**S9 Topic 3: How Genetic Material is Passed on to the Next Generation** p.26 – 36

Review powerpoint for Topic 3 on the CHS website

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| **Darwin’s Theory of Natural Selection : What does “survival of the fittest” mean?** |

**The fittest = the survivors** because they pass their **heritable** variations and adaptations from generation to generation

 **Learning check:** Which of the following are **heritable traits**? Which are **non-heritable** **traits.** Which could be a mix of the two?

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| • Paralyzed legs | • Hair color from a box | • The language you speak |
| • Height | • Natural hair color | • The color of your eyes |
| **THERE ARE 2 TYPES OF REPRODUCTION: ASEXUAL AND SEXUAL** |
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| **ASEXUAL REPRODUCTION** |

**Asexual reproduction: There is only one parent. The genetic material in the nucleus of the
 parent divides in half, and then the organism splits into 2 identical
 daughter cells (clones of the parent).**

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| **Advantages** | • many off-spring can be produced quickly • don’t have to spend precious  energy finding a mate • If parent is super adapted then offspring will  be super adapted |
| **Disadvantages** | • With asexual reproduction there are no new combinations, so there is no  possibility for variation or adaptation • if the ecosystem or climate changes  the organisms are unable to adapt, and the population can be wiped out |

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| **SEXUAL REPRODUCTION** |

**Sexual reproduction: There are 2 parents so genetic information from BOTH parents is
 passed on to the offspring and produces offspring that are not exactly like either parent
 because they are a new combination of the parents characteristics**

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 **• Sex cells = gametes (sperm + egg)
 • Process 2 = fertilization (when sperm and egg join)
 • Zygote is the fertilized cell that develops into the new organism (embryo)**

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| **Advantages** | **• each offspring is different from either parent so there is more  variation, more resilience to change in the environment. Ex. if the  climate changes or a diseas comes in some individuals in the  population will probably survive.** |
| **Disadvantages** | **• have to find a mate • reproduction is much slower  • offspring may not be as well adapted to the environment as parents** |

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| **THERE ARE 4 TYPES OF ASEXUAL REPRODUCTION** |



**1. Binary Fission (amoeba, bacteria)** cellduplicates nucleus and
 cell contents, then divides into two daughter cells



**2. Asexual Spores(fungi, green algae)**  Spores survive bad conditions because they are resistant to stressful environments like drought. They won’t grow until the environment becomes favorable for survival. A special type called **zoospore** have flagella. WHY? Spores survive but will not grow until environment becomes favorable.



**3. Asexual Reproduction in Plants** Take a cutting (leaf, root, stem) put in water or soil and the meristem (growing tips of roots, stems, leaves) will make a new plant.



**4. Asexual Animal Budding (Sea sponges, hydra, yeast) :** a cloned offspring
 grows on the animal and when it is a certain size it buds off and goes off on
 its own.

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| **THERE ARE 4 TYPES OF SEXUAL REPRODUCTION** |

**1. Zygospores (molds, algae):** Spores that can weather lousy conditions

**2. Bacterial Conjugation:** 2 bacterial cells connect and there is a one-way transfer of genetic material



**3. Sexual Reproduction in Plants • Gymnosperms** (i.e. Christmas trees) produce
 seeds in **cones**. • **Angiosperms** produce seeds in **flowers**. where
 seed is formed

**Individual plants often prevent self –pollination by having their pollen (sperm) and eggs mature at different times.**



 **Do dissection of a flower, label flower parts and watch video below:
• PISTIL** is the **female reproductive organ** in plants.
 It is made up of the **stigma**, **style** and **ovary**
 (protects the egg that becomes the seed)

**• STAMEN** is the **male reproductive organ** in a plant.
 It is made up of the **anther** (where pollen is made)
 and **filament**<http://www.teachersdomain.org/asset/oer08_vid_flowers/>

and Go to [http://www.learnalberta.ca/](http://www.learnalberta.ca/%22%20%5Ct%20%22_blank) , choose English, search Flower Pollination. Do this interactive activity and try the quiz that is part of the activity.





• Pollen grains (contains male genes) land on
 sticky stigma
• pollen tube grows down style til reaches ovule
 (egg). Male and female genes combine when
 sperm nucleus fertilizes the egg **(fertilization)**
 and a **zygote** is formed.
• the developing **embryo** is nourished by the
 cotyledons, and protected by the ovary.
 Developing seeds are often protected in a fruit

**4. Sexual Reproduction in Animals**

• A liquid environment prevents sperm and egg from drying out.

• Some animals use external fertilization (i.e. fish, frogs). Others use internal fertilization (i.e. humans and other mammals).

Just like in plants, the **sperm fertilizes the egg** and this makes a new cell called a **zygote** which develops into an **embryo** which grows into the **new organism**.

 

**Complete Questions Pg 36 #2,5,6**

 **Topic 1 – 3 quiz**