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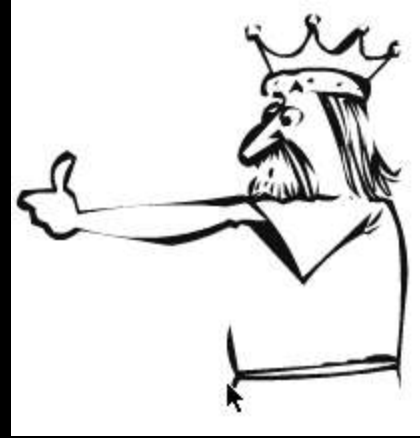
# THE METRIC SYSTEM OF MEASUREMENT

# Measurement Simulation

- Unit of measure = digit (finger length)
- Measure index finger

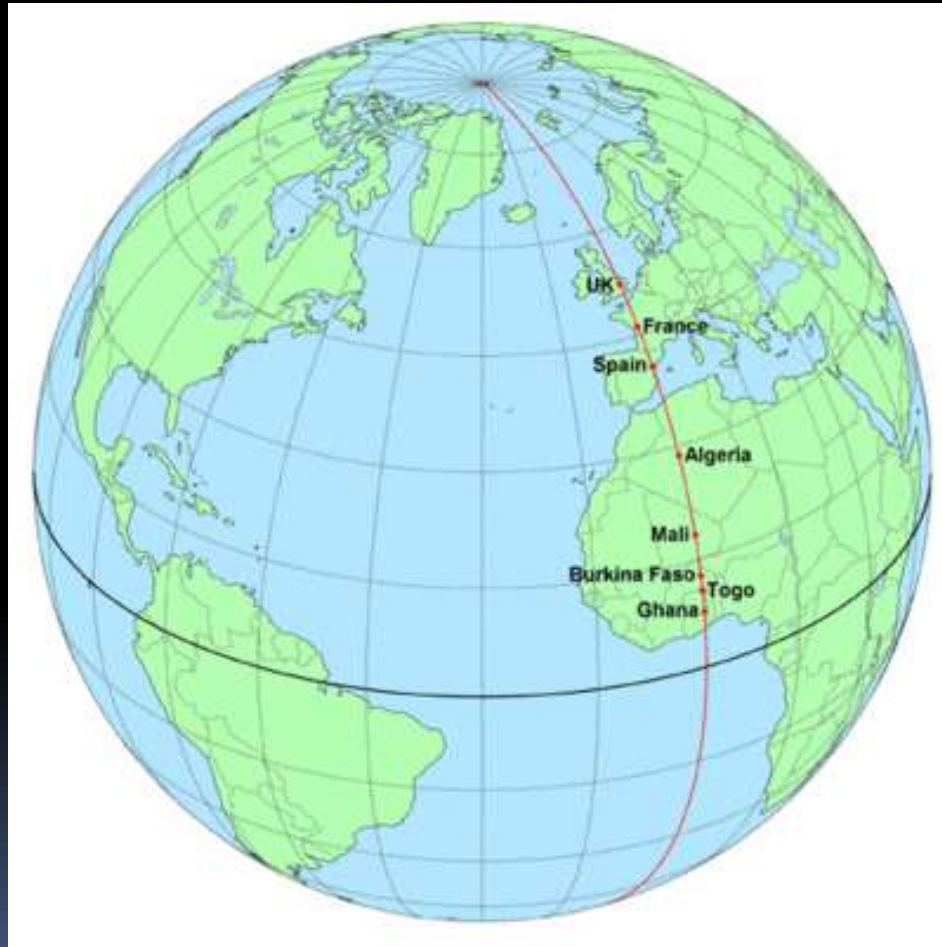


# History



- Body measurement. Not uniform
  - Span, palm, digit, foot
- King Henry I defined yard for England (1068–1135)
- Bishop Charles Maurice de Talleyrand proposed system (1790)
- Wanted a measurement that would be the same everywhere on earth
- Sea-level meridian arc.  $1/10,000,000^{\text{th}}$  of distance = 1 meter

# Meridian Arc



# Measuring the meter




- Delambre went north and Méchain went south
- They labored over the next few years
- Measured earth in grades.  $1/100$  of a right angle.
- Méchain found discrepancies in his work and went crazy
- Delambre published it though
- Earth not a perfect sphere
- Grade becomes radian






# History (cont)

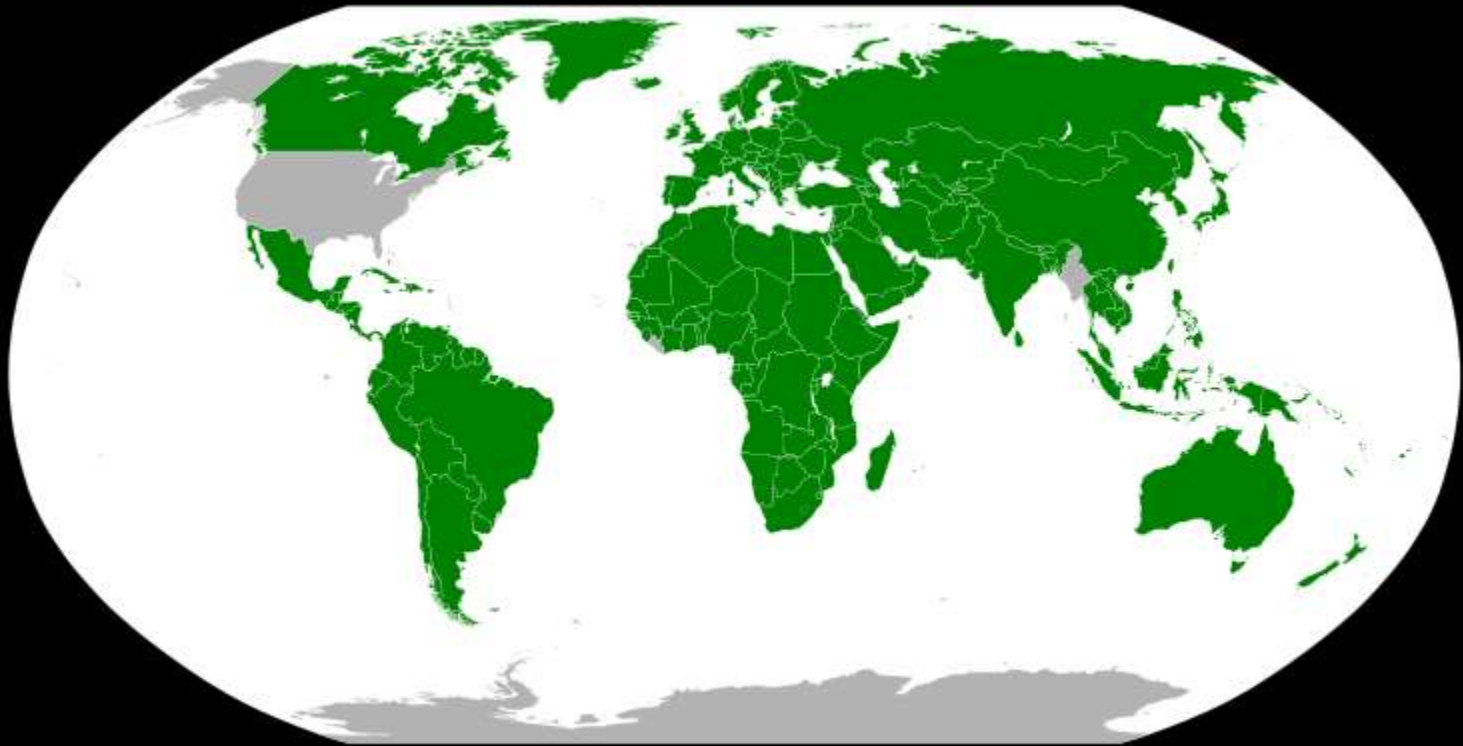
- Republic of France officially adopted the system (1795)
  - Napoleon abolished system (1812)
  - System returned (1840)
  - Treaty of the Meter (1875)
- 



# History (cont)

- Countries have been signing the treaty of the meter even up until present day
  - As of December 31, 2008 there are 52 participating countries including U.S.
  - renamed International System of Units (SI system) (1960)
  - All but three countries use the SI system as their official system of measurement
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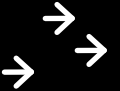
# Who Uses the Metric System



# How to define a meter

- Originally sea-level meridian arc.  
 $1/10,000,000^{\text{th}}$  of distance
- Then  $1,650,763.73$  x the wavelength of the radiation emitted at a particular energy level by Krypton-86
- Lastly defined as distance traveled by light in a vacuum in  $1/299,792,458$  of a second

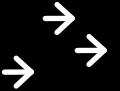
# Prefixes



<b>Gigameter</b>	1,000,000,000 = $10^9$
<b>Megameter</b>	1,000,000 = $10^6$
<b>Kilometer</b>	1000
<b>Hectometer</b>	100
<b>Dekameter</b>	10
<b>Meter</b>	1
<b>Decimeter</b>	.1
<b>Centimeter</b>	.01
<b>Millimeter</b>	.001
<b>Micrometer</b>	.000001 = $10^{-6}$
<b>Nanometer</b>	.000000001 = $10^{-9}$

# INTERNATIONAL SYSTEM OF UNITS-TABLE 1

Quantity	Name of Base SI Unit	Symbol
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd



# Measure Yourself

- Convert height (ft/in) to meters ( $1 \text{ ft} = .3048 \text{ m}$ )
  - Kilometers?
  - Nanometers?
- Convert weight (lb) to kilograms ( $1 \text{ lb} = .4536 \text{ kg}$ )
  - Grams
  - Gigagrams

# Timeline

- 1068-1135 King Henry defined the yard for England
- 1790 Bishop Charles Maurice de Talleyrand proposed a measurement system based on the length of a pendulum swing
- 1792 expedition by Méchain and Delambre set out to measure  $\frac{1}{4}$  distance of the meridian
- 1795 Republic of France adopted the system
- 1812 the system was abolished by Napoleon
- 1840 system brought back in France
- 1875 17 countries signed the treaty of the meter
- 1960 SI system established by 11<sup>th</sup> general conference on weights and measures.
- 1983 meter redefined by light in vacuum

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