**Unit 4: ATP Guided Notes**

**Standard**

* **SC.912.L.18.10** \_\_\_\_\_\_\_\_\_\_\_ the role of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(ATP) to energy \_\_\_\_\_\_\_\_\_\_\_ within a cell.

**Guiding Question**

* How do cells obtain and transform the energy required for biological processes?

**Homeostasis is hard work.** Organisms and the cells within them have to grow and develop, move materials around, build new molecules, and respond to environmental changes.

* + *What powers so much activity, and where does that power come from?*
    - Think for 10 seconds then be prepared for random calling!

**Video 1**

**Video 2 Notes**

1. How does the athlete get his energy?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

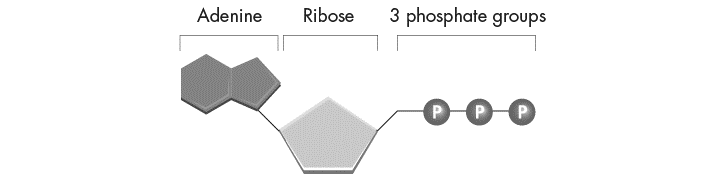
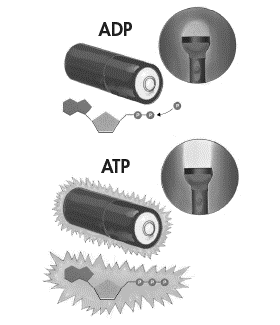
1. The prefix tri- means \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. When a cell needs energy, it gets it from \_\_\_\_\_\_\_\_\_\_\_.
3. What does the “D” stand for in ADP?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. We need the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, an organelle, to make ADP back into ATP.

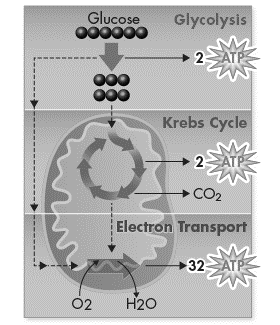
**Fill-in-the-Blank PowerPoint**

* Energy = the ability to do work
* Your cells are busy using energy to build new molecules, contract muscles, and carry out active transport.
* Without the ability to obtain and use energy, life would \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* One of the most important compounds that cells use to store and release energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ATP).
* \_\_\_\_\_\_\_ consists of adenine, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_called ribose, and three phosphate groups.



**STORING ENERGY**

* Adenosine diphosphate (ADP) looks almost like ATP, except that it has \_\_\_\_\_ phosphate groups \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + ADP contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but not as much as ATP.
* When a cell has energy available, it can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of it by adding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to ADP, producing ATP.
* ADP is like a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that powers the machinery of the cell.



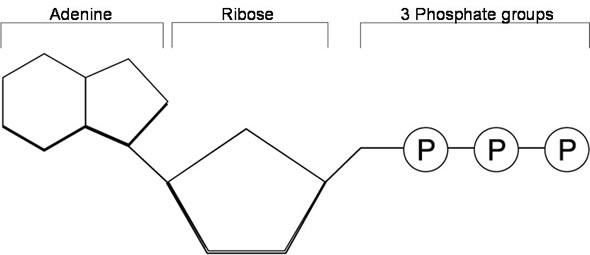
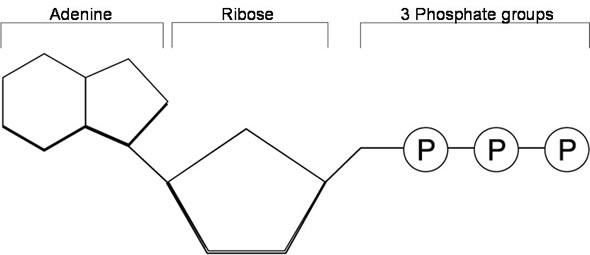
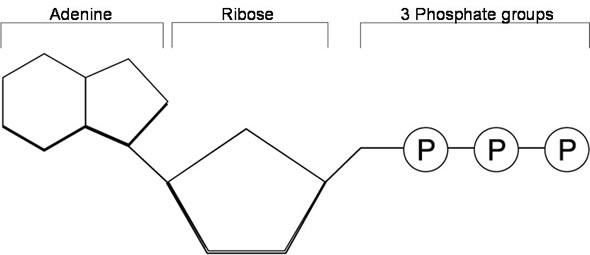
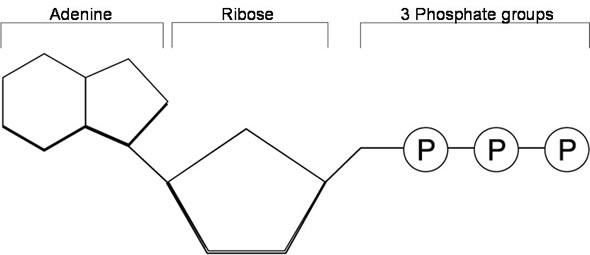
**RELEASING ENERGY**

* Cells can release the energy stored in ATP by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ phosphate groups.
* Because a cell can add or subtract these phosphate groups, it has an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ way of storing and releasing energy as needed.

**USING ENERGY**

* One way cells \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ provided by ATP is to carry out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Many cell membranes contain sodium-potassium pumps. ATP provides the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that keeps these pumps working, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of ions on both sides of the cell membrane.
* ATP \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, providing the energy for motor proteins that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and power the movement of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* ATP is not a good molecule for storing large amounts of energy over the long term.
* It is more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for cells to keep only a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on hand.
* Cells can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ATP from ADP \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by using the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**YOUR TURN**

* Now you are going to create your own model of ATP
* You will need:
  + 1 sheet of yellow paper
  + Pencil
  + Scissors
* Fold the yellow paper hamburger style, then open it up
* Create the model by drawing the adenine first with its bond lines exactly as shown in the picture (use a half of the paper)
* Now make the 5-carbon sugar that we call **ribose**
* Create the model by drawing the adenine first with its bond lines exactly as shown in the picture (use a quarter of the paper)
* Finally, make the 3 phosphate groups
* Make 2 pieces like the pictures below on the remaining part of the yellow paper:
* Finally, make the 3 phosphate groups
* Make 2 pieces like the pictures below on the remaining part of the yellow paper:
* WRITE YOUR NAME ON EACH PIECE OF YOUR ATP MOLECULE!!