TOPIC 3: PASSING IT ON

I Can...

- Distinguish between sexual and asexual reproduction
- Describe and provide examples of binary fission, budding, asexual spores, and asexual reproduction in plants
- Describe and provide examples of zygospores, bacterial conjugation, and sexual reproduction in plants & animals
- Compare the advantages and disadvantages of sexual and asexual reproduction

Genes & Heritability

Characteristics that are passed on from parents to their offspring are said to be *heritable*

These traits are passed down through their *genes*, the genetic mate[illegible]he nucleus of each body

Reproductive Strategies

Not all species reproduce the same way…

1) ASEXUAL REPRODUCTION
   - ➢ Involves just one parent
   - ➢ Offspring are duplicates, or clones of the parent; they have the same genetic material and thus the same characteristics

2) SEXUAL REPRODUCTION
   - ➢ Involves two parents
   - ➢ Offspring possess 50% of parent A's genetic info, and 50% of parent B's genetic info; they thus have a combination of parental characteristics

ASEXUAL REPRODUCTION

Why have some species evolved to reproduce asexually??? What might be some advantages of asexual reproduction?

- No need to find a mate
- Rapid reproduction (can produce lots of offspring)

Disadvantages of sexual reproduction???

Types of Asexual Reproduction:

a. Binary Fission
b. Asexual Spores
c. Budding
d. Asexual reproduction in plants

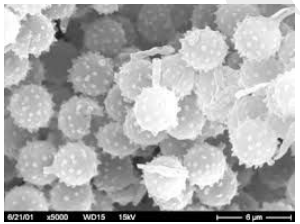
Binary Fission

- Used by one-celled organisms such as amoeba
- The organism duplicates its own DNA and splits into two genetically identical cells
- As a result, all

Kind of like this...

Asexual Spores

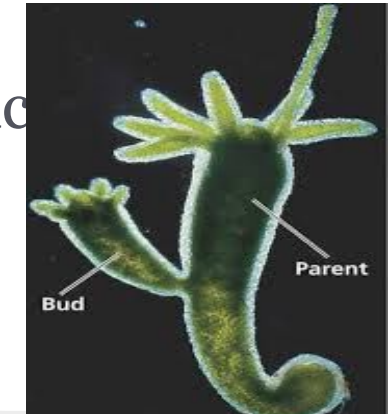
- Used mainly by fungi (e.g. mushrooms)
- Organism's genetic info is copied in each single-celled spore, which are released and spread through wind, rain, etc.
- Some spores, known as *zoospores*, have a flagella (a tail-like structure) to help them move around



grow into an exact copy of the parent

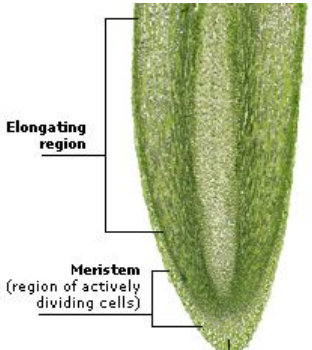
Budding

- Used by smaller animals such as sea sponges and hydra
- As the organism grows, one of its cells will form a bud and start to grow on its own
- When the bud has completely developed, it detaches
- The bud in an exac original organism



Asexual Reproduction in Plants

- Also known as *vegetative reproduction*
- The growing tips of plant roots and stems contain areas of rapidly reproducing cells called the *meristem*
- When a plant is damaged, these meristem cells can create copies of the damaged cells, allowing the plant to continue to grow
- By taki[illegible]of the meristem, y[illegible]xact copy of



Asexual Reproduction in Plants

- Plants also reproduce by using *runners*, stems that lay along the ground and form roots to create a new, genetically identical plant
- Bulbs and tubers are also forms of asexual reproduction in plants

SEXUAL REPRODUCTION

Why have some species evolved to reproduce sexually? What might be some advantages of sexual reproduction?

- Increases genetic diversity of populations, therefore promoting natural selection

Disadvantages of sexual reproduction???

Types of Sexual Reproduction:

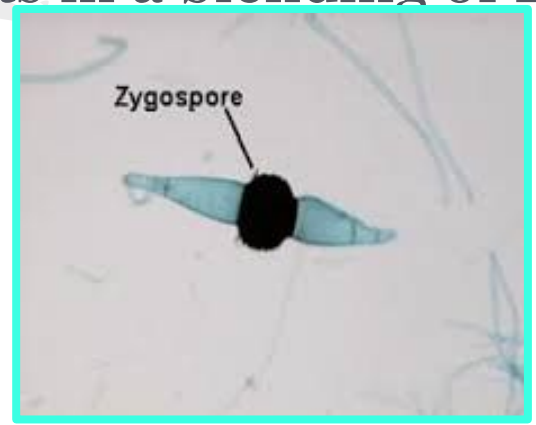
a. Zygospores
b. Bacterial Conjugation
c. Sexual Reproduction in Plants
   - ➢ Gymnosperms
   - ➢ Angiosperms
d. Sexual Reproduction in Animals
   - ➢ External fertilization
   - ➢ Internal fertilization

*** Note that all forms of sexual reproduction involve equal genetic input from both parents in the form of *gametes* (eggs & sperm), which combine to form a single fertilized cell or *zygote*. The zygote is genetically different from both of the parents. ***

Zygospores

(Not to be confused with zoospores!)

- Produced from two different organisms of the same species (e.g. mold cells)
- Created when a spore is given genetic info from two sources; results in a blending of DNA



Bacterial Conjugation

- Some bacteria are able to simply transfer genetic material directly from one cell to another
- No new cell is formed (so technically it is not reproduction), but both bacteria involved in the transfer end up having a new combination of genes
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- Bacteria with this mixture of genetic info will eventually reproduce using binary fission, resulting in many duplicates of the new bacteria
- Allows for variation and new inherited traits to be passed on

Sexual Reproduction in Plants

GYMNOSPERMS (“naked seeds”)

- used by conifers such as spruce, pine and fir
- do not form flowers or fruit; instead, seeds are produced inside of cones

ANGIOSPERMS (“covered seeds”)

- used by flowering plants
- produce seeds that are covered by fruit
- seed is formed when the pollen (sperm) and the ovule (egg) unite during

Sexual Reproduction in Animals

Egg & sperm from two different organisms of the same species (male & female) meet to produce a fertilized zygote, which then develops into a new organism with new genetic info. This can occur in two ways:

1) EXTERNAL FERTILIZATION

- ➢ Egg is fertilized outside the body
- ➢ Used by fish & amphibians
- ➢ Requires a moist environment (so sperm can swim to the egg, and the zygote won't dry out)

Sexual Reproduction in Animals

2) INTERNAL FERTILIZATION

- Egg is fertilized inside the body
- Used by mammals, birds, and insects

* Note that just because the egg is fertilized inside the body does not mean that it always develops inside the body (e. g. birds use internal fertilization, but after the zygote forms a shell develops around the growing embryo, and the bird lays the ~~egg. The embryo will finish developing~~ outside the mother)

Sexual Reproduction in Animals

Advantages and disadvantages of internal fertilization:

Advantages	Disadvantages
sperm, egg, and zygote are protected within the mother's body	both male and female must be present
greater chance of fertilization occurring	greater time and energy investment required
gametes are kept warm and moist	

Sexual Reproduction in Animals

Because sexual reproduction requires a mate, some pretty strange behaviours, or *mating rituals*, have evolved…

https://www.youtube.com/watch?v=iTmHtxJpEWE