

Name: _____

Period: _____

The "Parent Power" Project

Have you ever wondered why each person looks different from everybody else, even brothers and sisters? We all look different because of the large variety of traits that exist in our human population.

Imagine if *you* were to have kids of your own! How many of *your* traits do you think would appear in your children? The following project will help you find one possible answer to this question.

Part One:

1. Study the packet titled, "Genetic Facial Traits". See if you can identify which traits you seem to be dominant for, which ones you seem to be recessive for, and which ones you seem to be hybrid for. For some traits you probably won't be able to tell, and that's ok for now.
2. Now go to page ⁴ 8 in this packet, (Phenotypes and Genotypes). Print your name, period, and I.D. number at the top.
3. Find the column for *your phenotypes*. For each of the 23 traits that are listed, provide a one or two word description of your own phenotype.
4. On the same page find the column for *your genotypes*. For *some* traits you will know what your genotype is. In those spaces write down the two appropriate letters that you know represent your genotype. (Hint: a recessive phenotype indicates two recessive genes in your genotype!)
5. For some traits you will not know for sure whether your genotype is homozygous-dominant or heterozygous. We can assume that one of the genes is dominant, but you will need to flip a coin to make a guess about the other gene. Heads represents a dominant allele; tails represents a recessive allele. After you have done this, write in the remaining genotypes on your chart.

Part Two:

6. Fill in the appropriate genotype for your mate's sex. Now you will be able to predict the possible traits of your offspring using the genetic information provided from your "mate."
7. If one parent is homozygous, you know that the only allele they can give is one they have. (For example, if you are BB, you can only give a "B", so in the *Offspring Genotype* column, write one B.)

8. For some traits, where both parents are homozygous, you can easily determine what your child's genotype will be. (If you are BB, you can only give "B." If your mate is bb, they can only give "b" so the offspring will be Bb). Go ahead and enter those genotypes in the *Child's Genotype* column.

9. For some traits, where one or both parents are heterozygous, you won't know for sure which genes will be passed on to your child. For these cases, toss a coin for each *heterozygous* parent to determine which gene will be passed on. Again, heads is a dominant allele and tails is a recessive allele. Write these genes into the remaining genotype spaces for your child.

10. Now complete the Child's Phenotype column by using one or two words to describe the phenotype for each of your child's traits. (For this step, it might be helpful to use the other packet; "Genetic Facial Traits".)

Part Three:

11. To demonstrate your knowledge and understanding of how probability plays a role in the passing on of traits, you need to draw three Punnett Squares on page 4.

12. Choose a trait in which both you and your mate are homozygous. This will be Punnett Square #1. Complete the Punnett Square and all of the probability questions that go with it.

13. Choose a trait in which both you and your mate are heterozygous. This will be Punnett Square #2. Complete the Punnett Square and all of the probability questions that go with it.

14. Choose a trait in which one of you is homozygous and the other is heterozygous. This will be Punnett Square #3. Complete the Punnett Square and all of the probability questions that go with it.

Part Four:

15. After completing step 14 of part three, you will be required to draw an illustration using the genetic information you've developed. This picture will be drawn on page 5 of this packet.

Your drawing should include the following details:

- a) Shows each trait examined
- b) Labels for each of the 23 traits indicating both phenotypes and genotypes.
- c) Full use of the available drawing space. (Make each picture cover the page!)
- d) Appropriate coloring.

Turn in Page 3/4, 5, and 6. Use Page 6 as the coversheet for your project.

Punnett Squares

Punnett Square #1 Both parents are homozygous.

Trait being examined: _____
 Symbol representing the dominant allele: _____
 Symbol representing the recessive allele: _____

Genotypes

What is the probability that the offspring will:
 Be homozygous for the dominant trait: _____
 Be heterozygous: _____
 Be homozygous for the recessive trait: _____

Phenotypes

What is the probability that the offspring will:
 Show the dominant trait: _____
 Show the recessive trait: _____

Punnett Square #2 Both parents are heterozygous.

Trait being examined: _____
 Symbol representing the dominant allele: _____
 Symbol representing the recessive allele: _____

Genotypes

What is the probability that the offspring will:
 Be homozygous for the dominant trait: _____
 Be heterozygous: _____
 Be homozygous for the recessive trait: _____

Phenotypes

What is the probability that the offspring will:
 Show the dominant trait: _____
 Show the recessive trait: _____

Punnett Square #3 One parent is homozygous; the other is heterozygous.

Trait being examined: _____
 Symbol representing the dominant allele: _____
 Symbol representing the recessive allele: _____

Genotypes

What is the probability that the offspring will:
 Be homozygous for the dominant trait: _____
 Be heterozygous: _____
 Be homozygous for the recessive trait: _____

Phenotypes

What is the probability that the offspring will:
 Show the dominant trait: _____
 Show the recessive trait: _____

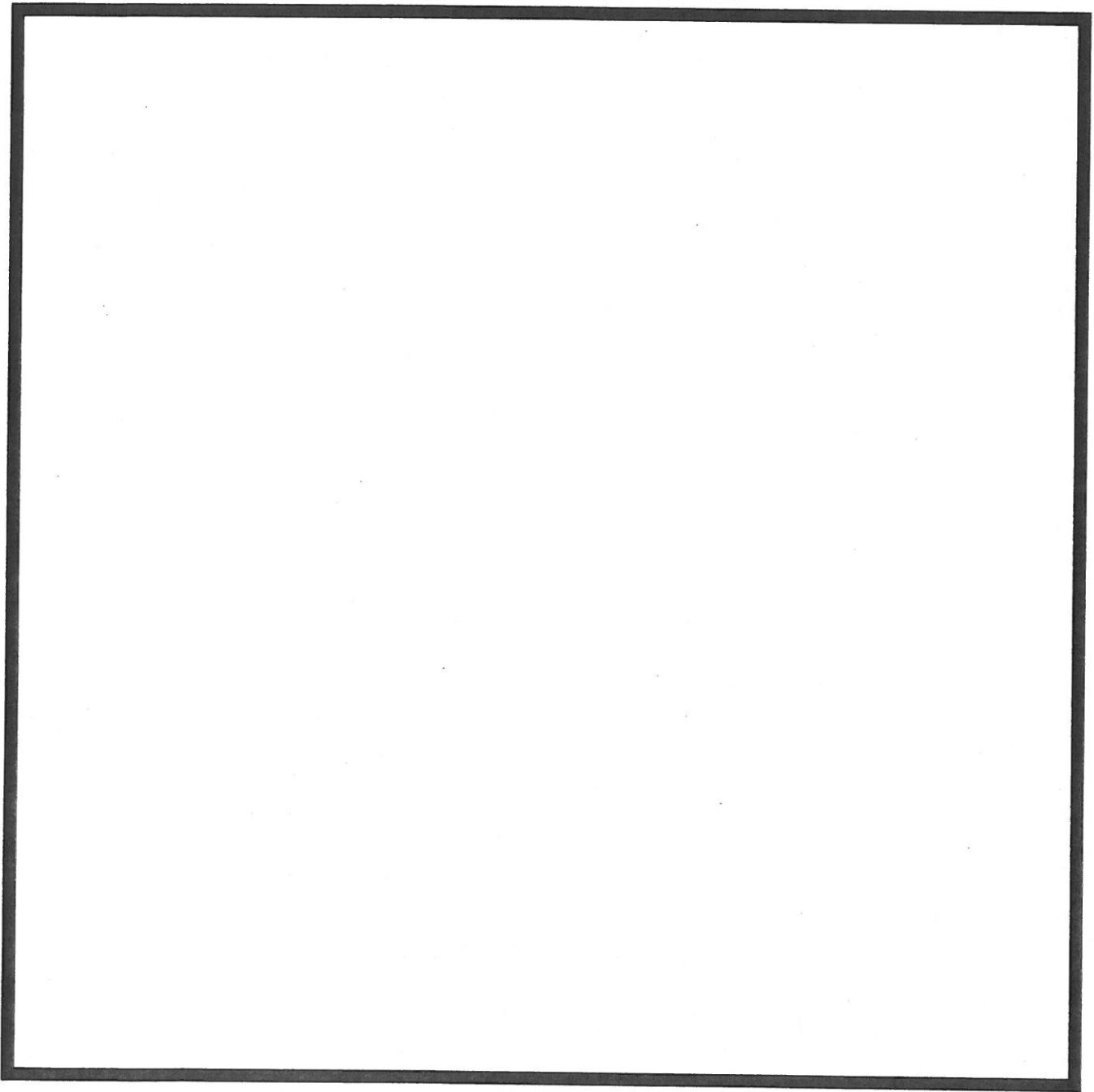
Name: _____ Period: _____ ID #: _____

Phenotypes and Genotypes

Traits	Your Phenotype	Your Genotype	Mate's Genotype	Child's Genotype	Child's Phenotype
3. Shape of Face			RR		
2. Cleft in chin			Cc		
3. Hair texture			Hh		
4. Widow's peak			WW		
5. Spacing of eyes			Ee		
6. Shape of eyes			aa		
7. Position of eyes			Ss		
8. Size of eyes			LL		
9. Length of eyelashes			LI		
10. Shape of eyebrows			Bb		
11. Position of eyebrows			Cc		
12. Size of nose			LI		
13. Shape of lips			tt		
14. Size of ears			ll		
15. Size of mouth			LI		
16. Freckles			ff		
17. Dimples			Dd		
18. Sex					
19. Hair color			dd		
20. Eye color			Bb		
21. Skin pigmentation			Pp		
22. Ear lobe connection			ee		
23. Quality of vision			VV		

Parent Power Project

Your Name: _____



1	5	9	13	17	21
2	6	10	14	18	22
3	7	11	15	19	23
4	8	12	16	20	

GENETIC FACIAL TRAITS

Name _____ Class _____ Date _____

Traits	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)
1. Shape of face	round (RR)	round (Rr)	square (rr)
2. Cleft in chin	absent (CC)	absent (Cc)	present (cc)
3. Hair	curly (HH)	wavy (Hh)	straight (hh)
4. Widow's peak	present (WW)	present (Ww)	absent (ww)
5. Spacing of eyes	close together (EE)	normal distance (Ee)	far apart (ee)
6. Shape of eyes	almond (AA)	almond (Aa)	round (aa)
7. Position of eyes	straight (SS)	straight (Ss)	slant upwards (ss)
8. Size of eyes	large (LL)	medium (Ll)	small (ll)

Traits	Dominant (both heads)	Hybrid (one head, one tail)	Recessive (both tails)
9. Length of eyelashes	long (LL)	long (Ll)	short (ll)
10. Shape of eyebrows	bushy (BB)	bushy (Bb)	fine (bb)
11. Position of eyebrows	not connected (CC)	not connected (Cc)	connected (cc)
12. Size of nose	large (LL)	medium (Ll)	small (ll)
13. Shape of lips	thick (TT)	normal (Tt)	thin (tt)
14. Size of ears	large (LL)	normal (Ll)	small (ll)
15. Size of mouth	large (LL)	medium (Ll)	small (ll)
16. Freckles	present (FF)	present (Ff)	absent (ff)
17. Dimples	present (DD)	present (Dd)	absent (dd)

Traits

	Dominant	Hybrid	Recessive
18. Sex	Female (XX) ♀	Male (XY) ♂	
19. Hair Color	Dark (DD)	Medium (Dd)	Light (dd)
20. Eye Color	Brown (BB)	Brown (Bb)	Blue, Green, Hazel (bb)
21. Skin Pigmentation	Dark (PP)	Medium (Pp)	Light (pp)
22. Ear lobe Connection	Disconnected (EE)	Disconnected (Ee)	Connected (ee)
23. Quality of Vision	Uses Lenses (VV)	Uses Lenses (Vv)	No Lenses (vv)

Drawing the Head

Over the next pages we will examine how to draw faces step by step, looking at the proportions of the head, the features, and finally, how to achieve a likeness.

The shape of the head

Viewed from the front, the head is an egg-shaped form sitting on the neck. Practice drawing the shape of the head and positioning the features within it, as described in the box below. Use the method described on pages 12-13 to feel your way toward the form and proportions of the head.

A study from life

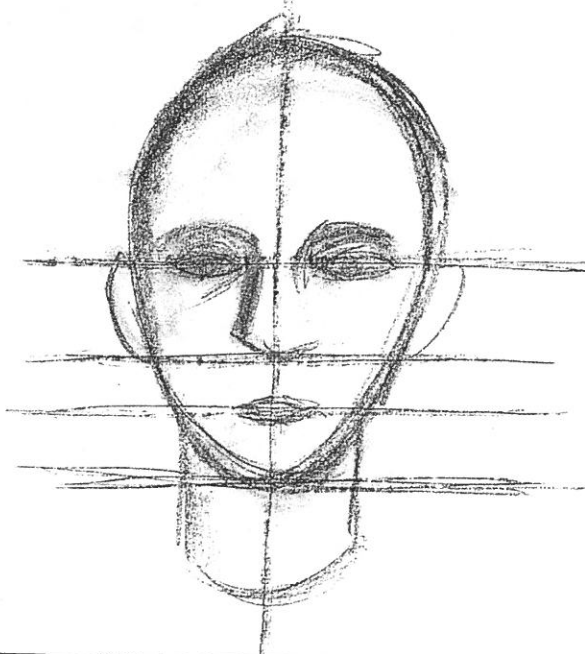
Once you can manage these proportions, ask a friend to sit for you. Perhaps you can draw each other at the same time. Draw your subject's head from side, front, and three-quarter views. Don't worry about getting a perfect likeness just yet.

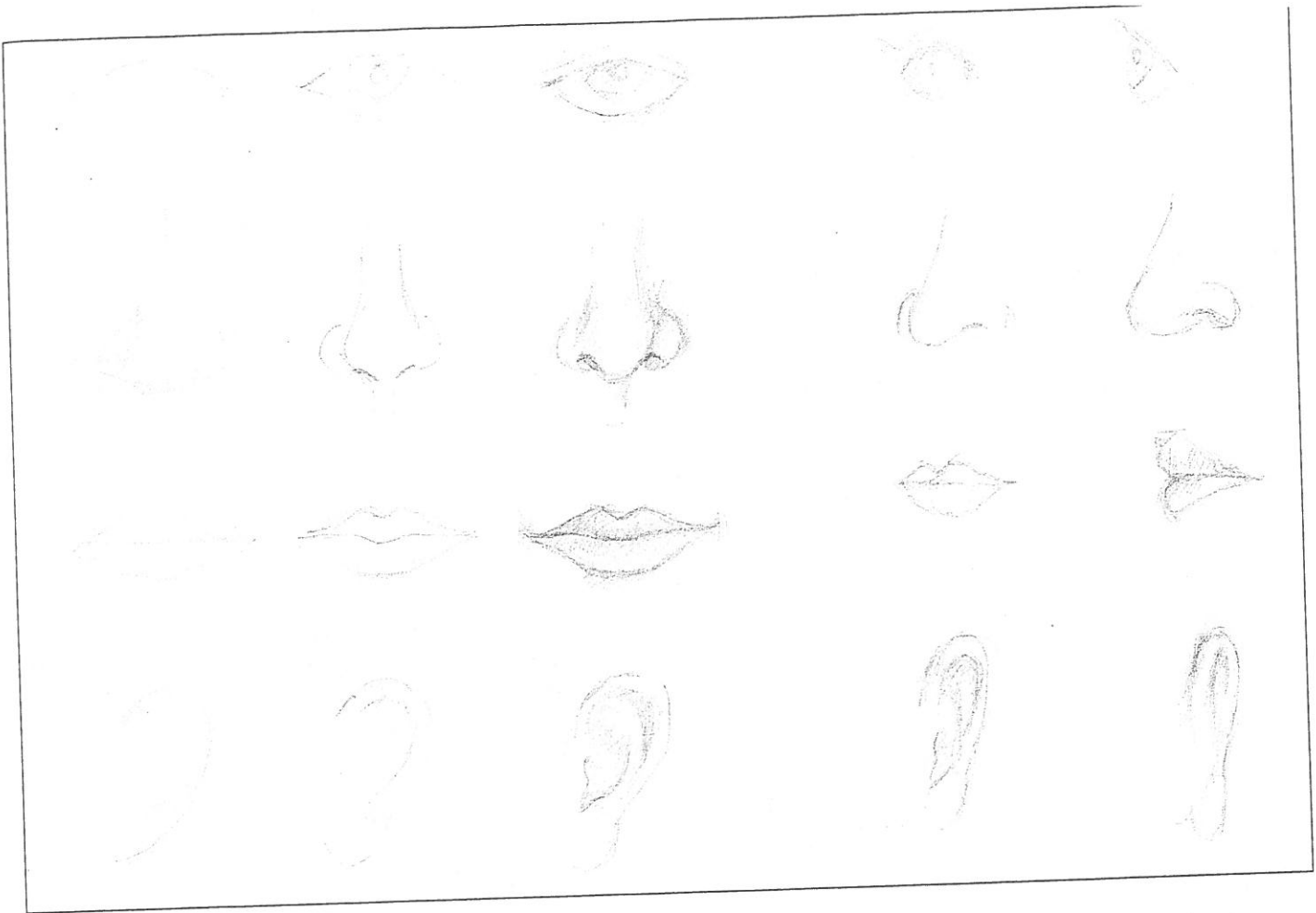
► "My simple line drawing could be taken further by adding shading, but I felt it might become confused. Sometimes it's best to quit while you are ahead, rather than risk going on for too long."

Making the headlines

The first thing to notice is that the eyes come halfway down the head, and not higher up. The end of the

nose lies midway between eyes and chin; the mouth comes halfway between nose and chin. There is the width of an eye between the eyes, and also across the bottom of the nose. On the sides of the head, the ears should be placed midway between the eyes and the nose.





▲ “Above, I have sketched front, three-quarter, and side views of the same features. Crosshatching adds solidity.”

Putting on expressions

The drawings on the left show the subject of the previous page in different moods: first sad, then happy, and slightly puzzled. The features, and even the hair, droop downward in the sad face, as though there is no energy to support them. Enthusiasm lifts the lines upward in the happy face. In a puzzled face, the lines are undecided and waver in different directions. See how your face changes as you practice looking delighted, annoyed, or tired.



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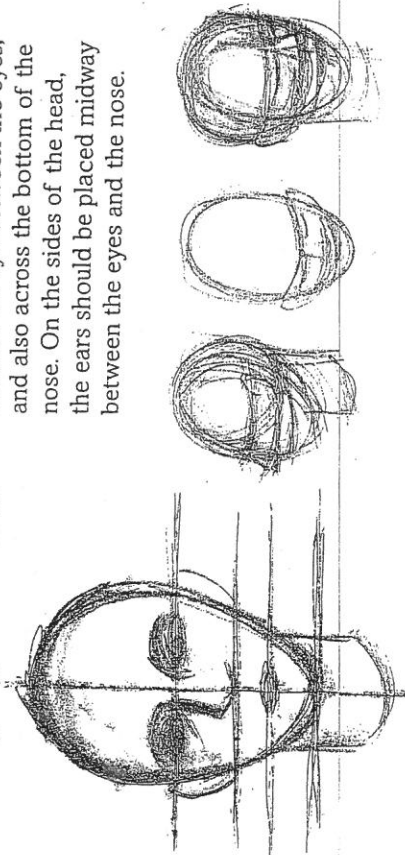
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