

# Learning Critical Thinking Through Astronomy: How Sticks and Shadows Teach Science Draft Outline of 2010-08-10

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Students acknowledge the difference.*
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*Question: What are the advantages of certain types of questions? How do we know what we think we know?  
Students confront the ultimate source of all scientific knowledge.*
- **1.4 Activity0103: Taking Your First Steps**  
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- **1.6 Activity0105: Logical Fallacies**  
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- **1.7 Activity0106: Scientific Validity**  
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- **2.1 Pre Assessment: observing shadows**
- 2.2 most of the time we make science more complicated than it needs to be
- 2.3 we're not used to simplicity
- 2.4 recording observations is simple, but requires practice
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This activity introduces shadow observations.*
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  - **2.5.5 Activity0205: Extreme Shadows**  
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*Question: How can observing sticks' shadows lead to an understanding of Earth's size and shape?  
Students reach their first milestone: deducing which scientific model correctly predicts Earth's shape and is consistent with observations.*
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- 2.8 Discussion questions
- **3 The Celestial Sphere: How can one use critical thinking? Critical thinking teaches us how to read the sky.**
- **4 Time: What time is it? Astronomers are the only ones who know for sure.**
- **5 Gravitation: How far away is the International Space Station? It's not as far away as you might think.**
- **6 Measurement: How is our solar system arranged? Give me a stick and a sunny day and I'll figure it out.**