

RE9.1

Examine the process of and influences on the transfer of genetic information and the impact of that understanding on society past and present.

Indicators for this outcome

- (a) Identify questions to investigate related to genetics.
- (c) Recognize that the nucleus of a cell contains genetic information and identify the relationship among chromosomes, genes, and DNA in transmitting genetic information.
- (d) Identify examples of dominant and recessive traits in humans and other living things.
- (e) Observe, collect, and analyze class and/or family data of human traits that may be inherited from parents (e.g., eye colour, chin shape, ear lobes, and tongue rolling).

1. A heterozygous red flower is crossed with a recessive white flower. What is the chance of having a white flower? Show the cross as well as the genotypic and phenotypic ratios.
2. Dimples are a dominant trait in humans. If 2 parents have dimples, one is heterozygous and the other is homozygous dominant, what is the probability of having a child with dimples? Show the cross as well as the genotypic and phenotypic ratios.
3. What are the chances of having a child with a recessive widow's peak if one parent has one and the other parent is homozygous normal for hairline? Show the cross as well as the genotypic and phenotypic ratios.
4. Show the cross and give the genotypic and phenotypic ratios of the expected offspring between a flower having an allele of each for height (both tall and short) and a flower which is recessive short.
5. What are the chances of a brown eyed woman and her blue eyed husband having a blue eyed baby? Her mother has brown eyes and her father has blue eyes. His mother has brown eyes too and his father has blue eyes.

6. Short eye lashes are recessive in humans. A woman with long lashes and her long lashed husband have a child with short lashes. Her mother had long lashes and her father had short lashes. His mother had long lashes and his father also had long lashes. Show the cross as well as the genotypic and phenotypic ratios.

7. Two plants have 300 offspring. If they were both heterozygous for seed shape and their shape was smooth, how many of the offspring would be suspected to be wrinkled for shape?

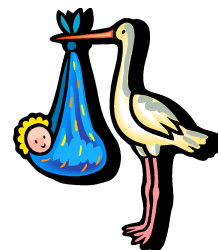
8. Black is recessive to white for sheep color. What are the 3 possible crosses which one could do to ensure that black sheep were produced?

9. A woman with homozygous dominant curly hair and her curly haired husband have a child. Show the cross and show the probability of having a straight haired child if the father's mother had straight hair.

10. Two phenotypically normal people have a child who is an albino (a genetic disorder where the skin is lacking all pigment). If the parents appear to be normal, but they have a child who is an albino, what would their genotypes be? Show the cross as well as the genotypic and phenotypic ratios.



Beaker Babies Assignment



Introduction:

As you already know, you get half of your genetic information from your mother and half from your father. Now you and your lab partner are going to create your own beaker baby!

Instructions:

1. First, you and your lab partner must decide who will contribute the female genes (yellow paper) and who will contribute the male genes (blue paper).
2. Next, you have to find out your genotype for each trait and write the corresponding alleles beside each trait number. (Each partner should do this on their own sheet)

For example, if you have curly hair (**HH**), you would write **H** on each side of the table. If you had wavy hair(**Hh**), you would write **H** on one side and **h** on the other side.

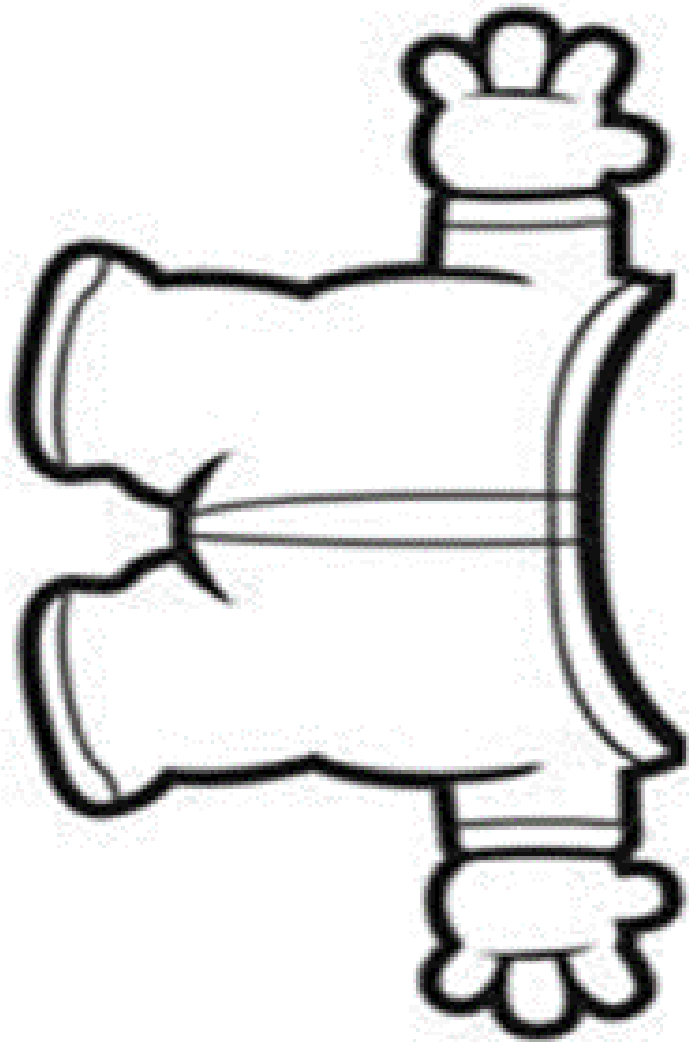
3. Once you have written down all the letters for each trait, you must cut out each letter separately (with the number beside it) and place all strips of paper into the beaker.
4. Next, you and your partner will take turns pulling pieces of paper out of the beaker. You can only use one yellow gene for each trait and one blue gene for each trait because, only one copy of an allele can be given by each parent. Write down the male and female alleles for each trait, the phenotype, and genotype on the back of the paper with a baby body on it. These will be the traits that are expressed in your baby.
5. Now you have to draw a picture of your baby showing all the characteristics that you and your partner have contributed to. For the traits that are not visible (ie: blood type) write the information somewhere on the drawing.

Be sure to include a name for your baby!

Note: These traits are simplified versions of human traits. In actuality, many alleles may contribute to the same trait. (For example, there are approximately 150 genes which code for our sense of smell; most of which are inactive.)

Beaker baby traits

1. Sex : XX (female) XY (male)
2. Hair color: ZZ, Zz, zz (black, brown, blonde)
3. Eye color: EE, Ee, ee (brown, green, blue)
4. Height: TT, Tt, tt (tall, medium, short)
5. Foot size: FF, Ff, ff (big, medium, small)
6. Tongue Roll: RR, rr (can or cannot)
7. Color blindness: CC, Cc (not) or cc (color blind)
8. Bone structure: SS, Ss, ss (large, medium, small)
9. Blood type: AA AB BB OO
10. Widow's peak: WW, Ww, (have) ww (have not)
11. Size of mouth: MM, Mm, mm (large, medium, small)
12. Size of nose: NN, Nn, nn (large, medium, small)
13. Size of ears: HH, Hh, hh (large, medium, small)
14. Shape of lips: LL, Ll, ll (thick, medium, thin)
15. Hair texture: DD, Dd, dd (curly, wavy, straight)
16. Face shape: JJ, Jj, jj (round, oval, square)
17. Nostril hair: KK, Kk, kk (lots, some, none)
18. Eyelashes: GG, Gg, gg (long, medium, short)
19. Eyebrows: PP, Pp, pp (bushy, medium, thin)
20. Freckles: QQ, Qq (present), qq (absent)
21. Dimples: Ll, ll (present), ll (absent)
22. Cleft Chin: UU, Uu (absent), uu (present)



Non Visible Traits:

Height:

Tongue Roll:

Color Blindness:

Bone Structure:

Blood Type:

Greatest Discoveries with Bill Nye: Genetics

The Laws of Inheritance:

1. What plants did Mendel work with?
2. What happened when Mendel crossed a round seed with a wrinkled?
3. What happened when Mendel crossed the round offspring seeds?
4. About how many of the second generation seeds were wrinkled?
5. How many of Mendel's genetic factors are contributed by each parent?
6. What is a Mendelian trait?

Genes are Located on Chromosomes:

7. What organism was used by Thomas Hunt Morgan?
8. Why did Morgan choose these organisms?
9. What was the mutation in the flies that Morgan first noticed?
10. What is the gender of all of the white eyed flies?

11. What sex chromosomes do females have? What sex chromosomes do a males have?
12. What did Morgan and his students show that is important to modern genetics?

Genes control Biochemical Events

13. What organism did Beadle and Tatum use for their experiments?
14. What did Beadle and Tatum do to this organisms to produce genetic changes?
15. What changes did this process cause to the organisms being studied?
16. Genes direct the production of what type of biochemical?

DNA carries Genetic Material:

17. What organism were Hershey and Chase working with?
18. How does a bacteriophage attack a bacteria?
19. What two chemicals are present in a virus?
20. Which of these chemicals did Hershey and Chase discover inside of the bacteria after they were infected by the virus?

The Double Helix:

21. Which scientists were involved in the discovery of the structure of the DNA molecule (HINT: there are four mentioned in this section)?
22. How many base chemicals in a DNA molecule?
23. What is the name for the shape of a DNA molecule?
24. What type of bonds hold the bases together in a molecule of DNA?
25. What has to happen to a DNA molecule for it to make a copy of itself?
26. Why was Rosilind Franklin not awarded the Nobel Prize for her contribution to the discovery of the structure of DNA?

Messenger RNA

27. Cells that produces lots of proteins contained lots of what special chemical?
28. How many strands is an RNA molecule? A DNA molecule?
29. What happens in a bacteria soon after the viral RNA is detected in the cell?

30. Where are proteins made in the cell (HINT: not mentioned in the video but you are supposed to know this from our study of cell structures)?

The Genetic Code:

31. How many amino acids are involved in the production of protein?

32. What is a triplet?

33. What information does RNA contain?

34. What do you inherit from your parents that determine the proteins that your body makes?

35. How many triplets are there in the entire DNA genetic code?

36. How many DNA codes are used to produce life on Earth?