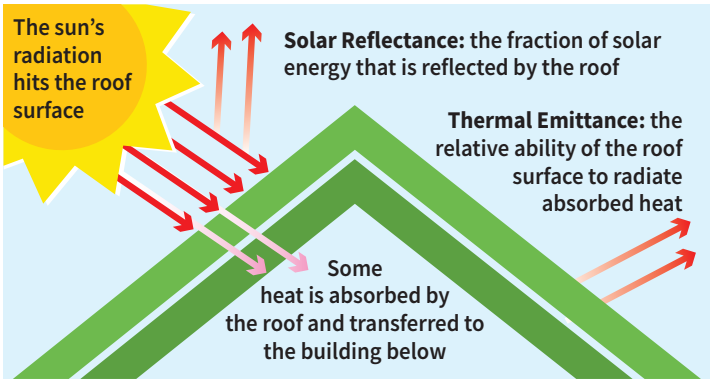
Cool & Collected

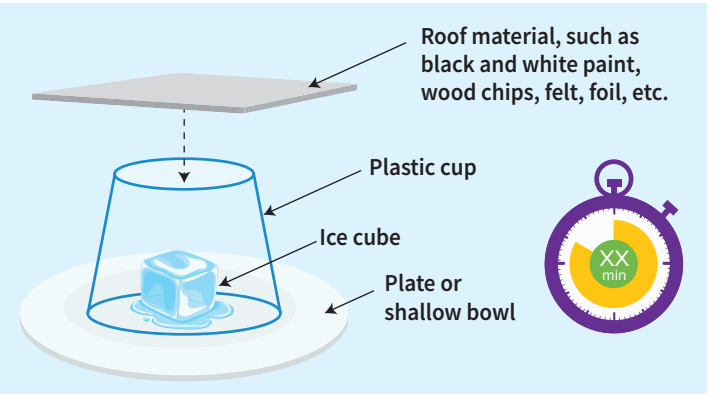
In the same way that visible light is absorbed and reflected, heat and energy from sunlight are absorbed and reflected by everything around us. This is why the seats in a car get hot on a sunny day and why people use umbrellas to prevent sunburn at the beach.

Study the diagram on the right to understand more about how this works. Then complete the experiment to learn how architects and engineers can use this principle to keep things cool, inside and out.



PROJECT BRIEF

The object of this experiment is to test how different roof colors and materials might impact the internal temperature of a structure. Using a plastic cup as the structure, you will work in groups to compare the time it takes to melt an ice cube using various materials.



Materials:

Plastic cup, a plate or shallow bowl, and ice cubes. Your teacher will help guide you in selecting materials to use for the roof, such as black and white paint, wood chips, felt, foil, etc.

Instructions:

1. Begin by making a hypothesis about how fast the ice cube will melt under specific materials. Consider the subtractive principles of color and whether that may be relevant.
2. Choose materials or paint colors to use as the roof of your structure. You will repeat this experiment several times with different selections.
3. Using the plastic cup as the base of your structure, coat, paint, or attach the roofing materials.
4. Place an ice cube on the plate or bowl and place the cup over it.
5. Use a stopwatch to measure how long it takes the ice cube to melt completely, and record your results in the chart below.

Hypothesis: The ice cube will take the longest to melt when_____

Test	Roof Material	Melt Time	Notes
1.	None		Use this as a control for direct light.
2.			
3.			
4.			
5.			

Conclusion: _____

What's Happening Here? Remember subtractive color mixing? Light colors absorb less and reflect more light than dark colors, and black absorbs all of the light. Just as with color, the same is true with light's invisible wavelengths, such as infrared and ultraviolet light. How do you think this would apply to different parts of a building or the pavement?

American Coatings Association℠