latitude40arts...astronomy STEM starts using arts™ for the Sun-Moon-Earth system ~ events-seminars-workshops

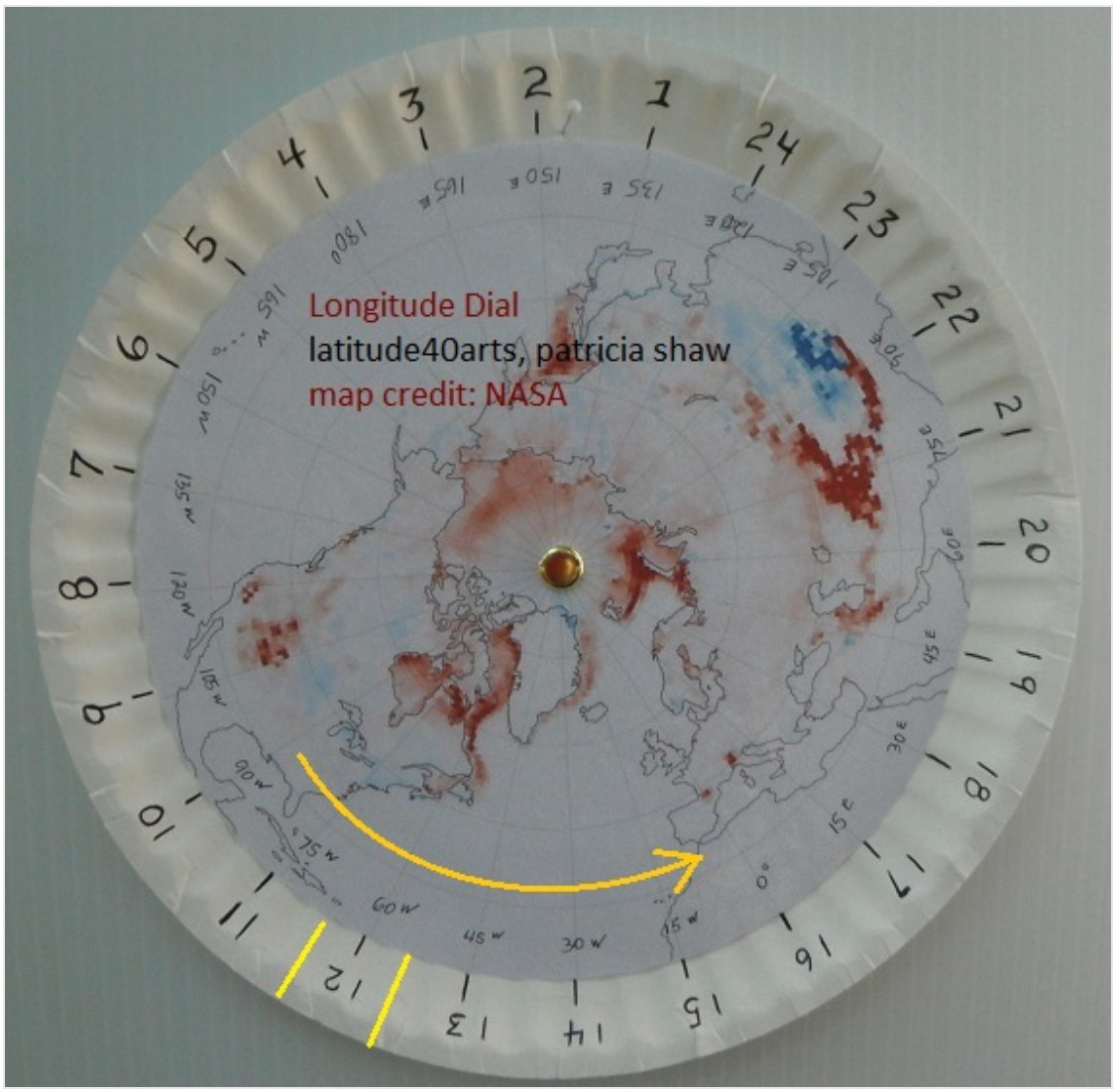
Paper Plate Astronomy - Longitude Finder Lesson Plan Activity: How longitude equals time

Paper Plate Longitude Dial demo / activity - PDF

Teachers Education ~ Paper Plate astronomy / navigation

Construct a dial to demonstrate the correlation of longitude and time

Use dial to illustrate the success of John Harrison's H-4 chronometer



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

Materials

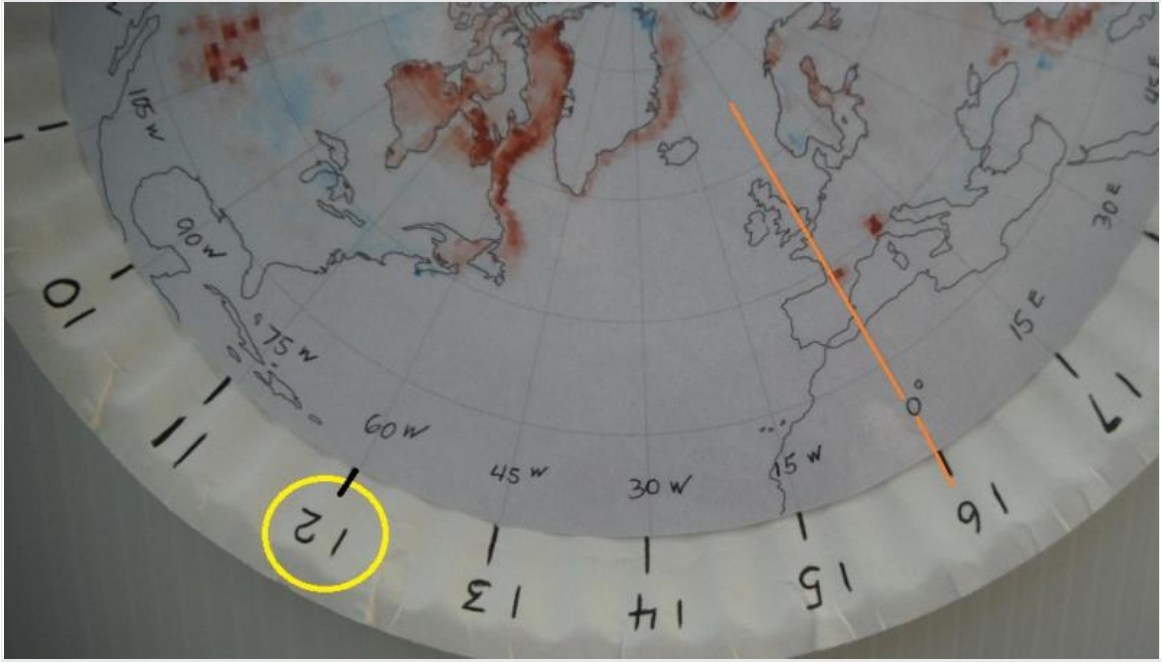
- **Ordinary white paper plate.**

- **Circular map of the Northern Hemisphere with longitude lines marked and numbered per 15º increments from 0º Prime Meridian Greenwich - East and West to 180º International Date Line.**
- **Brass brad round head fastener.**

Instructions

1. **Fasten plate and map through their exact centers with brass brad.**
2. **Mark plate rim with 24 lines carefully matched to map's longitude lines.**
3. **Number plate rim lines 1 - 24 (hours) counterclockwise.**
4. **Highlight number 12 in yellow to represent the Sun which is at High Noon at its corresponding longitude.**
5. **Spin dial counterclockwise to correspond to Earth's rotation.**

***Example* John Harrison's H-4 chronometer proving voyage to the West Indies. May 1764 - at High Noon in Bridgetown Barbados, John Harrison's H-4 chronometer read 3:55 pm Portsmouth time putting Barbados harbor just under 4 hours behind or 60º West of Portsmouth England.**



Cross-curriculum applications

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

This model functions as a practical time-zone chart-dial answering the question..."*Is it ok to call Japan now?"*

Credits

- **Longitude Dial, lesson plan - Patricia Shaw, latitude40arts**
- **presented August 20 2013 at Stillwater Stargazers astronomy club**
- **map - NASA**

Historical References

- **Lost at Sea - The Search for Longitude, PBS Nova**
- **Royal Museum Greenwich *John Harrison and the Longitude Problem* *http://www.rmg.co.uk/harrison***
- **Longitude by Dava Sobel**

Navigate your day!

sunrun ~ natural navigation - keeping place...*on the move*™