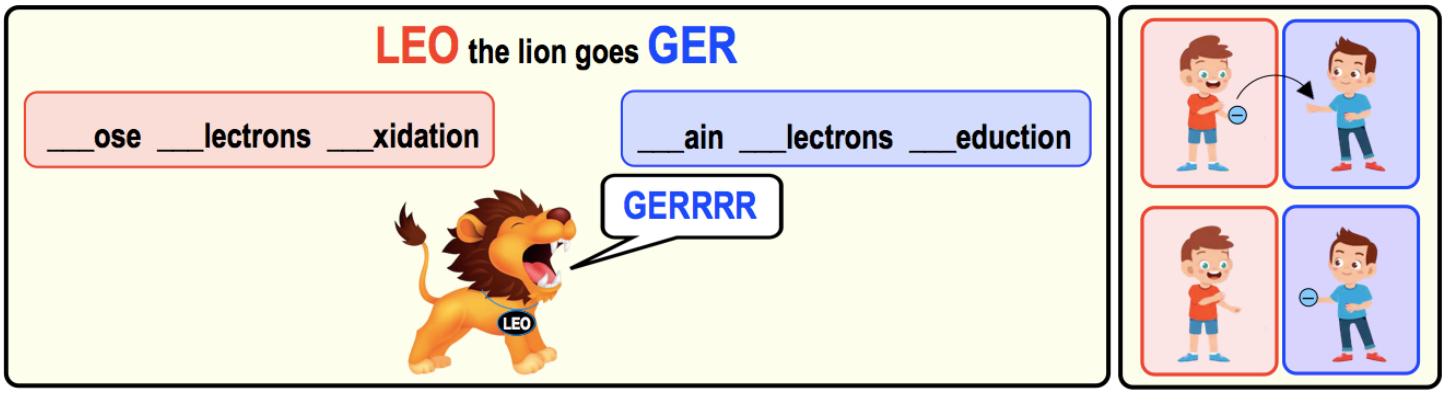
CONCEPT: REDOX REACTIONS

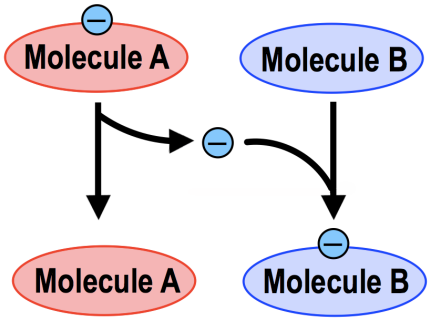
- **Oxidation-Reduction** (_____) **Reaction**: *transfers* _____ (e^-) between molecules.
  - □ **Oxidation:** the process of _____ one or more electrons.
  - □ **Reduction:** the process of _____ one or more electrons (overall charge is reduced).
  - □ Oxidation & reduction reactions always occur _____ (at the same time).

EXAMPLE: Redox Reaction (**LEO** the Lion goes **GER**).



EXAMPLE: Which of the following molecules is oxidized and which is reduced?

a) Molecule A is oxidized ; Molecule B is reduced.
b) Molecule A is reduced ; Molecule B is oxidized.
c) Both Molecule A & Molecule B are reduced.
d) Both Molecule A & Molecule B are oxidized.



PRACTICE: Oxidation is the _____, and reduction is the _____.

a) Gain of electrons ; Loss of electrons.
b) Gain of protons ; Loss of protons.
c) Loss of electrons ; Gain of electrons.
d) Gain of oxygen ; Loss of oxygen.

PRACTICE: When glucose donates electrons to NAD^+ creating NADH, the glucose molecule becomes:

a) Hydrolyzed.
b) Oxidized.
c) Neutral.
d) Reduced.

CONCEPT: REDOX REACTIONS

Electron Carriers: NADH & $FADH_2$

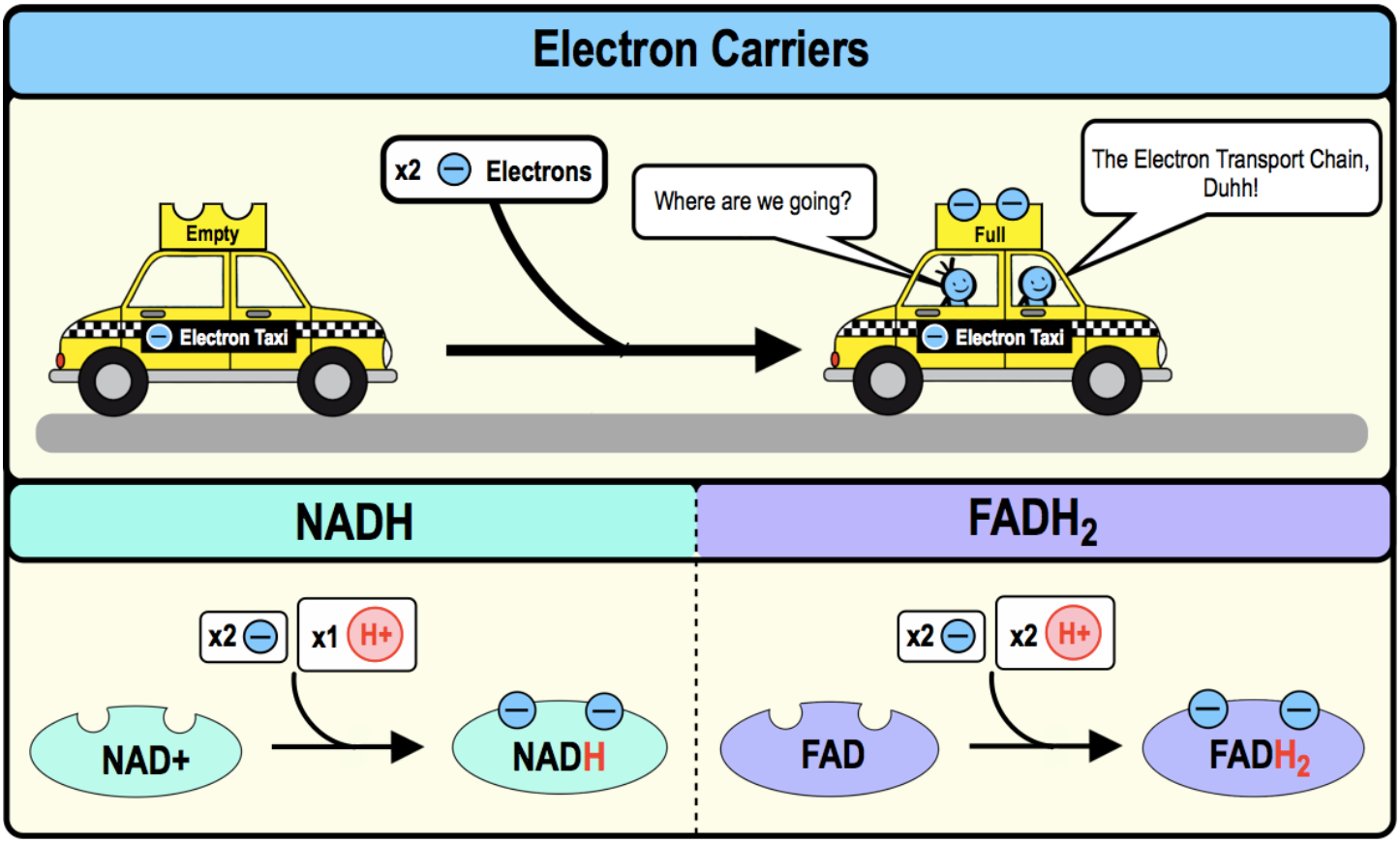
●Many biological processes (including *Cellular Respiration*) conduct redox reactions using *electron* _____.

□ Electron carriers such as _____ & _____ each carry/transport _____ electrons.

□ NADH & $FADH_2$ can shuttle electrons to different locations within a cell like an electron "_____" cab.

□ NAD^+ & FAD are the _____ forms of NADH & $FADH_2$, respectively.

EXAMPLE: Formation of NADH and $FADH_2$.



□ *Helpful Memory Tool*: think that NAD____ and FAD____$_2$ are just a little bit "____eavier."

□ During *Cellular Respiration*, electrons carried by NADH & $FADH_2$ go to the *Electron Transport Chain*.

PRACTICE: An electron carrier before it harvests energy from glucose molecules in a series of gradual steps is:

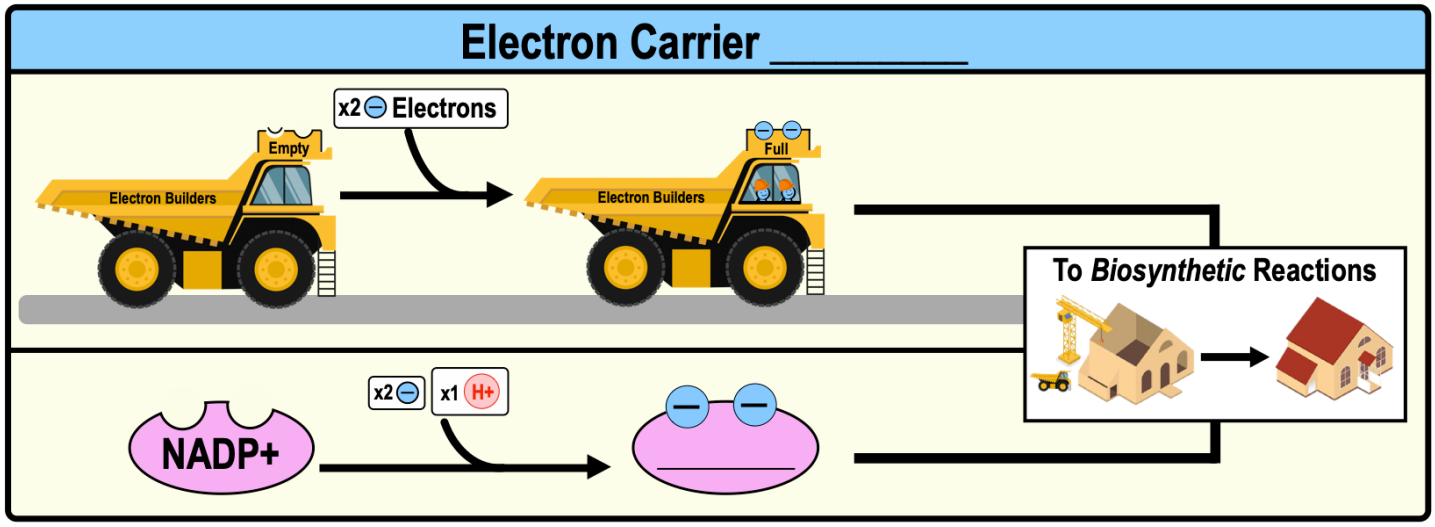
a) Pyruvate. b) AMP. c) ATP. d) NAD^+. e) NADH.

CONCEPT: REDOX REACTIONS

Electron Carrier NADPH

●NADPH is an electron _____ similar to NADH and $FADH_2$ for reduction reactions.

●However, unlike NADH & $FADH_2$, NADPH is used in _____ reactions for biosynthesis.



PRACTICE: NADH is commonly used as an electron carrier during the *breaking down* of complex molecules like glucose in cellular respiration. NADPH is also a common electron carrier. However, NADPH is used to *build* complex molecules like glucose in a process called:

a) Biogenesis.
b) Biocatalysis.
c) Biosynthesis.
d) Metabolism.

PRACTICE: Which electron carrier is *not* matched with its correct function.

a) NADH: Shuttles electrons to regions of the cell which need energy.
b) $FADH_2$: Shuttles electrons to the electron transport chain during cellular respiration.
c) NADPH: Shuttles electrons to photosynthesis where glucose molecules are being made.
d) All of the above electron carriers are matched with their correct function.