## REVIEW GAME: CELL BINGO

**Each player will need:**

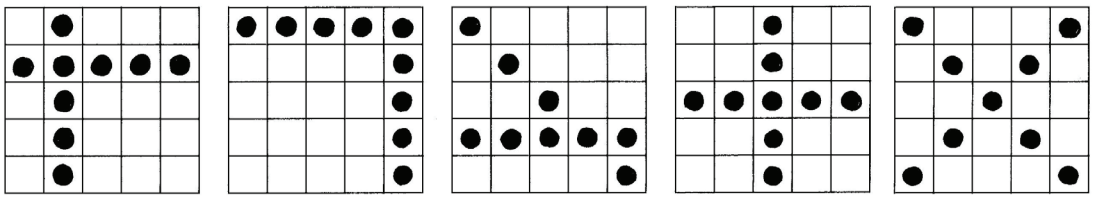
- A copy of the page with the cell squares (page 127)
- A copy of the page with the blank squares (page 126)
- About 24 tokens ("markers") to place on each square as clues are read
- A pair of scissors
- A glue stick (or other glue, if sticks are not available)

**Set up:**

Cut apart the cell squares so you have 25 individual square pieces. Glue these squares onto the page with the blank squares. (Don't cut apart the blank squares.) The cell corner pieces must go in a corner, the edge pieces must stay on an edge and the nucleus pieces must still form a circle, but other than that the players are free to put the pieces wherever they want to. Each player should create their own unique pattern.

**How to play:**

This is a bingo-type game. The only difference is that to win, you must fill both a vertical row AND a horizontal row. (A diagonal row would also be acceptable.) So winning patterns might look something like these:



**Giving clues:**

There are three pages of clues. This gives you several options.

- You can play the game three times, getting progressively harder each time.
- You can play just once, selecting the level most appropriate for your players.
- You can keep going even after you have a winner and play through the rest of the clues on that level so that all the clues are used (maximizing review). For example, if someone gets a bingo while you are on question 15 on the easy level, you can just pick up with clue 16 for the next game, then bridge over to the medium clues to finish that game. Then pick up with the rest of the medium clues for the next game.
- You can play all (or most of) the clues on the level if you let the rest of the players keep playing even after a bingo has been called.
- You can do the clues in order, or you can skip around and use the clues you feel are the best review questions for your players. (If you don't go in order, just remember to put a pencil mark next to the ones you've done so that you can keep track of them!)

RE-USABLE OPTION: If you want to use these cell pieces multiple times (for example, a permanent classroom set) copy the cell page onto white sticky-back label paper (the full sheet 8.5" x 11" labels). Then stick these to pieces of mat board or heavy cardboard. (You could also print the cell pages onto card stock, then use spray adhesive to adhere them to the mat board.) Use an craft/utility knife to cut apart the squares. Mark the backs of each set with a number or letter so that if the pieces get mixed up they are easily sorted again. Put each set in a small zip-lock plastic bag. When it is time to play, give each student a bag and have them arrange their 25 pieces into a square. The pieces will not be glued together, just set into place like puzzle pieces with straight edges.

CELL BINGO Easy Clues

| | |
|---|---|
| 1) This organelle generates energy in the form of ATPs. | MITOCHONDRIA |
| 2) This is a dense area in the nucleus that contains the information for how to make a ribosome. | NUCLEOLUS |
| 3) This organelle contains many digestive enzymes. | LYSOSOME |
| 4) This organelle is often called the “post office” of the cell because it packages and labels things. | GOLGI BODY |
| 5) This is the name of the watery fluid inside the cell. | CYTOSOL |
| 6) These are sugar molecules that the cell breaks down to make ATPs. | GLUCOSE |
| 7) This is called “rough” because it has ribosomes stuck to it. | ROUGH ER |
| 8) This is how the cell takes in little “swallows” of the fluid surrounding it. | PINOCYTOSIS |
| 9) This organelle makes toxic hydrogen peroxide but then neutralizes it. | PEROXISOME |
| 10) This structure is a central point for the organization the cytoskeleton. | CENTROSOME |
| 11) These are like little “cardboard boxes” that the cell uses to transport things. | VESICLES |
| 12) DNA is made of these. | NUCLEOTIDES |
| 13) This is like the library of the cell. It contains all the information the cell needs. | NUCLEUS |
| 14) These act like little connecting rods between cells. | DESMOSOMES |
| 15) These things bring amino acids to ribosomes that are busy manufacturing proteins. | tRNAs |
| 16) This organelle consists of a complicated network of smooth tubes. Its membrane is “continuous with” the outer membrane of the nucleus. | SMOOTH ER |
| 17) This is what separates the cell from its environment. | PLASMA MEMBRANE |
| 18) These are the little manufacturing units that take amino acids and string them together into long protein chains. | RIBOSOMES |
| 19) These are the largest fibers of the cytoskeleton. Their structure is similar to drinking straws because they are cylindrical and hollow. | MICROTUBULES |
| 20) These are what proteins are made of. There are 20 types. | AMINO ACIDS |
| 21) These are the smallest fibers of the cytoskeleton. | MICROFILAMENTS |
| 22) Your cells can use these to create and repair phospholipid membranes. | FATTY ACIDS |
| 23) These proteins are “stuck” in the plasma membrane and serve quite a variety of functions, including as portals for letting things in and out. | MEMBRANE-BOUND PROTEINS |
| 24) These proteins help join things together or break things apart. | ENZYMES |
| 25) This is basically a very large empty vesicle. | VACUOLE |

CELL BINGO Medium Clues

| | |
|---|---|
| 1) This is where the centrioles are located. | CENTROSOME |
| 2) This has four layers of phospholipids around the outside. | NUCLEUS |
| 3) This is basically the same thing as phagocytosis, just on a smaller scale. | PINOCYTOSIS |
| 4) These are formed by the rough ER and used to transport polypeptides over to the Golgi body. | VESICLES |
| 5) Your digestive system breaks down fats into these molecules. | FATTY ACIDS |
| 6) This organelle has many functions, including storing calcium and manufacturing steroids. Part of its name means “network.” | SMOOTH ER |
| 7) These are attached to proteins that are bound to the inside of the plasma membrane. They help the cell maintain its shape or change its shape. They form the “skeletal” structure of a moving pseudopod. | MICROFILAMENTS |
| 8) This organelle gets its name from the Latin word for “empty.” | VACUOLE |
| 9) This is where the electron transport chain is located. | MITOCHONDRIA |
| 10) This organelle deals with several kinds of toxins produced by the cell. | PEROXISOMES |
| 11) Glycolysis is when a cell starts harvesting ATPs from this molecule. | GLUCOSE |
| 12) Most of this is consists of water molecules. | CYTOSOL |
| 13) This organelle is responsible for labeling digestive enzymes (from the ER) so that they get transported over to the lysosomes. | GOLGI BODY |
| 14) These are made of two pieces—a larger one and a smaller one. | RIBOSOMES |
| 15) This contains lipid rafts. | PLASMA MEMBRANE |
| 16) About 40 different kinds of these are found inside lysosomes. | ENZYMES |
| 17) This is where ribosomes are made. | NUCLEOLUS |
| 18) This is the smallest type of RNA we’ve learned about. | tRNA |
| 19) This organelle pumps protons into itself. | LYSOSOME |
| 20) This organelle has docking ports for ribosomes. | ROUGH ER |
| 21) These are the highways along which motor proteins can travel. | MICROTUBULES |
| 22) Some of these act as “flags” to identify the cell as part of the body. | MEM-BOUND PROTEINS |
| 23) These connect skin cells to each other and give skin its stretchiness. | DESMOSOMES |
| 24) The nucleus contains lots of these, all joined together into a twisted ladder shape. | NUCLEOTIDES |
| 25) When proteins have been thoroughly digested, they break down into these simple molecules. | AMINO ACIDS |

CELL BINGO Harder Clues

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|---|---|
| 1) This is the only organelle that doesn't have any phospholipids in it. | RIBOSOMES |
| 2) Although usually located towards the center of the cell, much of what this organelle does involves sending its products (such as steroid hormones) outside the cell, often to cells that are very far away. | SMOOTH ER |
| 3) This organelle is full of chaperone proteins. Somehow they stay in place even though the organelle is in constant flux. | GOLGI BODY |
| 4) Some of these require an acidic environment to work properly. | ENZYMES |
| 5) During the last part of mitosis, the movement of these causes the cell to pinch in the middle. | MICROFILAMENTS |
| 6) Tay-Sachs Disease is caused by a malfunction of this organelle. | LYSOSOME |
| 7) This has an inner region called the matrix. The walls of the matrix contain ion pumps. | MITOCHONDRIA |
| 8) Examples of these include: serine, proline, lysine, arginine, and valine. | AMINO ACIDS |
| 9) Inside this are little "snipper" enzymes that can snip off the ends of protein chains being manufactured by ribosomes that are attached to it. | ROUGH ER |
| 10) This is where glycolysis occurs. | CYTOSOL |
| 11) This can be filled with waste and sent to merge with the membrane. | VACUOLE |
| 12) This has an anti-codon. | tRNA |
| 13) One of this organelle's main jobs is to break down long chains of fatty acids. It also can detoxify alcohol and other wastes. | PEROXISOME |
| 14) This process forms small vesicles filled with water, minerals, and hopefully some food molecules. | PINOCYTOSIS |
| 15) These were discovered by using antibodies stained with a fluorescent dye. The antibodies attacked and covered these, then the dye made them show up on a screen. | MICROTUBULES |
| 16) This is where you would find histones with DNA wound around them. | NUCLEUS |
| 17) This contains 6 carbon atoms and its basic shape is a hexagon. | GLUCOSE |
| 18) This has thousands of sets of instructions for making just one thing. | NUCLEOLUS |
| 19) These are formed by both smooth and rough ER and by the Golgi. | VESICLES |
| 20) The structure of this is sometimes described as a fluid mosaic. | PLASMA MEMBRANE |
| 21) These are basically long strings of carbon atoms. | FATTY ACIDS |
| 22) Some of these act as receptors, receiving chemical messages from other cells. | MEMBRANE-BOUND PROTEINS |
| 23) These are attached to the inside of the plasma membrane with a plate-like structure. The plate is then connected to the cytoskeleton. | DESMOSOMES |
| 24) This is made of a base, a sugar, and a phosphate. | NUCLEOTIDES |
| 25) This is made of two barrel-shaped things inside a blob of protein. | CENTROSOME |

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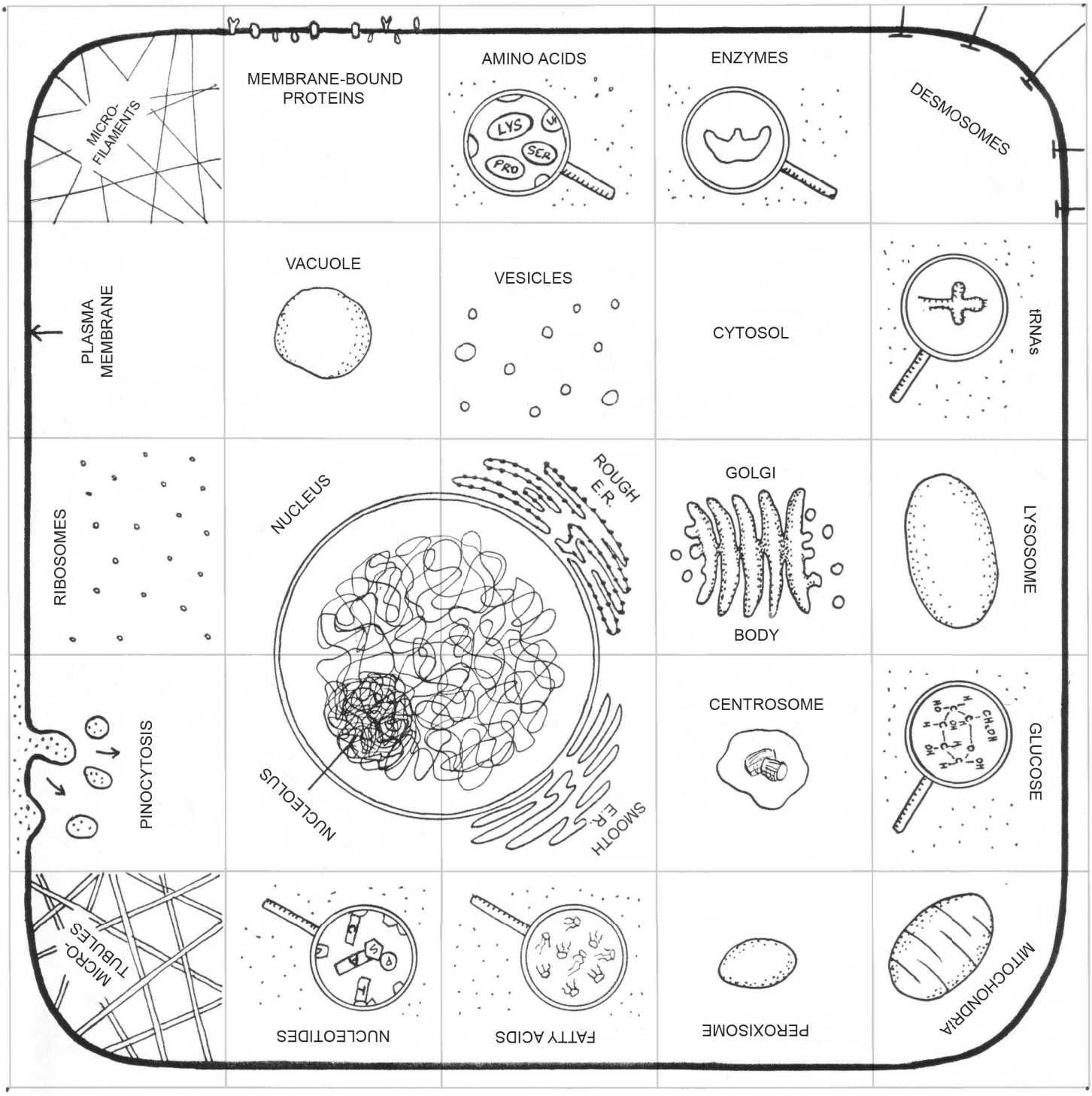
MICRO-FILAMENTS
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SER
PRO
ENZYMES
DESMOSOMES
PLASMA MEMBRANE
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