****

**Create a Baby Lab** *Artwork by Maria Rascon*

**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, 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 gender of the baby is a special case and is determined by dad alone. Boys are XY and girls are XX. Mom can give only an X but dad can give either an X or a Y.)

2) Record the alleles which resulted from the coin flips, and put "sperm and egg" together. (You cannot pick the traits you want; life doesn't work that way!) Write down baby's genotype for each trait in Table 1. Heads represents allele #1 and tails represents allele #2.

3) Record the baby's phenotype in Table 1 by looking up the genotype you got in the Genotype/Phenotype Reference Sheet. 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 that represents the traits you got - not a child's or an adult's (no tattoos, no mustaches, no piercings, etc., and not too much hair!)

**Genotype/Phenotype Reference Sheet**

|  |  |  |  |
| --- | --- | --- | --- |
| **Trait** | **Genotype/Phenotype (Homozygous for Allele 1)** | **Genotype/Phenotype (Heterozygous)** | **Genotype/Phenotype (Homozygous for Allele #2)** |
| Face Shape | |  |  | | --- | --- | | RR  Round | round face | | |  |  | | --- | --- | | Rr  Round | round face | | |  |  | | --- | --- | | rr  Square | square face | |
| Chin Shape | |  |  | | --- | --- | | NN  Noticeable | noticeable chin | | |  |  | | --- | --- | | Nn  Noticeable | noticeable chin | | |  |  | | --- | --- | | nn  Less Noticeable | less noticeable chin | |
| Chin Dimple | |  |  | | --- | --- | | AA  Absent | chin dimple absent | | |  |  | | --- | --- | | Aa  Absent | chin dimple absent | | |  |  | | --- | --- | | aa  Present | chin dimple present | |
| Freckles | |  |  | | --- | --- | | FF  Present | freckles | | |  |  | | --- | --- | | Ff  Present | freckles | | |  |  | | --- | --- | | ff  Absent | no freckles | |
| Cheek Dimples | |  |  | | --- | --- | | DD  Present | dimples | | |  |  | | --- | --- | | Dd  Present | dimples | | |  |  | | --- | --- | | dd  Absent | no dimples | |
| Lip Thickness | |  |  | | --- | --- | | TT  Thick | thick lips | | |  |  | | --- | --- | | Tt  Thick | thick lips | | |  |  | | --- | --- | | tt  Thin | thin lips | |
| Eye Brows | |  |  | | --- | --- | | BB  Bushy | bushy eyebrows | | |  |  | | --- | --- | | Bb  Bushy | bushy eyebrows | | |  |  | | --- | --- | | bb  Fine | fine eyebrows | |
| Eye Shape | |  |  | | --- | --- | | WW  Wide | wide eyes | | |  |  | | --- | --- | | Ww  Wide | wide eyes | | |  |  | | --- | --- | | ww  Round | round eyes | |
| Eyelashes | |  |  | | --- | --- | | LL  Long | long lashes | | |  |  | | --- | --- | | Ll  Long | long lashes | | |  |  | | --- | --- | | ll  Short | short lashes | |
| Ear Shape | |  |  | | --- | --- | | RR  Long | long ears | | |  |  | | --- | --- | | Rr  Long | long ears | | |  |  | | --- | --- | | rr  Round | round ears | |
| Ear Lobes | |  |  | | --- | --- | | FF  Free | earlobes free | | |  |  | | --- | --- | | Ff  Free | earlobes free | | |  |  | | --- | --- | | ff  Attached | earlobes attached | |
| Widow's Peak | |  |  | | --- | --- | | WW  Present | widow's peak | | |  |  | | --- | --- | | Ww  Present | widow's peak | | |  |  | | --- | --- | | ww  Absent | no widow's peak | |
| Hair Curliness | |  |  | | --- | --- | | C1C1  Curly | curly hair | | |  |  | | --- | --- | | C1C2  Wavy | wavy hair | | |  |  | | --- | --- | | C2C2  Straight | straight hair | |
| Eyebrow Color | |  |  | | --- | --- | | D1D1  Darker than hair | darker eyebrows | | |  |  | | --- | --- | | D1D2  Same as hair | eyebrows same as hair | | |  |  | | --- | --- | | D2D2  Lighter than hair | lighter eyebrows | |
| Eye Width | |  |  | | --- | --- | | W1W1  Close Together | eyes close together | | |  |  | | --- | --- | | W1W2  Average | eyes average | | |  |  | | --- | --- | | W2W2  Far apart | eyes far apart | |
| Eye Size | |  |  | | --- | --- | | S1S1  Large | eyes large | | |  |  | | --- | --- | | S1S2  Medium | eyes medium | | |  |  | | --- | --- | | S2S2  Small | eyes small | |
| Mouth Size | |  |  | | --- | --- | | M1M1  Wide | mouth wide | | |  |  | | --- | --- | | M1M2  Medium | mouth average | | |  |  | | --- | --- | | M2M2  Narrow | mouth narrow | |
| Nose Size | |  |  | | --- | --- | | P1P1  Small | small nose | | |  |  | | --- | --- | | P1P2  Medium | medium nose | | |  |  | | --- | --- | | P2P2  Large | large nose | |
| Birth Mark (mole) | |  |  | | --- | --- | | B1B1  Left cheek | left | | |  |  | | --- | --- | | B1B2  Absent | absent | | |  |  | | --- | --- | | B2B2  Right cheek | right | |
| Skin Tone | |  |  | | --- | --- | | S1S1  Light | light skin | | |  |  | | --- | --- | | S1S2  Medium | medium skin | | |  |  | | --- | --- | | S2S2  Dark | dark skin | |
| Hair Color | |  |  |  | | --- | --- | --- | | AABB=Black | AaBB=Dark Brown | aaBB=Blond | | AABb=Black | AaBb=Light Brown | aaBb=Blond | | AAbb=Red | Aabb=Dark Blond | aabb=white (albino) | | | |
| Eye Color | |  |  |  | | --- | --- | --- | | AABB=Deep Brown | AaBB=Greenish Brown | aaBB=Green | | AABb=Deep Brown | AaBb=Light Brown | aaBb=Light Blue | | AAbb=Brown | Aabb=Gray-Blue | aabb=Pink | | | |