The CUTE

Celebrity Babies

Workbook of SCIENCE

I am owned by:

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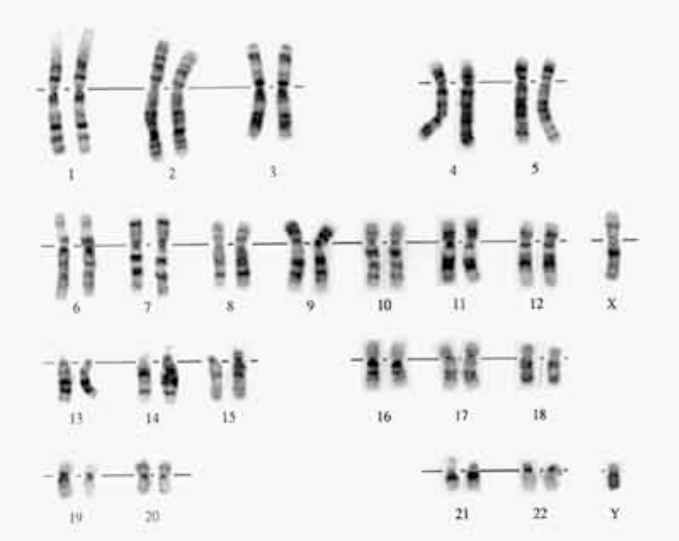


Activity	Mark
Figuring out the genotype	Complete/Incomplete
Making eggs and sperms	Complete/Incomplete
Fertilisation	Complete/Incomplete
Conclusion Questions	Complete/Incomplete

Celebrity Babies

When you look at the picture of a celebrity you see their **phenotypes** – or observable traits. For every characteristic (like eye color) there are different forms or varieties of that characteristic that someone could actually have (blue, green, hazel or brown eyes).

All of these traits are caused by variations in **genes**. Every gene comes in one of two different forms. We represent those forms by a letter, either as a capital letter or a lower case letter. For example, eye color has a gene that can come in the B form (brown) or the b form (non-brown). These different forms are called **alleles**.

Every individual has 2 copies of each gene, one from mom, the other from dad. Thus, for eye color, you could be:
BB – two brown alleles
Bb – one brown allele, one non-brown allele
bb – two non-brown alleles
These double letter pairs representing trait forms are called **genotypes**.

One allele is **dominant**. The other allele is **recessive**. The dominant allele masks or covers up the other gene. Brown eyes are dominant over blue eyes. If you have a brown allele, your eyes will be brown no matter whether the other allele is. Thus, if a person is Bb with one brown allele and one non-brown allele, then they will have brown eyes, not a mixture of brown and blue.

If you are BB, your eyes will be brown.
If you are Bb, your eyes will be brown.
If you are bb, your eyes will be blue.

Every gene has two alleles or forms, one that is dominant and one that is recessive. For each of the traits we looked at, there is a dominant and a recessive form.

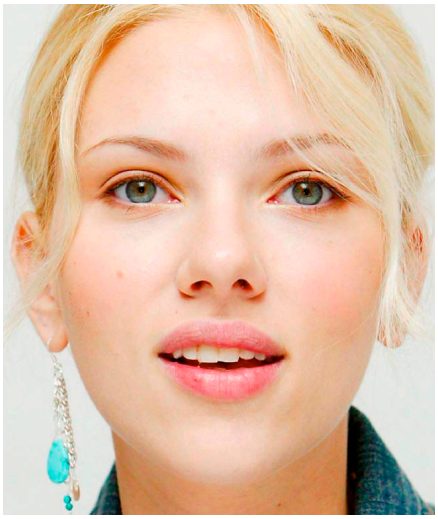
Trait	**Dominant**	**Recessive**
Eye color	Brown (BB or Bb)	Non brown (bb)
Freckles	Freckles (FF or Ff)	No freckles (ff)
Nose Shape	Roman (RR or Rr)	No bump (rr)
Dimples	Dimples (DD or Dd)	No dimples (dd)
Earlobe attachment	Unattached (EE or Ee)	Attached (ee)
Widow's peak	Widow's peak (WW or Ww)	Straight hairline (ww)
Cleft chin	Cleft chin (CC or Cc)	Smooth chin (cc)
Face Shape	Oval (OO or Oo)	Square (oo)
Hair color	Dark (HH or Hh)	Light (hh)

Hair texture is a little more complicated because curly textured hair (T) is not completely dominant over straight hair (t). If you have one curly allele and one straight allele (Tt) then you end up with wavy hair. This is called incomplete dominance.

Step 1 – Figure out the genotype

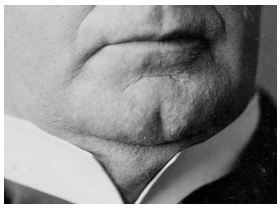
Here are 2 photos of celebrities: Black Widow and Iron Man.

Examine the protraits and determine what the offspring will look like if Black Widow has a baby with Iron Man.



Iron Man and Black Widow

Roman Nose



Cleft Chin

Iron Man's genotype

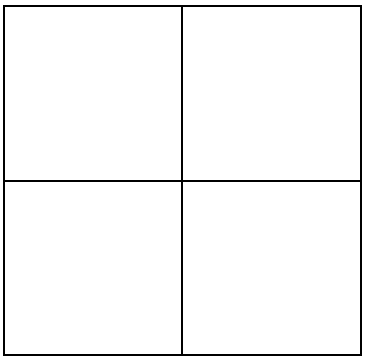
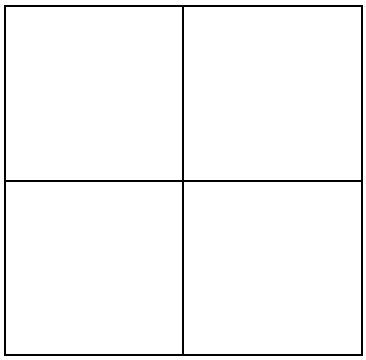
Trait	Dominant	Recessive	Genotype
Eye Color	Brown (BB or Bb)	Non brown (bb)	
Freckles	Freckles (FF or Ff)	No freckles (ff)	
Nose Shape	Roman (RR or Rr)	No bump (rr)	
Dimples	Dimples (DD or Dd)	No dimples (dd)	
Earlobes	Unattached (EE or Ee)	Attached (ee)	
Hair line	Widow's peak (WW or Ww)	Straight hairline (ww)	
Cleft chin	Cleft chin (CC or Cc)	Smooth chin (cc)	
Face Shape	Oval (OO or Oo)	Square (oo)	
Hair color	Dark (HH or Hh)	Light (hh)	
Hair texture	Curly (TT) | Wavy (Tt)	Straight (tt)	
Gender	Male (XY)	Female (XX)	

Black Widow's Genotype

Trait	Dominant	Recessive	Genotype
Eye Color	Brown (BB or Bb)	Non brown (bb)	
Freckles	Freckles (FF or Ff)	No freckles (ff)	
Nose Shape	Roman (RR or Rr)	No bump (rr)	
Dimples	Dimples (DD or Dd)	No dimples (dd)	
Earlobes	Unattached (EE or Ee)	Attached (ee)	
Hair line	Widow's peak (WW or Ww)	Straight hairline (ww)	
Cleft chin	Cleft chin (CC or Cc)	Smooth chin (cc)	
Face Shape	Oval (OO or Oo)	Square (oo)	
Hair color	Dark (HH or Hh)	Light (hh)	
Hair texture	Curly (TT) | Wavy (Tt)	Straight (tt)	
Gender	Male (XY)	Female (XX)	

<u>Using Punnett Squares</u>:

Determine the probability that Iron and Black's baby will have brown eyes, if Iron's genotype is Bb.	Determine the probability that Iron and Black's baby will have brown eyes, if Iron's genotype is BB.
The probability is _____ %.	The probability is _____ %.

Determine the probability that Iron and Black's baby will have a straight hairline, if Black's genotype is Ww.	Determine the probability that Iron and Black's baby will have a straight hairline, if Black's genotype is WW.
	
The probability is _____ %.	The probability is _____ %.

Step 2 – Make eggs and sperm

To begin, two **gametes** (sperm and/or eggs) will need to be made. Sperm and eggs are special because while every other cell in our bodies has two copies of our genes (one from mom and one from dad), sperm and eggs have only one copy of each gene.

Look closely at your genotype. If it is a recessive trait, every gamete will have the same gene.

If it is a dominant trait, then it is either a heterozygous pairing or homozygous dominant pairing.

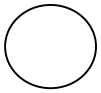
Flip a coin to determine which pairing to use:

Heads → homozygous dominant pairing
Tails → heterozygous pairing

For example, you have brown eyes. You can either have BB or Bb. Flip a coin to determine which pairing to use.

Heads → BB
Tails → Bb

Fill in the sperm and eggs below for the "future" parents.

Black Widow's Egg #1 

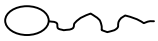
Trait	Allele
Eye Color	
Freckles	
Nose	
Dimples	
Earlobe attachment	
Hair line	
Cleft chin	
Hair color	
Hair texture	

Black Widow's Egg #2 

Trait	Allele
Eye Color	
Freckles	
Nose	
Dimples	
Earlobe attachment	
Hair line	
Cleft chin	
Hair color	
Hair texture	

Iron Man's Sperm #1 

Trait	Allele
Eye Color	
Freckles	
Nose	
Dimples	
Earlobe attachment	
Hair line	
Cleft chin	
Hair color	
Hair texture	
Gender	

Iron Man's Sperm #2 

Trait	Allele
Eye Color	
Freckles	
Nose	
Dimples	
Earlobe attachment	
Hair line	
Cleft chin	
Hair color	
Hair texture	
Gender	

Notice, there is an extra line for gender under the sperm. That is because sperm pass on the information that determines whether the child will be a boy or a girl. The sperm providing partner should flip their coin one extra time.

Head → girl
Tails → boy

Step 3 – Fertilization

Offspring are now ready to be made! Two children will be made.

Sperm #1 will fertilize egg #1 to create baby #1. They combine their genes to make a baby. That baby now has two copies of each gene – one copy from mom, and one from dad.

In the chart below, fill in each baby's genotype and phenotype. Once you are finished with the final questions, feel free to draw a picture of what each child will look like as a freshman.

Baby #1 - Name _____

Who does Baby #1 look more like? Why?

Trait	Genotype	Phenotype
Eye Color		
Freckles		
Nose		
Dimples		
Earlobe attachment		
Widow's peak		
Cleft chin		
Hair color		
Hair texture		
Gender		

Baby #2 - Name _____

Who does Baby #1 look more like? Why?

Trait	Genotype	Phenotype
Eye Color		
Freckles		
Nose		
Dimples		
Earlobe attachment		
Widow's peak		
Cleft chin		
Hair color		
Hair texture		
Gender		

Conclusion Questions

1. What's the difference between your phenotype and your genotype?

2. What does it mean for an allele to be dominant?

3. Are dominant allelles the common traits? Explain.

4. What are gametes? _____

5. Look at the gametes you made. Are they exactly the same? _____
   Explain why or why not.

6. Why likely is it for someone to have kids that look exactly like them?