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Teaching Physics through Ancient Chinese Science and Technology

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Asian studies and Physics is a unique blend rarely found in a Western scientific classroom.The field of Asian studies is rapidly growing and the traditional study of Asian philosophy, art, language and literature is branching out into scientific realms. At the same time, there is a growing need to educate our young people in science technology and mathematics (STEM). Reaching non-science majors with the basic principles of physics presents a particularly unique challenge. The topics presented in this work are designed to appeal to a wide range of students and present scientific principles through the technology and inventions of ancient China. We explore these ideas in their historical Chinese context and through the lens of our current scientific understanding. Our exploration of ancient Chinese science is not limited to just a theoretical understanding of physical principles. One distinction of this book is the strong "hands on" component. Detailed laboratory experiments are included which enable students to analyze ancient technology using modern laboratory techniques. Each experiment introduces the historical context and provides associated Chinese vocabulary. On the surface, these experiments involve recreating a Chinese technology. On a deeper level, we find connections to the scientific method and techniques of experimental analysis. Thus, an activity such as making paper, turns into a lesson on statistics and graphical analysis. Topics included in this volume cover one dimensional motion, energy conservation, rotational equilibrium and elasticity. We also explore the nature of science and include an introduction to the Chinese language. Laboratory experiments cover papermaking, constructing a weighing balance and stress-strain analysis of silk.

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