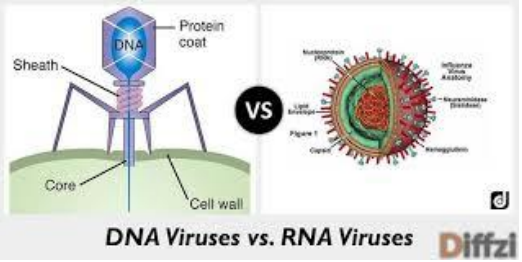
TOPIC 1.1
HOW DOES AN UNDERSTANDING OF DNA HELP US

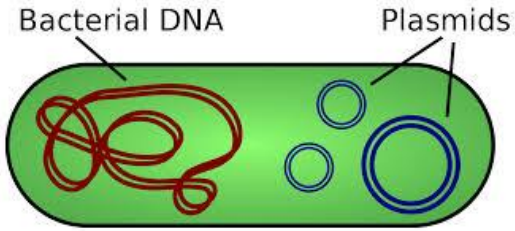
THE VARIATION IN LIVING THINGS WE SEE AROUND US IS DUE TO DNA

Concept 1

DNA

- all living things are closely linked by their DNA (molecule)
- DNA is genetic material that stores information
- DNA is responsible for variations among living things (influence appearance and life processes)
- How is DNA influencing the following diversity of this picture?
- DNA must be passed to the next generation (goal of living things)





DNA

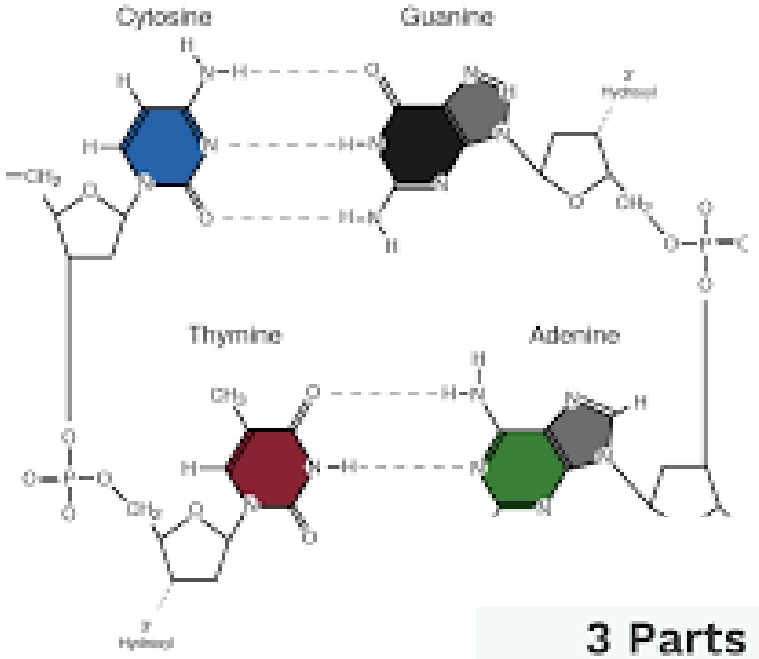
- Animals are multicellular the but differences in DNA results in the diversity that we see.
- Bacteria are single-celled and microscopic. It is estimated that there are over 100 000 difference species of bacteria in the world, their differences in DNA influence their roles in the environment.

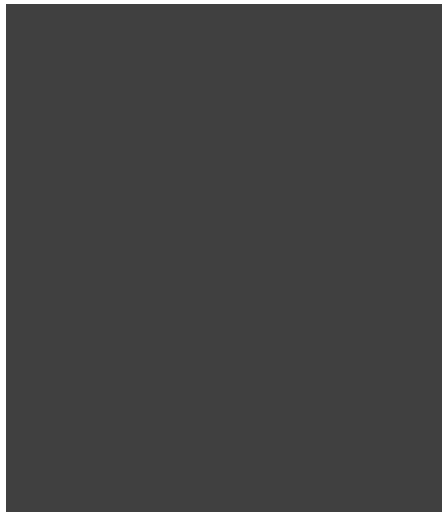
DNA IS MADE OF MANY NUCLEOTIDES LINKED TOGETHER IN A SPECIFIC ORDER

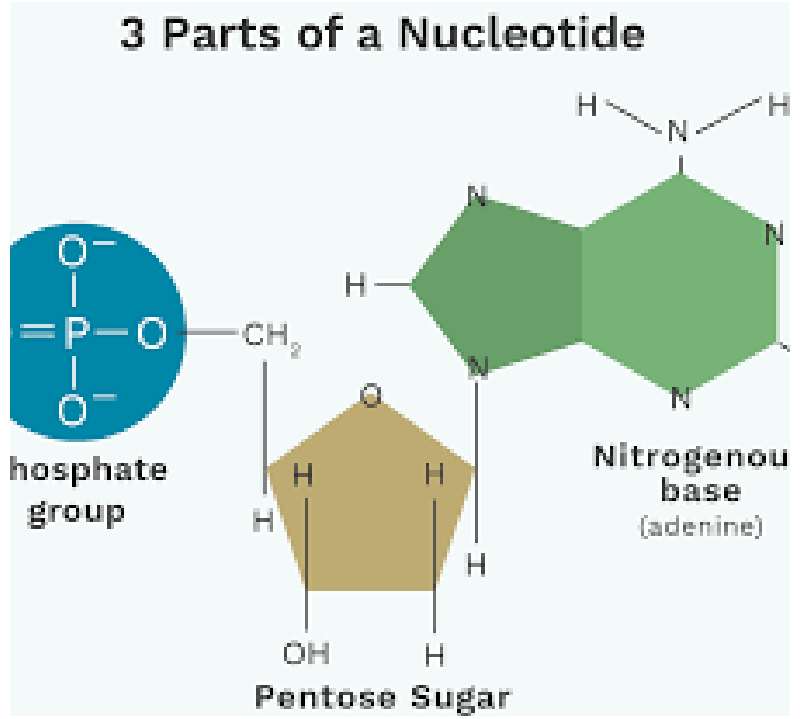
Concept 1.2

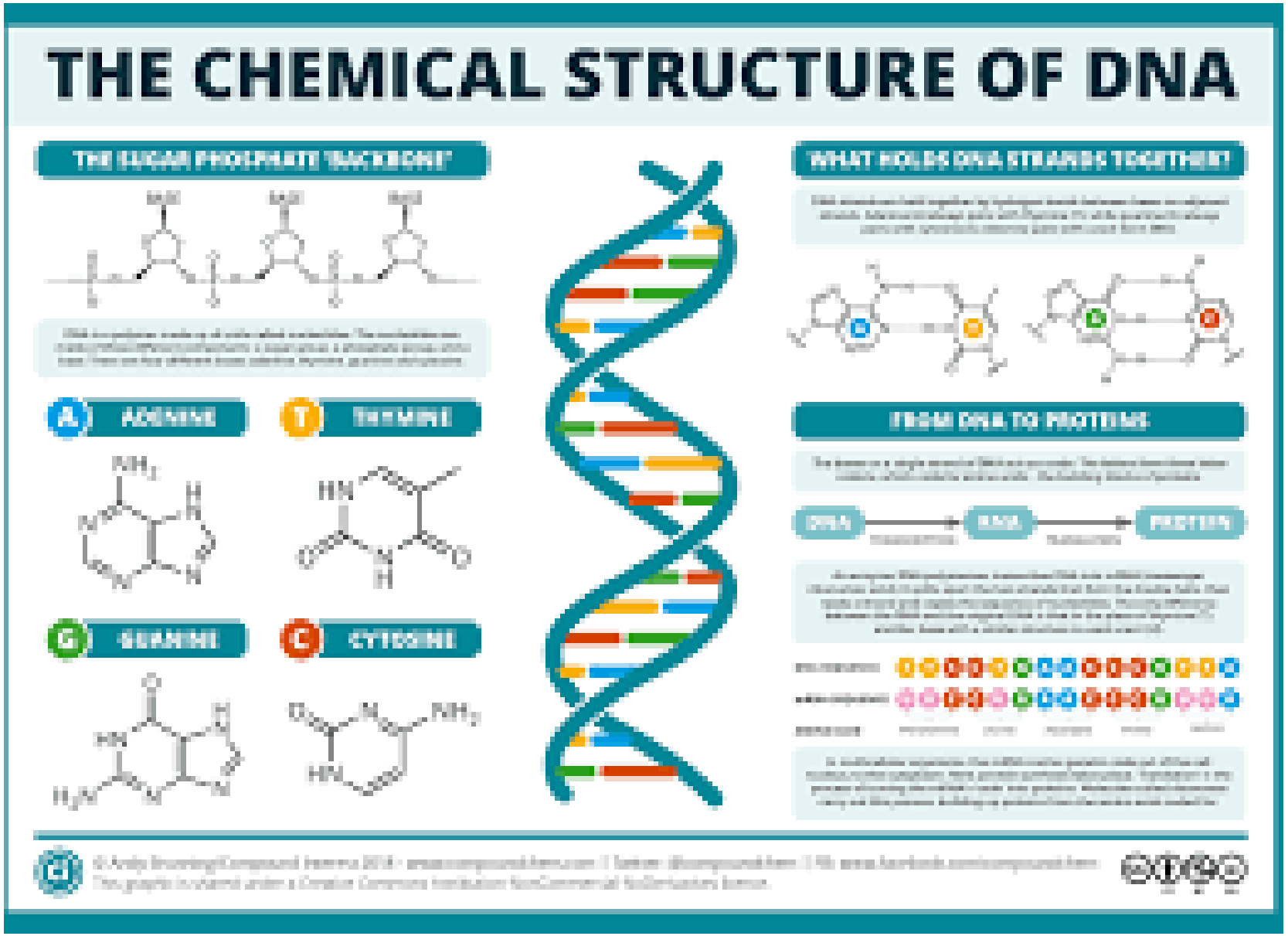
Building blocks of DNA - Nucleotides

- General structure is composed of
  - Phosphate group
  - Sugar
  - Nitrogenous base
- There are 4 types of nucleotides in DNA
  - Adenine
  - Cytosine
  - Guanine
  - Thymine
- A always pairs with T
- C always pairs with G
- Uracil (U) (RNA) will take the place of T



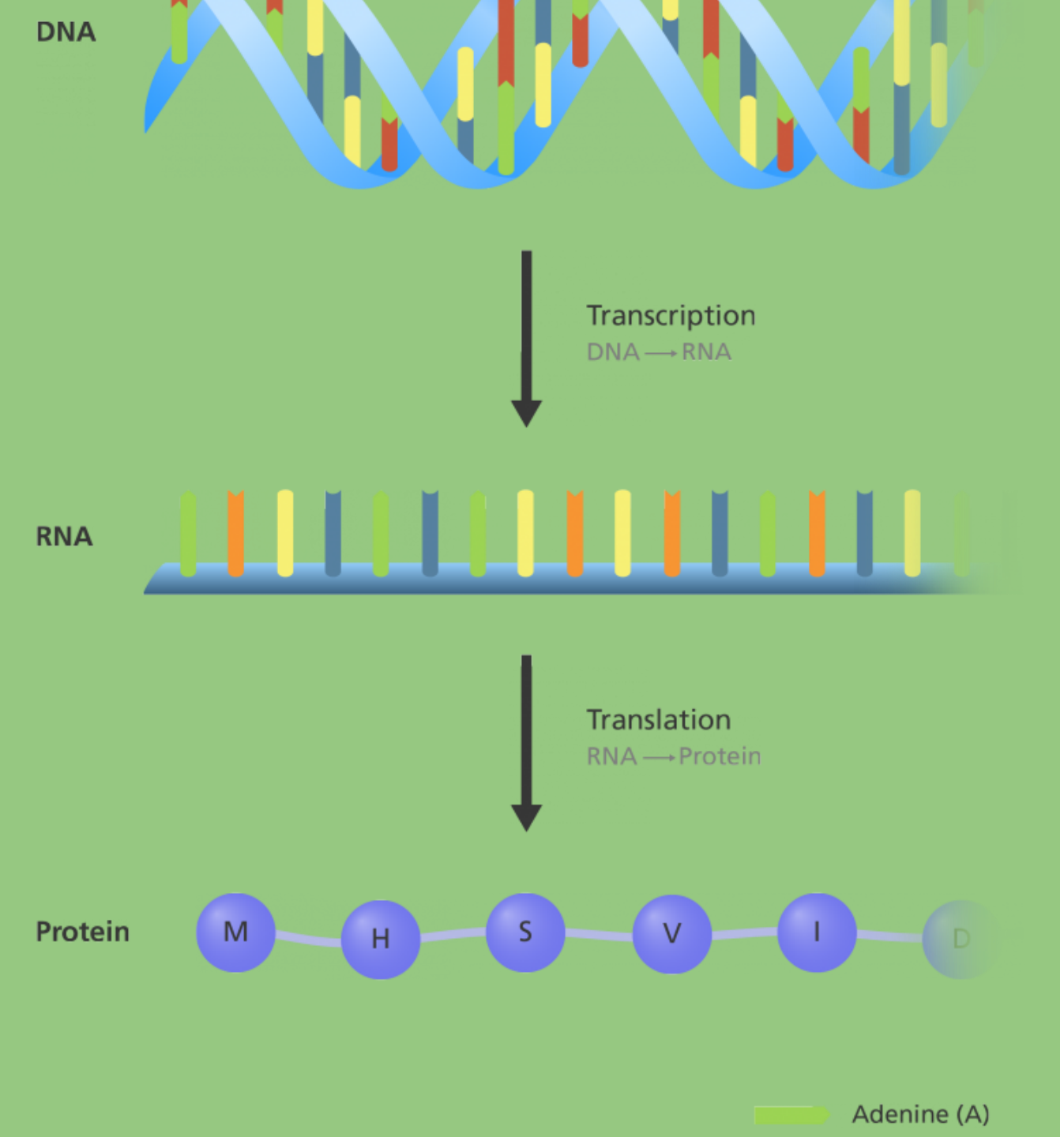






Structure of DNA

- DNA is a molecule made up of 2 strands linked together by hydrogen bonds
- The structure of DNA looks like a twisted ladder (double helix)
- **Assignment Notes**



Function of DNA – why is it important?

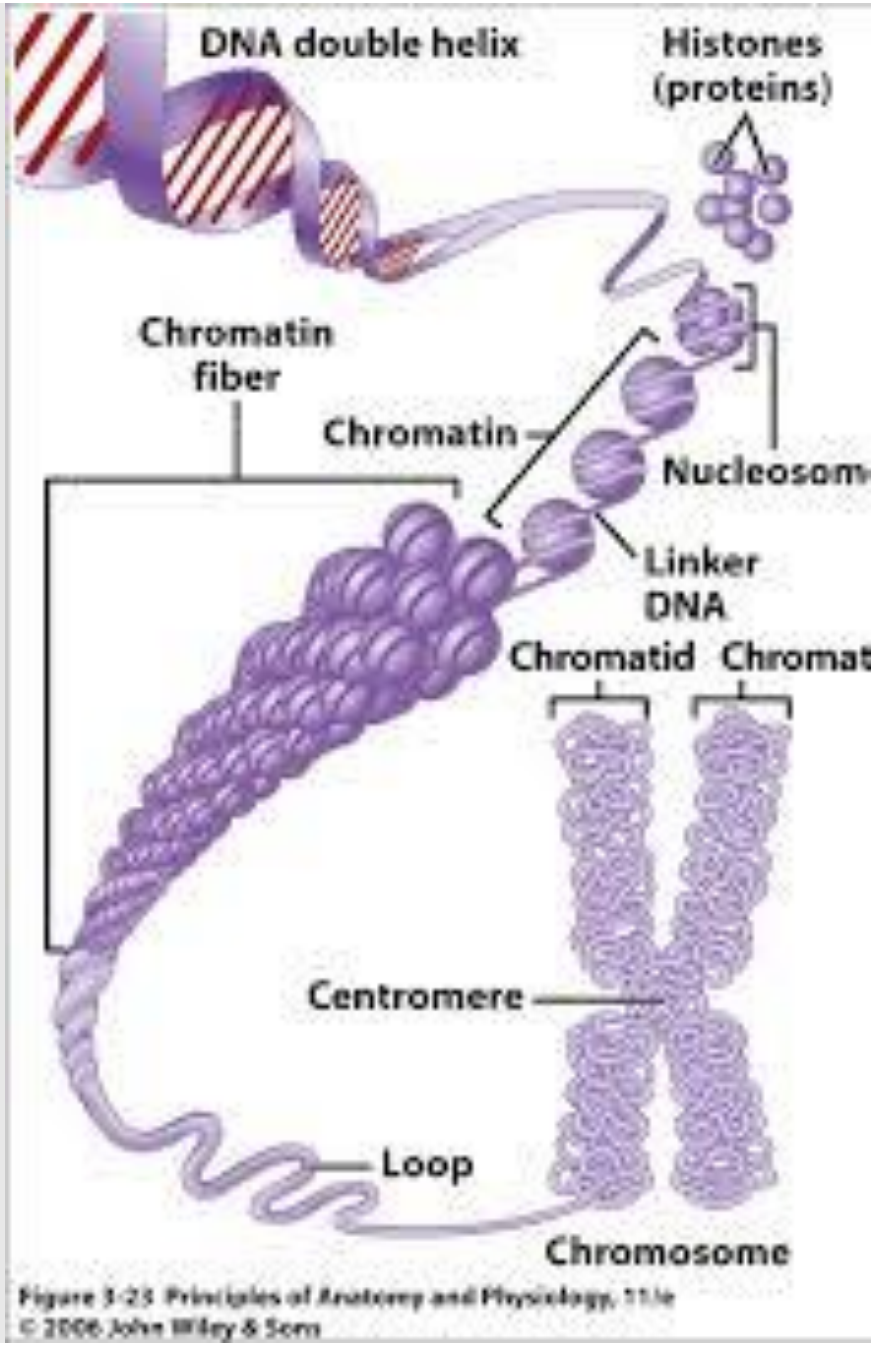
- DNA stores genetic information and that information is a sequence of bases
- Those base are the "code" to make proteins
- Proteins make up the cell structure of every cell
- Proteins also controls how a cell is formed and functions

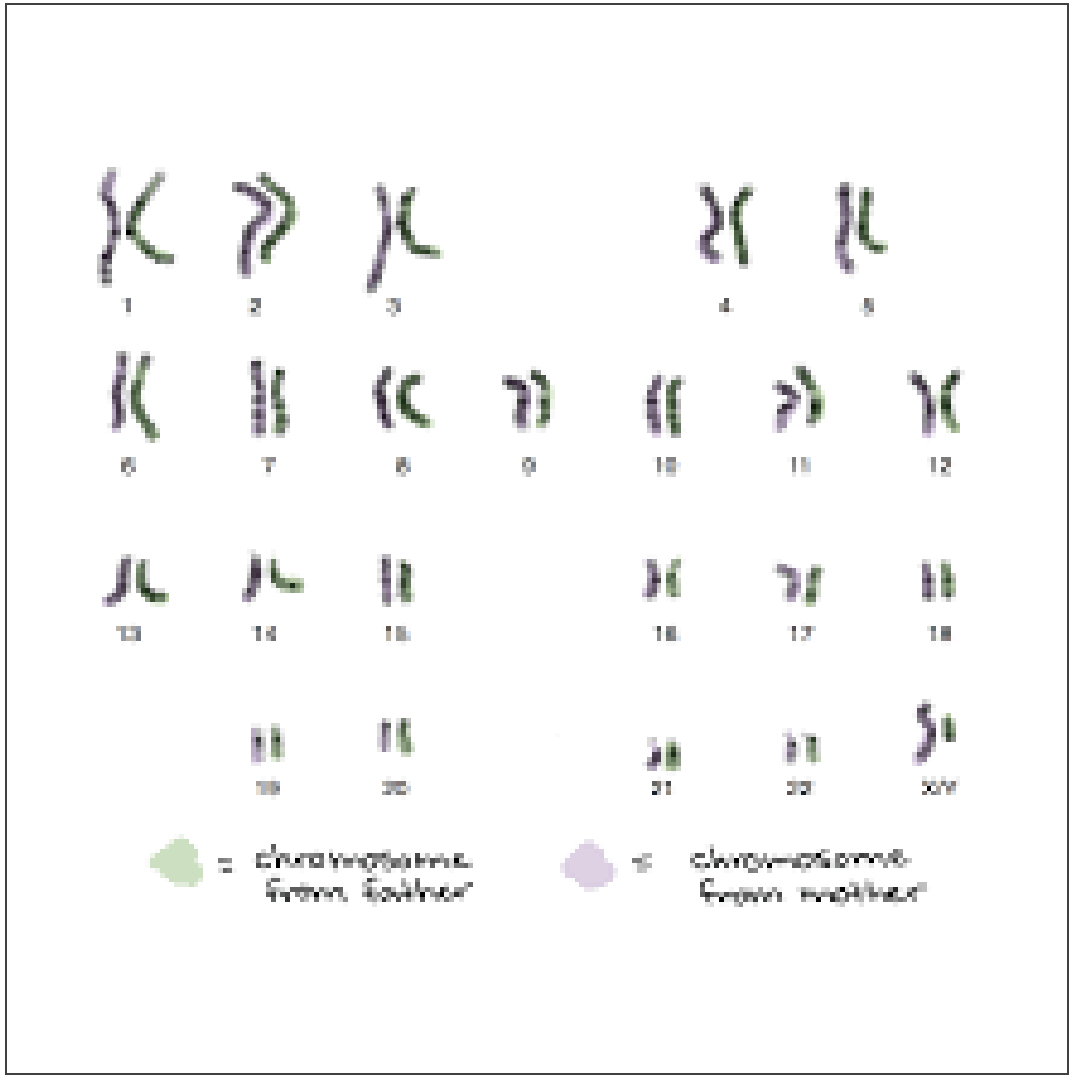
DNA EXISTS IN CHROMOSOMES, WHICH CONTAIN THOUSANDS OF GENES

Concept 3

DNA, chromatic and chromosomes

- Chromatin – fibres of DNA in its condensed form. The usual form of DNA during interphase
- Chomosomes – when a cell prepares to divide, DNA condenses into a visable form



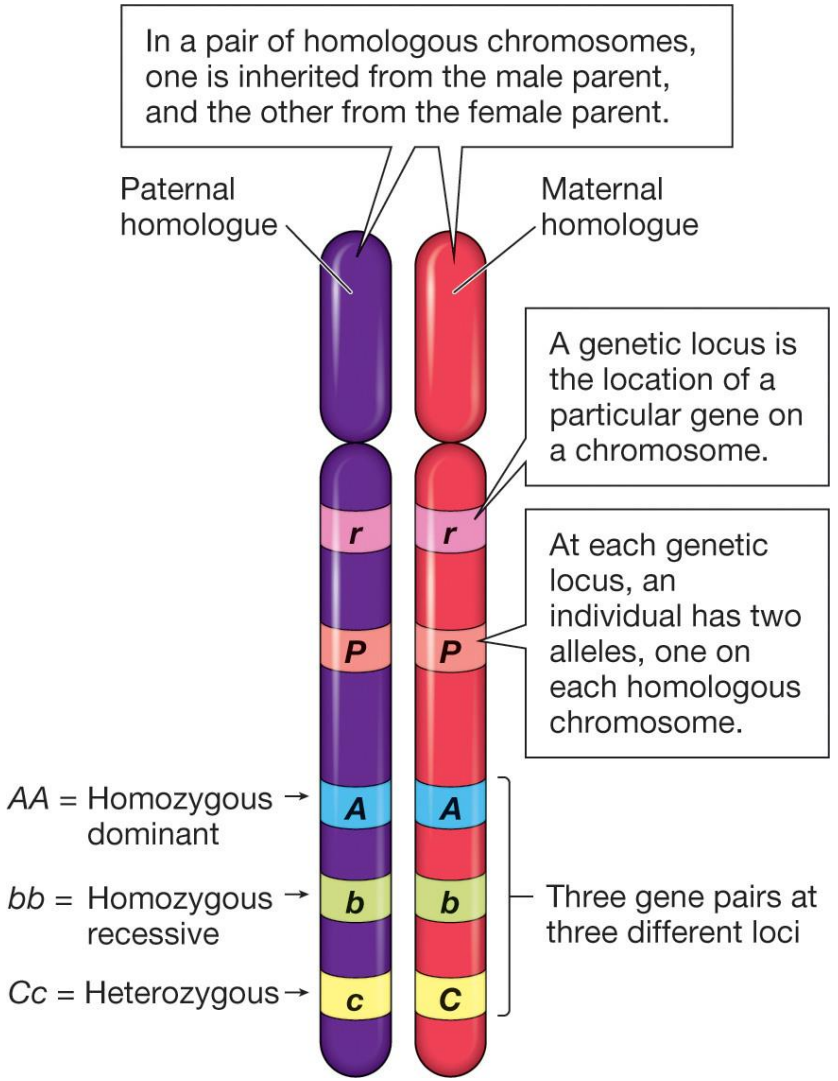


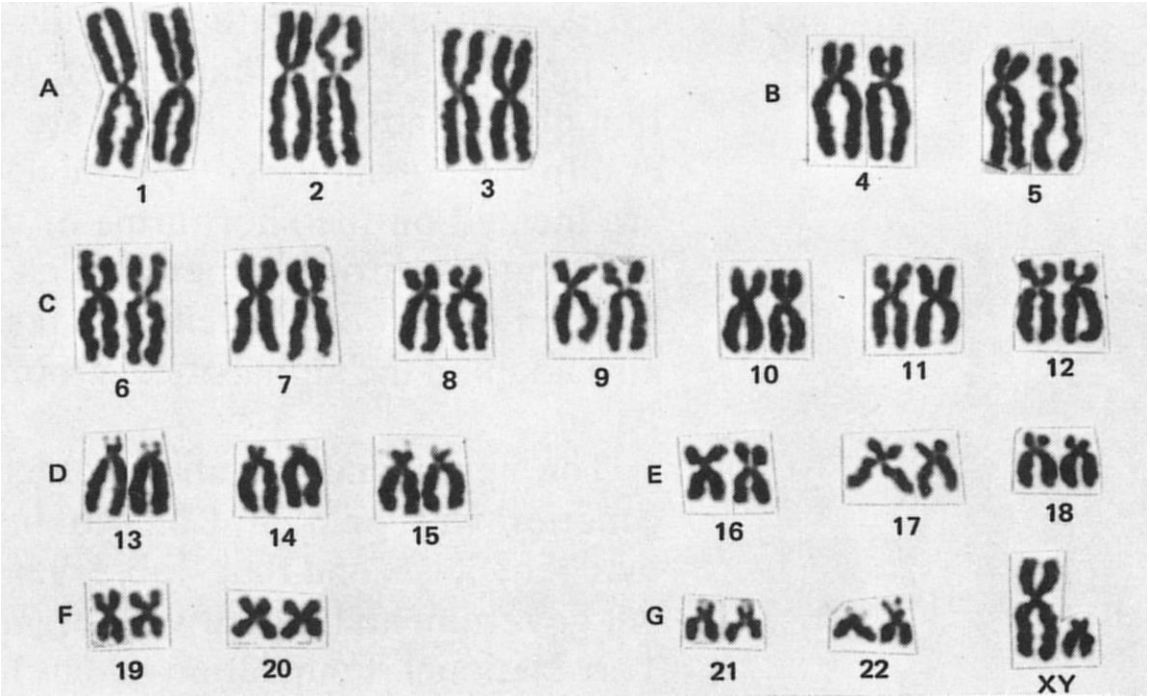
Pairing of Chromosomes

- Somatic cells are composed of 46 chromosomes or 23 pairs
- For each pair, one chromosome is from the sperm and the other from the egg
- One of the chromosome pairs is the sex chromosome that determines genetic sex (X = female, Y = male)

Homologous Chromosomes are responsible for the traits you see and inherit

- A homologous chromosome contains the same sequence of genes as another chomosome
- Genes are parts of a chromosome that contains the information for the inheritance of specific traits
- Alleles are different forms of the same genes





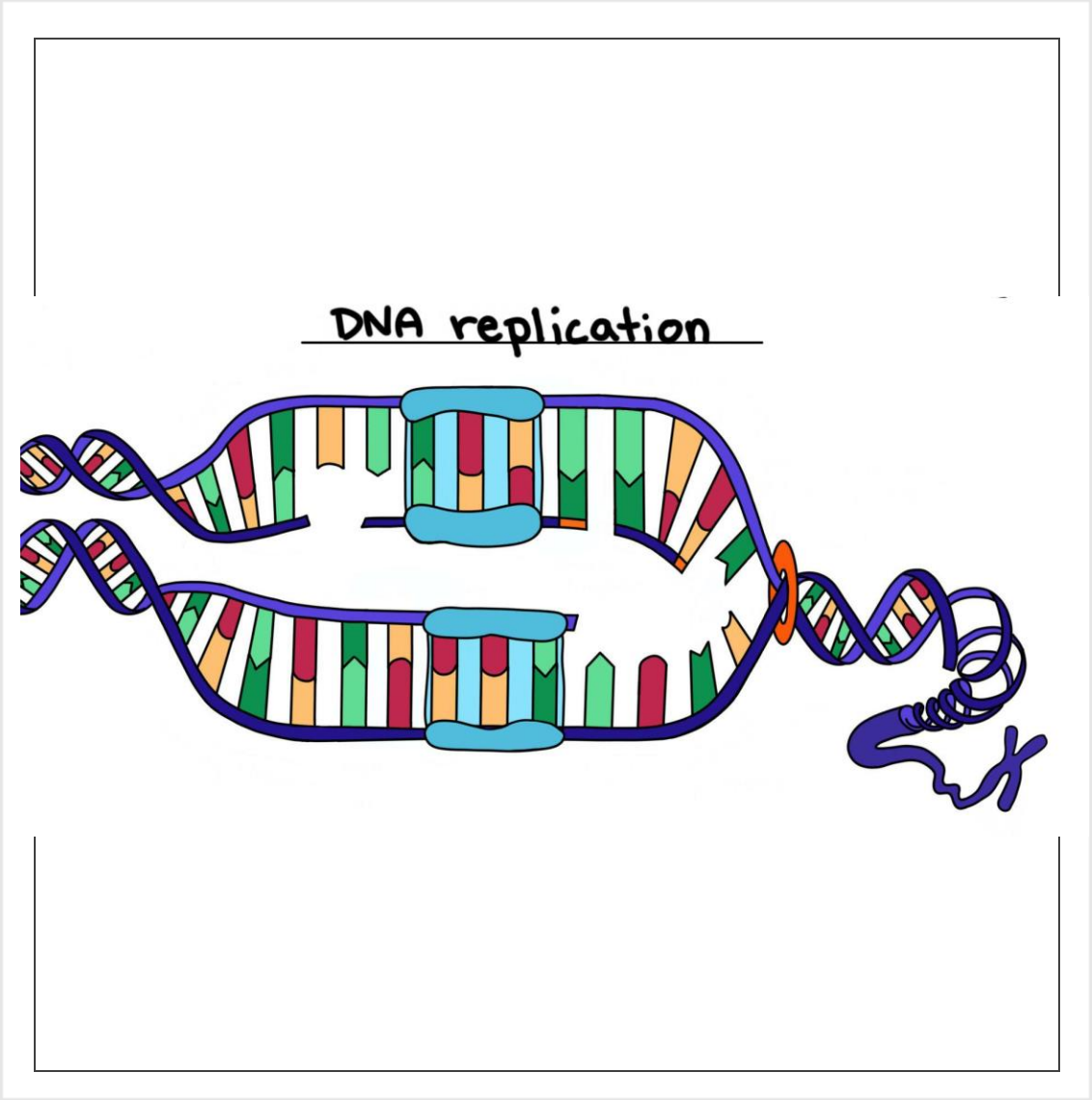
Examining Chromosomes

A particular set of chromosomes that an organism has is called a Karyotype

Chromosomes are stained, seperated, sorted and paired.

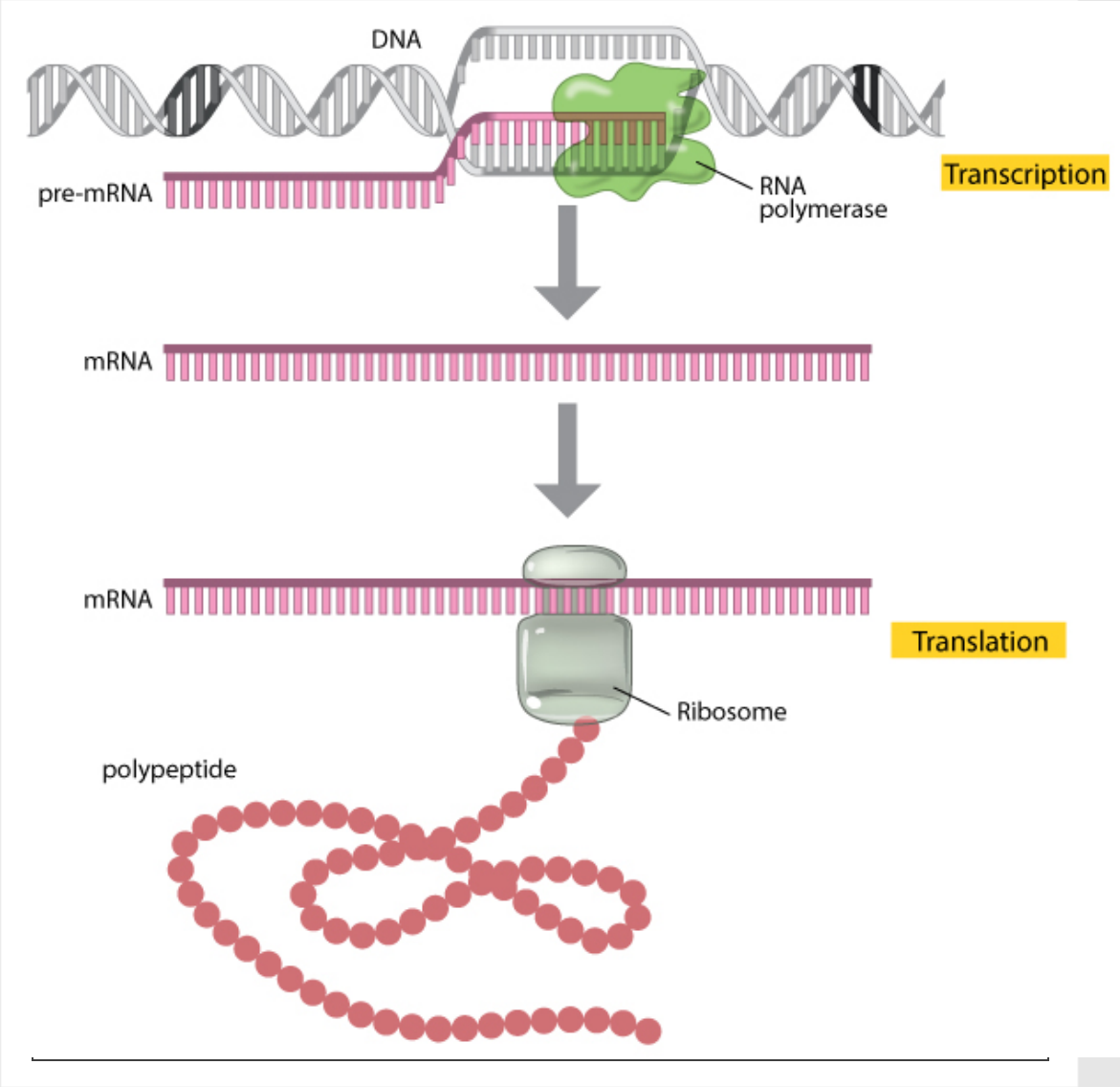
THE STRUCTURE OF DNA IS IMPORTANT TO PASSING ON GENETIC INFORMATION

Concept 1.4



DNA Replication

- Replication is the process of creating an exact copy of a molecule of DNA
- During replication, the human cell has an error rate of 1 per 1B nucleotide pairs
- This replication process is completed by very specific proteins called enzymes

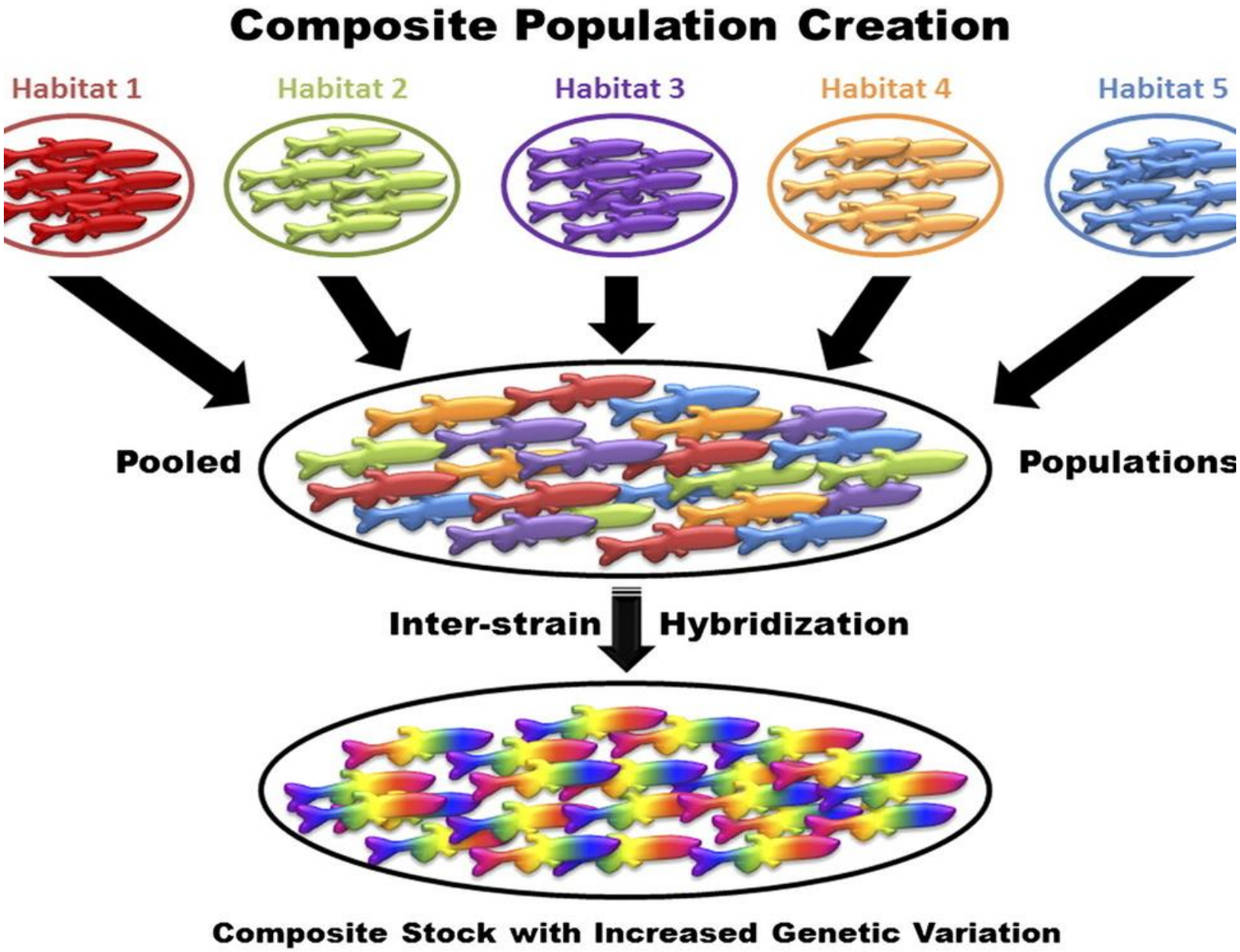


Translation

- After DNA replicates, the genetic code is copied to RNA and "translated" to make proteins
- This RNA strand is used to produce the correct sequence of amino acids to build the protein

THE DIFFERENT GENETIC MAKE-UP OF ORGANISMS IS REFLECTED IN THE DIVERSITY OF LIFE

Concept 5



Genetic Diversity

Species diversity is the variety and abundance of species in a given area

Genetic diversity is evident in the variety of inherited traits within a species

Variation among individuals in a population is largely a result of their genes