CONCEPT: ATP

●*Recall:* **Adenosine Triphosphate** (_____): a _____ energy molecule used to "*power*" cellular activities.

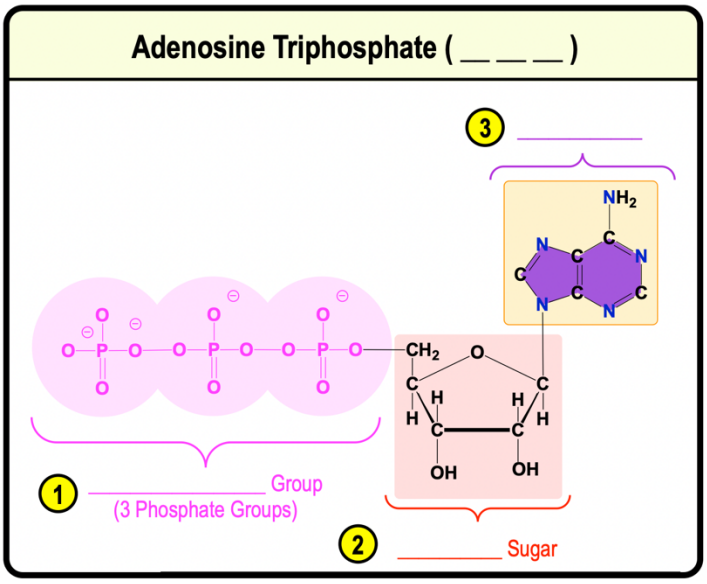
●There are 3 primary components of an ATP molecule:

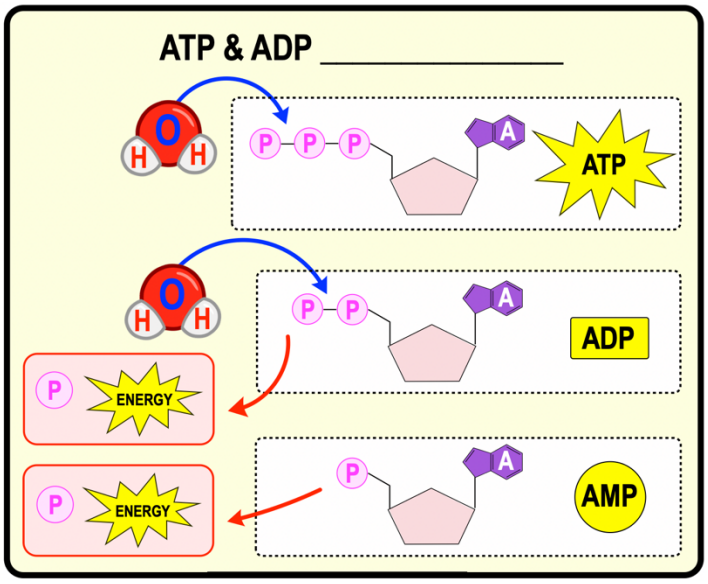
1 Chain of ____ phosphate groups 2 _____ sugar 3 _____ nitrogenous base.

●**ATP Hydrolysis:** process of breaking bonds between _____ *groups* generating *chemical energy* & ADP.

□ Sometimes ADP can be hydrolyzed to form AMP.

EXAMPLE: ATP structure & hydrolysis.





PRACTICE: Which of the following statements is true?

a) ADP contains more potential energy than ATP.

b) Following hydrolysis, ATP can give off one phosphate group and usable energy, whereas ADP cannot.

c) The energy produced by ATP comes from the breaking of the bond between two phosphate groups.

d) AMP and ADP contain the same amount of potential energy.

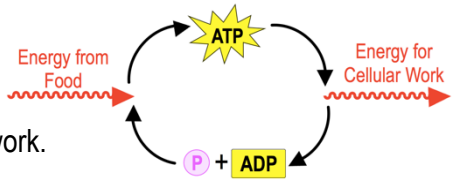
PRACTICE: Which of the following is the most correct interpretation of the figure?

a) Energy from food sources can be used directly for performing cellular work.

b) ADP + P_i are a set of molecules that store energy.

c) ATP is a molecule that acts as an intermediary to store energy for cellular work.

d) Pi acts as a shuttle molecule to move energy from ATP to ADP.



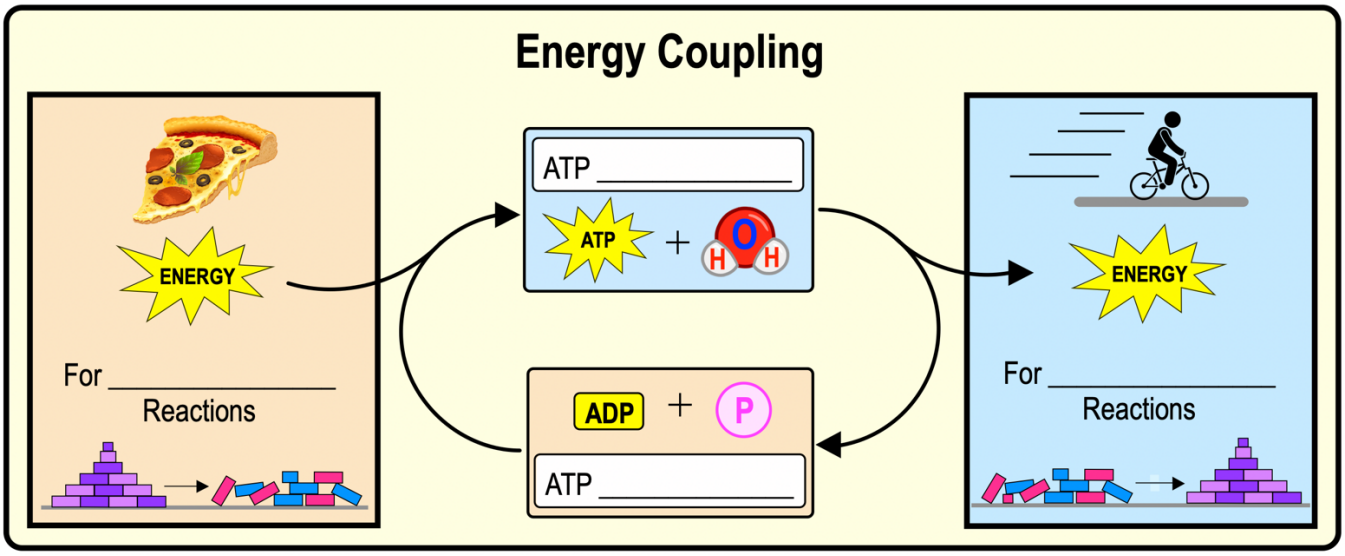
CONCEPT: ATP

Energy Coupling

●When energy released by an _____ *reaction* is used to power/drive an *endergonic* reaction.

□ *ATP* _____ is coupled to *endergonic* reactions to provide the energy input they need to proceed.

EXAMPLE: Energy Coupling.



PRACTICE: How does ATP participate in energy-coupling reactions?

a) Hydrolysis of ATP fuels endergonic reactions.

b) Hydrolysis of ADP fuels endergonic reactions.

c) Synthesis of ATP fuels exergonic reactions.

d) Synthesis of ADP fuels exergonic reactions.

Phosphorylation

●The transfer of a *phosphate group* from _____ to another molecule to provide *energy*.

●Phosphorylation by ATP hydrolysis can have a wide _____ of effects:

1 _____ a target molecule to react.

2 Changes the _____ of a target protein.