

Heat in Motion

Track structure and diction in a technical explanation.

12.RI.2 “Craft and Style Analyze text structures to discern how they affect the meaning and message of informational and technical writing and how their text structures differ from those in narrative texts...”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the words that signal a structural move, then circle two words or phrases that shape the writer’s attitude or the mood. These marks will help you connect organization and diction to the article’s message.

How a Heat Pump Moves Warmth

- ① Winter heating often sounds like a simple battle against cold, but a heat pump does not manufacture warmth in the way a toaster makes heat. Instead, it relocates thermal energy already present outdoors, even when the air feels bitter. This distinction matters because the device’s efficiency depends on a temperature difference, not on creating energy from nothing. In a conventional resistance heater, electricity becomes heat at the unit. In a heat pump, electricity chiefly runs compressors and fans that move heat from one place to another. This difference between the two systems shapes how engineers judge efficiency.
- ② First, a refrigerant absorbs heat as it evaporates in an outdoor coil. Although the outdoor air may be cold, its molecules still contain thermal energy above absolute zero. Next, a compressor squeezes the refrigerant vapor, raising its pressure and temperature. Inside the building, the hot vapor releases heat through an indoor coil and condenses back into liquid. Finally, an expansion valve lowers the liquid’s pressure so it can absorb heat again. The cycle is closed, continuous, and carefully controlled. Each stage prepares the refrigerant for the stage that follows.
- ③ However, performance is not equally strong in every setting. As outdoor temperatures fall, the pump must work harder to gather usable heat, and some systems rely on supplemental resistance heating during severe cold. Installation also demands space for equipment, sound planning, and attention to a building’s insulation. These limits temper claims that a heat pump is effortless or universal. The technology remains capable, but its benefits are conditional: they depend on climate, equipment design, and the building around it. A useful decision weighs those constraints alongside possible energy savings.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What text structure dominates paragraph 2? Cite two signal words or phrases, and explain how this structure helps the reader.

2 How do paragraphs 1 and 3 frame the process explained in paragraph 2? What message does this overall structure create?

3 How do the words “carefully controlled” and “conditional” affect the writer’s attitude and the mood of the passage?

4 What does paragraph 2 follow from beginning to end, and why is that focus more typical of technical writing than of narrative writing?

3 YOUR TURN _____ Your own words

Write a 90-120-word technical explanation of a device or process you know. Use a problem-to-process-to-limitation structure, at least three structural transitions, and at least two precise technical terms. Then add one sentence that identifies the structure and mood you created.

PART 1 • READ AND MARK

Underline the words that signal a structural move, then circle two words or phrases that shape the writer's attitude or the mood. These marks will help you connect organization and diction to the article's message. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What text structure dominates paragraph 2? Cite two signal words or phrases, and explain how this structure helps the reader.	Paragraph 2 uses sequence, or process order. "First," "Next," and "Finally" guide readers through the refrigerant cycle so they can follow each stage in order.
2	How do paragraphs 1 and 3 frame the process explained in paragraph 2? What message does this overall structure create?	Paragraph 1 contrasts moving heat with creating heat, paragraph 2 explains the process, and paragraph 3 gives limitations. This structure presents heat pumps as efficient but not effortless or universal.
3	How do the words "carefully controlled" and "conditional" affect the writer's attitude and the mood of the passage?	"Carefully controlled" presents the system as precise and dependable, while "conditional" qualifies that confidence. Together, they create a measured, cautious mood.
4	What does paragraph 2 follow from beginning to end, and why is that focus more typical of technical writing than of narrative writing?	It follows thermal energy and refrigerant through equipment stages. Technical writing explains how a system works, while narrative writing usually follows characters and events.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Rain can make a bicycle rim brake less reliable because water reduces friction between the pad and rim. First, a hydraulic disc brake transfers force from the rider's hand through sealed fluid in a hose. Next, pressure pushes pistons in the caliper, which clamp pads against a metal rotor attached to the wheel. The friction converts the wheel's motion into heat, slowing the bicycle. Regular inspection prevents small leaks from becoming dangerous failures. However, the system still needs aligned parts and uncontaminated pads, because oil on the rotor sharply weakens braking. The structure moves from problem to process to limitation, and the mood is practical and cautious.

Accept equivalent descriptions of the passage's compare-and-contrast, sequence, and qualification structure when students support claims with passage evidence. For the open task, accept varied devices or processes if the explanation includes the required structure, transitions, technical diction, and an accurate note about mood.