

# VIDEO SUMMARIES: GENETIC VARIATION

## MEIOSIS AND MUTATION

### What you need to know:

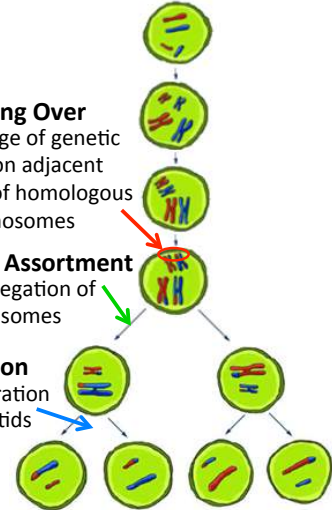
- Genetic variation creates differences in individuals that could be advantageous for survival
- Linked genes are on the same chromatid and are close to each other so can be inherited together
- Mutation is the changing of the structure of a gene resulting in new alleles
- Causes:
  - Light
  - Radiation
  - Chemicals
  - DNA replication errors
- Somatic vs. Gametic Cells
  - Inheritance (gametic)
  - Individual (somatic)
  - Passed on (gametic)
  - Added to gene pool (gametic)



**Crossing Over**  
The exchange of genetic material on adjacent chromatids of homologous chromosomes

**Independent Assortment**  
Random segregation of chromosomes

**Segregation**  
Random separation of chromatids



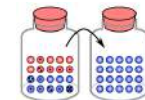
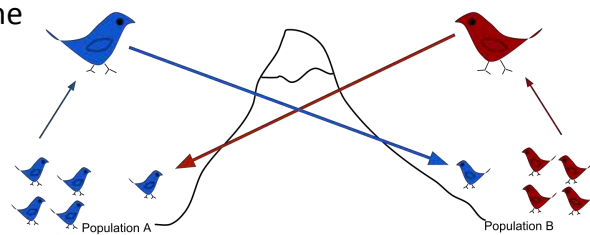
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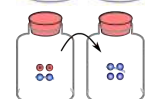
## MIGRATION AND GENETIC DRIFT

### What you need to know:

- Migration is alleles flowing from one population to another for the purpose of genetic variation
- Causes:
  - Barriers
  - Mobility
  - Choice
- Genetic Drift is the change in the frequency of alleles, due to random sampling and chance  
Small populations are much more likely to change due to genetic drift



Chance = 1  
in a million



Chance = 1  
in 16

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## NATURAL SELECTION

### What you need to know:

- Natural selection is the process whereby organisms that are better suited to the environment tend to survive and produce offspring
- Purpose: to help the survival of the population
- Chatham Island (NZ) Black Robin
  - All from 5 one female
  - Now 250+
  - No inbreeding effects
  - Due to small population must have naturally selected for no inbreeding alleles

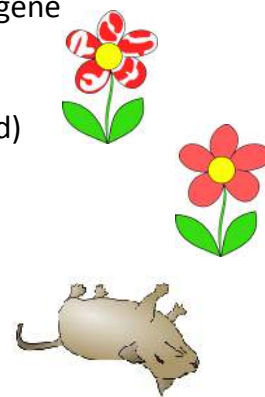
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## MONOHYBRID INHERITANCE

### What you need to know:

- Monohybrid inheritance is the inheritance of a single gene
- These come in different forms:
  - Co-dominance is where each allele separately contributes to the new phenotype (eg A B O blood)
  - Incomplete dominance is where both alleles are 'mixed' or expressed together, creating a (new) intermediate phenotype
  - Lethal alleles are alleles that cause death when expressed in homozygous conditions



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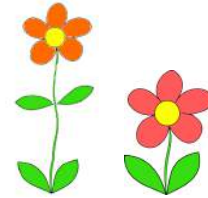


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## DIHYBRID INHERITANCE

### What you need to know:

- Dihybrid inheritance is the inheritance of two different genes, each with two alleles
- Pure breeding:
  - Recessive (one phenotype)
  - Dominant (cross breed with homozygous recessive)
    - Variation = heterozygous
    - No variation = homozygous dominant
- To draw a dihybrid cross:
  1. Do 2 x 2 punnett square for each trait
  2. Do 4 x 4 punnett square with all solutions
- If genes are linked then it is very difficult to breed out because they are next to each other



	H	h
h	Hh	hh
h	Hh	hh

	O	o
o	Oo	oo
o	Oo	oo

	Hh	Hh	hh	hh
Oo	Hh Oo	Hh Oo	hh Oo	hh Oo
Oo	Hh Oo	Hh Oo	hh Oo	hh Oo
oo	Hh oo	Hh oo	hh oo	hh oo
oo	Hh oo	Hh oo	hh oo	hh oo

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