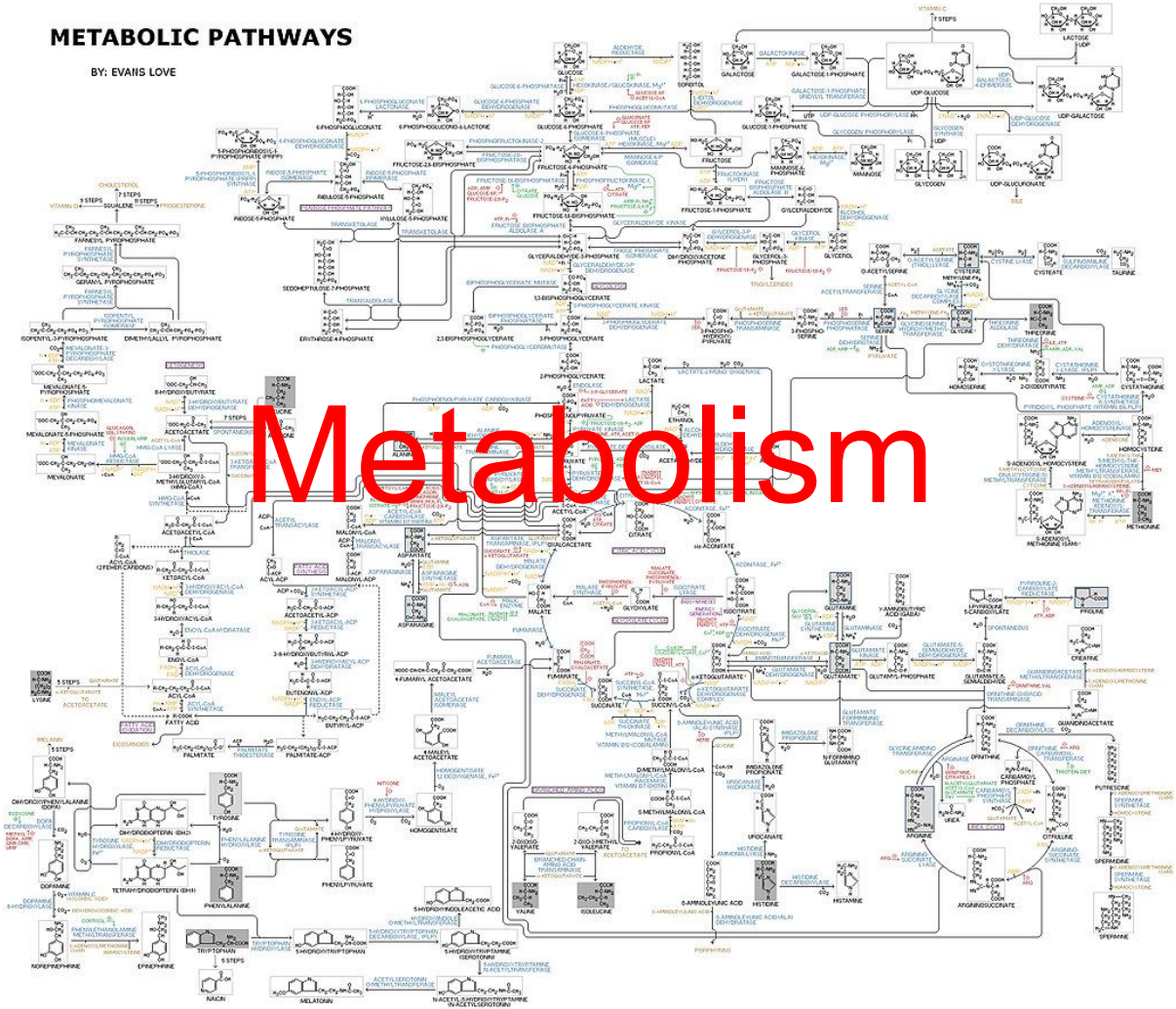
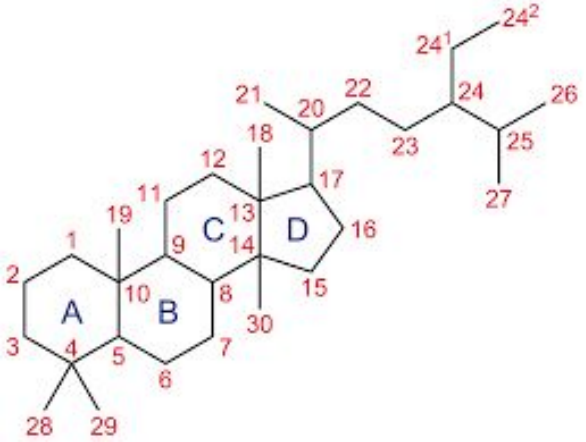

METABOLIC PATHWAYS
BY: EVANS LOVE
Metabolism

Anabolic pathways require an input of energy to synthesize complex molecules from simpler ones.

- Synthesis of large proteins from amino acid building blocks
- Synthesis of new DNA strands from nucleic acid building blocks.

Demand energy provided by ATP and other high-energy molecules like NADH



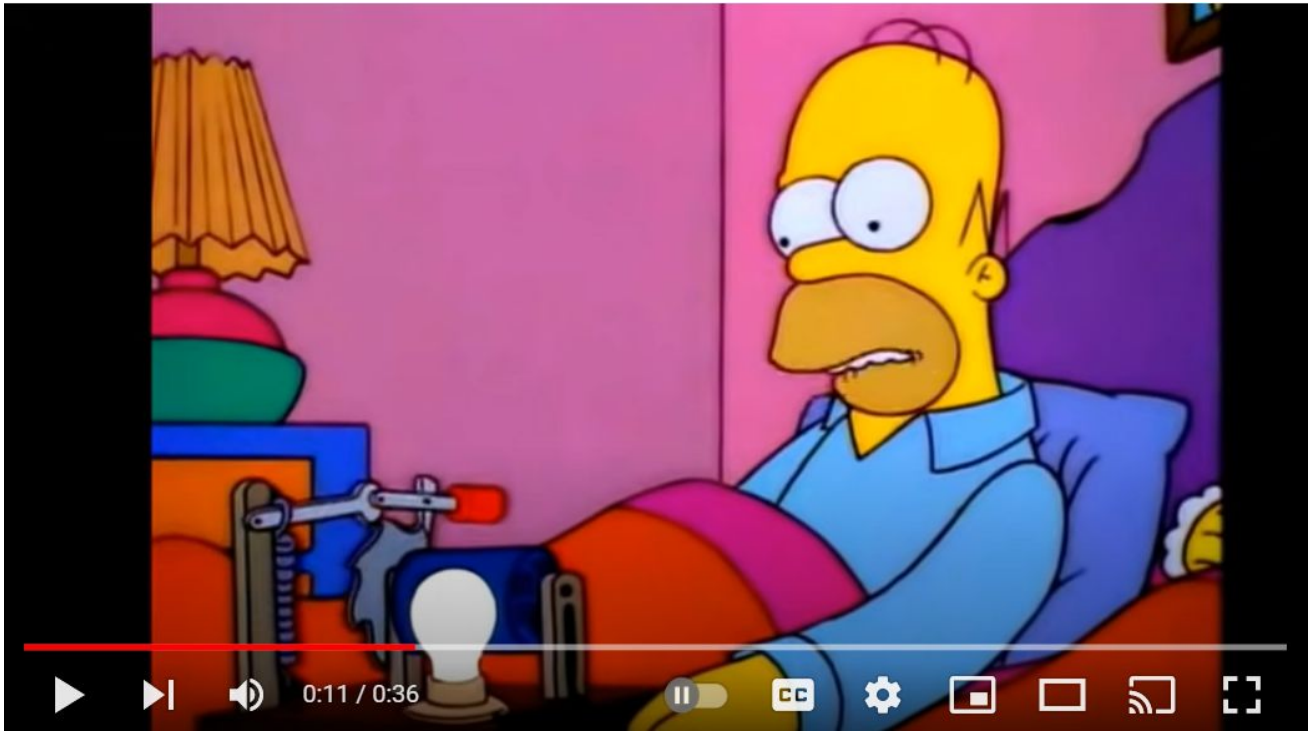
Catabolic pathways involve the degradation (or breakdown) of complex molecules into simpler ones.

- Molecular energy stored in the bonds of complex molecules is released in catabolic pathways and harvested in such a way that it can be used to produce ATP.

Other energy-storing molecules, such as fats, are also broken down through similar catabolic reactions to release energy and make ATP

“There is nothing that living things do that cannot be understood from the point of view that they are made of atoms according to the laws of physics”

The Laws of Thermodynamics



Types of Energy

Types of Energy

- Kinetic Energy
- Potential Energy
- Chemical Energy

Fire & Ice

Some say the world will end in fire,
Some say in ice.
From what I've tasted of desire
I hold with those who favor fire.
But if it had to perish twice,
I think I know enough of hate
To say that for destruction ice
Is also great
And would suffice.

-Robert Frost

The First Law of Thermodynamics

- The first law of thermodynamics deals with the total amount of energy in the universe. It states that this total amount of energy is constant.

The Second Law of Thermodynamics

- The second law of thermodynamics indicates the irreversibility of natural processes, and, in many cases, the tendency of natural processes to lead towards spatial homogeneity of matter and energy, and especially of temperature.

The Second Law of Thermodynamics

- Heat does not spontaneously pass from a colder to a hotter body.

The fate of the universe

The Second Law also predicts the end of the universe, according to Boston University. "It implies that the universe will end in a ‘heat death’ in which everything is at the same temperature. This is the ultimate level of disorder; if everything is at the same temperature, no work can be done, and all the energy will end up as the random motion of atoms and molecules.”

Third Law of Thermodynamics:

- A system's entropy approaches a constant value as its temperature approaches absolute zero