Carbon on the Move

Follow carbon through plants and animals.

7.2 "Construct an explanation of how photosynthesis and cellular respiration cycle matter and establish the flow of energy into and out of an organism. a..."

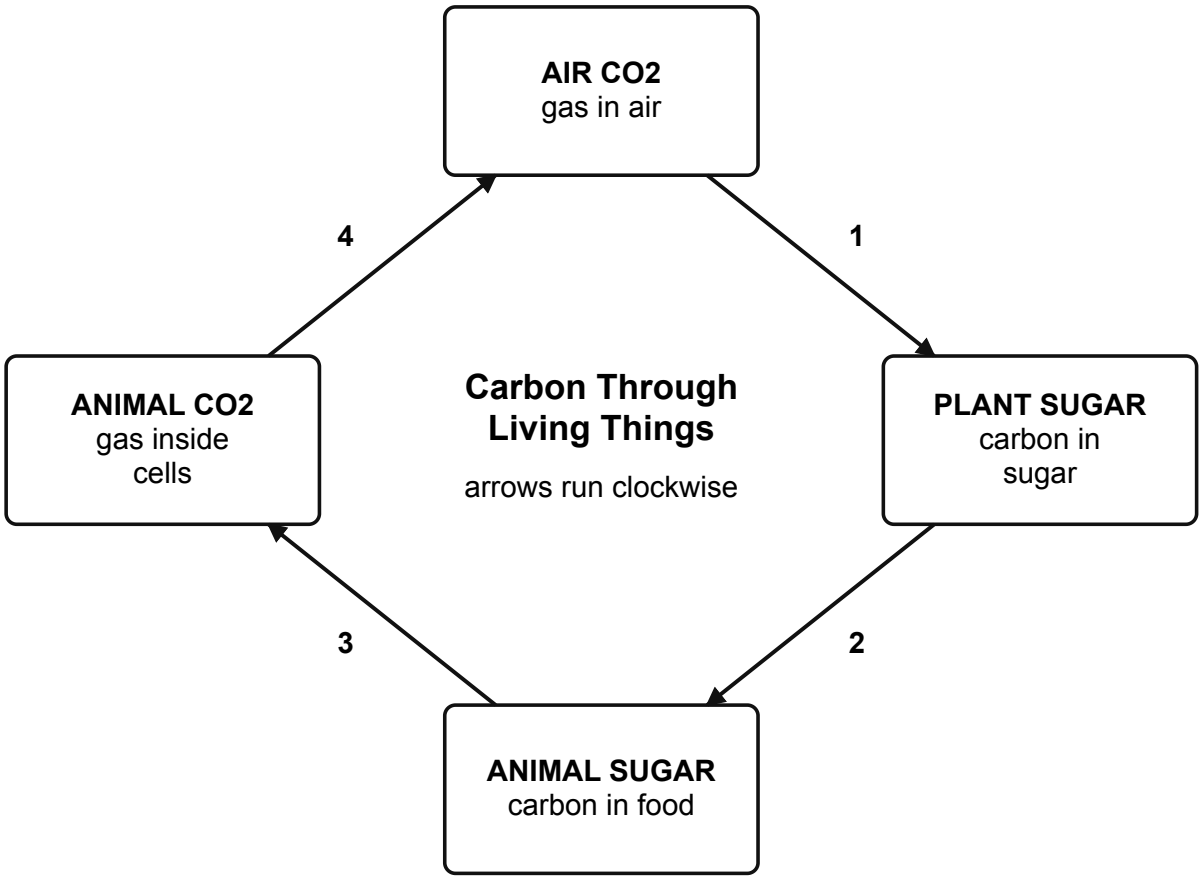
NAME _____ DATE _____

1 LABEL THE MODEL

Word bank below

Use the word bank to fill each numbered arrow box. Write one process in each box.

WORD BANK Cellular respiration | Eating and digesting | Exhaling | Photosynthesis



Arrow numbers match the response boxes on the next student section.

Label the arrows

Use the word bank to write the process for each numbered arrow.

Arrow 1	Arrow 2

Arrow 3	Arrow 4

2 RUN THE MODEL

Use your finished diagram

1. Which process uses light energy to move carbon from the air into sugar?

2. Which process releases usable energy from sugar in an animal?

3. Use the model to explain how a carbon atom can return to air and enter a plant again. Then trace energy from sunlight into food, through an animal and out as heat. Why is energy not another closed loop?

3 CHECK IT

Before you turn it in

- [ ] I used each process once.
- [ ] I explained a complete carbon path.
- [ ] I distinguished matter cycling from energy flow.

TEST THE MODEL

What is one way bacteria can release energy without oxygen that this model leaves out?

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PART 1 · COMPLETED MODEL

ARROW	FROM	TO	PROCESS
1	AIR CO2 gas in air	PLANT SUGAR carbon in sugar	Photosynthesis
2	PLANT SUGAR carbon in sugar	ANIMAL SUGAR carbon in food	Eating and digesting
3	ANIMAL SUGAR carbon in food	ANIMAL CO2 gas inside cells	Cellular respiration
4	ANIMAL CO2 gas inside cells	AIR CO2 gas in air	Exhaling

PART 2 · RUN THE MODEL

1. **Photosynthesis.** (Which process uses light energy to move carbon from the air into sugar?)
2. **Cellular respiration.** (Which process releases usable energy from sugar in an animal?)
3. **Carbon in plant food enters an animal, returns to air as CO2 through respiration and exhaling, and can reenter a plant through photosynthesis. Light energy becomes stored chemical energy; respiration transfers some to cellular work and some dissipates as heat. Matter cycles, but energy flows through and is not recycled as usable sunlight.** (Use the model to explain how a carbon atom can return to air and enter a plant again. Then trace energy from sunlight into food, through an animal and out as heat. Why is energy not another closed loop?)

TEST THE MODEL (SAMPLE ANSWERS)

- Some bacteria release energy from sugar by fermentation.
- Some bacteria use nitrate instead of oxygen during cellular respiration.

The arrows track carbon, not energy. Light energy enters during photosynthesis, and some energy eventually leaves as heat.