

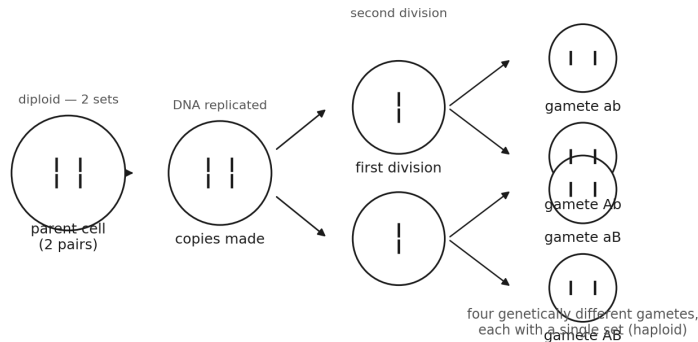
Exercise walk-through

6.5

Classification of living organisms (4.6.4)

AQA · GCSE · Biology

Meiosis in two divisions



- Copies of the genetic information are made first.
- Two divisions give four genetically different gametes.
- Fertilisation restores the number; mitosis builds the embryo.

Punnett squares and family trees

Mother's gametes			
Father's mates	X	X	
X	XX	XX	
Y	XY	XY	

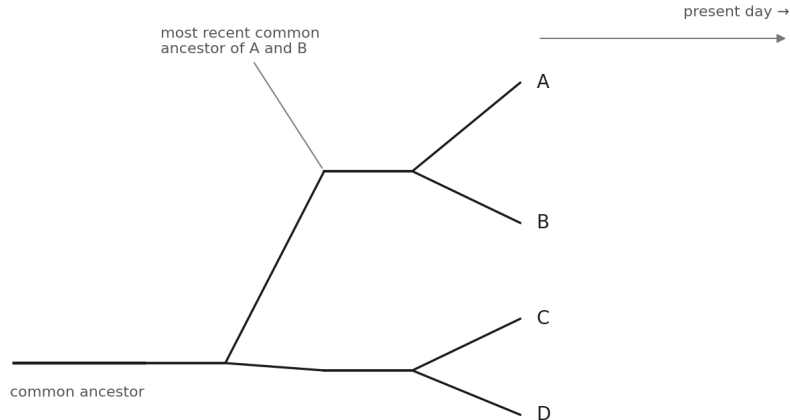
XX female : XY male = 1 : 1 (50 % each)

Carrier mother ($X^N X^n$)			
Father ($X^N Y$)	X^N	X^n	
X^N	$X^N X^N$	$X^N X^n$	
Y	$X^N Y$	$X^n Y$	

e.g. red-green colour blindness cross — ratios read straight off

- Write the parents' gametes on the edges first.
- Read ratios straight off — 3 to 1, 1 to 1, probabilities as fractions.
- Family trees — track carriers through the generations.

Fossils and extinction



- Fossils — no decay, mineral replacement, preserved traces.
- Soft-bodied early life — a record we cannot trust fully.
- Extinction — disease, predators, competition, catastrophe.

Exercises 2.1·2.3

2.1 List the Linnaean ranks from largest to smallest. [1]

2.2 What are the two parts of a binomial name? [2]

2.3 Name the three domains. [3]

Exercises 2.1·2.3

2.1 List the Linnaean ranks from largest to smallest. [1]

2.1 Kingdom, phylum, class, order, family, genus, species.

2.2 What are the two parts of a binomial name? [2]

2.2 Genus; species.

2.3 Name the three domains. [3]

2.3 Archaea; bacteria; eukaryota.

Exercises 3.1·3.2

3.1 Describe how developments in biology led from Linnaeus's system to the three-domain system. [4]

3.2 Archaea often live in hot springs; bacteria live in ordinary environments. Explain why they are placed in different domains despite both being single-celled. [3]

Exercises 3.1·3.2

3.1 Describe how developments in biology led from Linnaeus's system to the three-domain system. [4]

3.1 Linnaeus classified by structure and characteristics into kingdom → species; improvements in microscopes revealed more about internal structures; progress in understanding biochemical processes, and chemical analysis of organisms, showed deeper relationships; Carl Woese proposed the three-domain system – archaea, bacteria and eukaryota – from that chemical evidence.

3.2 Archaea often live in hot springs; bacteria live in ordinary environments. Explain why they are placed in different domains despite both being single-celled. [3]

3.2 Chemical analysis of their genetic material/biochemistry shows they are only distantly related; archaea are primitive bacteria adapted to extreme environments, while bacteria are true bacteria; classification now reflects evolutionary relatedness from chemical evidence, not just single-celled appearance.

Exercise 3.3

3.3 Use an evolutionary tree to explain which of three named species share the most recent common ancestor, and state the two data sources used to build trees. [4]

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3.3 The two species whose branches meet at the closest branch point share the most recent common ancestor; a species on a branch that splits earlier diverged longer ago. Trees are built from current classification data for living organisms and fossil data for extinct organisms.