**![C:\Documents and Settings\kjennings\Local Settings\Temporary Internet Files\Content.IE5\ZX9NT516\MC900057201[1].wmf]()Create a Baby Lab**

 **Purpose**: To demonstrate the principles of genetics, 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. Find a partner of the opposite sex to have a baby with (simulation only please!!!)
2. Use the **Genotype/Phenotype Reference Sheet** to fill out Data Table 1 to determine your traits and possible genotypes for each trait. Your partner does the same. If you are not sure if you are homozygous dominant or heterozygous for a trait, think about your parents’ appearance and take your best guess.
3. Determine the genotype of the baby by flipping pennies. “Mom” flips one penny to choose which of her two alleles will be placed into her egg during meiosis and “Dad” flips the other penny to choose which of his two alleles will be placed into his sperm during meiosis. (NOTE: 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 the Y or the X, thus determining the baby’s gender).
4. Record the alleles which resulted from the coin flips in your created baby worksheet. Heads represents allele #1 and tails represents allele #2.
5. 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. 3) Record the baby's 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.
6. 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, no mustaches, no pierced ears, noses, etc., and not too much hair!)

**My Baby (draw your baby below):**

**Genotype/Phenotype Reference Sheet**

|  |  |  |  |
| --- | --- | --- | --- |
| **Trait** | **Genotype/Phenotype****(Homozygous for Allele 1)** | **Genotype/Phenotype (Heterozygous)** | **Genotype/Phenotype (Homozygous for Allele #2)** |
| Face Shape |

|  |  |
| --- | --- |
| RR Round | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/round_face.gif |

 |

|  |  |
| --- | --- |
| Rr Round | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/round_face.gif |

 |

|  |  |
| --- | --- |
| rr Square | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/square_face.gif |

 |
| Chin Shape |

|  |  |
| --- | --- |
| NN Noticeable | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/noticeable_chin.gif |

 |

|  |  |
| --- | --- |
| Nn Noticeable | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/noticeable_chin.gif |

 |

|  |  |
| --- | --- |
| nn Less Noticeable | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/less_noticeable_chin.gif |

 |
| Chin Dimple |

|  |  |
| --- | --- |
| AA Absent | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/noticeable_chin.gif |

 |

|  |  |
| --- | --- |
| Aa Absent | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/noticeable_chin.gif |

 |

|  |  |
| --- | --- |
| aa Present | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/chin_dimple.gif |

 |
| Freckles |

|  |  |
| --- | --- |
| FF Present | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/freckles.gif |

 |

|  |  |
| --- | --- |
| Ff Present | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/freckles.gif |

 |

|  |  |
| --- | --- |
| ff Absent | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/round_face.gif |

 |
| Cheek Dimples |

|  |  |
| --- | --- |
| DD Present | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/cheek_dimples.gif |

 |

|  |  |
| --- | --- |
| Dd Present | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/cheek_dimples.gif |

 |

|  |  |
| --- | --- |
| dd Absent | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/round_face.gif |

 |
| Lip Thickness |

|  |  |
| --- | --- |
| TT Thick | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/thick_lips.gif |

 |

|  |  |
| --- | --- |
| Tt Thick | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/thick_lips.gif |

 |

|  |  |
| --- | --- |
| tt Thin | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/thin_lips.gif |

 |
| Eye Brows |

|  |  |
| --- | --- |
| BB Bushy | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/bushy_eyebrows.gif |

 |

|  |  |
| --- | --- |
| Bb Bushy | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/bushy_eyebrows.gif |

 |

|  |  |
| --- | --- |
| bb Fine | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/fine_eyebrows.gif |

 |
| Eye Shape |

|  |  |
| --- | --- |
| WWWide | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/wide_eyes.gif |

 |

|  |  |
| --- | --- |
| Ww Wide | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/wide_eyes.gif |

 |

|  |  |
| --- | --- |
| ww Round | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/round_eyes.gif |

 |
| Eyelashes |

|  |  |
| --- | --- |
| LL Long | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/long_eyelash.gif |

 |

|  |  |
| --- | --- |
| Ll Long | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/long_eyelash.gif |

 |

|  |  |
| --- | --- |
| ll Short | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/short_eyelash.gif |

 |
| Ear Shape |

|  |  |
| --- | --- |
| RR Long | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/long_ear.gif |

 |

|  |  |
| --- | --- |
| Rr Long | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/long_ear.gif |

 |

|  |  |
| --- | --- |
| rr Round | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/round_ear.gif |

 |
| Ear Lobes |

|  |  |
| --- | --- |
| FF Free | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/free_lobes.gif |

 |

|  |  |
| --- | --- |
| Ff Free | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/free_lobes.gif |

 |

|  |  |
| --- | --- |
| ff Attached | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/lobes_attached.gif |

 |
| Widow's Peak |

|  |  |
| --- | --- |
| WW Present | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/widows_peak.gif |

 |

|  |  |
| --- | --- |
| Ww Present | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/widows_peak.gif |

 |

|  |  |
| --- | --- |
| ww Absent | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/absent_peak.gif |

 |
| Hair Curliness |

|  |  |
| --- | --- |
| C1C1 Curly | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/curly.gif |

 |

|  |  |
| --- | --- |
| C1C2 Wavy | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/wavy.gif |

 |

|  |  |
| --- | --- |
| C2C2 Strait | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/straight.gif |

 |
| Eyebrow Color |

|  |  |
| --- | --- |
| D1D1 Darker than hair | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/darker.gif |

 |

|  |  |
| --- | --- |
| D1D2 Same as hair | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/same_as.gif |

 |

|  |  |
| --- | --- |
| D2D2 Lighter than hair | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/lighter.gif |

 |
| Eye Width |

|  |  |
| --- | --- |
| W1W1 Close Together | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/close.gif |

 |

|  |  |
| --- | --- |
| W1W2 Average | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/average.gif |

 |

|  |  |
| --- | --- |
| W2W2 Far apart | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/far_apart.gif |

 |
| Eye Size |

|  |  |
| --- | --- |
| S1S1 Large | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/large.gif |

 |

|  |  |
| --- | --- |
| S1S2 Medium | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/average.gif |

 |

|  |  |
| --- | --- |
| S2S2 Small | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/small.gif |

 |
| Mouth Size |

|  |  |
| --- | --- |
| M1M1 Wide | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/wide.gif |

 |

|  |  |
| --- | --- |
| M1M2 Medium | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/medium.gif |

 |

|  |  |
| --- | --- |
| M2M2 Narrow | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/narrow.gif |

 |
| Nose Size |

|  |  |
| --- | --- |
| P1P1 Small | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/small_nose.gif |

 |

|  |  |
| --- | --- |
| P1P2 Medium | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/medium_nose.gif |

 |

|  |  |
| --- | --- |
| P2P2 Large | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/large_nose.gif |

 |
| Birth Mark (mole) |

|  |  |
| --- | --- |
| B1B1 Left cheek | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/left.gif |

 |

|  |  |
| --- | --- |
| B1B2 Absent | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/round_face.gif |

 |

|  |  |
| --- | --- |
| B2B2 Right cheek | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/right.gif |

 |
| Skin Tone |

|  |  |
| --- | --- |
| S1S1 Light | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/light.gif |

 |

|  |  |
| --- | --- |
| S1S2 Medium | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/medium_skin.gif |

 |

|  |  |
| --- | --- |
| S2S2 Dark | http://jan.ucc.nau.edu/lrm22/lessons/baby_lab/dark.gif |

 |
| 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 |

 |

**Data Table 1 – My genotypes and phenotypes for each trait:**

|  |  |  |
| --- | --- | --- |
| **Trait** | **Genotype** | **Phenotype** |
| Gender | \_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 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 | \_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Polygenic Trait** | **Genotype** | **Phenotype** |
| Hair Color | \_\_ \_\_ /\_\_ \_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Eye Color | \_\_ \_\_ /\_\_ \_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |

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**Data Table 2 – My baby’s genotypes and phenotypes:**

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

|  |  |  |
| --- | --- | --- |
| Mom's Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Dad's Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Baby's Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Trait** | **Allele from Mom** | **Allele from Dad** | **Genotype** | **Phenotype** |
| Gender | \_\_\_\_\_\_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 | \_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Polygenic Trait** | **Alleles from Mom** | **Alleles from Dad** | **Genotype** | **Phenotype** |
| Hair Color | #1\_\_\_\_ #2\_\_\_\_ | #1\_\_\_\_ #2\_\_\_\_ | \_\_ \_\_ /\_\_ \_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Eye Color | #1\_\_\_\_ #2\_\_\_\_ | #1\_\_\_\_ #2\_\_\_\_ | \_\_ \_\_ /\_\_ \_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |

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**Discussion Questions**:

1. Why is the coin flip used to represent the selection of alleles?

2. Define the following terms:

*allele-*

*phenotype-*

*genotype-*

*dominant-*

*recessive-*

*homozygous-*

*heterozygous-*

*chromosome-*

*gene-*

3. If you and your partner decided to have a second child, would you expect your next baby to look the same as the first? Why or why not?