

The background of the slide is a collage. On the left, a diagram shows Earth's elliptical orbit around the Sun, with labels for Earth, Sun, semi-major axis  $a$ , semi-minor axis  $b$ , distance from focus to center  $c$ , and a point  $P$  on the orbit with distance  $r$  and angle  $\theta$ . On the right, the equation  $E=mc^2$  is displayed. In the center is a portrait of Albert Einstein. The text 'Chapter 1: Deep Inside the Scientific Method' is overlaid in a large, bold, brown font.

# Chapter 1: Deep Inside the Scientific Method

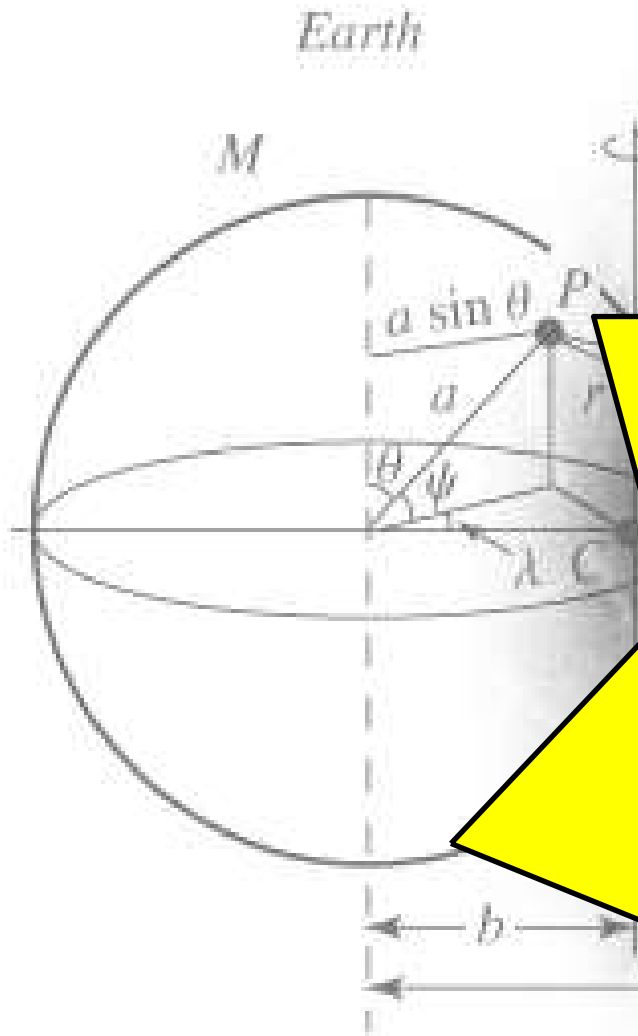
# An Exercise in Counting...



# Who Killed Lord Smythe?



# What is Physics really????




**The science of  
dealing with  
the observable  
universe**

# Observations:

Act of noticing OR perceiving  
a presumed fact or occurrence.

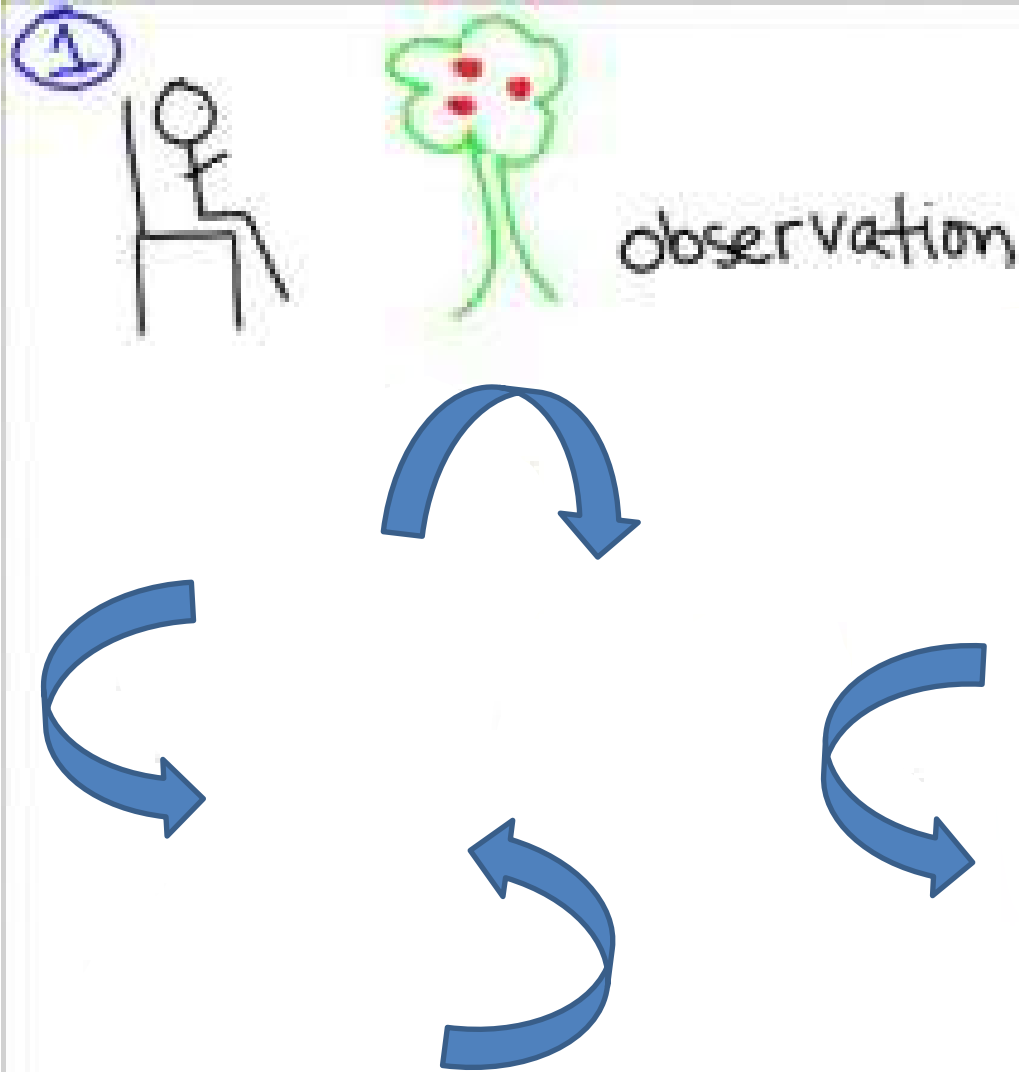
## Some Typical Observations:

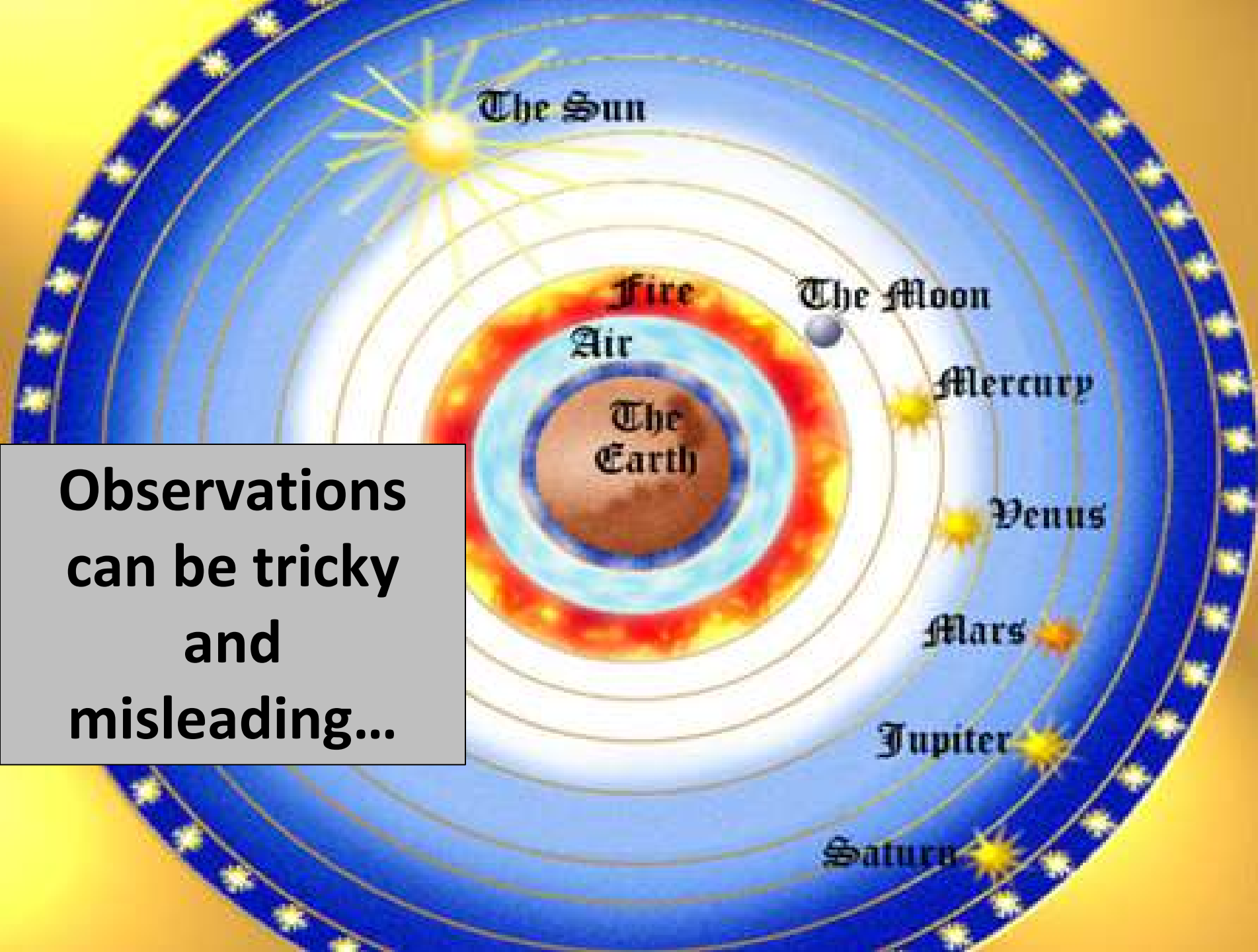
- Use your senses
- Use measurements
- Use past/proven knowledge or experiences
- Use reasoning/relevance
- Use technology (gather data/info)
- Use mathematics

The background of the image is a black screen filled with vertical columns of green, monospaced text that resembles computer code or data logs. The text is slightly blurred and has a digital, pixelated appearance. In the center, there is a solid black rectangular box containing white text.

Observations become **DATA**  
once it is written down or recorded

# Scientific Method





**Observations  
can be tricky  
and  
misleading...**



**\*Discovered in 1930**

**Pluto 's orbit is nearly 40 times further away than Earth's.**

**Pluto 's orbit is nearly 285 times longer than Earth's.**



**Pluto was able to be discovered and studied based on data**

# MEASUREMENTS

-Direct vs Indirect

-Qualitative vs Quantitative

(characteristic/comparison)

(numerical value/specific scale)

**Measurements further  
Defined by...**

**ACCURACY AND  
PRECISION**

**Accuracy:** Relative DISCREPANCY among “accepted” value and measured value

**Precision:** Relative AGREEMENT among repeated measurements



Accuracy = high  
Precision = high  
(a)

Accuracy = low  
Precision = high  
(b)

Accuracy = high  
Precision = low  
(c)

Accuracy = low  
Precision = low  
(d)

“Observing the World Around Us”