Welcome to Genetics

Lecture 3: Traits and
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Brainpop Genetics

- Click here

How Organisms Get their Traits?

- We share certain features with more than **1 1/2 million different** kinds of organisms.
- Even so, each human being also has feature that make him or her different from every other living thing even from every human.
- You may want to know where your features came from, long legs, high cheekbones, blue eyes, dark curly hair???
- They may be similar to someone else, but will not be identical.
- In fact, every living thing has **specific characteristics that are called traits.**
- Traits are unique.

Term to know:

- **Traits:** specific **,** inherited characteristics of an organism,
- they can be **passed from 1 generation to another** in a family and may be nearly identical or similar.
- Examples: dimples, hair color.
- They are controlled by genes carried on chromosomes.

- **Allele:** Form of a gene. For each gene there can be 2 alleles
- **Genotype:** This is the GENETIC alleles of a trait: BB, Bb, bb
- **Phenotype:** What the organism looks like. The genetic expression of the genotype. What we see!!
  (tall/short etc)

- **Dominant:** the strongest allele/the one expressed, that has the ability to mask another.
  Always expressed in capital letter:
  B, R, C, etc
- **Recessive:** an allele that can only be expressed when 2 are together.
  Always expressed in lower case letters:
  b, r, c.
  Only expressed in lower case letters:
  rr, bb, cc, etc

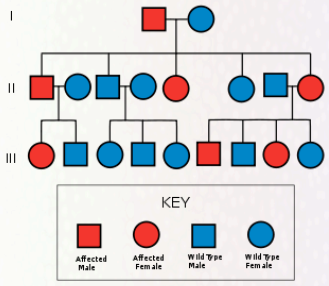
- **Homozygous Dominant:** Identical genetic alleles, that express a dominant trait. BB, CC, RR
- **Homozygous Recessive**: Identical genetic alleles, that express a recessive trait: bb,cc,rr

- **HETEROzygous Alleles**: This is a combination of two alleles that are doninant AND recessive. The trait that is expressed is the dominant trait. It MASKs the recessive trait. Bb, Cc, Rr
- **Punnett Square:** This is a box method that is used to show the genotypes of combinations:
- (mom) CC x (dad) cc:

Family Pedigrees:

- **<u>A pedigree is a diagram that shows the history</u> of a trait from one generation to the next.**
- Can you tell which people are closely related in a family by just looking at a photograph.
- Some family members look very similar, others look totally different.
- To find out how family members can have such different features we can use a tool called a pedigree to trace each trait in a family.

Family Pedigree



Where do your genes come from?

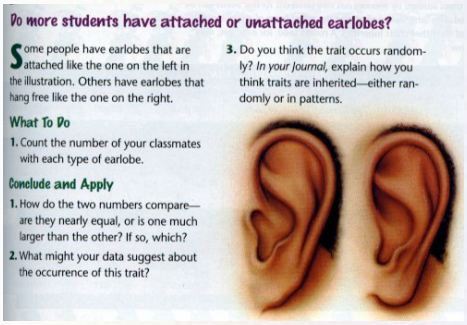
Do traits appear randomly??

- Do you see a pattern in the appearance of traits such as curly hair??
- Do traits appear and disappear at random?
- Random means that nothing is causing 1 trait to appear more often than another.
- It's like the lottery, each number has an equal chance of coming up.
- No number is favored.

Do traits appear randomly??

- In the case of 2 traits, if the traits are appearing randomly, there is an equal chance that either trait will appear...or in a large group of people, 50% will have 1 trait and 50 % will have the other.
- To find out if traits appear in patterns or randomly, we are going to do the next activity.

Lab: Do More Students have attached or unattached earlobes??



Do more students have attached or unattached earlobes?

Some people have earlobes that are attached like the one on the left in the illustration. Others have earlobes that hang free like the one on the right.

What To Do

1. Count the number of your classmates with each type of earlobe.

Conclude and Apply

1. How do the two numbers compare—are they nearly equal, or is one much larger than the other? If so, which?
2. What might your data suggest about the occurrence of this trait?
3. Do you think the trait occurs randomly? *In your Journal*, explain how you think traits are inherited—either randomly or in patterns.

50:50 Chances

- **The chance of a flipped coin landing with the "heads" side up rather than the "tails" side is 50:50.**
- **Does that mean that for every two times a coin is flipped, heads will turn up once and tails will turn up once?**
- **The chance of a boy rather than a girl being born in a family is also 50:50.**

50:50 Chances

- **Does that mean that in a family with six children, three are boys and three are girls?**
- **You know the answer to both of these questions is no.**
- **What is the value, then, of saying the chances are 50:50?**

Strategy

- You will compare the chances of a boy or girl being born with the chances of a flipped coin landing on one side or the other.
  You will flip a coin six times to represent the sexes of the children in one family
- You will record your results and compare the sexes of the children in 15 families. THEN you will compare with the other teams in the classroom.

- **Materials: 1 coin**

- **Procedure:**
- 1. Let the heads side of the coin represent the girls. Let the tails side represent the boys. Flip the coin 6 times and record the data in Table 1 -trial1.
- 2. Continue to flip the coin 6 more times for each of the remaining 15 trials in Table 1.

DATA & OBSERVATIONS:

- 1.Record the results of the 15 groups of 6 coin flips in the columns of Table 1

Table 1

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Girls (Head)															
Boys (Tails)															

DATA & OBSERVATIONS:

- 2. Using the data from Table 1 record the combinations in Data table 2.
- When you are done record the data from 4 other groups in the classroom.

Table 2

Possible Combinations	6 girls 0 boys	5 girls 1 boy	4 girls 2 boys	3 girls 3 boys	2 girls 4 boys	1 girl 5 boys	0 girls 6 boys
YOUR Number of Combinations							
Group 1							
Group 2							
Group 3							
Group 4							

Questions & Conclusions:

- **Be sure to answer all the questions and write your conclusion when you have all your data!!**

Tonight's Homework

1. Complete the lab: designer genes at home
- 2. Complete the lab write up for 50/50 chances at home