

The alien couple pictured above displays characteristics that have been linked to the sex chromosomes of this particular species. Below is a chart listing some of these traits. Use the information in the chart to solve the genetics problems that follow.

Trait	Chromosome	Dominant Phenotype	Recessive Phenotype
Body color	X	(P) purple	(p) pink
Ear shape	X	(H) pointed	(h) round
Eye color	X	(E) yellow	(e) red
Foot color	X	(F) matches body	(f) mismatch to body
Size of nose	X	(N) small	(n) large
Eyebrows	Y	eyebrows present	
Extra arms	Y	extra arms present for 4 arms total	

1. A male with yellow eyes mates with a red-eyed female. What is the chance that this couple will have a baby boy with red eyes?
2. A female, heterozygous for the body color trait, mates with a pink male. What is the chance that these aliens will give birth to a purple-skinned girl?
3. A small-nosed male falls in love and marries a large-nosed female. The couple becomes pregnant with their first child. What is the chance that the baby will be a girl and have a large nose like the mother?

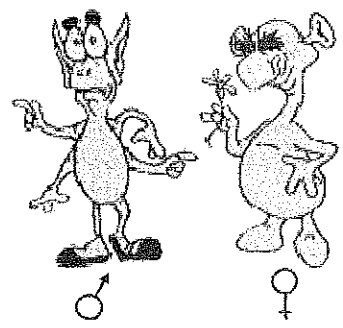
4. Two aliens with mismatched feet are expecting a baby. What is the chance that this couple's child will have feet that match its body?

5. Mr. & Mrs. Yardaz are expecting their second child. Both parents have pointed ears but the couple's 2-year old son has round ears. What is the chance that their second born will have pointed ears like the parents?

6. Doug Doouge has four arms. Doug's pregnant wife only has two arms. Doug would really like a daughter that has four arms just like him. What is the chance that Doug's wife will give birth to a baby girl with four arms?

7. Wendy is a female alien whose feet and body color match. She always considered herself lucky because her father's feet did not match his body and she thought that looked strange. Wendy would like to have children someday but is extremely concerned about mismatching feet. She makes an appointment with a genetic counselor. Wendy tells the counselor that she will only mate with males whose feet match their body and asks if there is any possibility that any of her children would have mismatching feet. What does the geneticist tell Wendy?

KEY



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1. A male with yellow eyes mates with a red-eyed female. What is the chance that this couple will have a baby boy with red eyes?

*E - yellow e - red*

$$\begin{array}{c}
 X^E Y \\
 X^e X^e \times X^E Y \\
 \hline
 X^E X^e \quad X^E Y \\
 X^e X^e \quad X^e Y
 \end{array}$$

50%

2. A female, heterozygous for the body color trait, mates with a pink male. What is the chance that these aliens will give birth to a purple-skinned girl?

*P - purple p - pink*

$$\begin{array}{c}
 X^P X^p \times X^p Y \\
 \hline
 X^P X^p \quad X^P Y \\
 X^p X^p \quad X^p Y
 \end{array}$$

25%

3. A small-nosed male falls in love and marries a large-nosed female. The couple becomes pregnant with their first child. What is the chance that the baby will be a girl and have a large nose like the mother?

*N - small n - large*

$$\begin{array}{c}
 X^n X^n \times X^N Y \\
 \hline
 X^n X^N \quad X^n Y \\
 X^n X^n \quad X^n Y
 \end{array}$$

0%

4. Two aliens with mismatched feet are expecting a baby. What is the chance that this couple's child will have feet that match its body?  $X^F$  - matched feet  $X^f$  - mismatched

$X^f X^f \times X^f Y$   
 $X^f \quad X^f \quad Y$   
 $X^f \quad X^f X^f \mid X^f Y$   
 $X^f \quad X^f X^f \mid X^f Y$

100% mismatched  
0% matched feet

5. Mr. & Mrs. Yardaz are expecting their second child. Both parents have pointed ears but the couple's 2-year old son has round ears. What is the chance that their second born will have pointed ears like the parents?

$X^H$  - pointed  
 $X^h$  - Round  
 MR Yardaz  $X^H Y$   
 MRS Yardaz  $X^H X^h$   
 2nd child 75%

TEST CROSS  
 $X^H X^H \times X^H Y$   
 $X^H \quad Y$   
 $X^H \quad X^H X^H \mid X^H Y$   
 $X^H \quad X^H X^H \mid X^H Y$

$X^H X^h \times X^H Y$   
 $X^H \quad Y$   
 $X^H \quad X^H X^H \mid X^H Y$   
 $X^h \quad X^H X^h \mid X^h Y$

6. Doug Doouge has four arms. Doug's pregnant wife only has two arms. Doug would really like a daughter that has four arms just like him. What is the chance that Doug's wife will give birth to a baby girl with four arms? DO NOT DO

7. Wendy is a female alien whose feet and body color match. She always considered herself lucky because her father's feet did not match his body and she thought that looked strange. Wendy would like to have children someday but is extremely concerned about mismatching feet. She makes an appointment with a genetic counselor. Wendy tells the counselor that she will only mate with males whose feet match their body and asks if there is any possibility that any of her children would have mismatching feet. What does the geneticist tell Wendy?

$X^F$  - matches body  
 $X^f$  - mismatch body

Dad Mismatched  $X^f Y$   
 Wendy matches  $X^F X^f$  (she must be hetero.)

TEST CROSS  
 Wendy  $X^F X^f$   $\times$  possible dad  $X^F Y$   
 $X^F \quad Y$   
 $X^F \quad X^F X^F \mid X^F Y$   
 $X^f \quad X^F X^f \mid X^f Y$

There will be a 25% chance of Wendy's children having mismatched feet