When Rev interlocks his fingers, he positions the left thumb on top of the right one. When Boopsie interlocks her hands, she places her right thumb on top of the left one. What are the chances of their daughter having bent little fingers? BENT LITTLE FINGER INFORMATION A dominant allele (B) causes the last joint of the little finger to bend inward towards the fourth (ring) finger. To determine, lay both hands flat on the table with your fingers slightly spread and note whether the last joint of your little finger bends inward.

In peas red flowers (R) are dominate over white flowers (r). Two plants that had red flowers. There were 76 plants with red flowers and 24 plants with white flowers in the F1 generation. What was the genotype of the two parent plants.

Cross a heterozygous long-stem plant with a short-stem plant. Give the genotype and phenotype ratios of the F1 generation. A normal corn plant is crossed with dwarf plant. Of the progeny 247 are normal and 264 dwarf. What are the genotypes of the two parent plants.

Assume that white is the dominate color over yellow squash. If pollen from the anthers of a heterozygous white-fruited plant is placed on the pistil of a yellow-fruited plant, show, using ration, the genotypes and phenotypes you would expect the seeds from the cross to produce.

In human beings, brown eyes are usually dominate over blue eyes. Suppose a blue-eyed man marries a brown-eyed woman whose father was blue-eyed. What proportion of their children would you predict will have blue eyes.

In peas red flowers (R) are dominate over white flowers (r). A pea plant with white flowers is crossed with one that has red flowers; of the progeny 147 have white flowers and 161 have red flowers. What are the genotypes of the two parent plants.

Jim did not have bent little fingers, but his mother did. Rosie, his wife had bent little fingers. What are the chances that they will have kids with bent little fingers. BENT LITTLE FINGER INFORMATION A dominant allele (B) causes the last joint of the little finger to bend inward towards the fourth (ring) finger. To determine, lay both hands flat on the table with your fingers slightly spread and note whether the last joint of your little finger bends inward.

Both Count Dracula and Natasha are heterozygous for widow's peak. What are the chances that their son Igor will also have widow's peak? WIDOW'S PEAK INFORMATION The dominant allele (W) causes the hairline to form a V-shape point in the middle of the forehead. A person who is homozygous recessive has a straight hair line. See "Human Traits" for more information

George has attached ear lobes. Barbara has free earlobes, but she is heterozygous for this trait. What are the chances of their child having free earlobes? ATTACHED EARLOBE INFORMATION If a person is homozygous recessive (ee) for this trait, the earlobes attach directly to the head and do not hang free. Ask someone to look at your earlobes if you are interested about yourself. Other genes can influence this trait, so there will be a considerable amount of variation in the size and appearance of the earlobes in a group of people.

"Beaver" Cleaver can't roll his tongue, but his father can. What is Mr. Cleaver's genotype for tongue rolling? TONGUE ROLLING INFORMATION A dominant allele (R) enables some people to roll their tongues into a distinct U-shape. There is no known function for this trait.

The allele for Huntington's Chorea is dominant. Woody Guthrie was heterozygous for this trait and Mrs. Guthrie did not have Huntington's Chorea. What are the chances that their son Arlo will develop this disease?

When Rev folded his arms, he always positioned/placed his left arm on top of the right. His mother always positioned/placed her right arm on top when she folded her arms. When Boopsie folded her arms, she always positioned her right arm on top of the left. Rev and Boopsie are having a child...it is a girl. Which way will this girl position her arms when she folds them? ARM POSITIONING/PLACEMENT WHEN FOLDED Genes determine how you place your arms when you fold them across your chest. Positioning/placing the left arm on top of the right is due to a dominant allele (A). Placing the right arm on top is due to a recessive allele (a). Test this...cross your arms. Then reverse the position. Which way feels more comfortable? Now do the problem.

When Rev interlocks his fingers, he positions the left thumb on top of the right one. When Boopsie interlocks her hands she places her right thumb on top of the left one. How will their daughter position/place her thumbs? THUMB PLACEMENT/POSITIONING Your genes influence how you fold your hands. interlock your fingers.
Positioning the left thumb on top of the right one is due to a dominant allele (P). Do this quickly, without conscious effort. Try reversing the position of your thumbs. Which feels best? Now do the problem.

20. The allele for Tay-Sachs is recessive. The Tay-Sachs program has enabled Bernie to determine that he is a carrier (and that his wife, Beverly, is not). What are the chances that they could have a child with Tay-Sachs?

21. Fred is type A and his father is type O. Wilma is type B and her father was type O. The Rh blood group is not linked to the ABO system. It is a two allele group, with positive dominant to negative. Fred is positive, but his mother is negative. Wilma is also negative. What are the chances that “Pebbles,” Fred and Wilma’s daughter, will be AB negative?

22. Persons who are heterozygous for sickle cell anemia are said to have the sickle trait. What are the chances that Sam and his wife Ethyl, both who have the trait, will have a child with sickle cell anemia (homozygous recessive).

23. Jerry has a well-developed hitchhiker’s thumb, but neither of his parents show the trait. What are the chances that they are both heterozygous for this allele?  

HITCHHIKER’S THUMB INFORMATION  

The distal (last) joint of the thumb can be bent back to form a 45 degree angle with the proximal joint (attached to your hand) if you are homozygous recessive (hh) for this trait. This genotype may produce only slightly bent thumbs (or only one thumb bent). This sort of variation in the expressions of a gene is termed expressivity.

24. John can roll his tongue, but his mother cannot. He also has attached earlobes. He marries Marsha, who cannot roll her tongue but has free earlobes. Marsha’s father, however, has attached earlobes. What are the chances that their child will have free earlobes and be able to roll its tongue?

25. Roger is homozygous for Huntington's and has cystic fibrosis. Elvira is homozygous normal for Huntington's but a carrier of cystic fibrosis. Cystic fibrosis is inherited via a recessive allele. What are the chances that their child has neither Huntington's nor cystic fibrosis?

26. Both Willy and Ethyl are heterozygous for earlobe attachment and also for hitchhiker's thumb. What are the chance of a child with ....attached earlobes and a hitchhiker's thumb? ......free earlobes and no hitchhiker's thumb?

27. Y= yellow seed; y= green seed; R= round seed; r= wrinkled seed. Find the offspring of the following crosses:  

RRYY x rryy; RrYy x rryy; RrYy x RrYy; RRyy x rrYY; RrYY x RRYy.

28. In Guinea pigs rough coat (fur) texture and black coat (fur) are dominate. A rough-coated, black guinea pig, whose mother was smooth and white is mated with a smooth, white animal. What kinds of offspring would they produce and in what relative numbers?

29. A rough, black guinea pig bred with a rough, white one gives 28 rough, black; 31 rough, white; 11 smooth, black, and 9 smooth white. Give the genotypes for the parents and each offspring.

30. Two rough black guinea pigs when bred together have two offspring, one of them rough white and the other smooth, black. If these same parents were to be bred together further, what offspring would you expect from them.

31. A right -handed, blue-eyed man whose father was left-handed marries a left-handed, brown-eyed woman from a family in which all the members have been brown-eyed for several generations what offspring may be expected from this marriage as to the two traits mentioned? Assume that brown eyes (B) are dominate over blue (b) and right-handedness (R) over left handedness (r). (Actually some modifying factors do not allow exactly this interpretation). Assume these two people have 20 children. Give the phenotype that you would expect in these kids.

32. A brown-eyed, right -handed man marries a blue-eyed right-handed woman. Their first child is blue-eyed and left-handed. If other children are born to this couple, what will probably be their appearances as to these two traits.

33. A right-handed, blue-eyed man marries a right-handed, brown-eyed woman. They have two children, one left-handed and brown-eyed and the other right-handed and blue-eyed. By a later marriage with another woman who is also right-handed and brown-eyed, this man has nine children, all of whom are right-handed and brown-eyed. What are the genotypes of this man and his two wives?

34. A purple, smooth Jimson weed plant crossed with white, spiny one gives 320 purple, spiny and 312 purple smooth. If these two types of offspring are bred together, what will their offspring be like, both as to appearance and as to genotype.

35. Can a human male be homozygous for a sex-linked character? From which parent does a human male receive his sex-linked genes? To which sex among his offspring does he transmit his sex-linked characters? If a gene were located in his Y chromosomes, to what offspring would he transmit it?

36. Color-blindness is a sex-linked recessive, and sex in man is determined essentially as in Drosophila. A girl of normal vision whose father was color-blind married a color blind boy. What type of vision will be expected in their children?

37. A woman of normal vision, whose father was color-blind, marries a man of normal vision whose maternal grandfather was color-blind. What type of vision will be expected in their children? Color-blindness is sex linked recessive.
38. A color-blind boy's parents and grandparents all had normal vision. What was the genotype of his maternal grandmother? Of his mother?

39. Mating a red-eyed fly with curved wings and a brown-eyed fly with straight wings yields F1 all red-eyed and straight wings. What kinds of flies would you expect in F2? In what relative numbers?

40. In Drosophila, gray body is dominate over ebony, and straight wings dominate over curved. A certain gray-bodied, curved winged female is mated to a gray straight winged male and they produced some ebony curved offspring. What other kinds of offspring should they produce and what proportions?

41. Yellow body (y)...the recessive allele in Drosophila is a sex-linked character recessive to gray body (Y)...the dominant allele. A certain gray female mated with an unknown male produced some yellow and some gray offspring of both sexes. What was the genotype of the original female? What was the phenotype of the male to which she was mated? Drosophila and human males are hemizygous. That is, they carry some alleles on the X chromosome and none of these alleles on the Y.

42. A female fruit fly with sable body (s) is mated with a male having gray body (S). Their daughters are gray, their sons sable. In what chromosomes are the genes S and s?

43. A woman whose maternal grandfather suffered from hemophilia has parents that are normal. The woman's husband is normal. She has a hemophiliac son. What is the chance that the next son will be normal? Will any of the daughters be hemophilic? Hemophilia is sex linked recessive

44. Albino pigmentation in humans is due to homozygous recessive. Hemophilia is sex linked recessive. An albino, non-hemophilic man marries a normally-pigmented, non-hemophilic woman whose father was hemophilic and whose mother was an albino. What kinds of children can they have and in what proportions?

45. In on type of cows, there are three colors.....red, white, and roan. A roan cow as a color pattern caused bv every other hair being either red or white. If you count hair pattern in any direction it is red, white, red, white, etc. The F1 of a cross of a red bull with a white cow is 100% roan. Crossing two roans will produced an F1 that has a phenotype ratio of 3 red to one white. Name this type of genetic inheritance. See text.

46. Two normal-visioned parents produce a color-blind son. What are the genotypes of the parents? What are the chances of their next child being a color-blind daughter?

47. In human beings, migraine (a type of sick headache) is due to a dominate factor. A normal visioned woman who has never suffered from migraine takes her daughter to the doctor for an examination. In the course of the examination the doctor discovers that the girl is color-blind, and suffers from migraine. What does the doctor automatically know about the father?

48. In man, aniridia (a type of blindness) is due to a dominate factor. Optic atrophy (another type of blindness) is due to a recessive sex-linked factor. A man blind from optic atrophy marries a woman blind from aniridia. Assuming that the mother is homozygous for both characters, would any of their children be expected to be blind? Which type of blindness would they have?

49. A non-hemophilic man who is blind from anirida but whose mother was not blind, marries a non-hemophilic woman who is not blind, but whose father was hemophilic. Hemophilia is sex-linked recessive. If they have four sons, what combination of these traits would they most probably show?

50. If the offspring in the previous problem consisted of four daughters instead of four sons, what would these daughters most probably be like?

51. A certain rough-coated guinea pig bred to smooth one gives eight rough and smooth offspring. What are the genotypes of parents and offspring? Note: In guinea pigs, rough coat (R) is dominate over smooth (r).

52. If one of the rough F1 animals in the preceding question is mated to its rough parent, what offspring may be expected?

53. If a homozygous rough-coated animal is crossed with a smooth one, what will the appearance of the F1 and F2? Of the offspring of a cross of the F1 back on it's rough parent? On its smooth parent?

54. A certain polled bull is bred to three cows. With cow A, which is horned, a horned calf is produced; with cow B, also horned, a polled calf is produced; and with cow C which is polled, a horned calf is produced. What are the genotypes of all of these four animals and what offspring would you expect from these four matings? Note: The polled or hornless condition in cattle (P) is dominate over the horned (p).

55. A brown-eyed man marries a blue-eyed woman and they have eight children, all brown-eyed. What are the genotypes of all the individuals of the family?

56. A blue-eyed man both of whose parents were brown-eyed marries a brown-eyed woman whose father was brown-eyed and whose mother was blue-eyed. They have one child, who is blue-eyed. What are the genotypes of all of the individuals mentioned? 

57. In the following crosses, in which the genotypes of the parent plants are given, what are the gametes produced by each parent and what will be the flower color of the offspring from each cross: Rr x RR, rr x Rr, Rr x Rr? Assume that red is dominant and white is recessive.
58. A red flowered four-o'clock plant was crossed with one that had white flowers. The F1 only produces pink flowers. What is this type of inheritance called? See text. Give the genotype and phenotype ratios when two pink plants are crossed.

59. If you wanted to produce four-o'clock seed all of which would yield pink-flowered plants when sown, how would you do it?

60. A normal-visioned man marries a normal-visioned woman whose father was color-blind. They have two daughters, who grow up and marry. The first daughter has five sons, all have normal vision. The second daughter has two normal visioned daughters and one color-blind son. Diagram the family history, including the genotypes of all of the individuals mentioned.