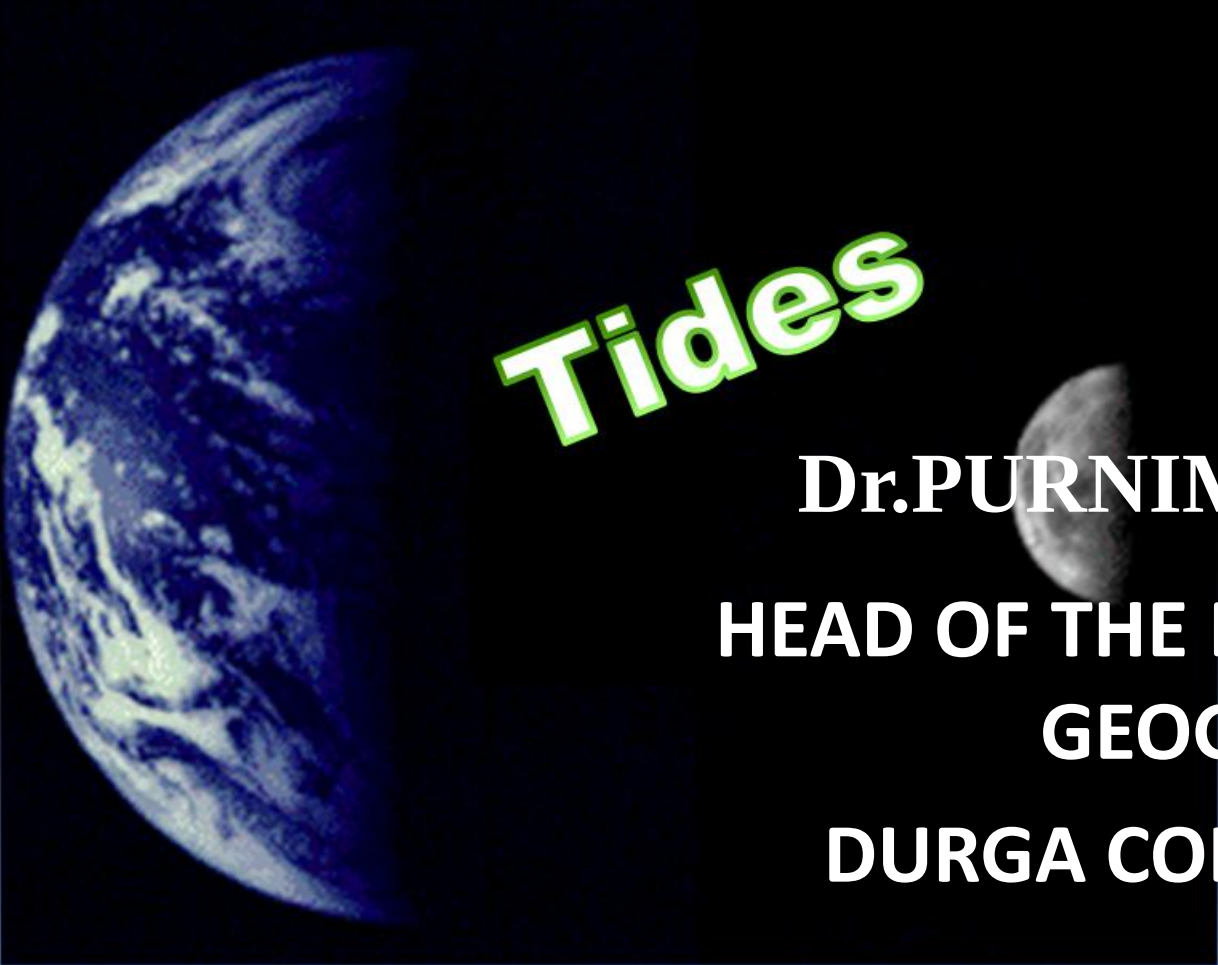


Tides



Tides

Dr.PURNIMA SHUKLA
HEAD OF THE DEPARTMENT OF
GEOGRAPHY
DURGA COLLEGE RAIPUR

Tides

- The rhythmic rise and fall of the ocean's water

High tide = rising, incoming tide, flow

Low tide = receding, outgoing tide, ebb

Slack tide = vertical movement stops

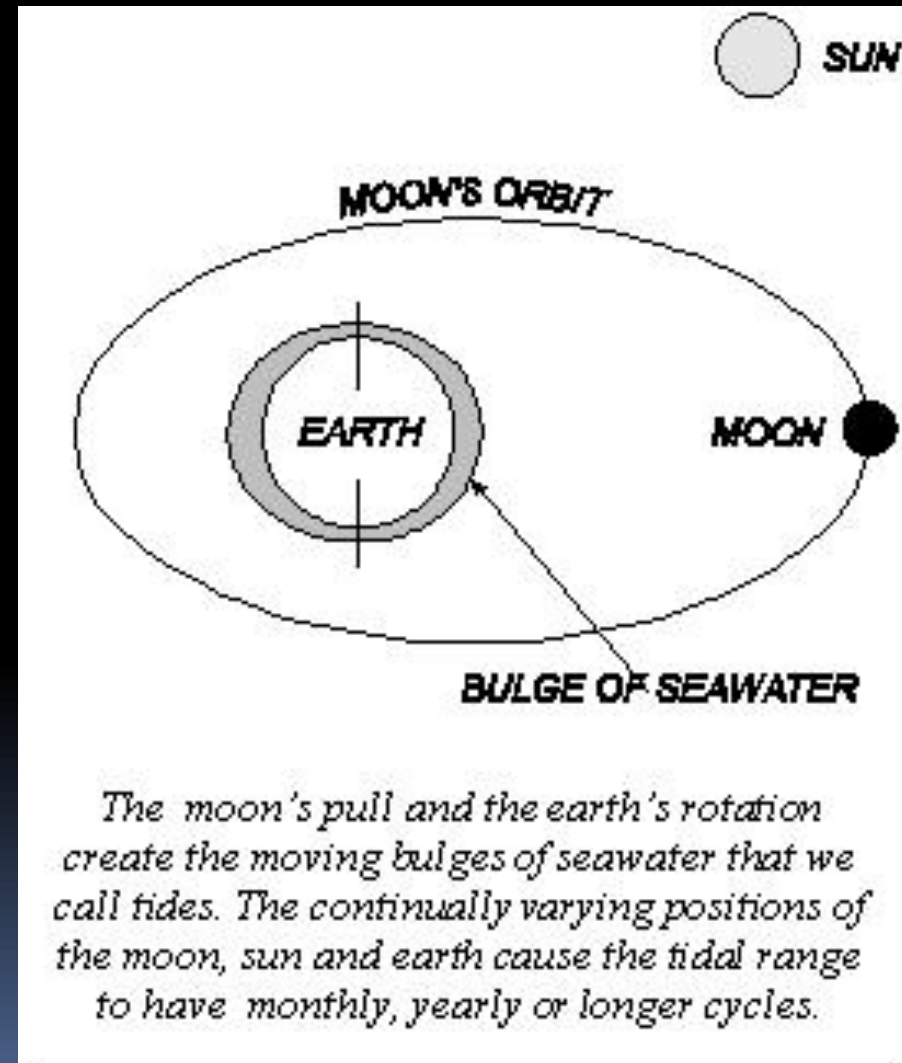


What Causes Tides?

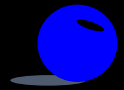
1. Gravitational pull of sun & moon on Earth

- Moon closer, therefore > effect
- Like magnet, pulls water away from surface
= **TIDAL BULGE**

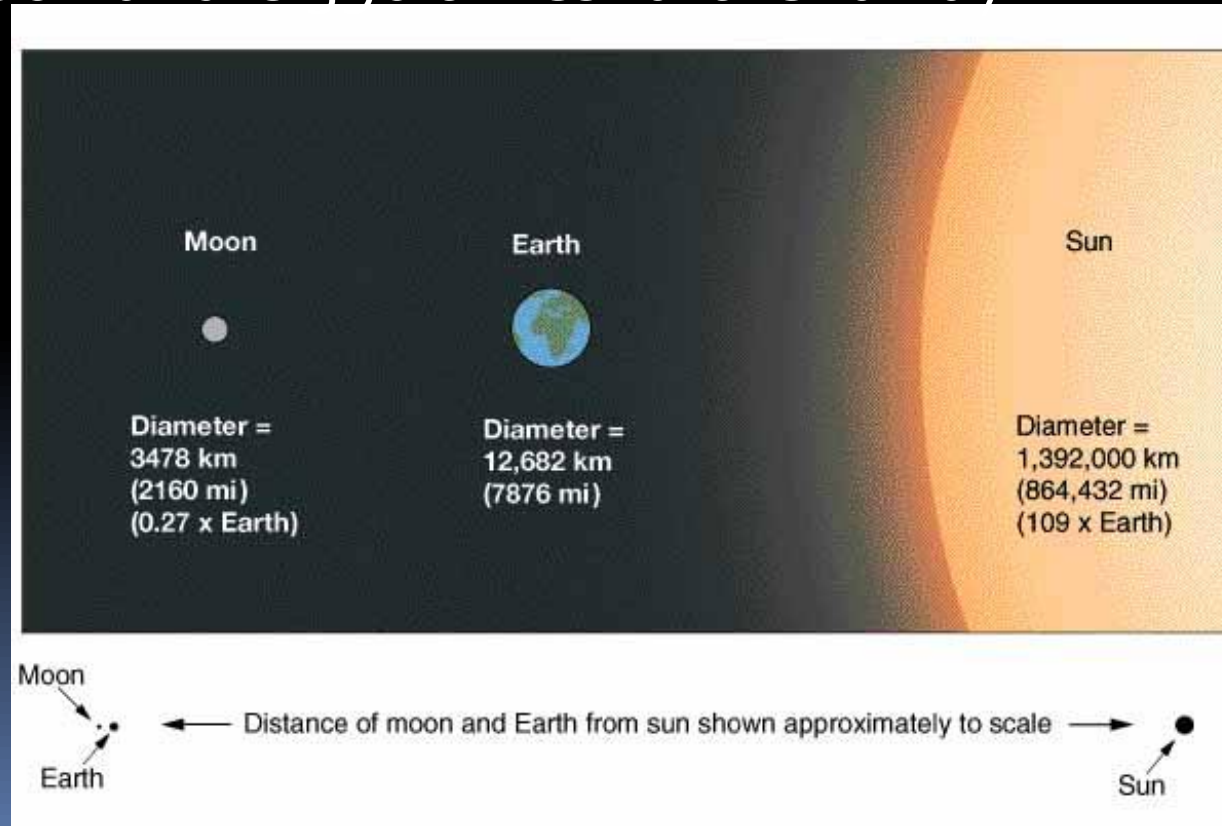
http://oceanservice.noaa.gov/education/kits/tides/media/supp_tideo4.html



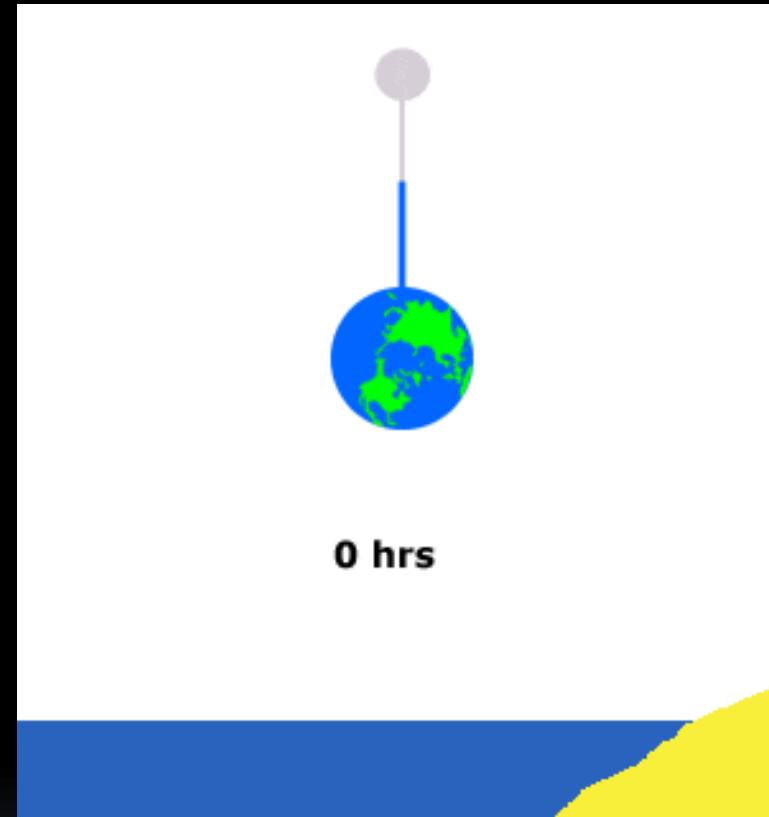
Tides are generated by:



- the *gravitational pull* of the moon and sun
 - moon has 2x greater gravitational pull than the sun
 - sun is 10 million x more massive than the moon and is 390 times farther away

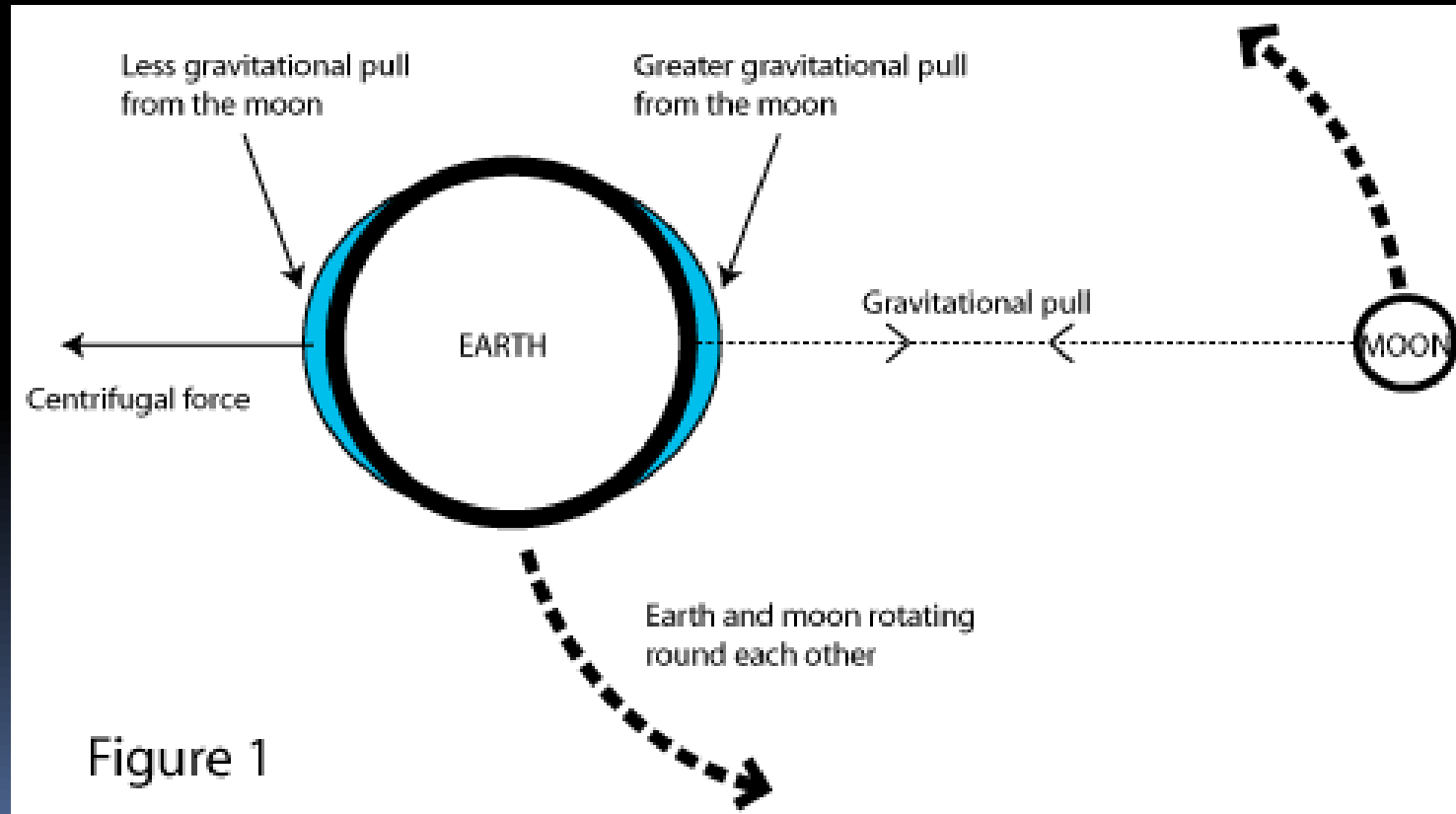


- Tides are very long, slow waves
 - They have a wave period of 12 hours 25 min
 - Tidal day is 24 hours 50 min
 - NJ has 2 high and 2 low tides daily

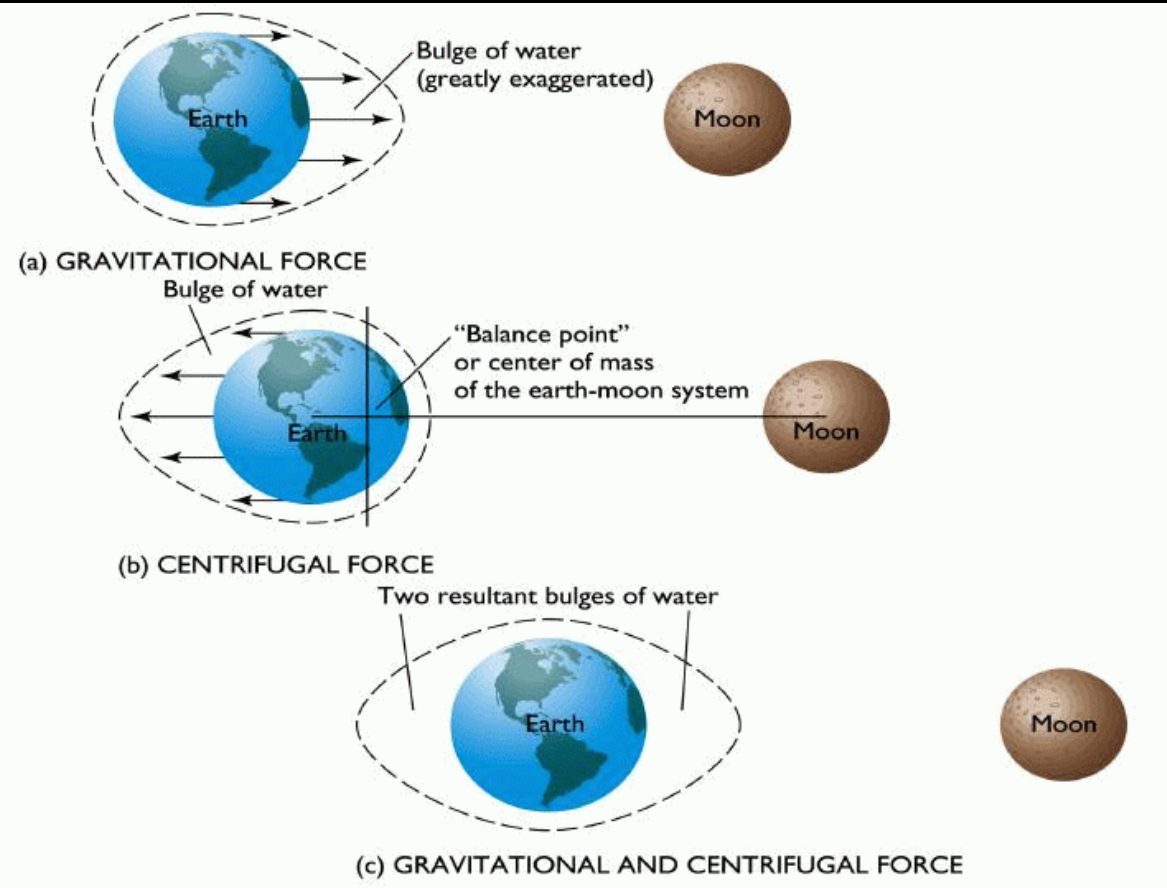
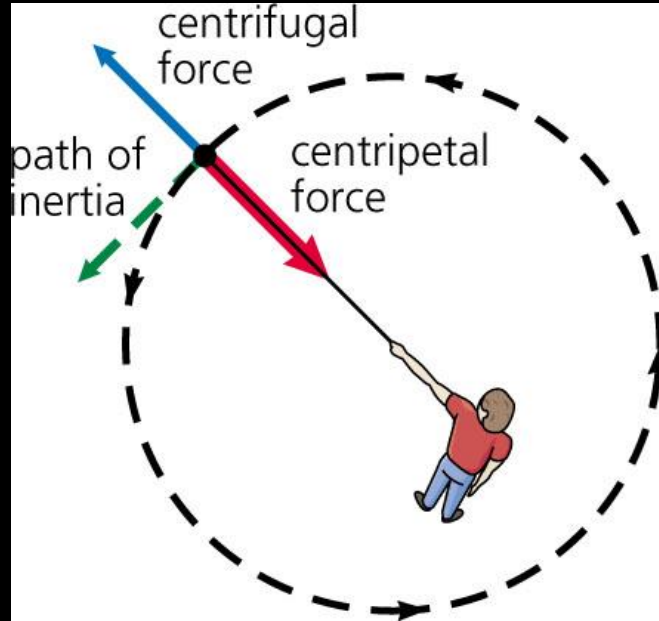


2. Centrifugal Forces

- Produced by motions of Earth, sun, & moon
- Bulge on opposite side because centr. force $>$ pull of moon



Centripetal force



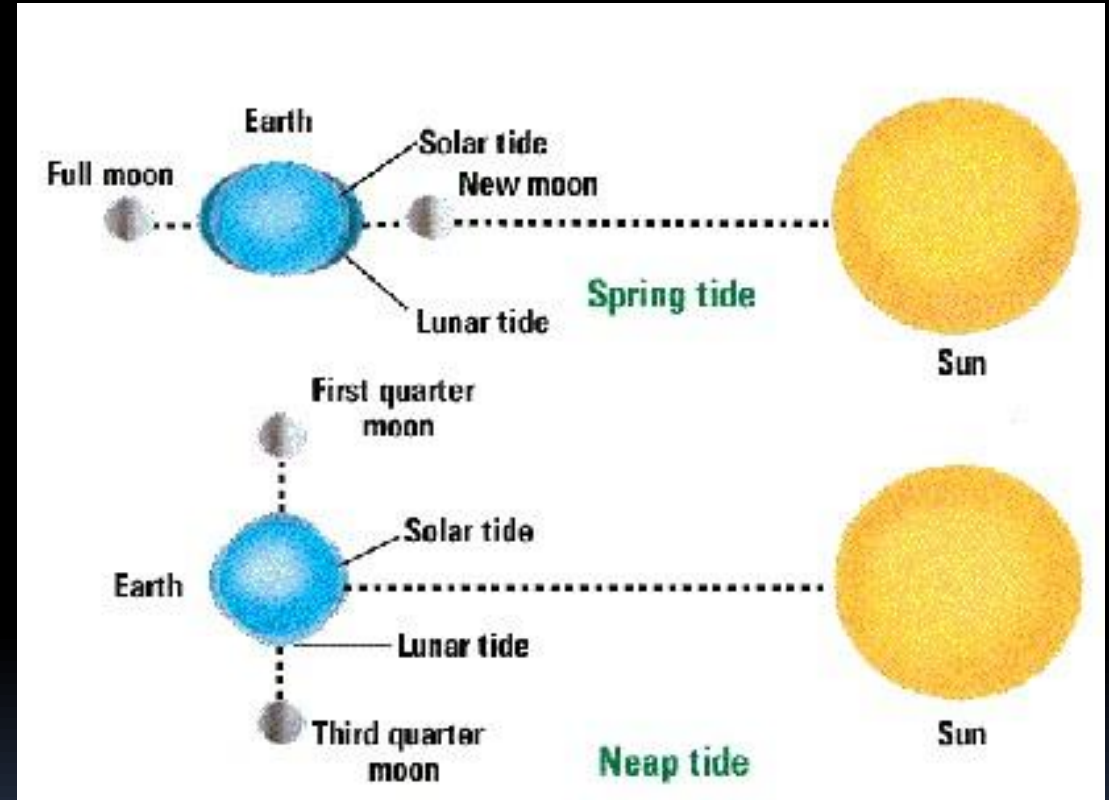
Types of Tides

- Spring Tide

- Moon and sun are in direct line with one another
- Results in unusually high tidal range

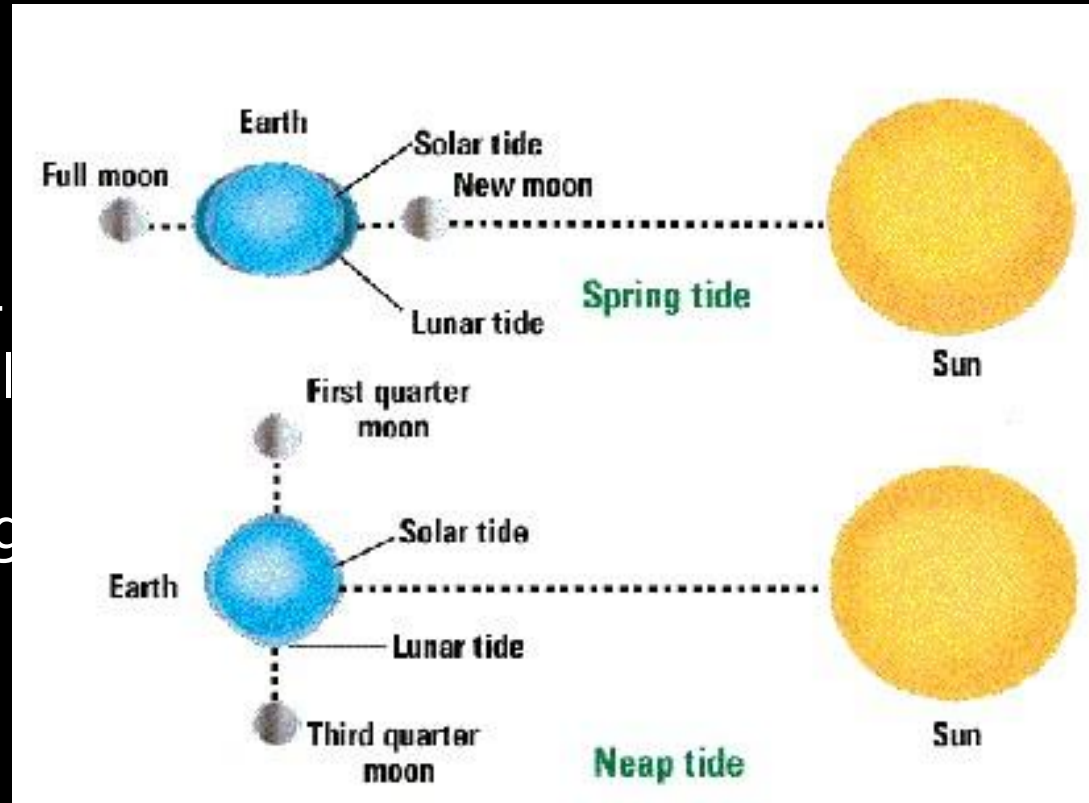
Tidal Range = vertical distance between high & low tides

□ 2x's/month

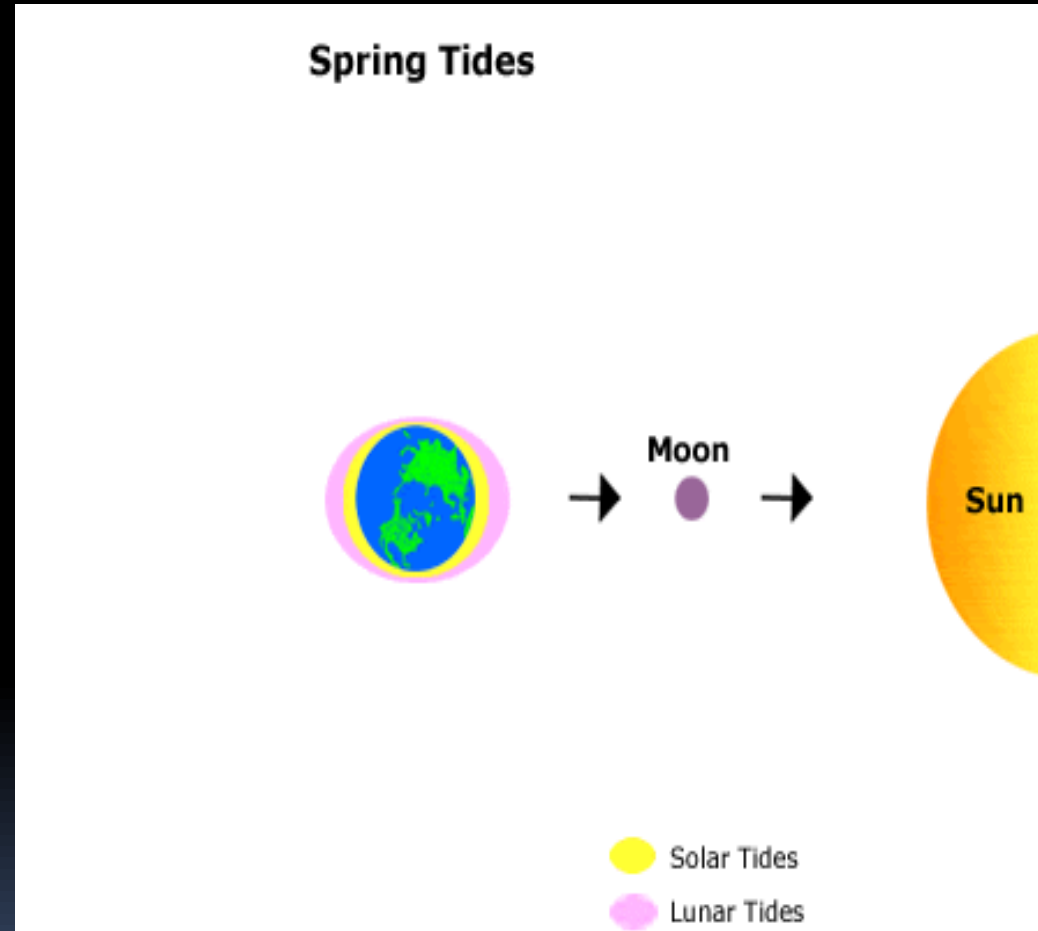


- **Neap Tide**

- sun and moon are at right angles
- Pulls cancel each other out – causes a weak pull
- unusually low tidal range
- 2 x's / month



Spring vs. Neap Tides



http://oceanservice.noaa.gov/education/kits/tides/media/supp_tideo6a.html



The monthly tidal cycle (29½ days)

About every 7 days, Earth alternates between:

- Spring tide
 - Alignment of Earth-Moon-Sun system (syzygy)
 - Lunar and solar bulges constructively interfere
 - Large tidal range
- Neap tide
 - Earth-Moon-Sun system at right angles (quadrature)
 - Lunar and solar bulges destructively interfere
 - Small tidal range



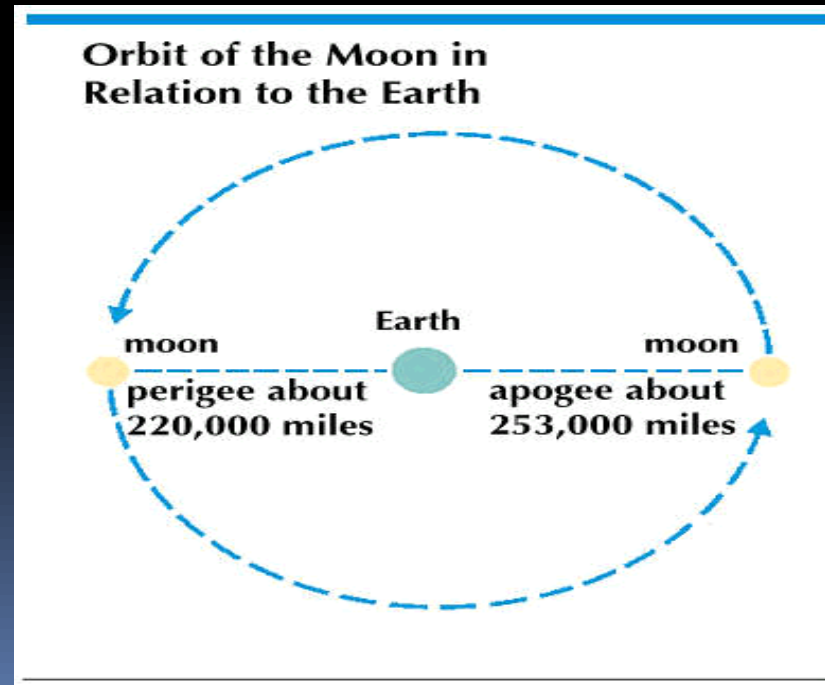
Distance bet. Moon & Earth

Perigee Tides

- Moon closest to earth, very high tides (causes flooding)

Apogee Tides

- Moon farthest away from earth, very low tides



Relative Sizes of the Full Moon



Smallest Full Moon

A full moon at apogee



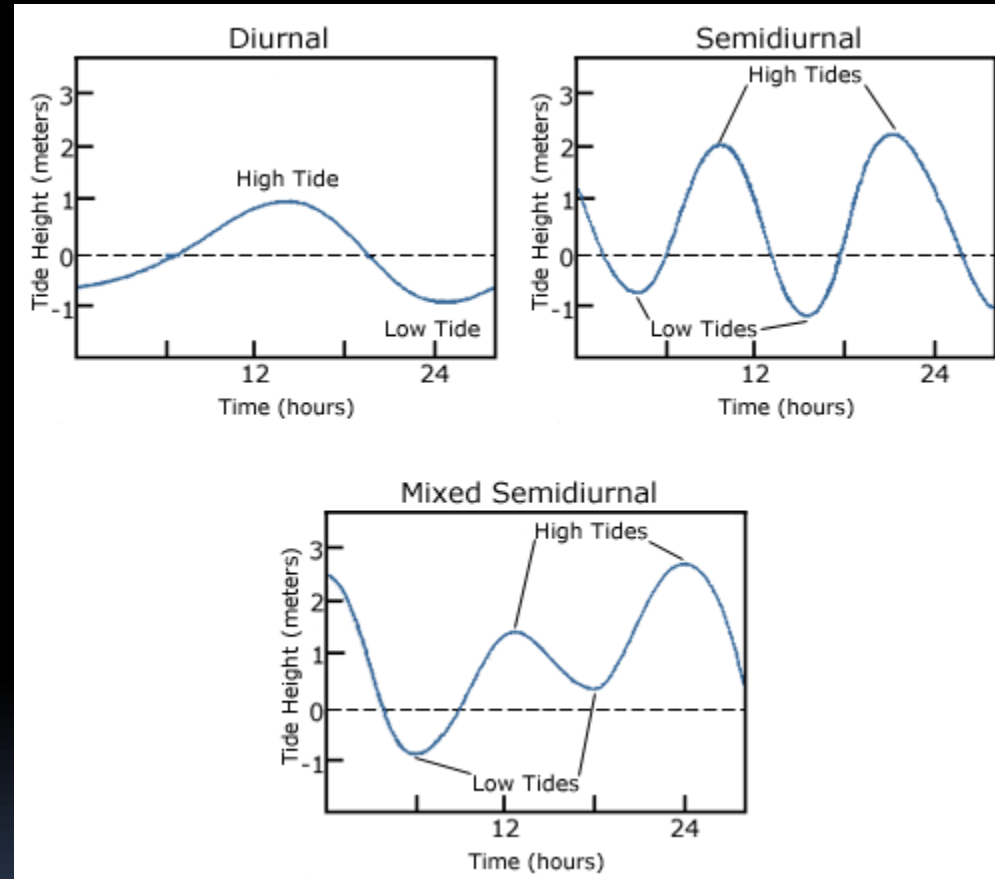
Largest Full Moon

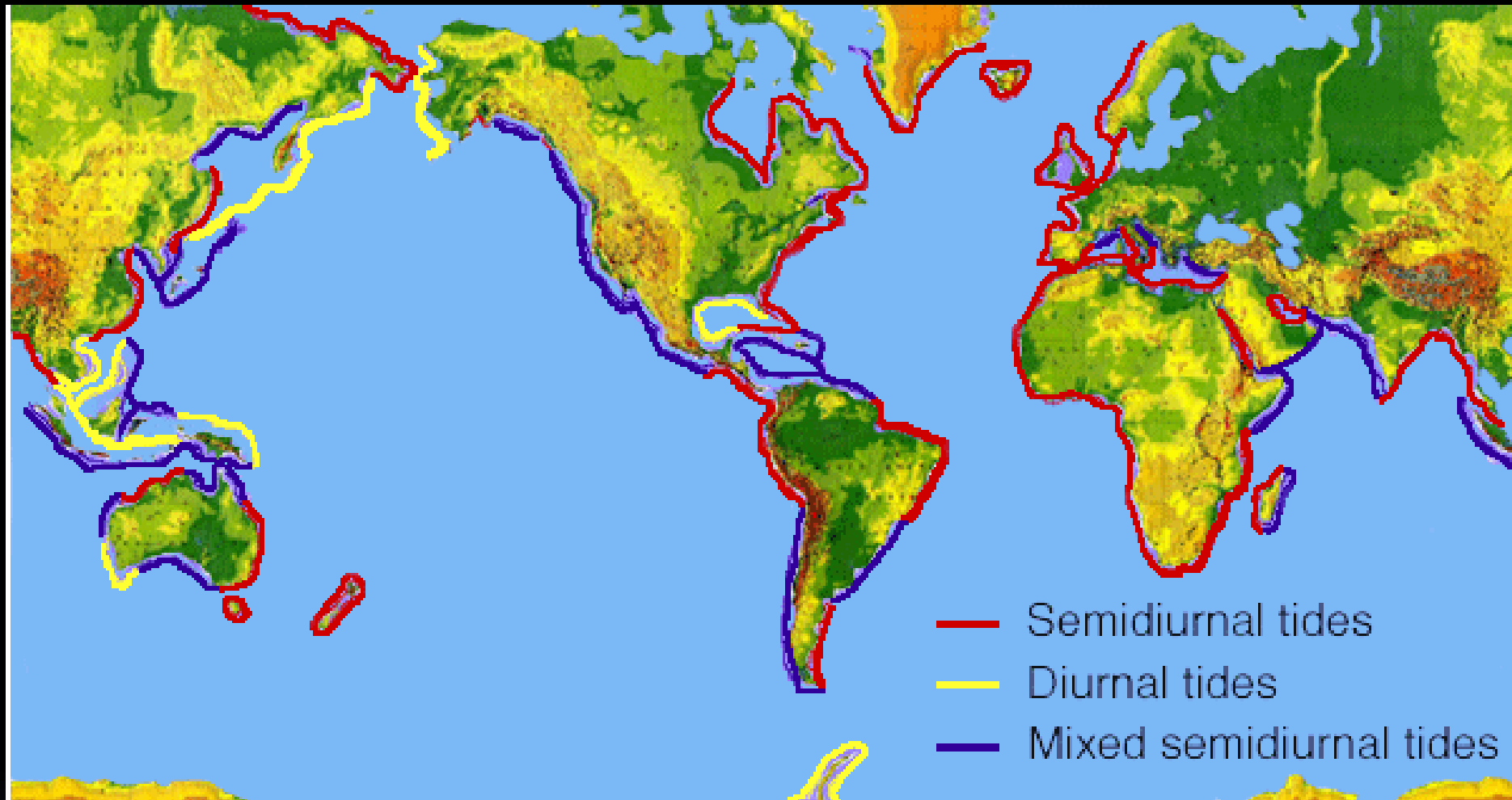
A full moon at perigee

Frank Summers, American Museum of Natural History

Types of Tides Continued

- Diurnal Tides
 - 1 high & 1 low / day
 - Parts of Gulf of Mexico and Asia
- Semi-Diurnal Tides
 - 2 high & 2 low / day
 - Atlantic coasts of North America and Europe
- Mixed
 - 2 high & 2 low / day (height varies)
 - Pacific coast







http://oceanservice.noaa.gov/education/tutorial_tides/media/supp_tideo1.html

Importance of Tides

- Expose & submerge orgs
- Circulate water in bays & estuaries
- Circulates food, wastes, etc
- Trigger spawning (grunion, horseshoe crab)



nitrogen



THANKS

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