

Inheritance, Variation and Evolution

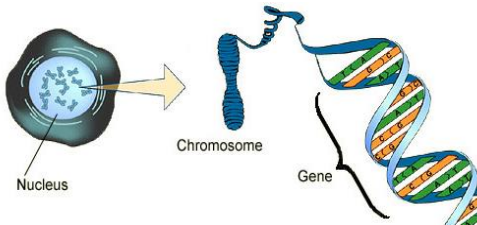
What is speciation?

- Speciation is the process by which a new species is formed
- Every species has variation and different characteristics
- When a group gets isolated from the rest of the species, it cannot breed. Over time, natural selection occurs and the species changes to adapt to its environment
- Eventually, the group is so different that it cannot breed with other members of the species to produce viable offspring. A new species is made.



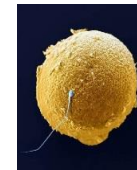
START

Each cell in the body contains a nucleus. This holds chromosomes made of DNA. **Small sections of DNA that code for a characteristic are called genes.**



Genetic information is passed from parents to children using the **egg and sperm cells**.

These sex cells are also called **gametes**. This means half the information comes from each parent and explains why you might look like your parents.



Reproduction can be **sexual** or **asexual**.

Sexual reproduction produces **variation**. Asexual reproduction produces **clones**.

In **sexual** reproduction **two parents** are involved. A mixture of genes is created. This **variety** is good as it helps us **cope with changes** and diseases as a species.

Asexual reproduction involves **only one parent**. So there is **no genetic variety**. However this works really well if you need to **grow or repair your cells**.

Remember: Differences between people aren't just because of different genes. The environment can have a big impact on how we turn out. **Genes and Lifestyle effect who we are and our health.**

New traits/genes are caused by **mutation of DNA**

What is Cell Division?

- A process that leads to the creation of new cells.
- Mitosis is a process used for growth and repair and happens in body cells. It involves a single division and produces diploid (two copies of each chromosome) cells.
- Meiosis creates gametes (sex cells). It involves two divisions and produces haploid cells (one copy of each chromosome).

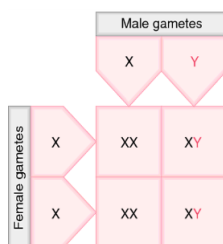
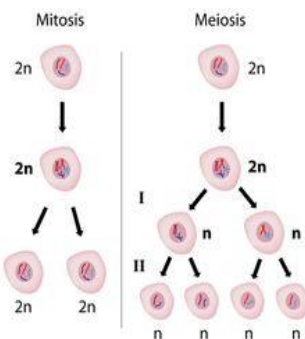


Key words:

1. **Variation:** The differences between individuals in a species. Often caused by mutations.
2. **Inheritance:** The process that enables parents to pass on their genes (and characteristics) to their offspring.
3. **Evolution:** The gradual change over time of a species.
4. **Natural Selection:** The process that enables evolution to happen.
5. **Gene:** A unit of inheritance, codes for a single characteristic.
6. **Allele:** A version of a gene.
7. **Chromosome:** A circular piece of DNA containing thousands of genes. Humans have 46 chromosomes found in the nucleus.
8. **Speciation:** A process that results in a new species.

How does inheritance work?

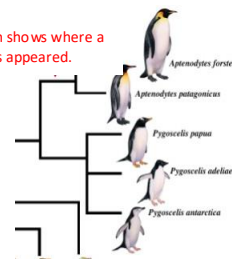
- In sexual reproduction both parents provide half the genetic material of their offspring
 - Humans have 46 chromosomes- 23 come from the father, 23 from the mother
 - Genes code for characteristics but these can be influenced by the environment too
- Diagrams called punnet squares can be used to show inheritance. Use them!



Cross: Aa x Aa

	A	a
A	AA	Aa
a	Aa	aa

Each new branch shows where a new species appeared.



Natural Selection and Evolution

Darwin suggested that certain traits would help an organism to **survive and reproduce**. They would then **pass this useful trait to their offspring**. The environment would **naturally select** which traits were more useful.

Darwin had a lot of trouble getting his ideas excepted because... People believed in god and felt his ideas went against this. He couldn't show them any evidence. He couldn't really explain how it worked. (no one knew about genes)



Inheritance, Variation and Evolution Questions

1. What is variation?
2. What is DNA?
3. Where in the cell is DNA found?
4. What form does DNA take in this place?
5. What is a gene?
6. What are gametes?
7. What process produces gametes?
8. What are the two types of reproduction?
9. How are they different?
10. What two factors affect how an organism looks and acts?
11. What causes changes to DNA?
12. Who suggested the theory of natural selection?
13. What happens in natural selection?
14. Define evolution.
15. Why did some people not believe evolution was right at first?
16. What is a punnet square?
17. Draw one to show that it is a 50/50 chance of parents having a boy or girl.
18. What is speciation?
19. How does speciation work?