Beyond a White Roof

Trace how an explanation connects a process, evidence, and a decision.

12.CL.11.b "Write explanations and expositions that examine and convey complex ideas or processes effectively, develop the topic utilizing and citing credible sources of information or data when relevant, use intentional transitions..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the two source references, circle transitions that show sequence or qualification, and number the paragraphs to show the movement from mechanism to evidence to decision.

Would a Cool Roof Help This School?

1 At noon, a dark school roof can become much hotter than the air above it. Some of that heat moves into the building, raising the demand for cooling. A cool roof changes this exchange without changing the building's shape: its surface reflects more incoming sunlight and releases absorbed heat efficiently. These are separate properties. Solar reflectance describes how much sunlight bounces away; thermal emittance describes how readily a surface radiates heat it has absorbed. This distinction matters because calling a roof simply "white" says little about how it performs after years of dirt, weather, and repairs.

2 The U.S. Environmental Protection Agency, in its guide *Using Cool Roofs to Reduce Heat Islands*, identifies high solar reflectance and high thermal emittance as characteristics of cool roofs. That guidance supports a mechanism, not a promise that every building will save the same amount of energy. First, less solar energy absorbed at the roof means less heat available to pass indoors. Consequently, cooling equipment may need to run less during hot weather. The U.S. Department of Energy's *Cool Roofs* guidance likewise notes that savings depend on factors such as climate, insulation, and building design.

3 However, a lower summer cooling load does not settle the purchase decision. In a cold season, reflecting sunlight can reduce helpful solar warming, although the size of that effect depends on the building and its location. Before replacing a sound roof, a school could compare roofing bids, inspect the existing insulation, and estimate energy use across the whole year. It could also check whether a proposed coating is compatible with its current roof. The strongest recommendation would connect these site-specific findings to the cited research, rather than treating a general explanation of heat flow as a guaranteed cost saving.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why does the first paragraph distinguish solar reflectance from thermal emittance instead of describing a cool roof only by its color?

2. What does the Environmental Protection Agency citation support, and what larger claim does the writer avoid making from it?

3. How does "However" at the start of the third paragraph change the direction of the explanation?

4. How does the final paragraph turn the cited research into a more useful recommendation for a particular school?

3 YOUR TURN

Your own words

Write one paragraph of 85 to 105 words explaining how a school should evaluate a cool roof for its gym rather than choosing a coating by color alone. Organize the steps, use at least two intentional transitions and one precise technical term, cite the EPA or DOE source named in the passage, and address a practical limitation.

ANSWER KEY

Beyond a White Roof

GRADE 12 · 12.CL.11.b

PART 1 · READ AND MARK

Underline the two source references, circle transitions that show sequence or qualification, and number the paragraphs to show the movement from mechanism to evidence to decision. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why does the first paragraph distinguish solar reflectance from thermal emittance instead of describing a cool roof only by its color?	**The terms name separate ways a roof manages heat: reflecting sunlight and releasing absorbed heat. Color alone does not establish how a roof performs.**
2	What does the Environmental Protection Agency citation support, and what larger claim does the writer avoid making from it?	**It supports the description of cool roofs as having high solar reflectance and thermal emittance. The writer avoids claiming that every building will save the same amount of energy.**
3	How does "However" at the start of the third paragraph change the direction of the explanation?	**It shifts from possible cooling benefits to limits on the purchase decision, including reduced solar warming in a cold season.**
4	How does the final paragraph turn the cited research into a more useful recommendation for a particular school?	**It calls for site-specific checks, such as insulation, bids, annual energy use, and coating compatibility, before recommending a roof.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Our school should evaluate the gym roof before choosing a new coating. First, facilities staff could inspect its insulation and ask contractors for products' solar reflectance and thermal emittance ratings. The Environmental Protection Agency's *Using Cool Roofs to Reduce Heat Islands* identifies these properties as characteristics of cool roofs. Next, staff could compare annual energy estimates for the proposed roof and the current one, not just summer cooling estimates. However, a coating that cannot be applied to the existing roof could increase costs. A recommendation should weigh the likely energy change against installation costs and the roof's remaining lifespan.

Accept different paragraph structures if students accurately explain how the evidence informs a site-specific decision. Do not accept a citation as proof of guaranteed savings.