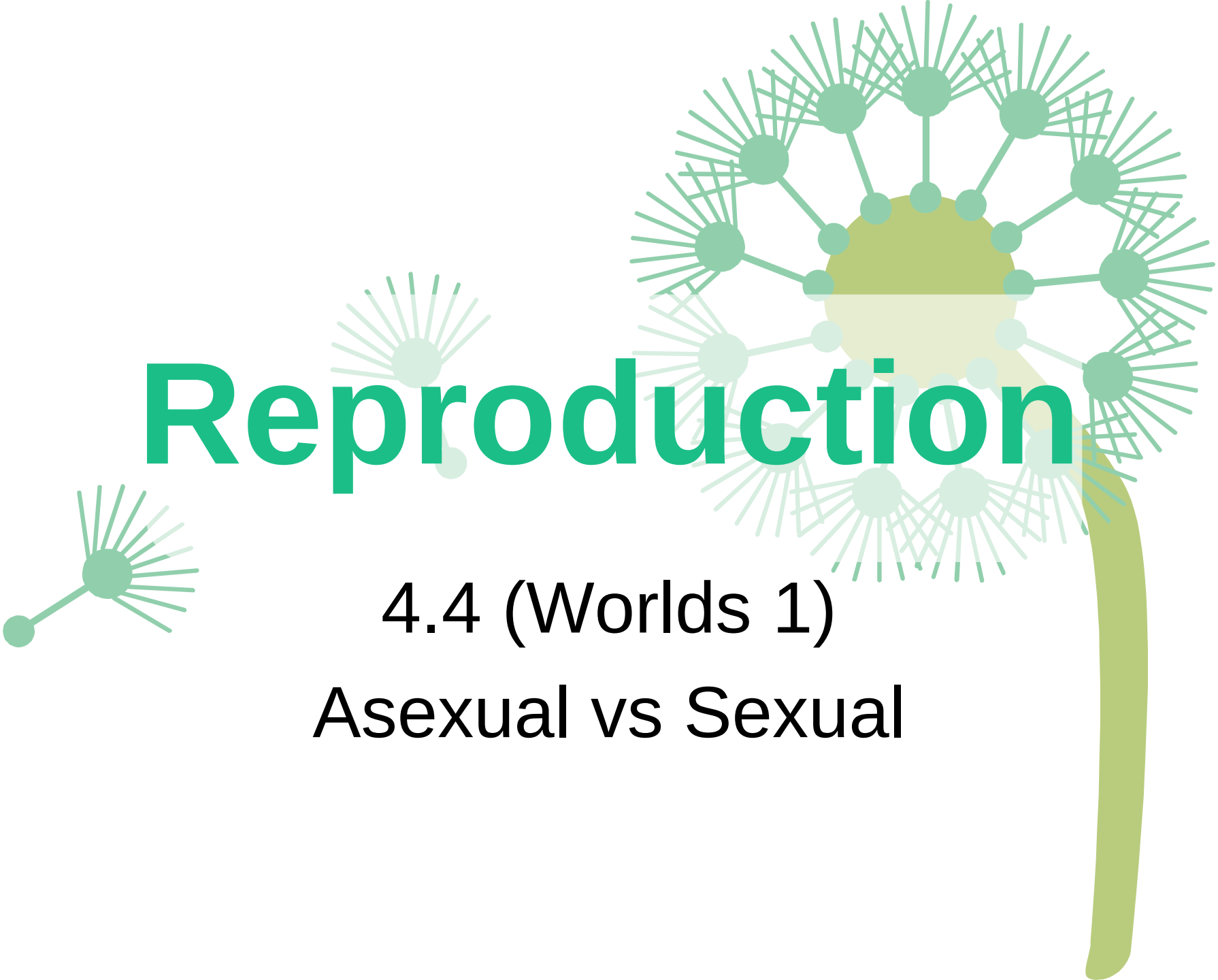


Reproduction

4.4 (Worlds 1)

Asexual vs Sexual

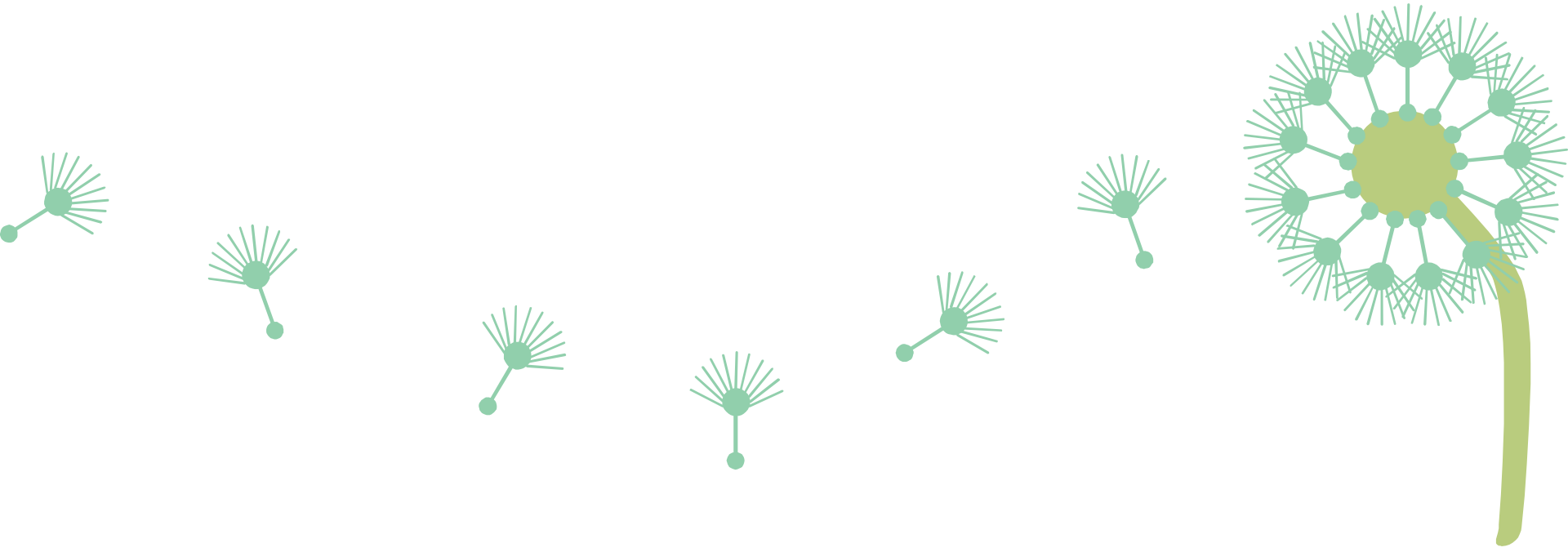
Why is Reproduction Important?

- The means by which an organism **produces offspring**
- Biologically and evolutionarily speaking, reproduction is what has made the **continuation of life** possible!
- Reproduction ensures the **survival** of a species

Types of Reproduction

- Reproduction is key to a species surviving but it is not always achieved in the same way
- We classify reproductive techniques into two main categories:
  - **Asexual reproduction**
  - **Sexual reproduction**

Asexual Reproduction



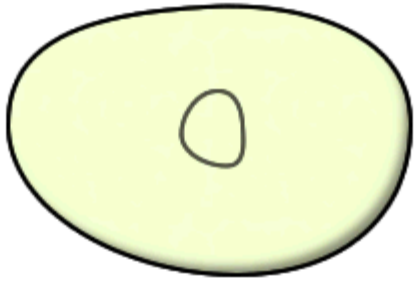
Asexual Reproduction

- Unlike sexual reproduction, asexual reproduction **does not require** both a male and a female
  - Only **one** organism is needed in order to create an offspring
  - And this offspring will be an **exact copy** of its parent

Types of Asexual Reproduction

1) **Binary Fission**

- This is when the organism just **splits in two**
- This type of asexual reproduction is only seen in **Prokaryotes** (Bacteria and Archaea)



Types of Asexual Reproduction

2) **Budding**

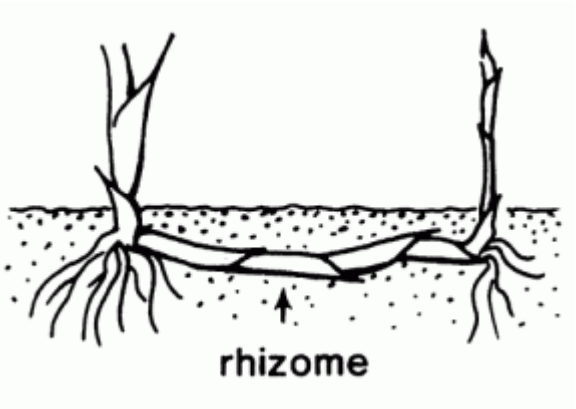
- A small growth or **bud** is produced on the parent organism
- Once the budding offspring is mature it **detaches** from the parent
- Seen in fungi and some animals like corals and sponges

Types of Asexual Reproduction

3) **Vegetative reproduction**

- Encompasses a bunch of **different** types of asexual reproductive techniques seen in **plants**

Types of Asexual Reproduction



3) **Vegetative reproduction**

a) Rhizomes and stolons

- **Rhizomes:** a **modified root** that grows horizontally underground and can produce **new shoots**
- **Stolons:** a **stem** that grows horizontally (above ground) that then produces **roots** and **new shoots**

Considered "layering" in workbook

Types of Asexual Reproduction

3) **Vegetative reproduction**

b) *Bulbs and tubers*

- **Bulbs:** a **modified short stem** that is used for storage and can produce new roots and shoots

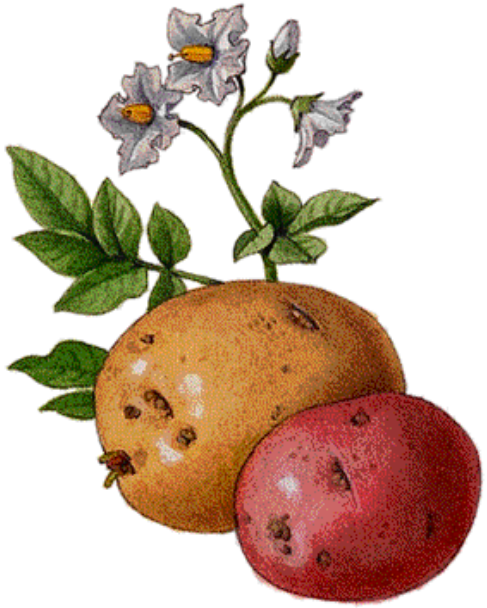
  Ex: onion or tulip

- **Tubers:** often a **modified**

and enlarged **rhizome or stolo**

that can produce a new plant

Ex: potato



Types of Asexual Reproduction

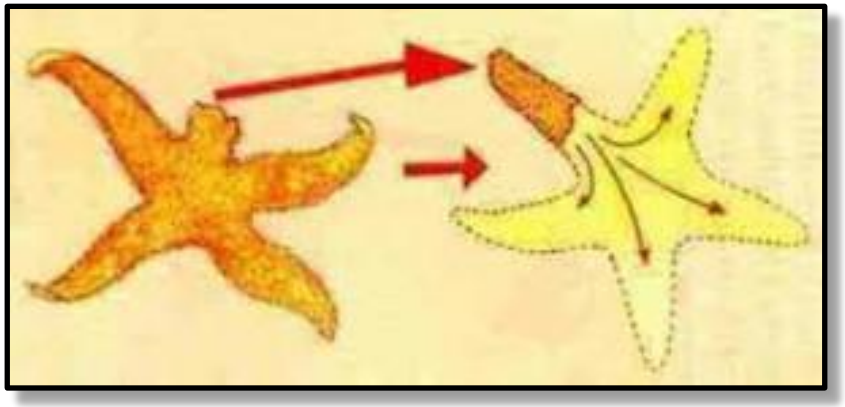
4) **Spores**

- Seen in plants, algae, fungi and protozoa. A reproductive unit that is **haploid** (only has **half** of the chromosomes of a normal individual).
- Often **very resilient** and can survive until more favourable conditions are available.

Types of Asexual Reproduction

5) **Fragmentation (or cutting for plants)**

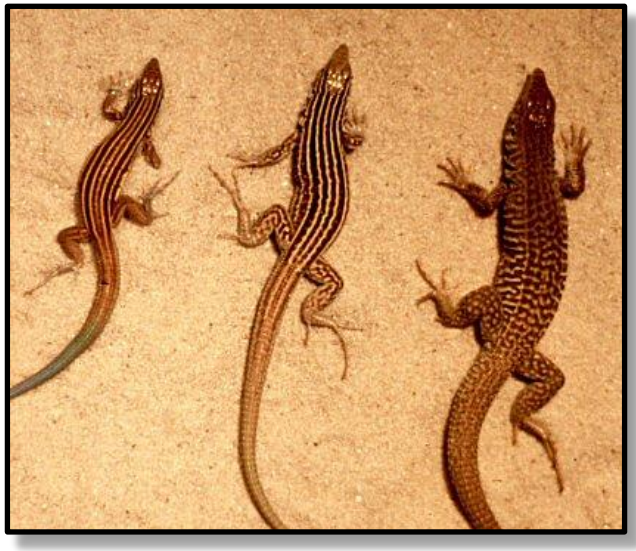
- A new organism grows from a **fragment of the parent**
- Seen in some animals, plants and fungi



Types of Asexual Reproduction

6) **Parthenogenesis**

- Form of asexual reproduction seen in some plants and animals where an **unfertilized egg** develops into a new individual



Advantages of Asexual Reproduction

1) **Only one organism is needed**
   - Not always easy to find a mate

2) **Rapid form of reproduction**
   - Can **populate** an area very quickly

Advantages of Asexual Reproduction

3) **Good for "in case of emergency" situations**

- Some organisms can use asexual reproduction in order to **survive adverse conditions**

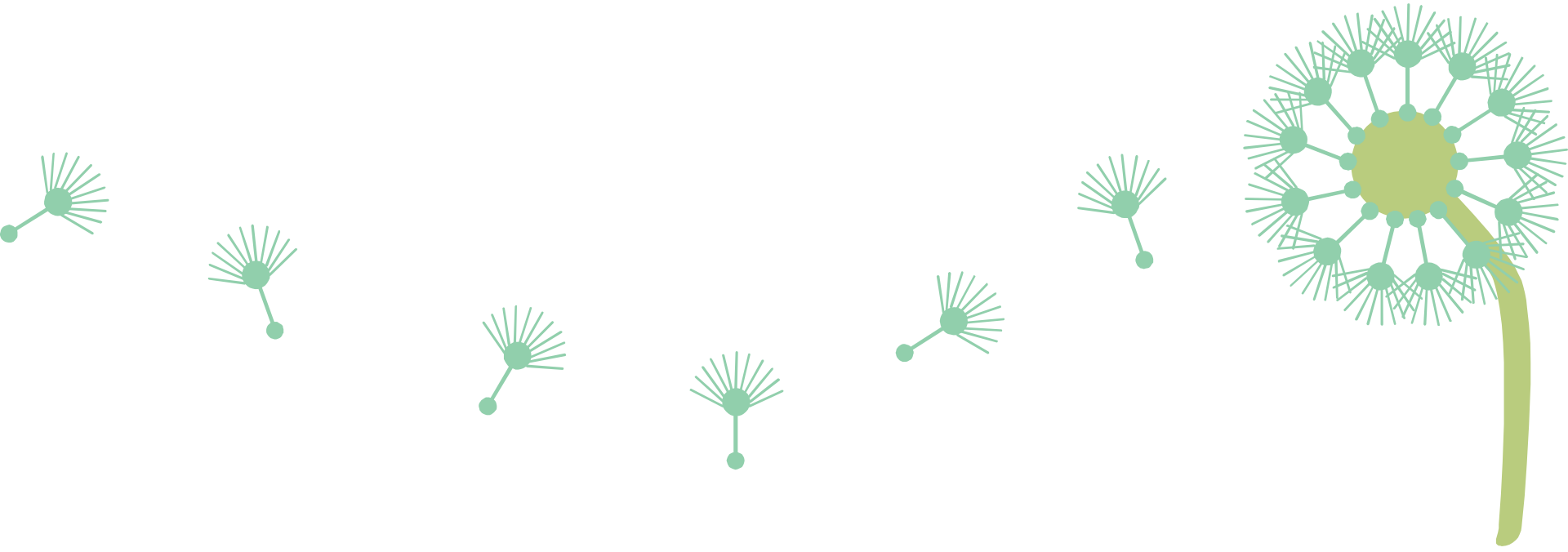
4) **Inexpensive**

- Does not require much parental **investment**

Disadvantages of Asexual Reproduction

1) **No diversity**
   - All organisms are **identical** to the parent; except for mutations
2) **Prone to extinction**
   - Means any "**bad genes**" keep getting passed on as well
3) **Cannot adapt**
   - Because the genetics do not really change, they **do not adapt** to environmental conditions very quickly

Sexual Reproduction

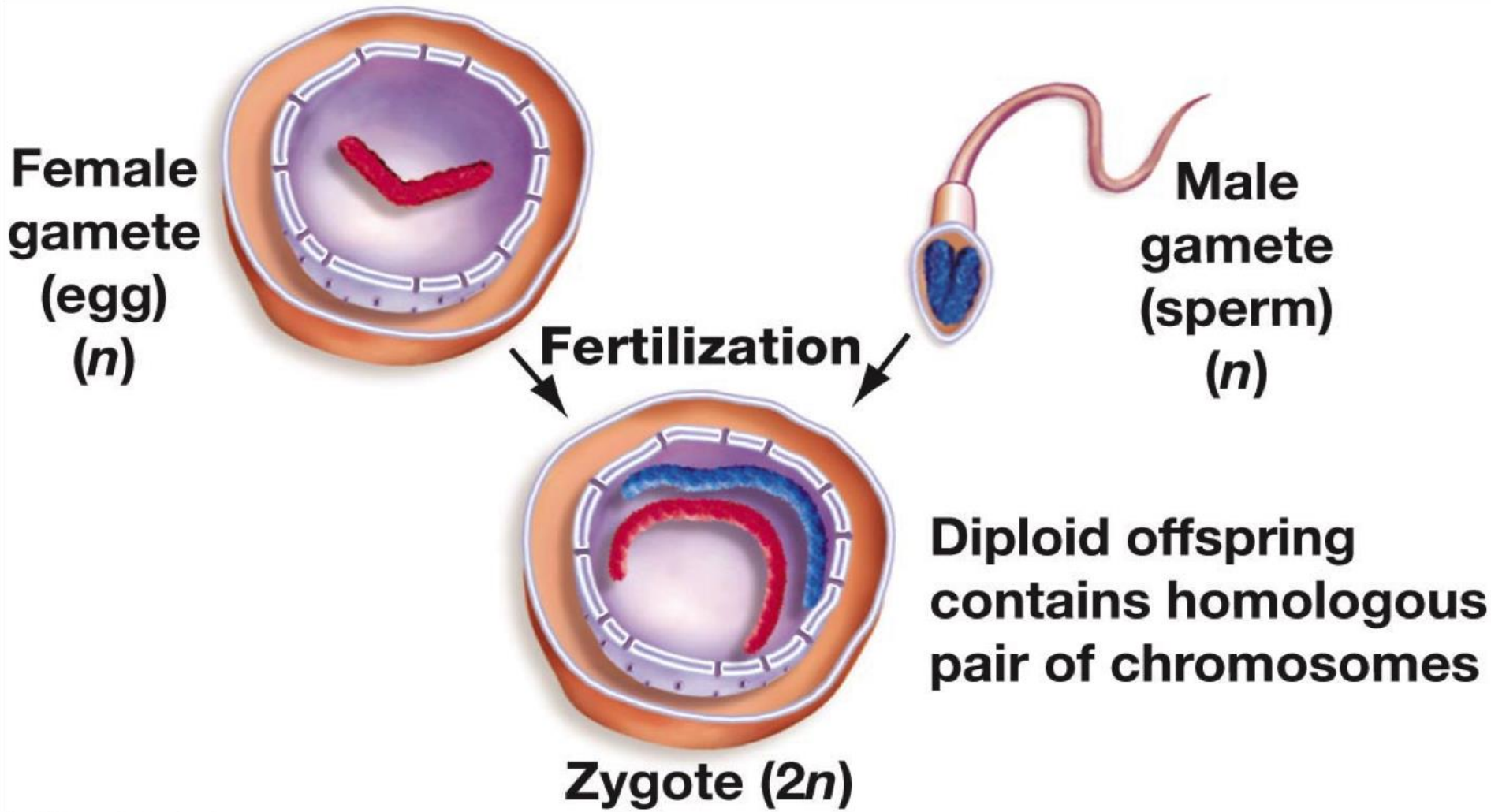


Sexual Reproduction

- Form of reproduction (producing offspring) that requires a **male** and **female gamete**
  - The offspring inherit some characteristics from **each parent**
  - The offspring are therefore **not genetically identical** to either parent

How it works

1. Each parent provides **one gamete** (**egg** and **sperm**)
2. Each gamete only has **half** of the chromosomes of a normal cell (**haploid**)
3. They then fuse together during fertilization to form one new **diploid** cell (has a **full set** of chromosomes) called a **zygote**

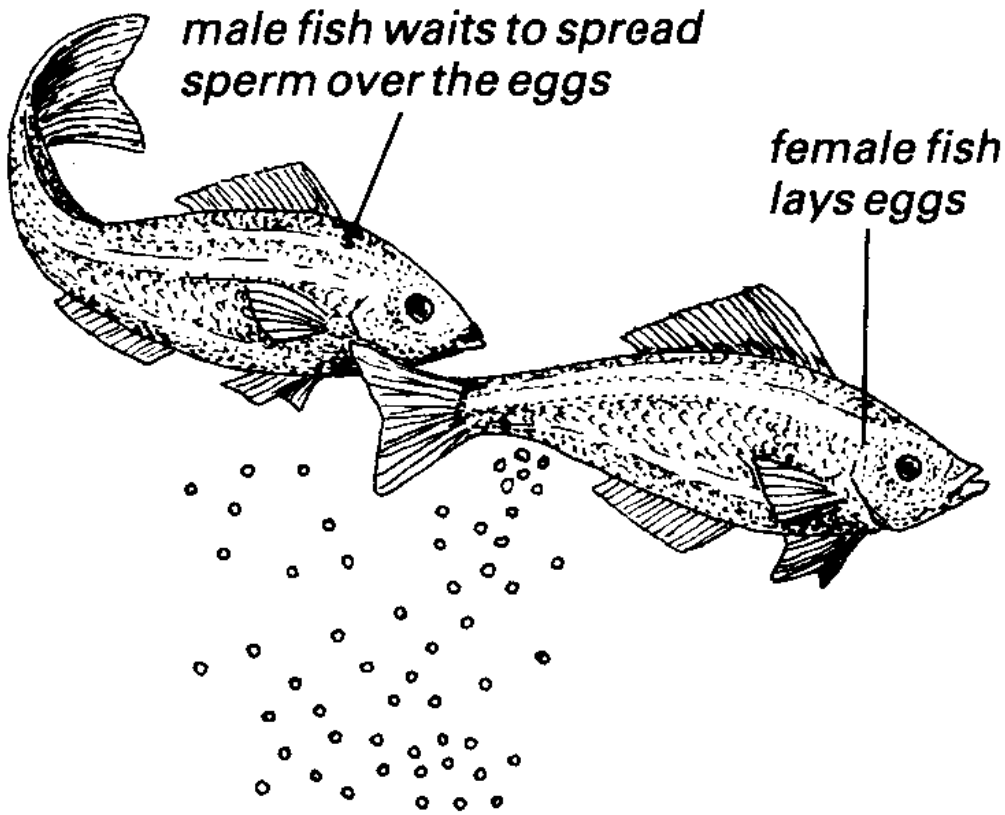


Sexual Reproduction in Animals

- Although the general fertilization process is the same, there are **different approaches** to bringing the egg and sperm together

1) External Fertilization

- In some species, **both** the female and male release the gametes into the **open**
  - E.g. most fish



2) Internal Fertilization

a) Oviparity (Egg-layers)

- Fertilization is internal but the offspring develop **externally** in **eggs**
  - E.g. birds and most reptiles

2) Internal Fertilization

b) Ovoviviparity (egg/live birth)

- Fertilization is again internal but the **eggs are retained** inside the mother so that it looks like a live birth
- Offspring still dependent on **egg yolk** for nutrition

  Ex: some reptiles and sharks

2) Internal Fertilization

c) Viviparity (Live-bearing)

- The zygote is produced through internal fertilization and the embryo grows **inside** the mother's uterus, getting **nutrients** from the **mother** (no yolk sac)

  Ex: mammals, some fish


JONATHAN BIRD'S
BLUE
WORLD
SHARK
ACADEMY

Advantages of Sexual Reproduction

1) **Genetic Diversity**
   - Because each individual is a result of the **mixing of genes** from their parents can have a lot of different combinations of genes

2) **Faster Adaptation**
   - With more genetic diversity, it is more likely that individuals can keep up with **environmental changes**

Advantages of Sexual Reproduction

3) **Lower Extinction Rates**

- **Undesirable traits** are not necessarily passed on; they can get weeded out through genetic recombination

Disadvantages of Sexual Reproduction

1) **Need two parents of opposite sex**

- It is not always easy, especially in unfavourable conditions, for a male and female to find each other

Disadvantages of Sexual Reproduction

2) **Time consuming**

– The development of offspring through sexual reproduction generally takes **longer** than through asexual reproduction and requires more parental involvement

– Can take a long time for population numbers to grow

Workbook

- P.128-129 (Worlds 1)