Genetics: Multiple Allele Traits

Blood Type

Blood type is controlled by 3 alleles: A, B, O. A & B are codominant, O is recessive.

1. a) What are the two genotypes possible for a person who as A blood? _____
b) What genotype does a person with AB blood have? _____
c) What genotype does a person with O blood have? _____
d) What are the two genotypes possible for a person who as B blood? _____

2. A man with type AB blood is married to a woman also with type AB blood. What percentage of their children will have:
A blood? _____ B blood? _____ O blood _____ AB blood _____

3. A man has type B blood (genotype BB) is married to a woman with type O blood. What blood type will all their children have? _____ What is the genotype of the children? _____

4. A woman with type A blood (genotype AO) is married to a type B person (genotype BO). What proportion of their children will have:
A blood? _____ B blood? _____ O blood _____ AB blood _____

5. A woman with type A blood is claiming that a man with type AB blood is the father of her child who is type B.
Could this man be the father of the child? _____ Show the possible crosses; remember that the woman can have AA or AO genotypes.
Assuming that he is the father, what must the mother's genotype be? _____

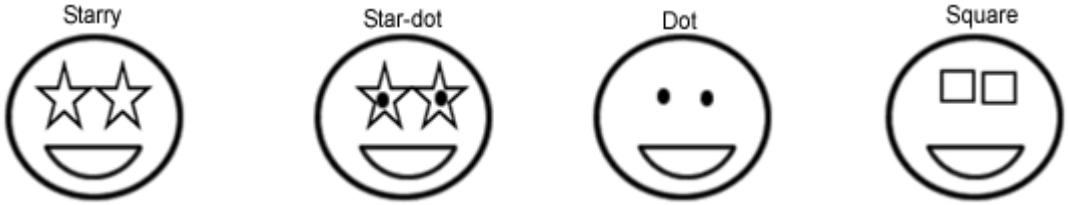
6. A man with type AB blood is married to a woman with type O blood. They have two natural children and one adopted child. Jane has type A blood, Bobby has type B blood, and Grace has type O blood.
Which child was adopted? _____

SMILEYS GENETICS

In smileys, the shape of the eye is controlled by multiple alleles, much like blood types. The smileys pictured show the four possible phenotypes. It is known that the star and

dot eyes are codominant and the square eyes is a recessive trait. Assign genotypes to each of the smileys pictured. (Hint: Use blood type genotypes to help you)

7. Show Genotypes



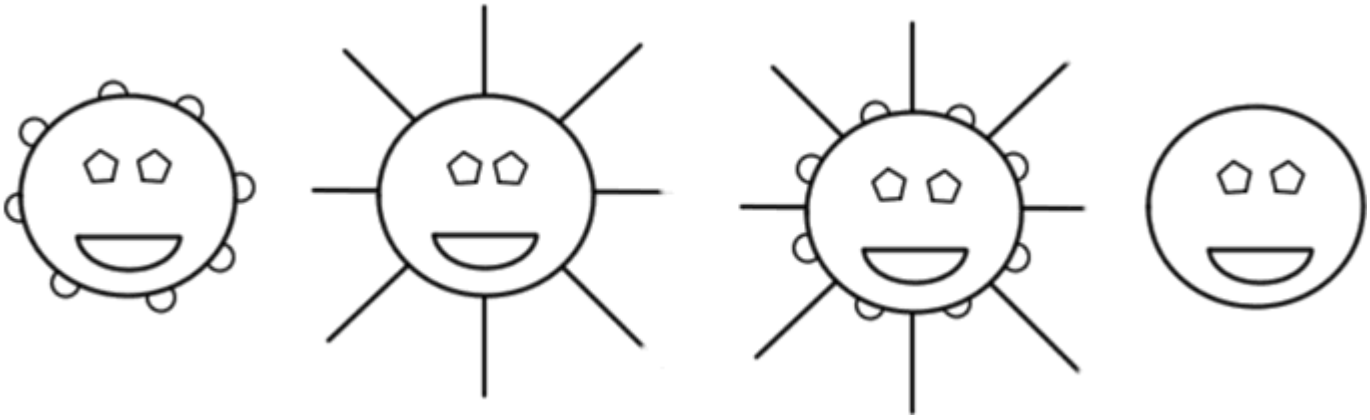
8. If a star-eyed smiley (homozygous) is crossed with a dot-eyed smiley (also homozygous) what will all of their offspring look like?

9. If the pair in the cross above were both heterozygous, what percentage of the offspring will be:
Starry _____ Star-dot _____ Dot _____ Square ____

10. If a starry-dot eyed smiley is crossed with a square eyed smiley what percentage of the offspring will be:
Starry _____ Star-dot _____ Dot _____ Square ____

11. If two starry-dot eyes smileys are crossed, what percentage of the offspring will be:
Starry _____ Star-dot _____ Dot _____ Square ____

SUNNY GENETICS



Determine the genotypes of the following Sunnys. It is a multiple allele trait, spiked and circles are codominant and the bare trait is recessive.

12. Show genotypes

13. If a spiked sunny (heterozygous) is crossed with a bare sunny, what percentage of the offspring will be bare? _____
What percentage will be spiked? _____

14. If a spike-circle sunny is crossed with a heterozygous spike sunny, how many of the offspring will be spiked? _____
How many will be circles? _____
How many will be spike-circles? _____

15. A female sunny who is spiked is married to a male sunny who is circle. They have a child who is bare. What must be the genotypes of the two parents?
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