Biochemistry Boxing Activity

Activity 1: Biochemistry Boxing

Teacher notes: Model this activity before asking the student to do it. Video example: Facebook page

Overview: Students will compete against each other by keeping track of how many boxes they can match up with each macromolecule (carbohydrate, lipid, protein, and nucleic acid). Each student will keep track of their opponent's correct answers using the scorecard.

1. The student keeping score should use the macromolecule box (labeled carbohydrate, lipid, protein, and nucleic acid) to show the other students what they need to match.
2. The other student will use the other four boxes and attempt to correctly match them with the macromolecule being shown by their opponent.
3. Using the key, the student keeping score should check their opponent's answers and record the number of correctly matched boxes. Students should continue until each player has done all four macromolecules. After both students complete round one, they should proceed to the next round.

Example: One student (scorekeeper) shows "carbohydrate" to their opponent. The opponent should look at each of the four boxes and determine which structure, function, picture, and examples match with carbohydrates.

The scorekeeper could use the provided key to determine how many boxes were correctly identified as being a carbohydrate. The scorekeeper will record the total number of boxes that were correct under round 1 carbohydrate. Next, the scorekeeper could show the box nucleic acid, protein, or lipid.

Activity 2: Group competition

Teachers Note: This is a great activity for a test review. I offer homework passes to the winning group.

1. Place students into pairs or small groups
2. Give each group one set of boxes.
3. The teacher will say the name of a macromolecule.
4. The groups will compete to correctly stack the boxes as quickly as possible. When the time is up all members of the group should put both hands up and refrain from touching the boxes until their work is checked or they will be disqualified and will not receive the point.

5. The groups with the correct answers receive one point.
    a. Note: Use a timer (5-15 seconds, decrease the time as the students get better)
6. Note: Do not begin checking groups until the time is up.
7. Keep track of the points on the board.

Activity 3: Warm-up or Closure

This is an excellent and quick activity for assessing students. I have used it for warm-ups and closure activities.

1. Distribute one box to each student. (not the box with the lipid, protein, carbohydrate, and nucleic acid on it)
2. Ask the students to hold up the side of the box that represents one of the macromolecules (carbohydrate, lipid, protein, and nucleic acid).
3. The teacher should circulate the room and give the students feedback or hints.

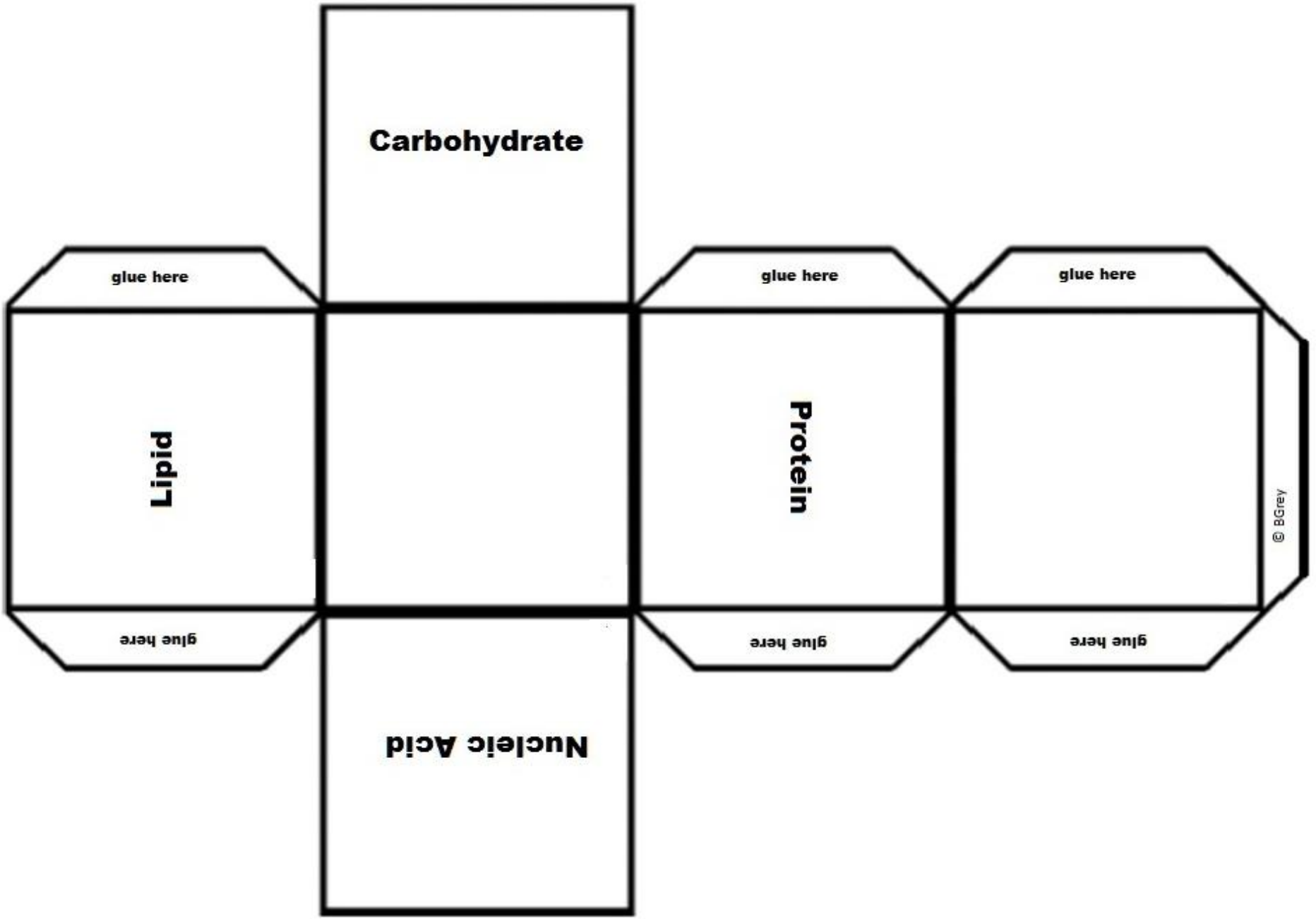
Suggestions:

1. Read the included lesson plan to see how I have effectively used these boxes.

Constructing the boxes:

1. Print the boxes. (Note: I recommend Card Stock Paper however, it will work just fine with regular copy paper.)
2. Carefully cut out the outline of the boxes.
3. Fold the tabs that say glue here.
4. Add glue (Note: I used super glue; however, clear tape would be easier but does not look nice.)

Tip: Find some reliable students to help you construct the boxes, especially if you are doing a class set. Use card stock, they should last several years.


Carbohydrate
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glue here
glue here
Lipid
Protein
© BGrey
glue here
glue here
glue here
Nucleic Acid

1. Provide a quick source of energy.
2. Dietary fiber
3. A main structure component in the cell wall.

glue here

glue here

1. Long-term energy source/storage.
2. Major Component of the cell membrane.

1. Speed up chemical reactions.
2. Other functions include: antibodies, muscle contraction, hormones, and connective tissue.

glue here

glue here

1. Store and transmit genetic information.
2. Direct the synthesis of new proteins.

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glue here
catalase
Insulin
keratin
hemoglobin
glue here
Fats, Waxes, Oils
Glucose
Fructose
Starches
glue here
DNA,mRNA,tRNA,rRNA
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Monosaccharides

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Fatty Acids

amino acids

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Nucleotides

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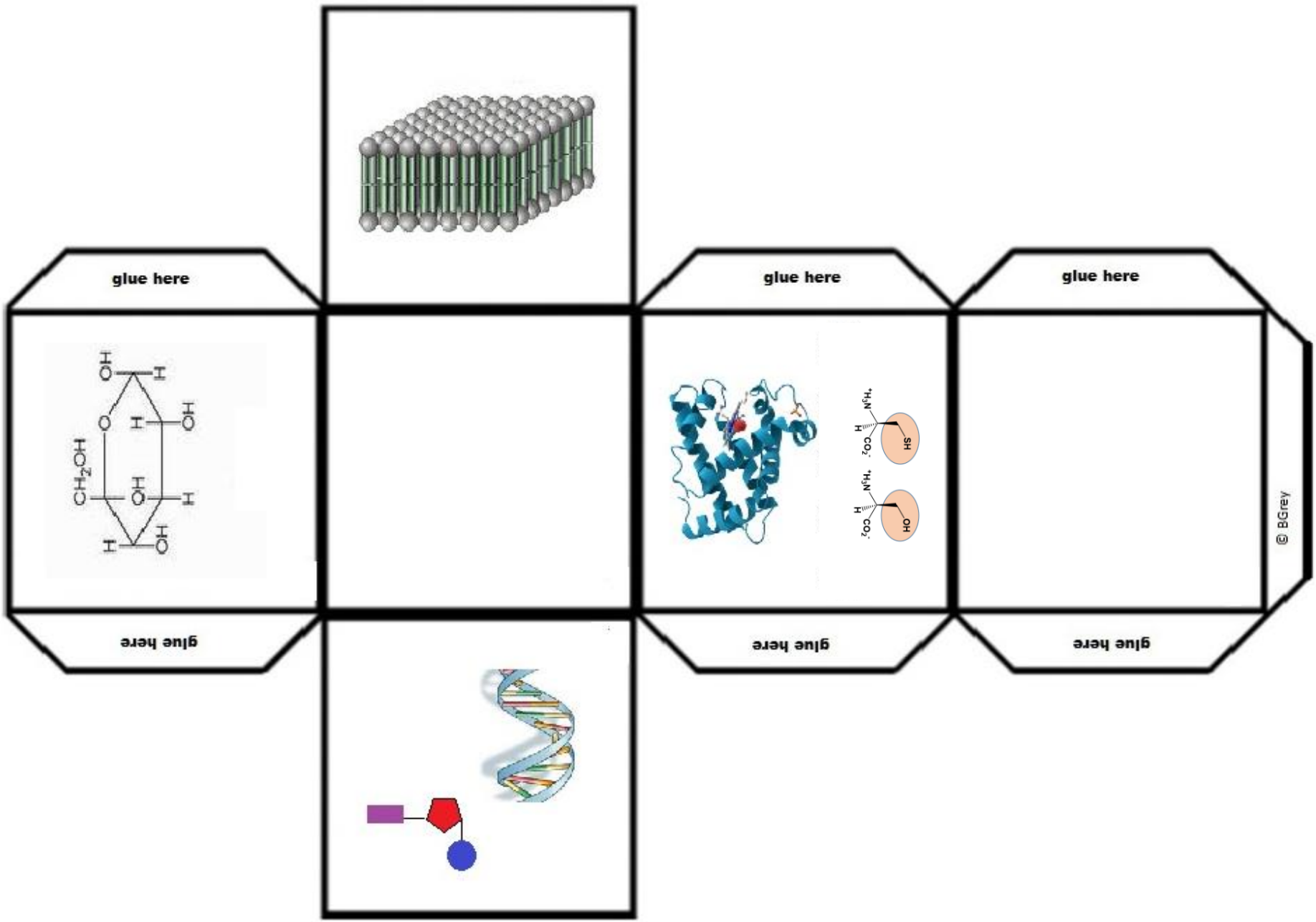
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	Score Card					
Player 1	**Round 1**	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 2	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 3	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 4	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 5	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 6	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 7	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 8	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
Name:						Overall Score

	Score Card					
Player 2	**Round 1**	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 2	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 3	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 4	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 5	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 6	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 7	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
	Round 8	**Lipids**	**Carbohydrates**	**Nucleic Acids**	**Proteins**	**Total**
	# of correct boxes					
Name:						Overall Score

Biochemistry Boxing Answer Key

	Carbohydrate	Protein	Lipid	Nucleic Acids
Function	1. Provide a quick source of energy. 2. Dietary Fiber 3. Structural Component of the cell wall	1. Speed up chemical reactions. 2. Other functions include: antibodies, muscle contraction, hormones and connective tissue.	1. Long-term energy source/storage. 2. Major Component of the cell membrane.	1. Store and transmit genetic information. 2. Direct the synthesis of new proteins.
Monomer Building Block	Monosaccharides	amino acids	Fatty Acids	Nucleotides
Molecule Examples	Glucose Fructose Starches	Catalase Insulin Keratin Hemoglobin	Fats Waxes Oils	DNA mRNA tRNA rRNA
Structural Example