

Name _____

Powering the World: How Heat Engines Drive Progress

Open-Ended Response Answer Key

1. The heat engine cycle in a car engine begins with the intake of air and fuel (heat absorption), followed by the compression of the air-fuel mixture (compression). Next, the mixture is ignited, leading to a rapid expansion of gases that pushes the piston (expansion). Finally, the exhaust gases release heat to the surroundings (heat release), and the cycle repeats.
2. Steam engines played a pivotal role in the Industrial Revolution by powering factories and locomotives. They enabled the efficient transportation of goods and people, revolutionizing industries and expanding trade networks.
3. In a future with highly efficient and environmentally friendly engines, we could experience reduced air pollution, lower fuel consumption, and decreased greenhouse gas emissions. Our daily commutes would be cleaner and more sustainable, benefiting both our health and the environment.
4. Reducing greenhouse gas emissions from internal combustion engines requires innovations like hybridization, electric vehicles, and the use of alternative fuels. Implementing these solutions can help decrease the environmental impact of these engines and transition to more sustainable transportation options.

