

What determines a trait or characteristic?	Genes and environment. Traits cannot be determined by either, but most are a combination.																			
Who was Gregor Mendel?	As Austrian man who became a monk. He experimented with pea plant traits, and in his experiments, became known as the "Father of Modern Genetics".																			
Why did he use pea plants?	<ol style="list-style-type: none"> 1. Easy/quick to grow 2. Have contrasting characteristics 3. Produce large numbers of offspring 4. Self-pollinating 																			
What was Mendel's experiment?	<p>**Note: all of the experiment was done in mass quantities, even if isn't written as such.</p> <ol style="list-style-type: none"> 1. He took a green parent and let it self-pollinate. The F₁ generation was green, as was the F₂. He did the same thing with yellow peas. 2. He cut emasculated (cut off anthers before maturity) a green and yellow plant, so they couldn't produce pollen. He grew others to cross pollinate, then crossed a yellow plant with green pollen and a green plant with yellow pollen. 3. The F₁ generation was all green. Wondering if it had yellow in it, he let it self-pollinate. 4. The F₂ generation was ¾ green and ¼ yellow. 																			
Shown symbolically?	<ol style="list-style-type: none"> 1. P → F₁ → F₂; P → F₁ → F₂ 2. P x P 3. F₁ x self 4. F₂: ¾: ¼ 	<p>Let G=green, g=yellow</p> <p>2. 100% green</p> <table border="1"> <tr> <td></td> <td>G</td> <td>G</td> </tr> <tr> <td>g</td> <td>Gg</td> <td>Gg</td> </tr> <tr> <td>g</td> <td>Gg</td> <td>Gg</td> </tr> </table> <p>4. 3:4 green:yellow</p> <table border="1"> <tr> <td></td> <td>G</td> <td>g</td> </tr> <tr> <td>G</td> <td>GG</td> <td>Gg</td> </tr> <tr> <td>g</td> <td>Gg</td> <td>gg</td> </tr> </table>		G	G	g	Gg	Gg	g	Gg	Gg		G	g	G	GG	Gg	g	Gg	gg
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What is a gene?	The DNA coding that determines traits.																			
What are alleles?	Different forms of genes found on chromosomes.																			
What are dominant and recessive alleles?	Alleles that are always expressed are the dominant ones, over recessive alleles, which are only expressed in the absence of dominant alleles. Dominant alleles are typically symbolized by capital letters and recessives by lowercases.																			
What does homozygous mean?	Having two of the same allele.																			
What does heterozygous mean?	Having two different alleles.																			
What does	Having only one allele- this refers to males, who often don't have a second allele																			

hemizygous mean?	on their Y chromosome to pair with one on their X.																				
What is a phenotype?	Physical appearance.																				
What is a genotype?	Genetic makeup.																				
What is probability?	The likelihood that a specific event will occur. There are mathematic systems to find this.																				
What are the rules of probability?	<ol style="list-style-type: none"> 1. The end results of 1 trial event has no bearing on future trial events. Each event is separate and unique. 2. The chances of 2 independent events occurring with the same results would be the product of their having occurred separately. 																				
What is a chi square value?	<p>A number that, when found, illustrates the discrepancy between the probability of an event's occurrence and what actually happened.</p> $\frac{(\text{observed results}-\text{expected results})}{\text{expected results}}$ <p>A perfect value is 0. If the numbers are very large, something besides chance may have affected the results. The larger the sample gets, the "better" the results become.</p>																				
How do the laws of probability apply to genetics?	The laws of probability can be used to determine the probability of children inheriting traits from their parents (Punnett squares) and the genotypes of parents by looking at their children. This can also be applied to large groups of people.																				
What is a test/back cross?	If you don't know a genotype, find what the children would be like using all possible genotypes. Then, determine which genotype is "right" based on the children.																				
What is incomplete dominance?	When two alleles blend together, to create a third phenotype. In this case, one's phenotype is one's genotype.																				
What is the ABO blood type system?	<p>A scientist, Landsteiner, discovered that there are antigens- proteins- on the surface of red blood cells. They also have antibodies, to kill other, foreign, antigens. Some people have one type, some a second type, some both, and some none.</p> <table border="1"> <thead> <tr> <th>Blood Type</th> <th>Antigen</th> <th>Antibodies (against)</th> <th>Genotype</th> </tr> </thead> <tbody> <tr> <td>37%</td> <td>A</td> <td>B</td> <td>AA/AO</td> </tr> <tr> <td>13%</td> <td>B</td> <td>A</td> <td>BB/BO</td> </tr> <tr> <td>44%</td> <td>O</td> <td>A, B</td> <td>OO universal donor</td> </tr> <tr> <td>6%</td> <td>AB</td> <td>-</td> <td>AB universal receiver</td> </tr> </tbody> </table>	Blood Type	Antigen	Antibodies (against)	Genotype	37%	A	B	AA/AO	13%	B	A	BB/BO	44%	O	A, B	OO universal donor	6%	AB	-	AB universal receiver
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What is the RH system of blood	There is a protein either present or not on the surface of a blood cell, in humans and in Rhesus monkeys (in whom the system was discovered and after whom it																				

typing?	is named). If the protein is present, then one is Rh+, and if it is not, then RH-. RH+ is dominant (85%) and RH- is recessive (15%).			
What is an autosome?	A trait on the 22 first pairs of chromosomes- not the sex chromosomes.			
What is a sex-linked trait?	When genes are on the X chromosome, males, who have one X and one Y, have no match for a genes on the X. When they express recessive traits because they are uncontested, these traits are called sex-linked.			
Trait	Normal Genotype	Affected Genotype	Pattern of Inheritance In order to exhibit his type of trait...	
Autosomal Recessive (Tay-Sachs Disease)	AA/Aa	aa	One must inherit two recessive alleles, one form each parent.	
Autosomal Dominant (Huntington's Disease)	aa	AA/Aa	One must inherit one dominant allele form either parent.	
Sex-Linked Recessive (R/G colorblindness, hemophilia)	<u>Female</u> A A A a	<u>Male</u> A †	<u>Female</u> a a <u>Male</u> a †	Males must inherit a recessive allele from their mothers. Females must inherit two, one from each parent.
Sex-Linked Dominant	<u>Female</u> a a	<u>Male</u> a †	<u>Female</u> A A A a <u>Male</u> A †	Males must inherit one dominant allele, form their mothers. Females must inherit one from either parent.
What is nondisjunction?	The failure of a chromosome to split. This is especially common in older mothers. There are three types: trisomic (3 copies of a chromosome), monosomic (only one copy of a chromosome), and polysomic (many copies of a chromosome).			
What is an example of an autosomal trisomy?	Down's Syndrome (aka Trisomy 21). One in every 300 births experiences nondisjunction of the 21 st chromosome, making a third copy of that one. Affected people all have the same (largeish) facial features, simian creases across their hands, some mental retardation, and a very endearing disposition.			
What is an example of a sex trisomy?	XXY- Klinefelter's Disease- these males exhibit the secondary sex characteristics of females and are sterile. Some suffer from mental retardation.			
	XXX- "Super-females"- these females have large statures and exhibit early menopause.			
What is an example of a monosomic nondisjunction?	X- Turner's Syndrome. Affected females have short statures, webbed neck, invaginated chests. This occurs about once in every 5,000 births.			
What is known about polysomic nondisjunction?	XXXY, XXXX. This is very rare. A link has been hypothesized between criminals and polysomic nondisjunction, as many criminals have been found to be polysomic.			
What is an ultrasound?	The least invasive type of pre-natal screening. Using sonar technology, doctors can see an fetus's features, gage development, find the sex, and determine weight.			

What is amniocentesis?	A thick needle is inserted into womb and amniotic fluid is drawn. It is analyzed to learn about the fetus's (chemicals, chromosomes, etc.)
What is Chromosome Villi Sampling (CVS)?	The most invasive type of pre-natal screening. Babies produce chorionic tissue (placenta and umbilical cord). This tissue is drawn and analyzed. Some problems detected can actually be treated in the womb.
What is a random sampling?	Looking at a small, random sample to represent a larger group.
What is a gene frequency?	How often a gene is expected to be expressed.
When does the gene frequency remain within the population?	If there is no: 1. Mutation 2. Selection for mates (so there is random mating) 3. No migration (so there is isolation)
What leads to genetic isolation?	1. Religion 2. Race 3. Politics 4. Culture 5. Social class 6. Geography All these <i>barriers</i> prevent gene pools from leaving