

Science 30	Unit A: Biology
Lesson 11 - Inheritance	84 mins

Fertilization

When two haploid (1n) cells come together to make 1 diploid (2n) cell	Sperm + Ovum = Zygote (1st cell of a fetus) Pollen + Ovum = Zygote (1st cell of a seed)
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Inheritance

<ul style="list-style-type: none"> - The acquiring of traits/genes from your parents <p>Our understanding of Inheritance</p> <ol style="list-style-type: none"> 1) Traits are determined by genes 2) Individuals get these traits randomly from their parents 3) Traits are not exclusive of each other 4) Some traits are dominant 	<ul style="list-style-type: none"> - Gregor Mendel and his pea plants - Paved the way for the understanding of artificial selection. <p>Brown eyes are found in your genes</p> <p>You can have brown eyes and hair but that's not required Brown eyes vs. blue eyes</p>
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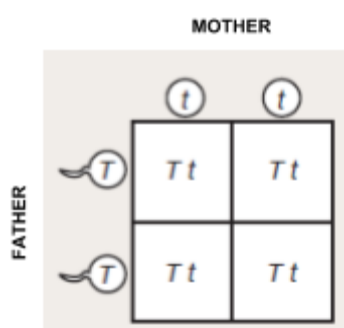
Acquired Traits vs. Inherited Traits

<ul style="list-style-type: none"> - Learned during your lifetime - Art, language, talents... - psychological 	<ul style="list-style-type: none"> - Gained from genetics - Eye colour, blood type, metabolism... - physical
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Alleles

<ul style="list-style-type: none"> - Different versions of the same genes <p>Dominant - traits that will express if present</p> <p>Recessive - traits that will only express if paired with another recessive</p>	<ul style="list-style-type: none"> - Brown eye and blue eyed genes are alleles - Brown eyes are dominant - Blue eyes are recessive
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Punnett Squares

<ul style="list-style-type: none"> - A table to show all the outcomes of a pairing or different alleles from parents - Dominant alleles get a Capital Letter - Recessives of the same trait get a lower case letter - REMEMBER: Father and Mothers only give ONE version of an allele, MEIOSIS 	 <p style="text-align: center;">MOTHER</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">t</td> <td style="text-align: center;">t</td> </tr> <tr> <td style="text-align: center;">FATHER</td> <td style="text-align: center;">T</td> <td style="text-align: center;">T</td> </tr> <tr> <td></td> <td style="text-align: center;">Tt</td> <td style="text-align: center;">Tt</td> </tr> <tr> <td></td> <td style="text-align: center;">Tt</td> <td style="text-align: center;">Tt</td> </tr> </table>		t	t	FATHER	T	T		Tt	Tt		Tt	Tt
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Homozygous and Heterozygous

<ul style="list-style-type: none"> - When two of the SAME alleles are paired - The ONLY way recessive traits will express 	<ul style="list-style-type: none"> - When two different alleles are paired - Only dominant traits will express
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- "Purebred"

- "Hybrid"

Genotype Vs. Phenotype

- The pairing of alleles in the genes
- Your genetics
 - Homozygous and Heterozygous

- The trait that is expressed
- What people see
- Brown or blue eyes

Other Mechanisms of Inheritance

- Most phenotypes are not expressed by 1 set of alleles
- Multiple alleles may code for different parts of the phenotype
- Generally is expressed as a mixture

- Codominance - red and white flowers produce pink
- A type blood and B type blood becomes AB type

Traits Associated with the X Chromosome

Sex-linked inheritance: traits not directly related to primary or secondary sexual characteristics that are coded by the genes located on the sex chromosomes

Autosomal inheritance: traits controlled by genes found on the 22 pairs of autosomal chromosomes

Colour blindness - recessive allele on the X chromosome

In punnett squares needs to be shown as a superscript letter on either the X or Y

Science 30 - Lesson 10 - What Is Genetics?

Name: _____

- 1) Jim has dark curly hair, brown eyes, and a large scar on his cheek. As a child, he regularly practised the piano and became a gifted pianist. He is a skilled downhill skier and loves all winter sports. From this description, list Jim's genetically inherited traits and the traits that he has acquired.

- 2) A genotype for the fur-colour trait in mice is abbreviated as Mm.

- a) State the dominant allele in the genotype. _____
- b) State the recessive allele in the genotype. _____
- c) Is this individual described as homozygous or heterozygous? _____
- d) If black fur is dominant over white fur in mice, state the phenotype of the mouse with the genotype Mm. _____

- 3) In cats, the gene that causes the ginger- or orange-fur colour is a sex-linked trait carried on the X chromosome. The ginger colour (G) is dominant to the black colour (g).

- a) Write the genotype for a ginger male cat.

- b) Describe the phenotype of a cat with the genotype X^gY .

- c) Describe the phenotype of a cat with the genotype $X^G X^G$.

- 4) A family has three girls and is expecting a fourth child. What is the probability that the fourth child will be a boy?

- 5) Explain the difference between autosomal inheritance and sex-linked inheritance.

- 6) In garden peas, the yellow-seed colour is an autosomal dominant trait over the green-seed colour.

- a) Choose letters to represent the dominant and recessive alleles for this trait. Write the genotypes for a pea plant that is homozygous for yellow, homozygous for green, and heterozygous for yellow.

b) Draw a Punnett square for a cross between a homozygous yellow-seeded pea plant and a homozygous green-seeded pea plant. State the predicted genotypes and phenotypes of the offspring.

c) Draw a Punnett square for a cross between two of the offspring produced in question 6 b. State the predicted genotypes and phenotypes of the offspring.

7) The gene for eye colour in fruit flies is located on the X chromosome. The allele for the dominant red-eye colour could be represented by the allele X^R , while the allele for the recessive white-eye colour could be represented by the allele X^r .

a) Draw a sex-linked Punnett square for a male with red eyes who breeds with a female with white eyes.

b) Determine the percentage probability that the male offspring will have white eyes.

c) Determine the percentage probability that the daughters will have white eyes.

d) Determine the percentage probability that the female offspring are carriers of the recessive white-eyed allele.