

## Create a Baby Lab

Name \_\_\_\_\_ Per \_\_\_\_

Purpose: To demonstrate the principles of Mendelian genetics and sex determination, including the concepts of allele, phenotype, genotype, dominant, recessive, codominant, homozygous and heterozygous by creating a simulated baby.

Materials: Two pennies, art supplies, paper.

Procedure:

- 1) Working with a partner, determine the genotype of the baby by flipping pennies. "Mom" flips one penny to choose an allele for her egg and "Dad" flips the other to choose an allele for his sperm. (Note that the sex of the baby is determined by dad alone. Boys are XY and girls are XX. Mom can give only an X but dad can give an X or a Y chromosome.)
- 2) Record the alleles which resulted from the coin flips, and put "sperm and egg" together. Write down baby's genotype for each trait in Table 1. Heads represents allele #1 and tails represents allele #2.
- 3) Record the resulting phenotype in Table 1. Note: Dominant alleles are written with an uppercase letter and recessive alleles are written as lowercase letters. Dominant alleles mask the expression of recessive ones. Co-dominant alleles are written as uppercase letters with a subscript. Co-dominant alleles result in a phenotype that is blended.
- 4) Repeat steps 1, 2, and 3 for all traits and then draw, color, and name your creation. Remember that you are drawing a baby's face—not a child's or an adult's (no tattoos, pierced ears, mustaches, etc.)

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Concluding Questions:

1. Why is the coin flip used to represent the selection of alleles?
2. Define the following terms:
  - allele-
  - phenotype-
  - genotype-
  - dominant-
  - recessive-
  - codominant-
  - homozygous-
  - heterozygous-
  - chromosome-
  - locus-
  - gene-

Results:

Table 1: **Circle here** whether you are the mom or dad and fill in the data below.

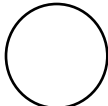
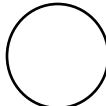









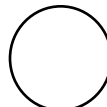


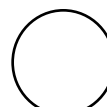

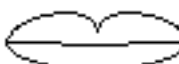











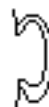




Mom's Name: \_\_\_\_\_ Dad's Name \_\_\_\_\_ Per. \_\_\_\_\_








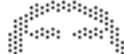
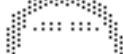






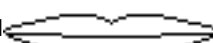
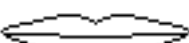





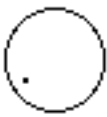

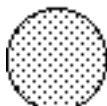
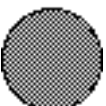
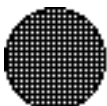
Baby's Name: \_\_\_\_\_

| <u>Trait</u>   | <u>Allele from Mom</u> | <u>Allele from Dad</u> | <u>Genotype</u> | <u>Phenotype</u> |
|----------------|------------------------|------------------------|-----------------|------------------|
| Sex            | X                      | _____                  | _____           | _____            |
| Face Shape     | _____                  | _____                  | _____           | _____            |
| Chin Shape     | _____                  | _____                  | _____           | _____            |
| Chin Dimple    | _____                  | _____                  | _____           | _____            |
| Freckles       | _____                  | _____                  | _____           | _____            |
| Cheek Dimples  | _____                  | _____                  | _____           | _____            |
| Lip Thickness  | _____                  | _____                  | _____           | _____            |
| Eye Brows      | _____                  | _____                  | _____           | _____            |
| Eye Shape      | _____                  | _____                  | _____           | _____            |
| Eyelashes      | _____                  | _____                  | _____           | _____            |
| Ear Shape      | _____                  | _____                  | _____           | _____            |
| Ear Lobes      | _____                  | _____                  | _____           | _____            |
| Widow's Peak   | _____                  | _____                  | _____           | _____            |
| Hair Curliness | _____                  | _____                  | _____           | _____            |
| Eyebrow Color  | _____                  | _____                  | _____           | _____            |
| Eye Width      | _____                  | _____                  | _____           | _____            |
| Eye Size       | _____                  | _____                  | _____           | _____            |
| Mouth Size     | _____                  | _____                  | _____           | _____            |
| Nose Size      | _____                  | _____                  | _____           | _____            |
| Birth Mark     | _____                  | _____                  | _____           | _____            |
| Skin Tone      | _____                  | _____                  | _____           | _____            |

| <u>Polygenic Trait</u> | <u>Alleles from Mom</u> | <u>Alleles from Dad</u> | <u>Genotype</u><br>1st / 2nd | <u>Phenotype</u> |
|------------------------|-------------------------|-------------------------|------------------------------|------------------|
| Hair Color             | #1____ #2____           | #1____ #2____           | ____ / ____                  | _____            |
| Eye Color              | #1____ #2____           | #1____ #2____           | ____ / ____                  | _____            |

## Create a Baby Lab: Genotype/Phenotype reference sheet

| Trait   | Homozygous for Allele #1   | Heterozygous   | Homozygous for Allele #2  |
|---|--|--|---|
| <b>Face Shape</b><br>Genotype:<br>Phenotype:    | RR<br>Round       | Rr<br>Round       | rr<br>Square           |
| <b>Chin Shape</b><br>Genotype:<br>Phenotype:    | NN<br>Noticeable  | Nn<br>Noticeable  | nn<br>Less Noticeable  |
| <b>Chin Dimple</b><br>Genotype:<br>Phenotype:   | AA<br>Absent      | Aa<br>Absent      | aa<br>Present          |
| <b>Freckles</b><br>Genotype:<br>Phenotype:      | FF<br>Present     | Ff<br>Present     | ff<br>Absent           |
| <b>Cheek Dimples</b><br>Genotype:<br>Phenotype: | DD<br>Present    | Dd<br>Present    | dd<br>Absent          |
| <b>Lip Thickness</b><br>Genotype:<br>Phenotype: | TT<br>Thick     | Tt<br>Thick     | tt<br>Thin           |
| <b>Eye Brows</b><br>Genotype:<br>Phenotype:     | BB<br>Bushy     | Bb<br>Bushy    | bb<br>Fine           |
| <b>Eye Shape</b><br>Genotype:<br>Phenotype:     | WW<br>Wide      | Ww<br>Wide     | ww<br>Round          |
| <b>Eyelashes</b><br>Genotype:<br>Phenotype:     | LL<br>Long      | Ll<br>Long      | ll<br>Short          |
| <b>Ear Shape</b><br>Genotype:<br>Phenotype:     | RR<br>Long      | Rr<br>Long      | rr<br>Round          |
| <b>Ear Lobes</b><br>Genotype:<br>Phenotype:     | FF<br>Free      | Ff<br>Free      | ff<br>Attached       |

| Trait                    | Homozygous for Allele #1   | Heterozygous   | Homozygous for Allele #2  |
|--------------------------|--|--|---|
| <b>Widow's Peak</b>      |  |  |   |
| Genotype:                | WW   | Ww   | ww  |
| Phenotype:               | Present           | Present         | Absent             |
| <b>Hair Curliness</b>    |  |  |   |
| Genotype:                | C <sub>1</sub> C <sub>1</sub>  | C <sub>1</sub> C <sub>2</sub>  | C <sub>2</sub> C <sub>2</sub>   |
| Phenotype:               | Curly             | Wavy            | Straight           |
| <b>Eyebrow Color</b>     |  |  |   |
| Genotype:                | D <sub>1</sub> D <sub>1</sub>  | D <sub>1</sub> D <sub>2</sub>  | D <sub>2</sub> D <sub>2</sub>   |
| Phenotype:               | Darker than hair  | Same as hair    | Lighter than hair  |
| <b>Eye Width</b>         |  |  |   |
| Genotype:                | W <sub>1</sub> W <sub>1</sub>  | W <sub>1</sub> W <sub>2</sub>  | W <sub>2</sub> W <sub>2</sub>   |
| Phenotype:               | Close Together    | Average        | Far apart          |
| <b>Eye Size</b>          |  |  |   |
| Genotype:                | S <sub>1</sub> S <sub>1</sub>  | S <sub>1</sub> S <sub>2</sub>  | S <sub>2</sub> S <sub>2</sub>   |
| Phenotype:               | Large             | Medium         | Small              |
| <b>Mouth Size</b>        |  |  |   |
| Genotype:                | M <sub>1</sub> M <sub>1</sub>  | M <sub>1</sub> M <sub>2</sub>  | M <sub>2</sub> M <sub>2</sub>   |
| Phenotype:               | Wide            | Medium       | Narrow           |
| <b>Nose Size</b>         |  |  |   |
| Genotype:                | P <sub>1</sub> P <sub>1</sub>  | P <sub>1</sub> P <sub>2</sub>  | P <sub>2</sub> P <sub>2</sub>   |
| Phenotype:               | Small           | Medium        | Large            |
| <b>Birth Mark (mole)</b> |  |  |   |
| Genotype:                | B <sub>1</sub> B <sub>1</sub>  | B <sub>1</sub> B <sub>2</sub>  | B <sub>2</sub> B <sub>2</sub>   |
| Phenotype:               | Left cheek      | Right cheek  | Absent           |
| <b>Skin Tone</b>         |  |  |   |
| Genotype:                | S <sub>1</sub> S <sub>1</sub>  | S <sub>1</sub> S <sub>2</sub>  | S <sub>2</sub> S <sub>2</sub>   |
| Phenotype:               | Light           | Medium       | Dark             |
| <b>Hair Color</b>        | AABB=Black<br>AABb=Black<br>AAbb=Red   | AaBB=Dark Brown<br>AaBb=Light Brown<br>Aabb=Dark Blond   | aaBB=Blond<br>aaBb=Blond<br>aabb=white (albino)   |
| <b>Eye Color</b>         | AABB=Deep Brown<br>AABb=Deep Brown<br>AAbb=Brown   | AaBB=Greenish Brown<br>AaBb=Light Brown<br>Aabb=Gray-Blue  | aaBB=Green<br>aaBb=Light Blue<br>aabb=Pink  |