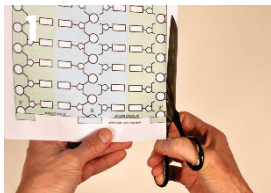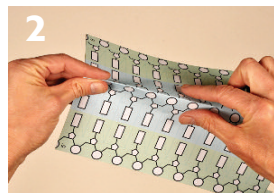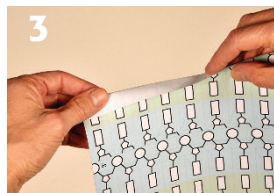# PDB-101

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Build a Paper Model of DNA

Fill in the names of the bases on the model shown to the right, or use the detailed model that shows all the atoms in each nucleotide (back side of paper).
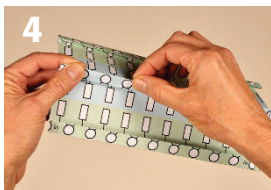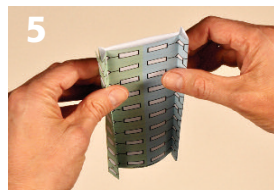
1 Cut out the model.

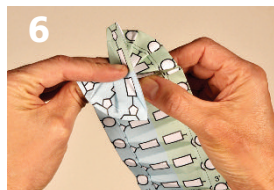**2** Fold all long creases first. Solid grey lines should be visible on the crease.

3 Fold dotted grey lines so they are hidden in the crease.

4 Fold the paper in half so that the backbone (with 3' written at the top) pops out.
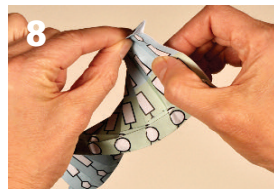
5 Tuck the other backbone flaps (with 5' at the top) one over the other, so your model looks like the on in the picture.
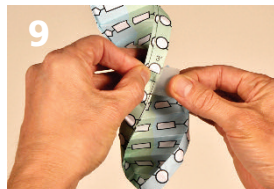
6 Fold the backbones so the model is flat. Fold the horizonal and diagonal lines like a fan (solid lines should be visible on the crease, dotted lines on the inside).

7 Your model should look like this when all lines have been folded.

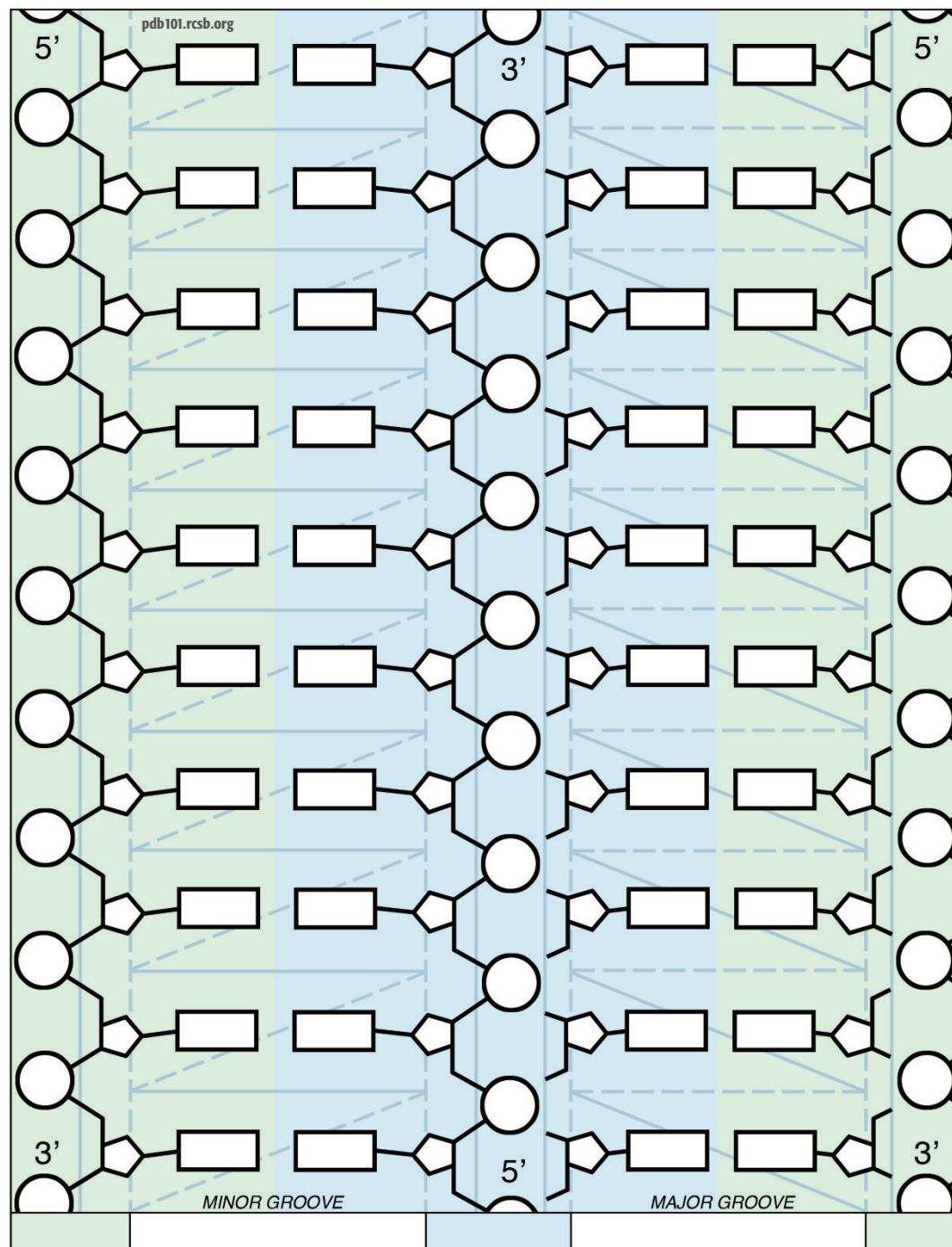**8** Pull the model open, and pop out the backbones on the sides.

9 Your finished model is a right-handed double helix. Use the tabs to connect several models to make longer strands.

About DNA

DNA is perfect for the storage and readout of genetic information, which is stored in the way the bases match one another on opposite sides of the double helix. Adenine (A) pairs with thymine (T), and guanine (G) with cytosine (C), with each pair forming a set of complementary hydrogen bonds.

The all-atom model (shown on the second side) has the sequence C-G-C-T-T-A-A-G-C-G. Notice that this sequence is palindromic: if you take one chain and flip it around, it will form the proper base pairs with another copy of the chain. Add your own base pairs in the model to the right…but be sure to pair them up properly! The edges of the base pairs are exposed in the two grooves of the double helix: the wider major groove and the narrower minor groove. These edges are also used to carry information that is read by proteins that interact with the double helix.

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5'   3'   5'

3'   5'   3'

MINOR GROOVE   MAJOR GROOVE

PDB-101 is the educational portal of RCSB Protein Data Bank (**rcsb.org**)

MAJOR GROOVE

guanine

adenine

cytosine

thymine

MINOR GROOVE