Section 13.1

Selective Breeding

•**Selective Breeding** – allowing only animals with _____ to produce _____

•This takes advantage of _____

•**Hybridization** – crossing _____individuals to bring together _____

•**Inbreeding** – the continued breeding of individuals with _____

Increasing Variation

•Mutations are the _____of genetic variance

•Breeders can increase genetic variation by inducing _____

– _____of bacteria to produce oil-digesting bacteria

– _____that inhibit _____causing plants to be polyploidy

Section 13.2

The Tools of Molecular Biology

•Scientists can _____DNA, make _____, and change _____

•**Genetic Engineering** – making changes to _____of a living organism

•**DNA Extraction** – taking DNA _____

•**Restriction Enzymes** – an enzyme that _____

•**Gel Electrophoresis** – a method of _____DNA fragments by use of _____

Using the DNA Sequence

•Scientists can 'read' the DNA sequence, meaning they _____ (ATCG)

•**Recombinant DNA** – DNA combined from _____

•**Polymerase Chain Reaction (PCR)** – artificially create _____of the DNA

Section 13.3

Transforming Bacteria

•**Transformation** – a cell takes in _____from outside the cell and it becomes _____

•**Plasmid** – small, _____circular DNA

•**Genetic Marker** – a gene that makes it possible to _____.

Transforming Plant Cells

•Plasmid and plant cells allowed to _____

•The recombinant DNA is _____of the plant cell

Transforming Animal Cells

•DNA molecules can be created such that the ends _____

•The new gene will replace the host gene through _____

•These new genes are called _____

Section 13.4

Transgenic Organisms

•**Transgenic** – organisms that contain _____

•**Microorganisms** – can be used to produce _____, _____, _____and in the future used to fight _____

•**Animals** – chickens have genes that make them _____to bacteria, cows have extra _____, mice can be used to study human _____
•**Plants** – produce natural _____, human _____
Cloning
•**Clone** – member of a population of _____cells produced from _____
–Nucleus taken from _____ (_____cell)
–Egg fused with _____
–Fused cell begins to _____
–Embryo placed in a _____

Section 14.1
Human Chromosomes
•**Karyotype** – a picture of chromosomes completely _____
•**Sex Chromosomes** – two of the _____determine the individual's _____
–Males: _____
–Females: _____
•**Autosomes** – the other _____chromosomes that determine _____
Human Traits
•**Pedigree Chart** – a diagram that shows _____between people as well as how a specific trait is _____
•From these charts you can determine if the traits are _____
•Many traits are not due to _____
•Traits are also affected by _____
Human Genes
•We have _____genes
•Using computers we have been able to _____
•Blood Group Genes – one of the _____to be identified
–___,___,___, and ___ are the blood types with an Rh _____
•Many of the genetic diseases humans have are _____, meaning both _____
–_____, PKU, _____
From Gene to Molecule
•A small change in the _____will affect the _____of the protein
–Sickle Cell Anemia
•_____ DNA base is changed
•Blood cells _____
–Cystic Fibrosis
•Deletion of _____bases
•Airways clogged with _____

Section 14.2
Sex-Linked Genes
•**Sex-linked genes** – genes located on _____
–Colorblindness – 1 in 10 males; caused by defect in _____
–Hemophilia – 1 in 10,000 males; blood _____

–Muscular Dystrophy – 1 in 3000 males; weakening and loss of _____

•Males have just one X chromosome and so all _____

X-Chromosome Inactivation

•One of the X-chromosomes in females is _____

•In cats the spots of color are due to _____in one area and on in another

Chromosomal Disorders

•**Non-disjunction** – abnormal numbers of chromosomes are in some gametes due to _____

•Down Syndrome – chrom. _____does not separate and the person has _____; _____

•Sex Chromosome Disorders – multiple _____

Section 14.3

Human DNA Analysis

•Genes can be sequenced such that parents can know the _____that their child may have _____

•**DNA Fingerprinting** – analysis of sections of DNA that vary widely from _____, in order to _____individuals

The Human Genome Project

•Scientists have sequenced all of the DNA (_____) of _____

•All of the genes and the _____found on them have been sequenced to _____

Gene Therapy

•In gene therapy, an _____gene is replaced by a _____, working gene.

•This is achieved by inserting a _____that has the good gene in its DNA

Ethical Issues in Human Genetics

•In a democracy all _____, not just _____, decide on how the discoveries of science are used

•Genetic discoveries may take us _____…