

Name _____

Mechanics of a Wedge

Open-Ended Response Answer Key

1. To split a log of wood for a campfire using an axe, you would start by placing the log on a stable surface, like a log-splitting block. Position the axe with the wedge-shaped blade at the center of the log. By raising the axe and striking it forcefully with a downward motion, the wedge-shaped blade concentrates the force at the narrow end, causing the log to split along the grain, creating smaller pieces of wood for the campfire.
2. The trade-off between force and distance is crucial in the design of cutting tools like knives and scissors. The wedge shape of the blade allows users to apply a smaller force over a longer distance while concentrating that force at the sharp edge. This makes it easier to cut through materials such as food, paper, or fabric with precision.
3. A doorstop and a temporary securing wedge in construction both use the wedge shape to concentrate force. However, the doorstop is designed to prevent a door from closing, while the construction wedge is used to secure objects temporarily in place, like beams or boards during construction. Both applications leverage the mechanical advantage of the wedge to serve their respective purposes.
4. Wedges have been used by humans for centuries due to their versatility and efficiency in various tasks. They have influenced the development of tools and objects across different cultures and time periods. For example, ancient civilizations used wedge-shaped stones as cutting tools and wedges to secure heavy objects. This simple machine continues to play a significant role in modern life, contributing to the design of various tools and devices, making tasks easier and more efficient.

