





Making Babies Lab

What would your baby look like if both you and your classmate (who will simulate your spouse) have one dominant gene and one recessive gene for each of the facial features illustrated in the following pages? In other words, each of you will be heterozygous for each trait. To determine the facial appearance of your child, you and your spouse will each flip a coin to determine what bit of information or gene you will contribute to the child. HEADS will represent DOMINANT (shown with a large letter) and TAILS will represent RECESSIVE (shown with a small letter). Flip the coins to determine which gene of each pair you contribute. Each child will have two genes for each trait, one from each parent. You will supply one gene and your spouse will supply one gene. Record the genetic contributions of each parent on the chart provided. When you have determined all of the features for a particular structure (eyes for example), draw and color the way the baby will look after he/she has reached high school age. You and your spouse will produce one child. The traits indicated by an asterisk are believed to be inherited in the explained manner. Most of the traits, however, in this activity were created to illustrate how human heredity works in a simplified model and to reinforce basic genetics principles. In actuality, inherited characteristics of the face are much more complicated than this activity illustrates. Most of these facial characteristics are determined by many genes working together in a way geneticists do not yet understand. We hope you will be successful in this very important role as parents. Your first task is to record your names, as parents, on the attached data sheet. First we should determine the sex of the child. Which parent should flip a coin to determine the sex of the child? Heads will be a boy (Y-bearing sperm) and tails will be a girl (X-bearing sperm). Give your child a name and record the name on your data sheet. Continue.

1. FACE SHAPE

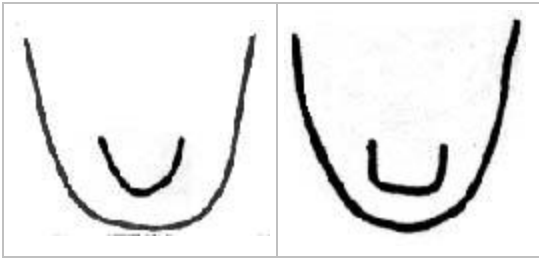
Round (RR, Rr)	Square (rr)
	

2. CHIN SHAPE: Next Three Flips

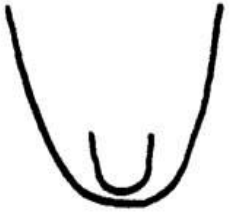
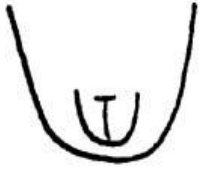
Very Prominent (VV, Vv)	Less Prominent (vv)
	

3. CHIN SHAPE: ONLY flip coins for this trait if chin shape genotype is VV or Vv. (The genotype of vv prevents the expression of the next two pairs of genes.)

Round (RR, Rr)	Square (rr)
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4. CLEFT CHIN

Absent (AA, Aa)	present (aa)
	

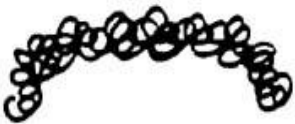


5. SKIN COLOR:

To determine the color of skin, assume there are three gene pairs involved. Flip your coins first to determine the genotype of the first pair of genes (AA, Aa, aa). Then flip your coins again to determine the genotype of the second pair of genes (BB, Bb, bb). Flip for the last time to determine the third pair of genes (CC, Cc, cc). If your gene pairs are --1-- then the skin color is --2--.



Each capital letter represents an active allele for pigmentation.

--1--	--2--	--1--	--2--
6 capitals	very dark black	3 capitals	medium brown
5 capitals	very dark brown	2 capitals	light brown
4 capitals	dark brown	1 capital	light tan
		No capital	white


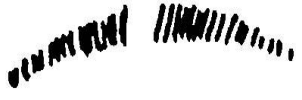

6. HAIR TYPE:

Curly (CC)	Wavy (Cc)	Straight (cc)
		

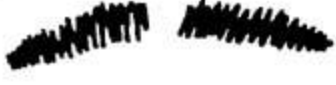

7. WIDOW'S PEAK: The hairline comes to a point in the center of the forehead.

Present (WW, Ww)	Absent (ww)
	


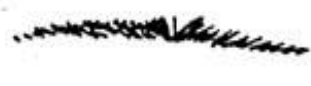
8. COLOR OF EYEBROWS: Consider all eyebrow traits (next three) before drawing.

Very dark (HH)	Medium dark (Hh)	Light (hh)
		

9. EYEBROW THICKNESS:

Bushy (BB, Bb)	Fine (bb)
	

10. EYEBROW PLACEMENT:

Not connected (NN, Nn)	Connected (nn)
	

11. EYE COLOR:



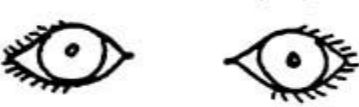
Darker eyes are produced in the presence of more active alleles. In this situation, the large letters (A or B) represent alleles that are active in depositing dark pigment. Small letters (a and b) represent alleles that deposit little pigment.

To determine the color of the eyes, assume there are two gene pairs involved, one which codes for depositing pigment in the front of the iris and one which codes for depositing pigment in the back of the iris. Determine the genotype of the first pair (AA, Aa, aa) and then the second pair (BB, Bb, bb). If your genotype is --1-- the eye color is --2--. In reality, the determination of eye color is much more complicated.




--1--	--2--	--1--	--2--
AABB	Dark Brown	AAbb	brown
AABb	Brown	aaBB	Green
AaBB	Brown/green fleck	Aabb	Gray- Blue
AaBb	Brown	aaBb	Dark Blue
		aabb	Pale Blue (hazel)

EYE TRAITS--NEXT FOUR FLIPS Determine the phenotype with respect to all four flips before drawing the eyes.


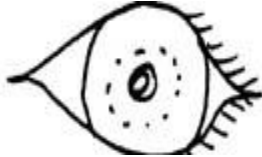
12. EYES--DISTANCE APART:

Close Together (EE)	Average Distance (Ee)	Far Apart (ee)
		

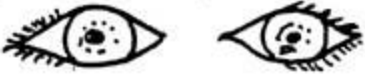
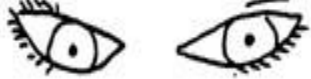
13. EYES--SIZE:

Large (EE)	Medium (Ee)	Small (ee)
		



14. EYES: Shape

Almond (AA, Aa)	Round (aa)
	

15. EYES: Slantedness



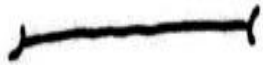
Horizontal (HH, Hh)	Upward Slant (hh)
	

16. EYELASHES:

Long (LL, Ll)	Short (ll)
	

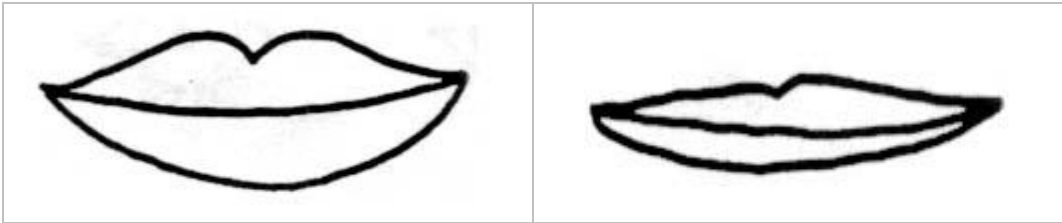
MOUTH AND LIP TRAITS: Next Four Flips Determine the phenotype with respect to all four flips before drawing the mouth.

17. MOUTH: Size




Long (MM)	Average (Mm)	Short (mm)
		

18. LIPS:



Thick (LL, Ll)	Thin (ll)
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19. PROTRUDING LIP:


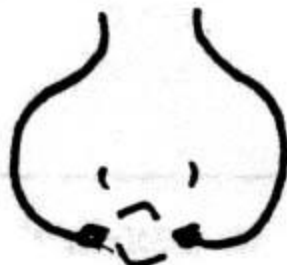

Very Protruding (HH)	Slightly Protruding (Hh)	Absent (hh)
		

20. DIMPLES:


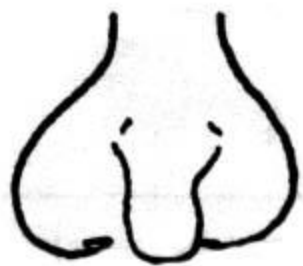
Present (DD, Dd)	Absent (dd)
	

NOSE AND EAR TRAITS: Next **Seven Flips** Record your genotypes on your data sheet but do not draw these features until all the traits are established.



21. NOSE: Size

Big (NN)	Medium (Nn)	Small (nn)
		

22. NOSE SHAPE:



Rounded (RR, Rr)	Pointed (rr)
	

23. NOSTRIL SHAPE:



Rounded (RR, Rr)	Pointed (rr)
	

EAR TRAITS: Next four flips along with the preceding flip control ear traits.

24. EARLOBE ATTACHMENT:

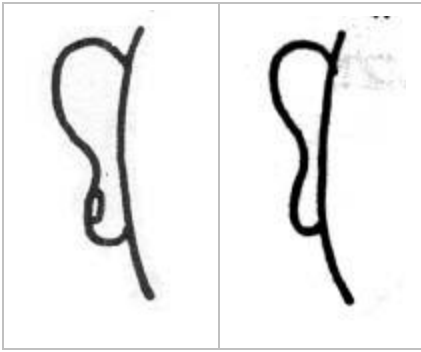
Free (FF, Ff)	Attached (ff)
	

25. DARWIN'S EARPOINTS:



Present (DD, Dd)	Absent (dd)
	

26. EAR PITS:



Present (PP, Pp)	Absent (pp)
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27. HAIRY EARS: (Hairy ears is sex-limited to males.)

Absent (HH, Hh)	Present (hh)
	

28. FRECKLES ON CHEEKS:

Present (FF, Ff)	Absent (ff)
	

29. FRECKLES ON FOREHEAD:

Present (FF, Ff)	Absent (ff)
	

Data Table (Model)

5.2.1 Develop and/or use a model(s) to justify a phenomena.

5.2.2 Given resources, develop and/or revise model(s) to show the relationships among processes, systems, etc.

Parent's Name _____ and _____

Child's Name _____ Sex _____

Trait No.	Trait	Gene from Mother	Gene from Father	Genotype	Phenotype
1	Face Shape				
2	Chin Shape				
3	Chin Shape				
4	Cleft Chin				
5	Skin Color				
6	Hair Type				
7	Widow's Peak				
8	Color of Eyebrows				
9	Eyebrow Thickness				
10	Eyebrow Placement				
11	Eye Color				
12	Eyes-Distance Apart				
13	Eyes-Size				
14	Eyes-Shape				
15	Eyes-Slantedness				
16	Eyelashes				
17	Mouth Size				
18	Lips				
19	Protruding Lip				
20	Dimples				
21	Nose-Size				
22	Nose Shape				
23	Nostril Shape				
24	Earlobe Attachment				
25	Darwin's Earpoints				
26	Ear Pits				
27	Hairy Ears				
28	Freckles on Cheeks				
29	Freckles on Forehead				

Data Analysis

1. Each partner should draw a picture (model) of their "child," noting the child's name and parents.
2. Describe some of the important traits (ones that dramatically determined appearance) that your child inherited. Discuss which traits you preferred and which ones you and your spouse did not prefer.
3. A fifth grade friend has seen a picture (model) of your "child" and asks you to explain how kids get their traits from their parents. Using your data table and picture (models), write your explanation for this friend.
4. Using specific examples from your data table and picture (models), explain the following terms:
 - a. homozygous
 - b. genotype
 - c. dominant
 - d. phenotype
 - e. recessive
 - f. heterozygous
5. Explain how the coin flip models the following:
 - a. Creates the same probability as getting one gene of a pair
 - b. Relates to the probability of inheriting genetic conditions
6. Explain how this model does and does not represent real life.
7. Partner up with another couple. Compare the traits their child received versus the traits your child received. Referring to your model and their model, explain what would happen to the appearance of your child if one of the parents had different genes (i.e. you flipped partners with the other couple). Use specific examples from the model you created.