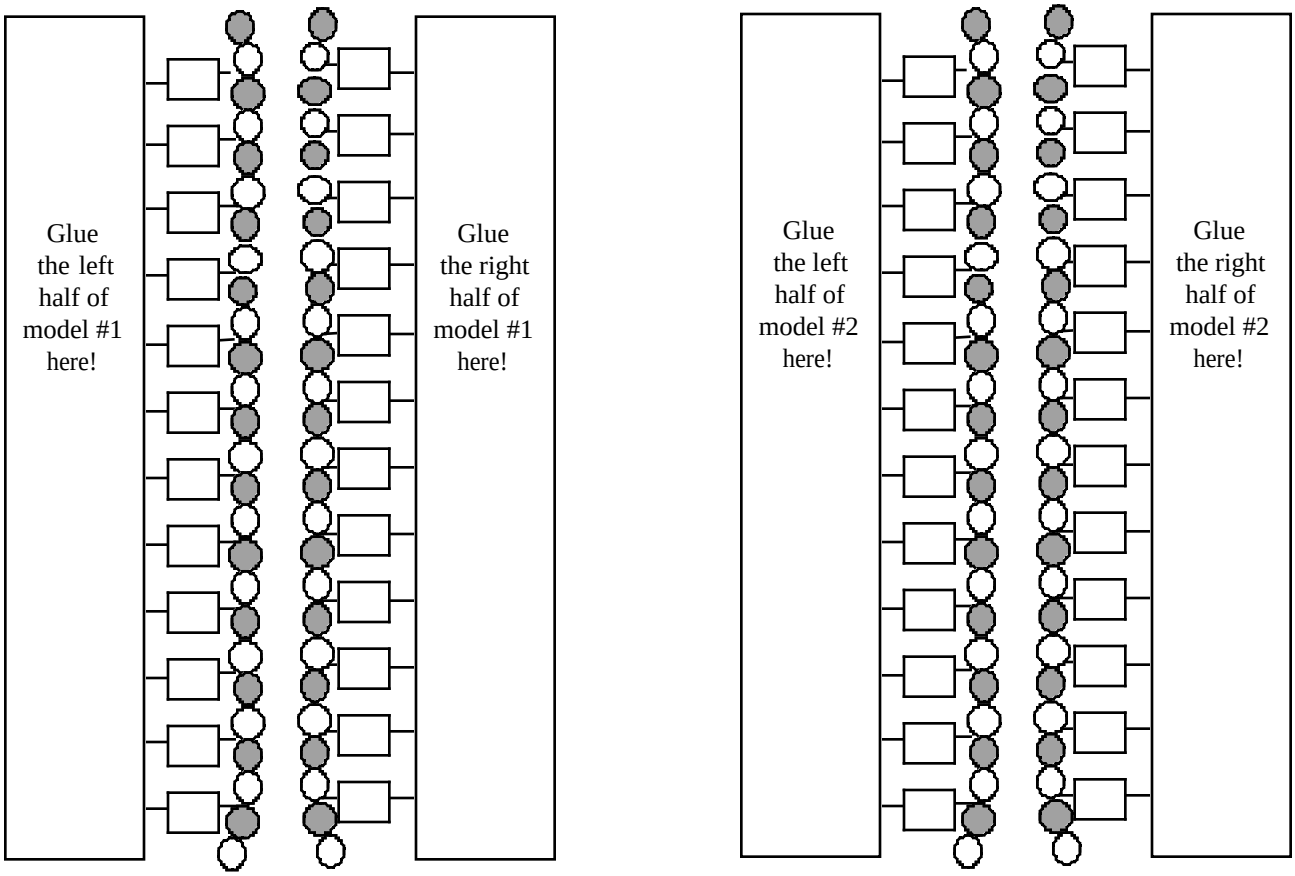
Decoding DNA

Name _____

Part A:
Follow your teacher's directions to create a DNA key chain. Color the key to the right to show the colors you will use for the beads.

◯ **Sugars**- 26 large beads ◯ **Phosphates** - 26 large beads	**Base Pairs -** 6 small beads for each base; must be four different colors ○ A ○ C ○ G ○ T

Part B: DNA Replication
(1) Untwist your DNA key chain. Use the bases on the key chain as a guide to make a paper model. Label the nitrogen bases on both paper models at the bottom of the page using the letters A, T, G, or C. Shade (or outline) the squares to match the colors used for your key chain. You may also shade in sugar and phosphate molecules.
(2) Keep paper model #1 for yourself and exchange model #2 with a classmate.
(3) Cut the paper models in half to "unzip" or split the DNA molecules. Glue the halves in the correct boxes.
(4) Complete the new DNA molecules by adding the new bases. Label each new base with A, T, G, or C and shade (or outline) using the colors from the original DNA models.

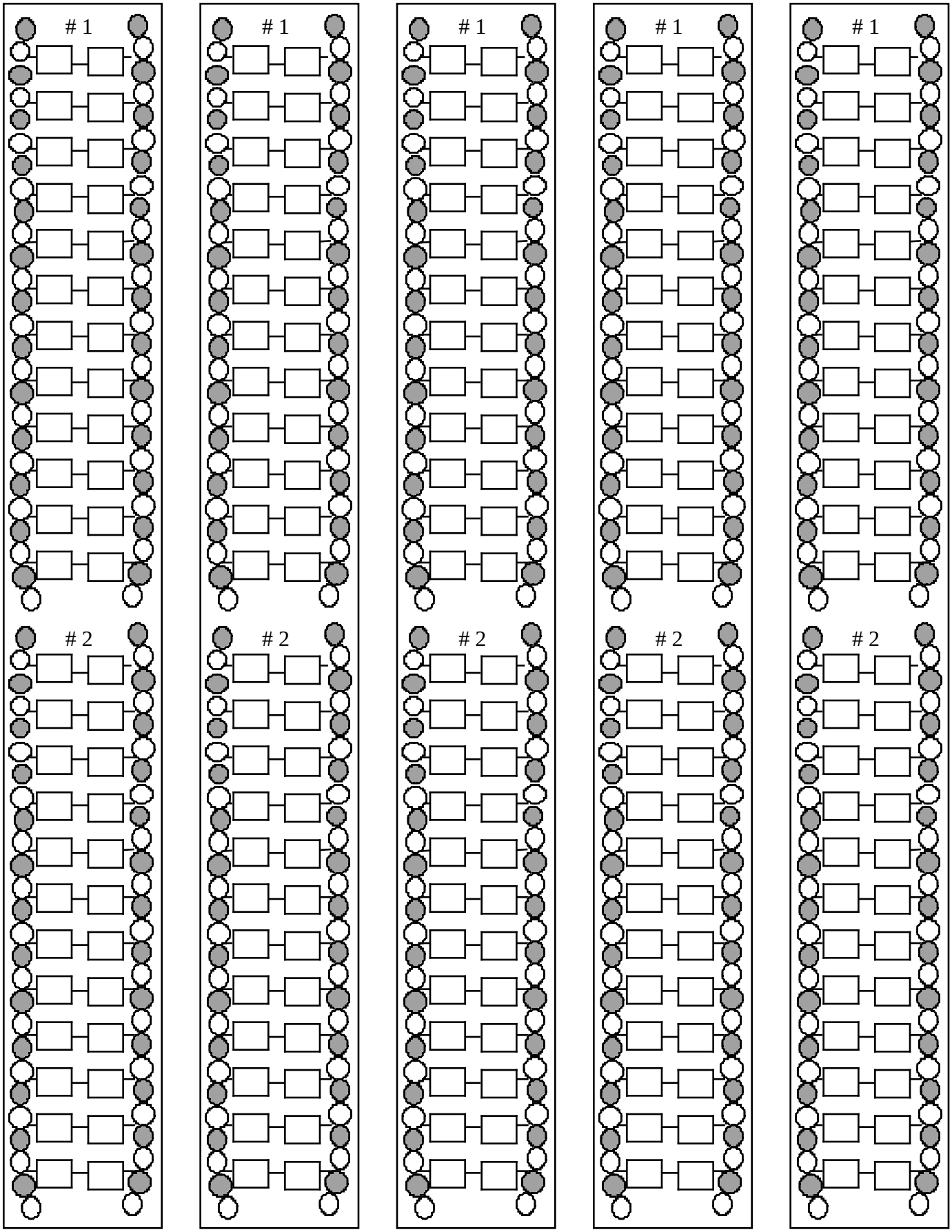


(1) How do the two new molecules for your key chain (#1) compare with the original? Explain.

(2) How do the two new molecules for your classmate's key chain (#2) compare with the original? Explain.

(3) If you were to replicate the four DNA molecules on this page, how would the new molecules compare to the original DNA key chains?

DNA Paper Models - Provide one strip with 2 models for every student



Decoding DNA
Teacher Notes

Visit http://accessexcellence.org/AE/AEC/AEF/1995/ross_jewelry.html to view the activity description.

Materials Used:
Each student will need:

- 6 mm faceted beads - 52 beads per student (26 of two different colors)
- Glass seed beads (Seed Beads 10/0) - 24 beads per student (6 of 4 different colors)
- 20 gauge wire- 18" per student (May use 20 gauge floral wire already cut to 18" pieces)
- 28 gauge wire - 20" per student
- Lanyard hooks or key rings - 1 per student
- Small plastic bag or container to hold beads during construction

You will also need:

- Needle-nose pliers & wire cutters
- Small plastic containers for the beads
- Copies of the Decoding DNA worksheets and one paper strip (2 models) for each student

Notes:
(1) You will want to make a few key chains on your own before attempting this with a class. I used large wooden beads, plastic pony beads, and heavy wire to make a demonstration set. The wooden beads were used for the sugar phosphate backbone and the pony beads made up the base pairs.

(2) It took two days (42 minute class periods) to make the key chains and one day to complete the Decoding DNA worksheet. During the first day, I reviewed the structure of DNA and allowed time for the students to pick out their 6mm beads. I provided heavy wire and had the students thread the large beads on the wire to make the sugar phosphate backbone. During the second day, I demonstrated how to "cross two in the middle" and had the students finish their key chains by picking out the small beads and adding the base pairs. During the third day, we colored the paper models and completed the Decoding DNA worksheet.

(3) Challenging parts ...

(a) My students had the most difficulty learning how to do the "cross two in the middle." I used two large metal rings to show them the correct way to do the step. I placed both rings on one hand and "threaded" other hand through the rings in the other direction. Tell the students that the step is similar to tying a shoe - cross the wires and pull tight to form a knot.

(b) Some of the students did not keep the thin wire tight while they were building the model and ended up with key chains that did not look the greatest. Remind the students to keep the thin wire tight after each step - crossing two in the middle or threading two on the sides.

(c) Many students decided to alternate the base pairs - A with T on one rung followed by G with C on the next - to make it easier. Students may choose to do all the A/T pairs before adding the G/C pairs.