Genotype to Phenotype

Translation Booklet

The contents of this booklet

will help you determine

what your baby will look like.

Questions / Comments / Suggestions? Contact:Thomas Atkins
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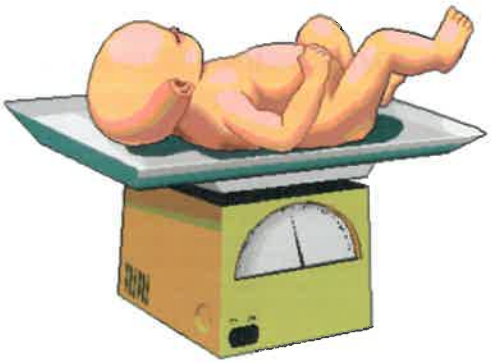
From:
http://www.woodrow.org/teachers/bi/1997/makeface/bookttlpg.html

If your dropping of the genes resulted in two "XX" chromosomes turning face up, then you are the very lucky parents of a little girl.

Its a Girl!

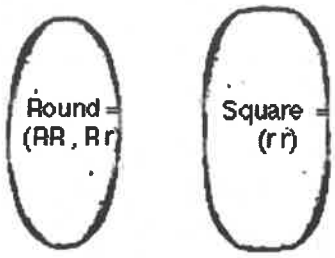
The Mom contributed one "X" and the Dad the other "X".

If your dropping of the genes resulted in an "Xy" combination of chromosomes turning face up, then you are the very lucky parents of a little boy.

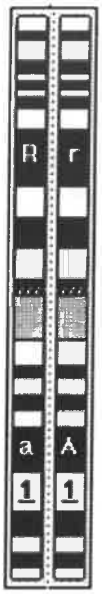


Its a Boy!

The Mom contributed one "X" and the Dad the "y" chromosome.

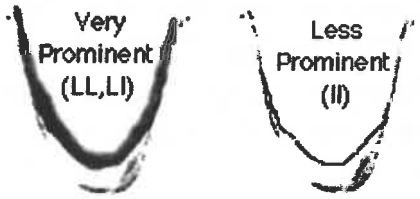


#1 Face Shape

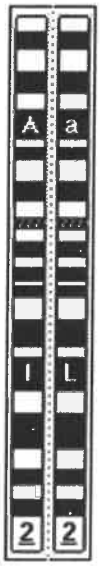


Chromosome #1 contains the genetic information in a gene we will call "R". This information determines the general shape of the face.

Place your baby's genotype for face shape in the data table.



#2 Chin Shape

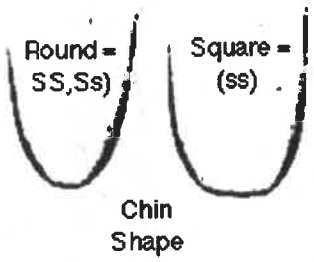


Chromosome #2 contains the chin shape gene "L." The genotype "ll" prevents the expression of the next two pairs of genes.

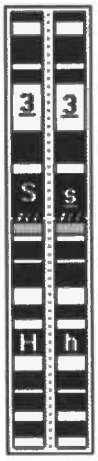
Place your baby's genotype for chin shape in the data table.

The control of one set of genes by another is called *epistasis.*

If you landed the genotype "ll" then skip the next two and start on Skin Color.

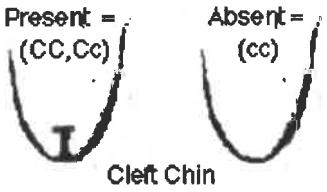


Chromosome #3 contains the "S" gene. This gene controls the shape of the chin, round or square. These genes are activated only if the dominant "L" on chromosome #2 is present.

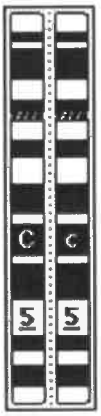


Place your baby's genotype for chin shape in the data table.

The control of one set of genes by another is called *epistasis.*



Chromosome #5 carries the "C" gene. The "C" gene controls the development of the cleft chin phenotype.



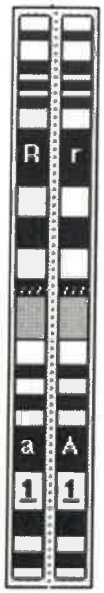
Remember these "C" genes are activated only if the dominant "L" on chromosome #2 is present.

Place your baby's genotype for chin shape in the data table.

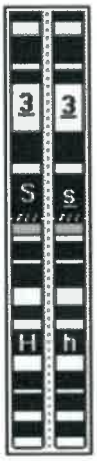
The control of one set of genes by another is called *epistasis.*

Skin color is determined by three sets of genes on chromosomes #'s 1, 2,and4. The dominant genetic code, gene "A" translates into a protein called melanin. This dark pigment is like a natural UV blocker. The greater the number of dominant genes one has, the greater the amount of melanin, the darker the skin, and the more UV protection a person has. These genes have been selected-for near the Earth's equator where the intense UV photons can cause a great deal of damage to lighter skin.

Count up the number of dominant and recessive genes and place your baby's genotype for skin color in the data table.



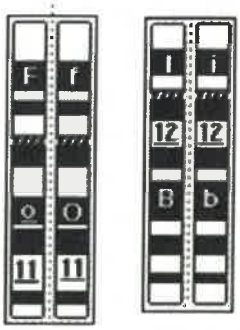
The hair color gene, like skin color, is polygenic. The same genetic code is found on chromosome #'s 3, 6, 10 and 18. This code translates into pigment which is incorporated into the hair as it is growing. The greater the number of dominant alleles, the darker the hair. Hair color varies from black to white.



Count up the number of dominant and recessive genes and place your baby's genotype for hair color in the data table.

Chromosomes #'s 11 and 12 contain Eye Color Genes: Darker eyes are produced in the presence of more active alleles. In this situation, the Capital letters (F or B) represent alleles which are active in depositing dark pigment. Lower case letters (f or b) represent alleles which deposit little pigment. To determine the color of the eyes, assume there are two gene pairs involved, one of which codes for depositing pigment in the front of the iris, and the other codes for depositing pigment in the back of the iris. Determine the genotype of the first pair (FF,Ff,ff). and the the second (BB,Bb,bb). If your genotype is in the first column then check your eye color in the second column.

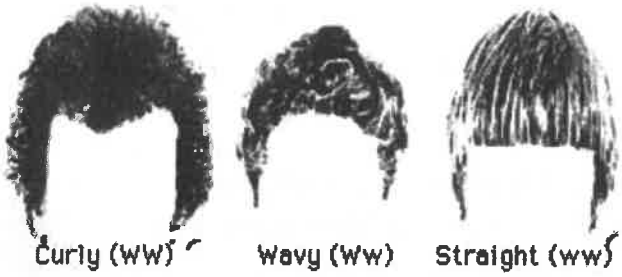
Column #1	Column #2
Genotypes	Protein Phenotypes
FFBB	Dark brown
FFBb	Brown
FFbb	Brown
FfBB	Brown
FfBb	Dark Blue
Ffbb	Dark Blue
ffBB	Light Blue
ffBb	Light Blue
ffbb	Pale blue

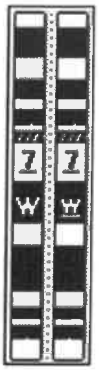


Place your baby's genotype for eye color in the data table.

Red Hair: Red hair is another gene for hair color present on a different chromosome.It blends its effect with other hair colors. Redness of the hair seems to be caused by a single gene pair with two alleles, red (G) or no red (g), and displays incomplete dominance. Thus, if a person has two genes for red (GG), the hair will be a more intense red than if they have a single gene (Gg). If a person has no genes for red (gg), then the hair does not show as red at all. Red hair is complicated by the fact that dark pigment, controlled by the many hair color genes, may mask or hide the red color. The darker the brown, the less the red shows through, although more shows with (GG) than with (Gg). As the hair becomes lighter in color, more red shows through. If your child is blond as evidenced by 3 Capitals or less above and (GG) lands facing up, then your child will probably have flaming red hair. Auburn might be (Gg) with the lighter shades of pigmentation.

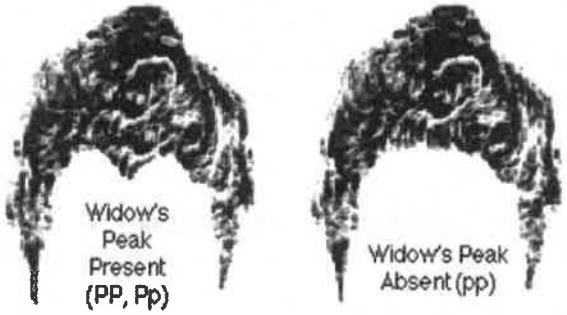
GG = Heavy Red Pigment
Gg = Medium Red Pigment
rr = No Red Pigment

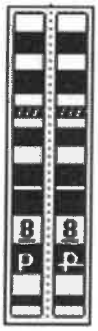




Chromosome #7 contains the genetic code for hair type. The "W" hair-making DNA codes for amino acids which contain a sulfur atom which causes cross links between amino acids in the hair..... thus curly hair! Straight hair lacks the many sulfur amino acids and does not make as many cross links.

Place your baby's genotype for hair type in the data table.





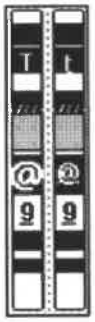
Chromosome #8 contains the genetic code for Widow's Peak. If your baby has a dominant "P" then he or she will possess that trait. (Notice that there is a line through the recessive small "p".)

Place your baby's genotype for Widow's Peak in the data table.

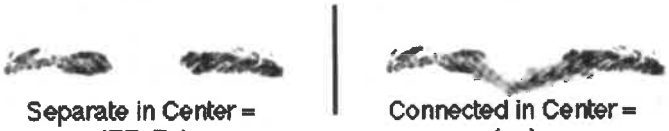
Thick Eyebrows = (TT, Tt)

Thin Eyebrows = (tt)

Chromosome #9 carries a gene for eyebrow thickness called "T". It works with complete dominance.



Place your baby's genotype for eyebrows in the data table.

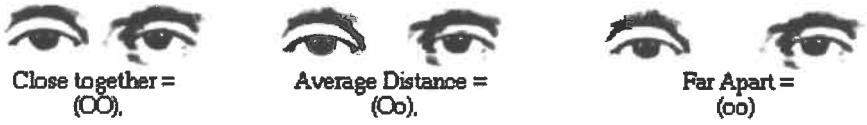


Separate in Center = (EE, Ee)

Connected in Center = (ee)

Chromosome #10 has the gene for eyebrow placement. "E" separates and lack of "E" causes connected eyebrows.

Place your baby's genotype for eyebrow placement in the data table.



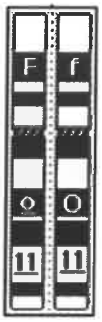
Close together = (OO).

Average Distance = (Oo).

Far Apart = (oo)

Chromosome #11 has the gene for eye placement. The dominant gene places the eyes close together, the recessive, far apart.

Place your "baby's" genotype for eye placement in the data table.



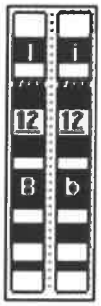
Large Eyes =LL

Medium Eyes =LI

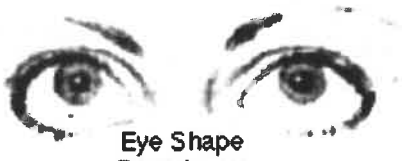
Small Eyes =ll

Chromosome #12 beside carrying one of the pigment genes for eye color also carries the gene "I" for eye size.

Place your "baby's" genotype for eye size in the data table.



Eye Shape
Almond = YY, Yy



Eye Shape
Round = yy

Chromosome #13 has the eye shape gene "V." Dominant genes code for almond shape and homozygous recessive is round.

Place your baby's genotype for eye shape in the data table.

Eyelashes:
Movie Type =
(MM, Mm)

Eyelashes:
Not Movie Type =
(mm)

Movie star eyelashes are found on chromosome #15. Dominant "M" genes place your kid on the way to stardom!

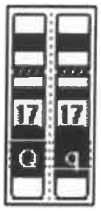
Place your baby's genotype for eyelashes in the data table.

Wide Mouth
= QQ

Medium Mouth
= Qq

Narrow Mouth
= qq

Chromosome #17's "Q" gene controls the width of the mouth. The dominant gene imparts width.



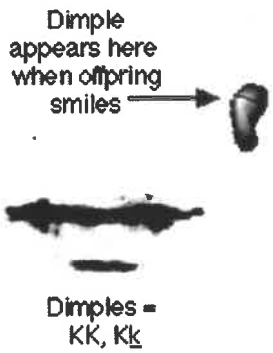
Place your baby's genotype for mouth width in the data table.

Lip Thickness
Thick =
(JJ, Jj)

Lip Thickness
Thin =
(jj)

Chromosome #18's gene "J" adjusts the thickness of the lips.

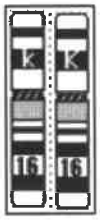
Place your baby's genotype for fullness of lips in the data table.



Dimples =
KK, Kk

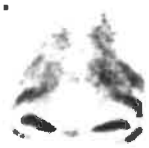
No Dimples =
kk

Chromosome #16 contains genetic information regarding the construction of dimples.



Place your baby's genotype for dimples in the data table.

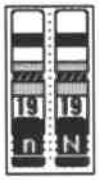
Nose Size
Big =
(NN)



Nose Size
Average =
(Nn)

Nose Size
Small =
(nn)

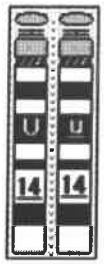
Chromosome #19 contains genetic information regarding the construction of nose size



Place your baby's genotype for nose size in the data table.

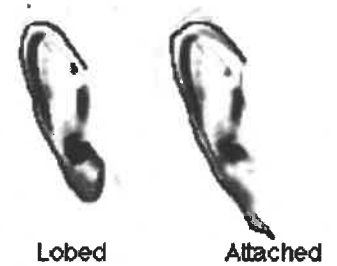
Nose Shape
Rounded =
(UU, Uu)

Nose Shape
Pointed=
(uu)



Your baby's nose shape is determined by a gene on chromosome #14. The allele "U" imparts a rounded shape to the nose.

Place your baby's genotype for nose shape in the data table

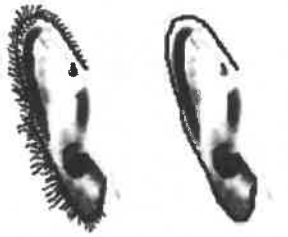


Lobed
Ears = ZZ, Zz

Attached
Ears = zz

Chromosome #22 carries the gene for free ears. The gene "Z" causes the earlobe to hang free at the side of the head.

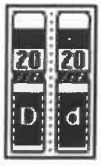
Place your baby's genotype for earlobe attachment in the data table.



Hairy Ears
Present =
(DD, Dd)

Hairy Ears
Absent=
(dd)

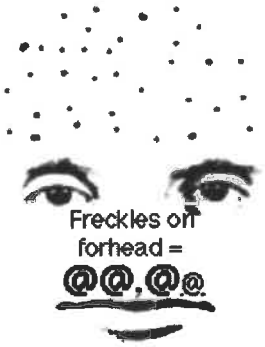
Chromosome #20 contains DNA information encoded in a gene called "D". This information, if in its dominant form, causes the ear to grow a large amount of fuzzy hair.



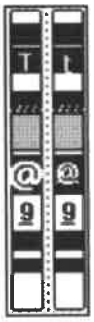
Place your baby's genotype for hairy ears in the data table.

Chromosome #21 contains a gene, "$" which causes uneven pigment to form in the cheek region. If "$" is present then your child will have cheek freckles.

Place your baby's genotype for freckles in the data table.



Finally on chromosome #9 there is data in the form of a gene "@". If your baby has "@" there will be freckles on the forehead! ("@@" underlined, represent the recessive genes)



Place your baby's genotype for freckles in the data table.