



Exploring the Significance of Sundials in Ancient Chinese History and Culture

Introduction	
<p>Students will explore the cultural significance of sundials in ancient China, and understand their connection to Chinese geography and history.</p>	
<p>Indiana Standards Connections:</p> <ul style="list-style-type: none"> • Standard 5.1: Explain how geographic factors such as location, climate, and physical features have influenced the development and distribution of human settlements and patterns of land use. • Standard 5.2: Describe and explain the patterns of human settlement, population distribution, and migration across the Earth’s surface. • Standard 5.3: Explain how technology and innovation have impacted human activity and shaped the physical and human characteristics of places and regions. • Standard 5.4: Analyze the impact of cultural diffusion and the exchange of ideas on human activity and the environment. 	<p>Compelling Question(s):</p> <ul style="list-style-type: none"> • How did the invention and use of sundials reflect the geographical, cultural, and technological advancements of ancient China?
<p>Lesson Objectives:</p> <ul style="list-style-type: none"> • To explore the cultural significance of sundials in ancient China. • To understand the connection between Chinese geography, history, and the invention of sundials. • To make connections between the study of ancient Chinese sundials and Indiana State Geography Standards. <p>Students will:</p> <ul style="list-style-type: none"> • Explain the cultural significance of sundials in ancient China, including their importance in daily life, agriculture, and religious practices. • Describe how geographical factors such as location, climate, and physical features influenced the development and use of sundials in ancient China. • Identify connections between the study of ancient Chinese sundials and Indiana State Geography Standards, particularly in terms of cultural diffusion, technological advancements, and the impact of geography on human activity. 	

Materials

- Image of the Chinese Brass Equatorial Sundial
- Map of China
- Drawing materials (paper, pencils, markers)
- Computer/tablet with internet access for research
- Texts or resources about Chinese geography and history

Learning Plan

Activities

Introduction (10 minutes):

- Display the image of the Chinese Brass Equatorial Sundial and provide a short description.
- Ask students what they know about sundials and how they work.
- Encourage discussion about the concept of timekeeping based on the position of the sun.
- Explain that the Chinese Brass Equatorial Sundial is a sophisticated timekeeping instrument used in ancient China and other civilizations for centuries.

Historical Context (15 minutes):

- Briefly discuss the historical significance of sundials in ancient civilizations, including China.
- Explore how the Chinese Brass Equatorial Sundial differs from traditional sundials in terms of design and functionality.
- Discuss the importance of timekeeping in ancient societies for agriculture, navigation, and religious observances. Connect to other cultures that have been discussed in class.

Construction and Functioning (20 minutes):

- Break down the components of the Chinese Brass Equatorial Sundial, such as the disk, partial rim, and rectangular stand.
- Explain how the sundial is oriented towards the sun and how the shadow cast by the disk indicates the time.
- Discuss how the equatorial ring design allows for accurate timekeeping throughout the year.

Activity: Design Your Sundial (30 minutes):

- Divide students into small groups and provide them with drawing materials.
- Instruct each group to design their sundial, incorporating elements of the Chinese Brass Equatorial Sundial as well as their creative ideas.
- Encourage students to consider the practicality and functionality of their designs.
- Allow time for groups to present their designs to the class and explain their thinking behind the design choices.

Research and Reflection (15 minutes):

- Assign students to research further about the history and cultural significance of sundials, focusing on different civilizations and periods of time.
- Have students write a short reflection on what they've learned about sundials and their importance in human history.

Conclusion (5 minutes):

- Recap the key points discussed during the lesson.
- Emphasize the importance of understanding ancient timekeeping methods in appreciating the development of modern technology.
- Encourage students to continue exploring topics related to astronomy, history, and engineering.

Assessment Suggestions

Assessment can be based on participation in discussions, the quality of the sundial designs, and the depth of reflection in written assignments.

Extensions

- **Comparative Analysis:** Have students compare and contrast the Chinese Brass Equatorial Sundial with other ancient timekeeping devices from different cultures, such as the Egyptian sundial or the Greek water clock. This extension could involve research, group discussions, and presentations.
- **Hands-on Construction:** Provide materials for students to create their own working models of sundials, either based on the Chinese design or using variations inspired by other cultures. This extension allows for practical application of concepts learned in the lesson and encourages creativity.
- **Geographical Case Studies:** Assign students to research and present case studies of how geographical factors influenced the development of timekeeping methods in different regions of the world, such as the use of sundials in ancient Mesopotamia or the adoption of mechanical clocks in medieval Europe.
- **Cross-Curricular Connections:** Integrate the study of sundials into other subject areas, such as mathematics (calculating angles and shadows), science (understanding the Earth's rotation and orbit), or art (creating illustrations or sculptures of sundials). This extension encourages interdisciplinary learning and reinforces key concepts from the lesson.
- **Field Trip or Guest Speaker:** Arrange a field trip to a local observatory, or museum with a collection of ancient timekeeping devices, or invite a guest speaker who specializes in the history of astronomy or ancient technologies. This extension provides students with real-world connections and enhances their understanding of the topic.
- **3D Printing:** If available, have students research designs of sundials on 3D printing resource websites and see if they can print a sundial that works the same way as the Chinese Sundial.