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## INVESTIGATING THE EFFECT OF MATERIAL PROPERTIES ON THERMAL CONDUCTIVITY: AN INQUIRY-BASED APPROACH

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This study investigates the effect of material properties, specifically wood, plastic, and steel, on thermal conductivity through an inquiry-based approach. Thermal conductivity is a key factor influencing heat transfer in various applications, from construction to manufacturing. The research explores how the intrinsic properties of these materials, including density, structure, and composition, affect their ability to conduct heat. By focusing on common materials like wood, plastic, and steel, the study provides a comparative analysis of their thermal performance. Experimental and theoretical methods were employed to examine the heat transfer characteristics of each material under different conditions. The results reveal that steel, with its high density and metal structure, exhibits the highest thermal conductivity, while wood, being a natural insulator with a porous structure, shows the lowest thermal conductivity. Plastics exhibit intermediate thermal conductivity values depending on their type and molecular structure. The findings emphasize the significant role of material composition and structure in determining heat transfer efficiency, offering valuable insights for selecting materials in energy-efficient designs. This inquiry-based approach deepens the understanding of thermal conductivity in diverse materials and encourages further exploration into how these properties can be optimized for various industrial applications.

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