Cell Defense: The Plasma Membrane Webquest

<https://biomanbio.com/HTML5GamesandLabs/Cellgames/celldefensehtml5page.html>

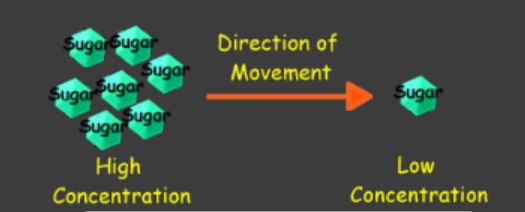
1. Click start new game and hit the space bar
2. Choose Build a membrane, read the descriptions and answer the following questions
   1. \_\_\_\_\_\_ living cells depend on the plasma membrane to regulate what comes into and out of the cell.
3. Press space bar (Twice)- read the Urgent Message! to answer the questions
   1. Phospholipids are made of a phosphate \_\_\_\_\_\_\_\_\_\_\_\_\_ and 2 fatty acid \_\_\_\_\_\_\_\_\_\_\_\_\_
   2. The heads are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (water loving) they like to be close to water!
   3. The tails are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( water-fearing) they avoid water!
   4. For this reason the phospholipids make a phospholipid bilayer with the heads facing out toward water and the tails facing each other!
   5. Please draw and label a phospholipid in the box below then click I Understand!
4. Follow the on screen instructions before continuing – build your membrane – Click My Membrane is ready!
   1. Read the Urgent Message! to answer the following questions
      1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ helps to stabilize the membrane so that it is not too fluid nor too solid!
      2. Draw a cholesterol molecule in the space below
   2. Click I understand – and complete your membrane then read the Urgent Message! and answer the following questions
      1. Good Job! You have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the membrane with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      2. For the next phase of your mission you must understand that the cell membrane is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Semi- permeable)
      3. This means that the membrane allows some substances to pass through easily, but does not allow others to pass.
      4. This is important because the cell is able to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ what enters and leaves so that it can maintain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Click I understand and observe that molecules – continue working your way through the game.
      1. Which substances passed easily through the phospholipid bilayer of the membrane?

Ion+ Ion- Sugar CO2 O2

* + 1. Carbon Dioxide passes through easily because it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. NONPOLAR means that the molecule does \_\_\_\_\_\_\_\_\_\_\_\_\_\_ have significantly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ends. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules pass through most easily!
    2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ passes through easily because it is nonpolar and small. Nonpolar means that the molecule does NOT have significantly charged ends. Nonpolar, small molecules pass through most easily!
  1. Click I understand and continue answering the questions.
     1. Which substances did NOT passed easily through the phospholipid bilayer of the membrane?

Ion+ Ion- Sugar CO2 O2

* + 1. Charged substances like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ do \_\_\_\_\_\_\_\_\_\_\_\_ pass through the phospholipid bilayer
    2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules such as sugars do \_\_\_\_\_\_\_\_\_\_\_\_\_ pass through the bilayer. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ means that the molecule has partial charges. This is because electrons are not shared equally between atoms in the molecule, making some atoms a little bit negative and others a little bit positive.
  1. Click I understand. Then read the Urgent Message to answer the following.
     1. Let’s imagine our cell needs to let in some negative ions….
     2. Create a new \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by clicking the channel protein molecules in the supplies box.
     3. Click and drag to place the new \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in the membrane. It should span the entire membrane to make a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (or channel) that the ions can travel through to the other side!
     4. Draw a channel protein in the space below
  2. Click I understand and place your channel proteins. Then read the Urgent message!
     1. You may have noticed that channel proteins allow you to transport a substance across the membrane, but you could only transport the substance until there were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ amounts of it on both sides of the membrane.
     2. This is because substances naturally move from an area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (a place where there are a lot of them) to an area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( a place where there are fewer of them). In other words, molecules, ions and other substances like to spread out into available space
  3. Label the diagram below then click I understand!



* + 1. The process by which particles move from an area of higher concentration to an area of lower concertation is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ happens through a channel protein it is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. “Facilitated” means “helped” this makes sense because the channel protein helped or “facilitated” diffusion across the membrane. – click I understand
    2. Sometimes cells need to have a high concertation of certain substances and a low concertation of others. A cell \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ always get the right concentration of a substance by doing diffusion!
    3. If a cell wants to move a substance from and area with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ concentration \_\_\_\_ and area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ concentration it needs to use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the substance \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_! Remember substances naturally move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_( From High to Low) so going the other way is like going against the flow!
    4. This is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and uses \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ (cell ENERGY) – click I understand
    5. Let’s imagine that a cell needs to pump in more positive ions against the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    6. Click on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the supplies box to make a new CARRIER PROTEIN. Click and drag to place the new carrier protein in the membrane
    7. When the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ meets the pump, you will see that \_\_\_\_\_\_\_\_\_\_\_ also arrives. Click on the ATP to make the \_\_\_\_\_\_\_\_\_\_\_\_ work! Pump until you have 8 ions in side the cell! – click I understand
    8. Draw a carrier protein in the space below
  1. Read the following Urgent messages
     1. Notice that you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the ions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( from\_\_\_\_\_ to \_\_\_\_\_\_ concentrations)
     2. This required you to use \_\_\_\_\_\_\_\_\_\_\_ ( cellular \_\_\_\_\_\_\_\_\_\_\_\_) – click I understand
     3. You must master on final molecule to understand membrane structure and function \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     4. In the cell membrane \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are like identification \_\_\_\_\_\_\_\_\_\_\_\_! Cells have different membrane carbohydrates if they do different jobs. This helps cells to get \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into the right places and get their jobs done!
     5. Also, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ system uses the carbohydrates to recognize that your cells belong to your and that they are not viruses, bacteria or other foreign cells \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ your body! - click I understand
     6. Click on the membrane \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the supplies box. This will create a new carbohydrate.
     7. Click and drag the new carbohydrate to the outer surface of the plasma membrane.
     8. The immune system will come by shortly to make sure that your cell ins not a \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     9. Draw a carbohydrate molecule below - click I understand

Continue to work through each challenge at the end of class, or once you have finished all challenges, please take a screenshot to save your score and PASTE it below.

