

Systems Team Up During Exercise

Use evidence to explain how breathing, blood flow, and muscles work together

Name: _____ Date: _____

Part 1: Read the evidence and map the interaction

Three-system subset: Focus only on the respiratory, cardiovascular, and muscular systems. Your job is to show interactions, not just list what each system does.

Fictional classroom evidence cards

Card A - Activity model: In a classroom model, Jordan's breathing count changed from 16 breaths per minute while resting to 32 breaths per minute after jogging. Jordan's pulse changed from 72 to 128 beats per minute.

Card B - Muscle cells: Working muscle cells use oxygen and glucose for energy. They produce carbon dioxide as a waste.

Card C - Transport: Blood can carry oxygen from the lungs and glucose from digested food to body cells. Blood also carries carbon dioxide from cells to the lungs, where it can leave the body when a person exhales.

1. On the diagram, draw and label arrows for oxygen, glucose, and carbon dioxide. Make each arrow show where the material moves. Then add one note explaining why the heart pumps faster during exercise.

Respiratory system
lungs / breathing

Muscular system
working muscles

Draw labeled arrows in the open space.

Cardiovascular system
heart and blood vessels

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Part 2: Construct a CER explanation

2. Write a claim-evidence-reasoning (CER) explanation. Answer this question: **How do the respiratory, cardiovascular, and muscular systems interact during exercise?**

Claim: State how the three systems work as a team.

Evidence: Use at least two details from Cards A-C. Include a change shown in Card A.

Reasoning: Explain the cause-and-effect chain. Trace oxygen and glucose to muscles, then trace carbon dioxide away from muscles. Explain why this helps muscles keep working.

Self-check: Did I name materials moving between systems, use evidence, and explain why the interactions matter?

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Teaching notes: setup and observation

Purpose and materials

This is a three-system subset of S7L2.c. Supplied materials: student pages with fictional classroom evidence cards and a blank interaction diagram. Additionally needed: one copy per student, pencils, and optional highlighters. The evidence cards are original instructional models, not results from a real study.

Exact setup

Print both student pages double-sided or as two separate pages. Place students in pairs only for the diagram discussion; each student draws and writes independently. Give students 8 minutes for Part 1 and 12 minutes for Part 2.

Teaching script

Say: “Today we are studying only three body systems. Do not make a list of system jobs. Instead, show what moves between systems and why that movement matters. Read the cards. In your diagram, arrows must have a direction and a material label. In your CER, evidence is information from a card; reasoning explains how that evidence supports your claim.”

After 5 minutes, say: “Check that carbon dioxide travels away from muscles, not toward them.”

Observation method

While students work, use a checklist for each student: (1) labels oxygen, glucose, and carbon dioxide; (2) gives a direction for each; (3) cites two card details; (4) explains a causal chain rather than listing functions. Prompt only: “What material is moving, and where does it go?” Record whether the student revises independently after the prompt.

Source credit

Standard task reference: Georgia Science S7L2.c, supplied task reference URL:
<https://lessonmakerpro.com/standards/ga-science/s7l2-c>

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Answer key and scoring guide

1. Diagram key

Accept arrows showing: lungs/respiratory system → blood/cardiovascular system → muscles for oxygen; blood → muscles for glucose; muscles → blood → lungs for carbon dioxide. The heart pumps faster so blood can move oxygen and glucose to active muscle cells and carry carbon dioxide away more quickly. Card A supports increased breathing and pulse during this fictional activity model.

2. Sample CER response

Claim: During exercise, the respiratory, cardiovascular, and muscular systems interact to supply active muscles and remove a waste.

Evidence: In Card A, breathing increased from 16 to 32 breaths per minute and pulse increased from 72 to 128 beats per minute after jogging. Card B says muscle cells use oxygen and glucose and produce carbon dioxide. Card C says blood carries oxygen and glucose to cells and carbon dioxide to the lungs.

Reasoning: Faster breathing brings oxygen into the lungs. The cardiovascular system moves oxygen in blood to muscle cells and also delivers glucose that entered blood after digestion. The muscles use these materials for energy. Carbon dioxide made by muscles enters the blood, travels to the lungs, and is exhaled. Therefore, the systems depend on one another rather than working separately.

Scoring rubric - 4 points

1 point: accurate team claim. 1 point: at least two accurate evidence details, including Card A data. 1 point: traces oxygen and glucose from blood to muscles. 1 point: traces carbon dioxide from muscles through blood to lungs and explains why the movement supports continued muscle activity.

Accept equivalent wording. Do not require students to discuss the excretory or digestive systems; glucose may be described as “nutrient in the blood.”