

- 1) 2 2) 3 3) 2 4) 1 5) 4
 6) 3 7) 4 8) 2 9) 1 10) 3
 11) 4 12) 1 13) 3 14) 1 15) 2
 16) 2 17) 4 18) 3 19) 2 20) 4

21) SAMPLE ANSWERS:

- (1) genetic engineering OR selective breeding (cross-pollinating);
- (2) Genetic engineering involves moving the genes (DNA) for one of the desired traits into a plant with the other desired trait. OR Selective breeding (cross-pollinating) involves mating plants with one desired characteristic with plants with the other desired characteristic.;
- (3) The moved gene may not be expressed. OR It is difficult to isolate the gene. OR The trait may be recessive. OR There may be unintended adverse qualities.

22) SAMPLE ANSWERS:

- (1) There would be no variation in the cloned flock. OR All cloned sheep would be identical copies, unlike noncloned flocks, where much genetic diversity would be present. OR All cloned sheep would be the same.;
- (2) All cloned sheep would have one or more desired traits (that the original individual possessed.);
- (3) Since all cloned sheep are the same, the entire flock could be lost if a disease to which they have no resistance were to infect them. OR The cloned sheep may have a genetic flaw. OR shorter life span.;
- (4) The cloned sheep would all be the same sex, so they could not mate with each other.;
- (5) Both parents contribute genes to the offspring. OR Different gene combinations will result.

23) SAMPLE ANSWERS:

- (1) gene tests to diagnose disease OR gene therapy OR genetic engineering to produce hormones OR understand causes of inherited disease OR prevent disease;
- (2) Screening for genetic diseases may limit insurance coverage. OR Gene therapy could result in overpopulation. OR may lead to discrimination

- 24) 1 25) 3

26) SAMPLE ANSWERS: Varieties of peanuts that are low in the allergens will be crossed with commercial types. OR Varieties of peanuts that are free of the allergens will be crossed with commercial types. OR A variety of peanuts that has 80% less of the allergens will be crossed with commercial types.

- 27) 1 28) 4 29) 2

30) SAMPLE ANSWERS: Stress-Tolerant Rice: because it was made by inserting genes OR Trehalose-Producing rice: because it contains genes from bacteria OR Stress-Tolerant Rice: because bacterial genes for trehalose production were inserted into rice plants

31) SAMPLE ANSWERS: to see if it is safe OR to see if it has nutritional value

32) SAMPLE ANSWER: Choose parents with the desired trait to breed. A fast male horse is bred to a fast female horse and the offspring may inherit the fast-running traits of both parents.

33) SAMPLE ANSWERS: Undesirable traits of parents may be expressed in the offspring. OR unexpected combinations of genes OR unpredictable results OR decreased variation in race horses

- 34) 3 35) 4 36) 3 37) 3 38) 1

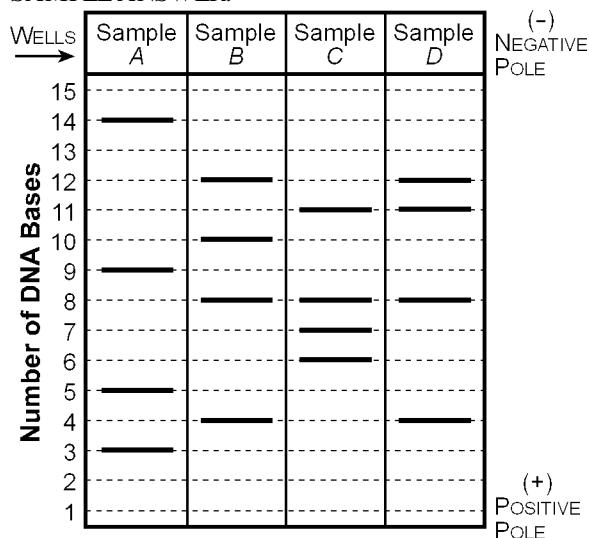
39) SAMPLE ANSWERS: Enzymes are used to cut the DNA. OR to cut the genetic material

- 40) 3 41) 1 42) 4 43) 2 44) 3

- 45) 1

- 46) SAMPLE ANSWERS: electrophoresis OR gel electrophoresis
- 47) SAMPLE ANSWERS: Since they have similar amino acid sequences, they may be closely related. OR Since they have amino acid sequences that are very much alike, the species have similar DNA.
- 48) SAMPLE ANSWERS: comparing embryos OR cytology OR comparing fossils OR comparing bone structures OR additional sequence studies
- 49) 4 50) 2
- 51) SAMPLE ANSWERS: determining evolutionary relationships OR gene testing for diagnosis OR paternity testing OR determining identity OR solving crimes
- 52) 1
- 53) SAMPLE ANSWERS: electric current OR attraction of negative fragments to positive pole OR charges on the DNA
- 54) SAMPLE ANSWERS: The bands are in different positions in each column. OR different banding patterns OR different numbers of bands
- 55) SAMPLE ANSWERS: enzymes OR restriction enzymes OR enzymes that cut DNA
- 56) SAMPLE ANSWERS: prevents contamination of the different filtrates OR to keep the filtrates separate
- 57) SAMPLE ANSWERS: There would be different combinations of colors. OR There would be different amounts of the different colors.
- 58) SAMPLE ANSWERS: The more similar the pattern of colors, the closer the relationships. OR The more similar the number of colors (and relative amounts of color), the closer the relationships.

59) SAMPLE ANSWER:



- 60) SAMPLE ANSWER: B and D because they have the most fragments in common
- 61) SAMPLE ANSWERS: determine identity of criminal OR determine parents of a child OR determine identity of a crime victim OR determine evolutionary relationships
- 62) SAMPLE ANSWERS: A and C share the most characteristics in common OR A and C have the same type of chlorophyll present
- 63) SAMPLE ANSWERS: structure of protein molecules OR types of enzymes present OR DNA sequences OR other physical characteristics

- 64) SAMPLE ANSWERS: Two related plants may produce similar substances that could be used for medicines. OR A related plant may provide a cheaper source of a substance. OR If a plant becomes extinct, a related plant may provide an alternative source of a substance.
- 65) species *C*
 SAMPLE ANSWER: The unknown species is most closely related to species *C*. The bands from the DNA of species *C* are the closest match to those of the unknown species.
- 66) SAMPLE ANSWERS:
 (a) structure of flowers OR structure of leaves OR structure of stems OR structure of seeds OR structure of pollen;
 (b) The physical characteristic chosen may be the only characteristic the organisms have in common, while the more similar the DNA, the more characteristics the organisms have in common.
- 67) SAMPLE ANSWERS: enzymes OR restriction enzymes OR proteins OR biological catalysts
- 68) electrophoresis OR gel electrophoresis
- 69) 2
- 70) SAMPLE ANSWERS: The number of bands would differ. OR The bands would be in different positions. OR The banding patterns would be different.
- 71) 1
- 72) (a) Species *B*: ACG ACG UAU GUC CAU;
 (b) Species *C*: GLY THR TYR VAL GLN;
 (c) SAMPLE ANSWER: Species *C* and *D* are closely related because the amino acid sequences are identical.
- 73) MET or START, ALA, GLY, SER
- 74) AUG, AAA, CGU, CCU
- 75) TAC, AAA, ACA, GGG
- 76) *B* and *E*
 SAMPLE ANSWER: *B* and *E*'s amino acid sequences are the same.