HOMESCHOOL SCIENCE LAB

Name: _____

Date: _____

BUILDING A MODEL OF A DNA DOUBLE HELIX

In this activity, you will build a hands-on model of DNA to see how its structure helps it store genetic information.

BACKGROUND

DNA (deoxyribonucleic acid) is the molecule that carries genetic instructions in living things. It has a double helix shape, like a twisted ladder.

- The sides (backbone) are made of repeating sugar and phosphate molecules.
- The rungs are pairs of nitrogen bases.
- Base-pairing rules:
  - Adenine (A) always pairs with Thymine (T)
  - Cytosine (C) always pairs with Guanine (G)

MATERIALS

- 2 colors of beads for the backbone (e.g., red and blue)
- 4 colors of beads for the bases:
  - Adenine (A) – green
  - Thymine (T) – yellow
  - Cytosine (C) – orange
  - Guanine (G) – purple
- String or pipe cleaners
- Scissors
- Optional: bead tray or bowls to sort beads
- Reference key (see right)

REFERENCE KEY

Backbone (sugar + phosphate)

Red Blue

Base Colors

- Adenine (A)
- Thymine (T)
- Cytosine (C)
- Guanine (G)

Base Pairing Rules

A – T

A pairs with T

C – G

C pairs with G

PROCEDURE

1. **Prepare the Backbone**: Cut two equal lengths of string or pipe cleaner. These will be the sides of your DNA ladder.
2. **Add Backbone Beads**: Thread beads onto each side, using one color for each side. Add about 10–12 beads on each side. These represent the sugar-phosphate backbone.
3. **Make Base Pairs**: Using the base pairing rules, thread beads onto short pieces of string or pipe cleaner to connect the two sides.
   - A (green) must pair with T (yellow).
   - C (orange) must pair with G (purple).
   - Make 10–12 base pairs.
4. **Connect the Ladder**: Tie or twist each base pair between the two backbone strands at each level to form rungs.
5. **Twist into a Helix**: Gently twist the ladder so the sides spiral in opposite directions, forming a double helix.
6. **Check Your Model**: Make sure all base pairs follow the rules: A–T and C–G. Adjust if needed.

OBSERVATIONS

What does your DNA model look like?

_____

_____

_____

How do the base-pairing rules help keep the structure consistent?

_____

_____

_____

What might happen if a base were paired incorrectly?

_____

_____

THINK & APPLY

1. How does the structure of DNA help it store information?

   _____

2. Where in living things do you think DNA is found?

   _____

3. If you were building a DNA model for a different organism, what would be the same? What might be different?

   _____

   _____

CHALLENGE

Build a longer section of DNA with 20 or more base pairs. Can you create a neat, even twist? Try using a pattern for your base pairs.