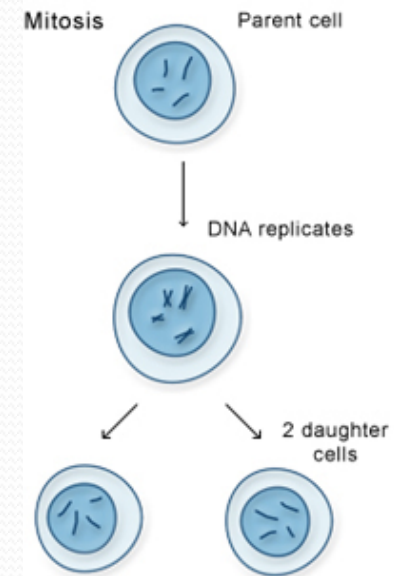


Make a Venn Diagram



Asexual Reproduction

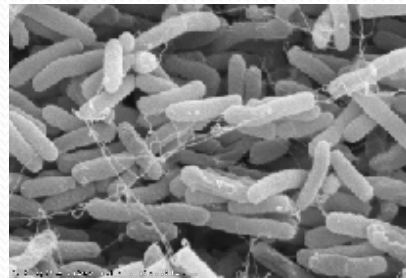
- Requires only one parent
- Offspring have 100% the same chromosomes as the parent.
 - In other words, the offspring are exact “clones” of the parent.
- Most unicellular organisms reproduce this way.
- Mitosis



Asexual Reproduction

- Binary Fission
 - Bacteria
 - Protists

Binary fission is a form of asexual reproduction where every organelle is copied and the organism divides in two.



Asexual Reproduction

- Vegetative Reproduction

Vegetative reproduction is a type of asexual reproduction in plants that relies on multicellular structures formed by the parent plant.



Asexual Reproduction

- Budding
 - Hydra

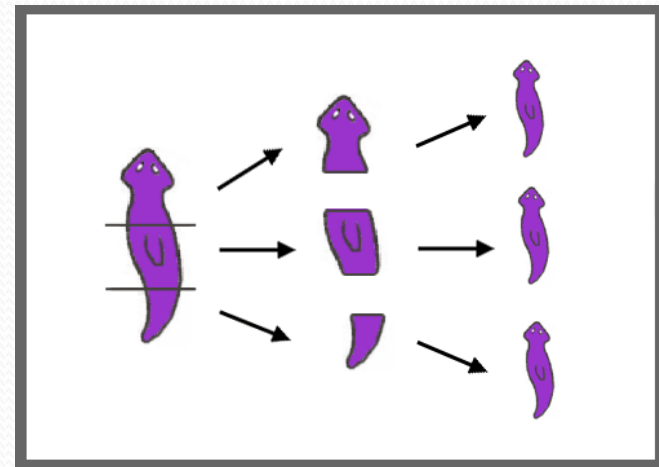
Budding is a means of asexual reproduction whereby a new individual develops from an outgrowth of a parent, splits off, and lives independently.



Asexual Reproduction

- Fragmentation

Fragmentation is a means of asexual reproduction whereby a single parent breaks into parts that regenerate into whole new individuals.



Asexual Reproduction

- **Regeneration**

Regeneration occurs when a body part has broken off and the organism grows a new one.



Asexual Reproduction

- Spores
- A spore is a specialized cell that can survive harsh conditions
 - Spores are produced by one parent
 - In the right conditions, spores can become a new organism

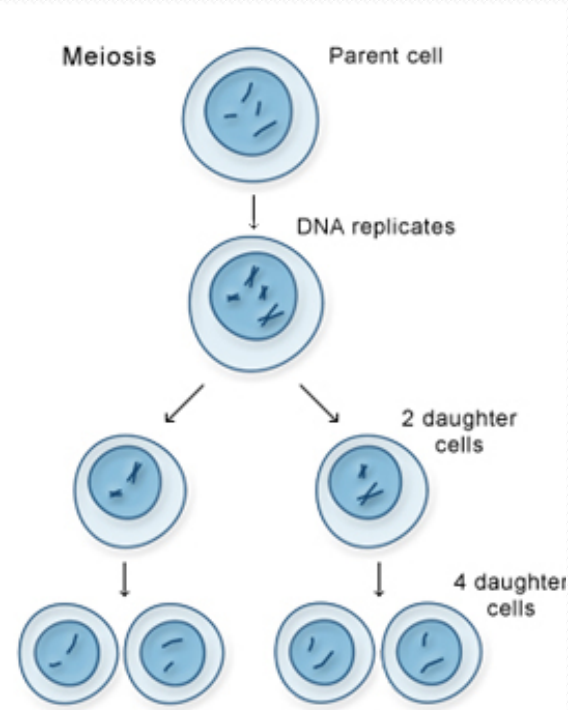
Asexual Reproduction

- Examples of organisms that reproduce asexually
 - Hydra
 - Sea Star
 - Strawberry
 - Archaeobacteria
 - Eubacteria
 - Euglena
 - Paramecium
 - Yeast



Sexual Reproduction

- Requires two parents that each share $\frac{1}{2}$ of the genetic information.
 - Offspring share the characteristics of each parent.
 - Meiosis



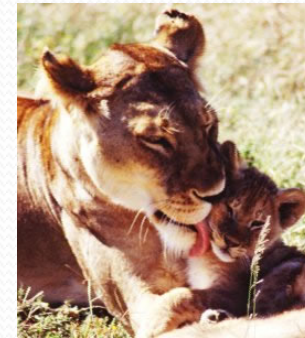
3 Types of Sexual Reproduction

- **Internal Fertilization** - Fertilization occurs within the female. Internal fertilization occurs in mammals, insects, birds, reptiles.
- **External Fertilization** - External fertilization usually requires a medium such as water, which the sperms can use to swim towards the egg cell. External fertilization usually occur in fish and amphibians.
- **Pollination** - occurs when pollen is transferred from the anthers to the female organs by wind or by animals.

Sexual Reproduction

- All the members of the Animal Kingdom

- Fish
- Mammals
- Amphibians
- Birds
- Reptiles
- Insects
- Crustaceans



Sexual Reproduction



- Plant Kingdom
 - Flowers are the reproductive organs of plants.

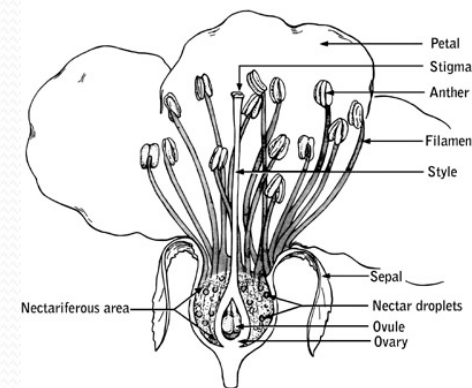


Male flower



Female flower

- Some flowers have both male and female reproductive organs on the same flower.



Sexual Reproduction

- Examples of organisms that reproduce sexually

- Chickens
- Iguanas
- Lobsters
- Sharks
- Humans
- Butterflies
- Sunflowers
- Roses



Sexual Reproduction Summary

	Male Gamete	Female Gamete	Type of Union	Result of Union	Final Result
Plants	pollen	ovule (egg)	pollination	single cell zygote	multi-cell embryo (in seed)
Animals	sperm	egg	fertilization	single cell zygote	multi-cell embryo

Sexual Reproduction

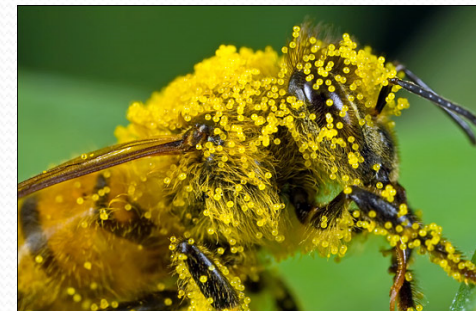
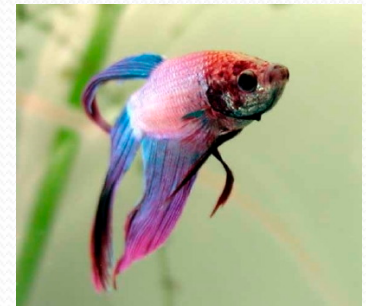
- Happens 2 ways

- Internally (inside)

- The egg is fertilized by sperm inside the female
 - Mammals, birds, reptiles, insects, spiders

- Externally (outside)

- The egg is fertilized by sperm outside the female
 - The female lays the eggs and then the male fertilizes them.
 - Fish and some amphibians
 - Plants and fungi (pollen and spores)



Which is Better? *It depends!*

Asexual Reproduction

- advantages
 - does not require special cells or a lot of energy
 - can produce offspring quickly
 - in a stable environment creates large, thriving population
- disadvantages
 - limited ability to adapt
 - face massive die-off if environment changes

Sexual Reproduction

- advantages
 - lots of variation within a species
 - able to live in a variety of environmental settings
 - able to adapt to changes in the environment
- disadvantages
 - needs time & energy
 - produce small populations