

## Longitude Dial Demo – Teachers Education *Lesson Plan*

**Activity:** construct a dial to demonstrate how longitude corresponds to time.

Paper Plate Astronomy / navigation

by Patricia Shaw, latitude40arts; presented 8/20/2013, Troy Ohio  
map credit: NASA

**Explanation:** Earth rotates 360° in 24 hours. Each hour represents 15° of longitude. A sea navigator who knows his local time and the time elsewhere (Greenwich, home port) can convert the time difference into geographical separation and determine his longitude.

This model also operates as a practical time-zone clock dial chart answering the question ...“I wonder if it’s ok to call Japan right now?”

### Materials:

1. Ordinary white paper plate
2. Circular map of the Northern Hemisphere with longitude lines marked and numbered per 15° increments from 0° Prime Meridian Greenwich East and West to 180° International Date Line
3. Brass brad round head fastener

### Directions

1. Fasten Plate and Map through their exact centers with brass brad.
2. Mark Paper Plate rim with 24 lines carefully matched to Map’s longitude lines.
3. Number these plate lines 1 – 24 (hours) counterclockwise
4. Highlight number 12 in Yellow to represent High Noon.
5. Spin the dial counterclockwise to correspond with Earth’s rotation.

### Cross Curriculum applications

1. Astronomy *Earth’s rotation*
2. Math, Geometry, Measurement
3. Geography
4. Horology, UT, 24 hour clock
5. Navigation and exploration *early methods and challenges*
6. Practical clock for estimating global time
7. Biography – John Harrison, inventor of the chronometer

### Example - John Harrison’s H-4 chronometer proving voyage

May 1764 – at High Noon in the West Indies, Bridgetown, Barbados, John Harrison’s H-4 chronometer read 3:55 pm Portsmouth time putting Barbados harbor just under 4 hours behind or 60° West of Portsmouth, England.

**References :** *Lost at Sea - The Search for Longitude*, PBS Nova  
*Longitude* by Dava Sobel

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