ASTR 1010
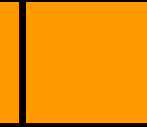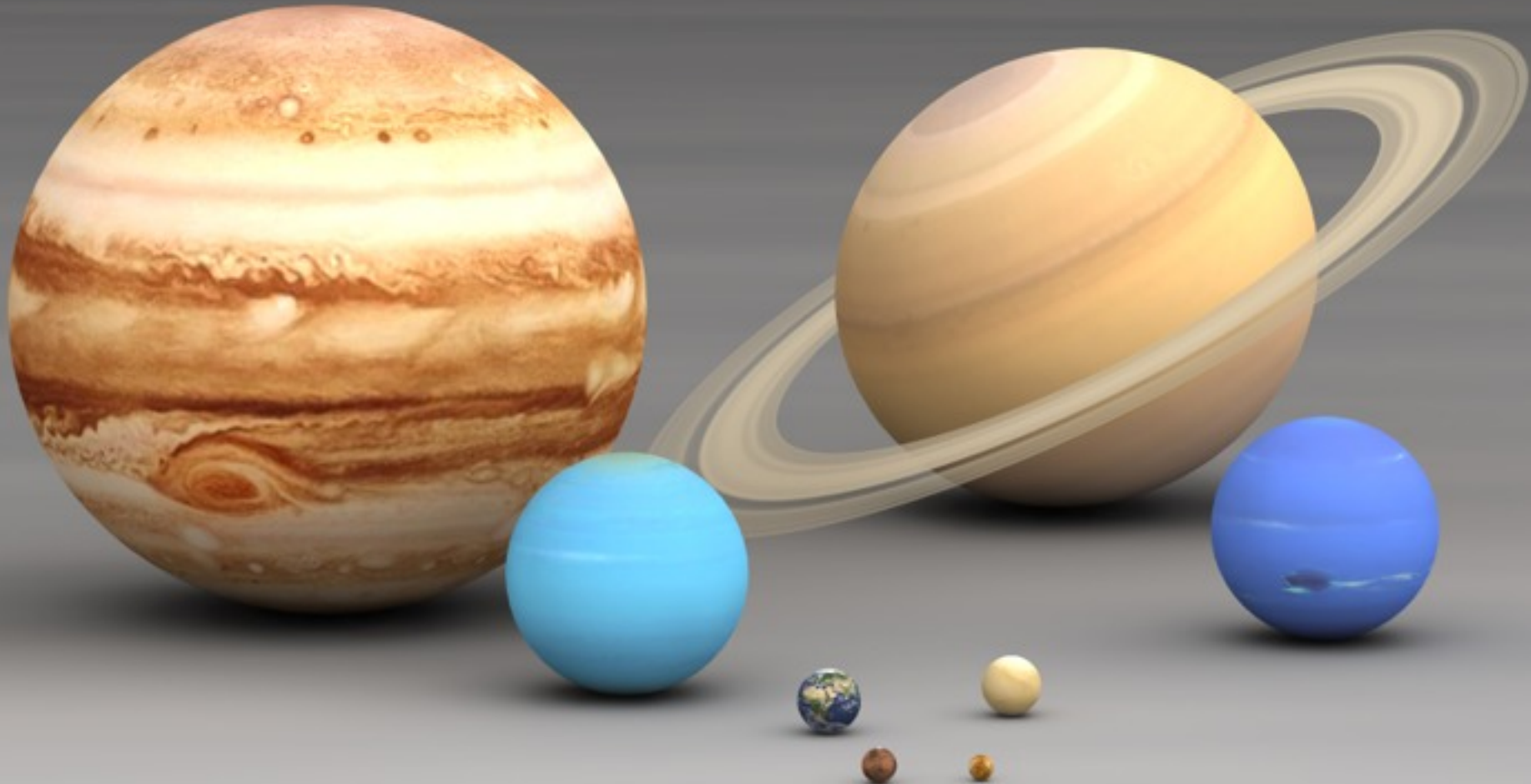
Handout: Scale Sizes of the Solar System

Earth
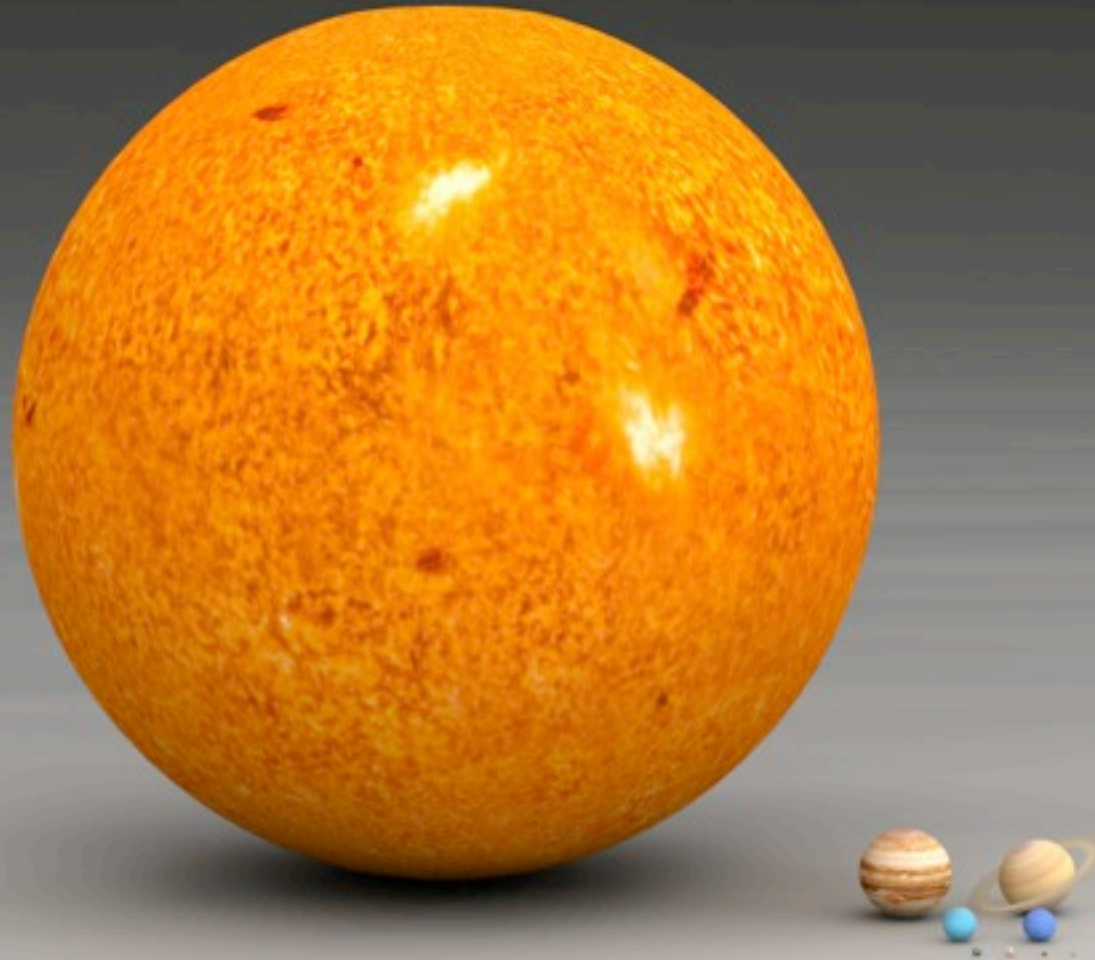
The Earth is much, MUCH bigger than you...

Solar System Planets

...but one of the punier members of the Solar System. Earth has some pretty big neighbors...

Sun and Planets

...that are dwarfed by the Sun! The Sun makes even Jupiter look pretty small! Earth, meanwhile, is just a tiny dot, about one pixel here. In short, the main members of our Solar System are big...

Distances

...but the distances are even bigger. All the planets could fit between the Earth and the Moon! The Sun would need just 3½ times more room than the planets.

...With about 8,030 km or 4,990 miles to spare
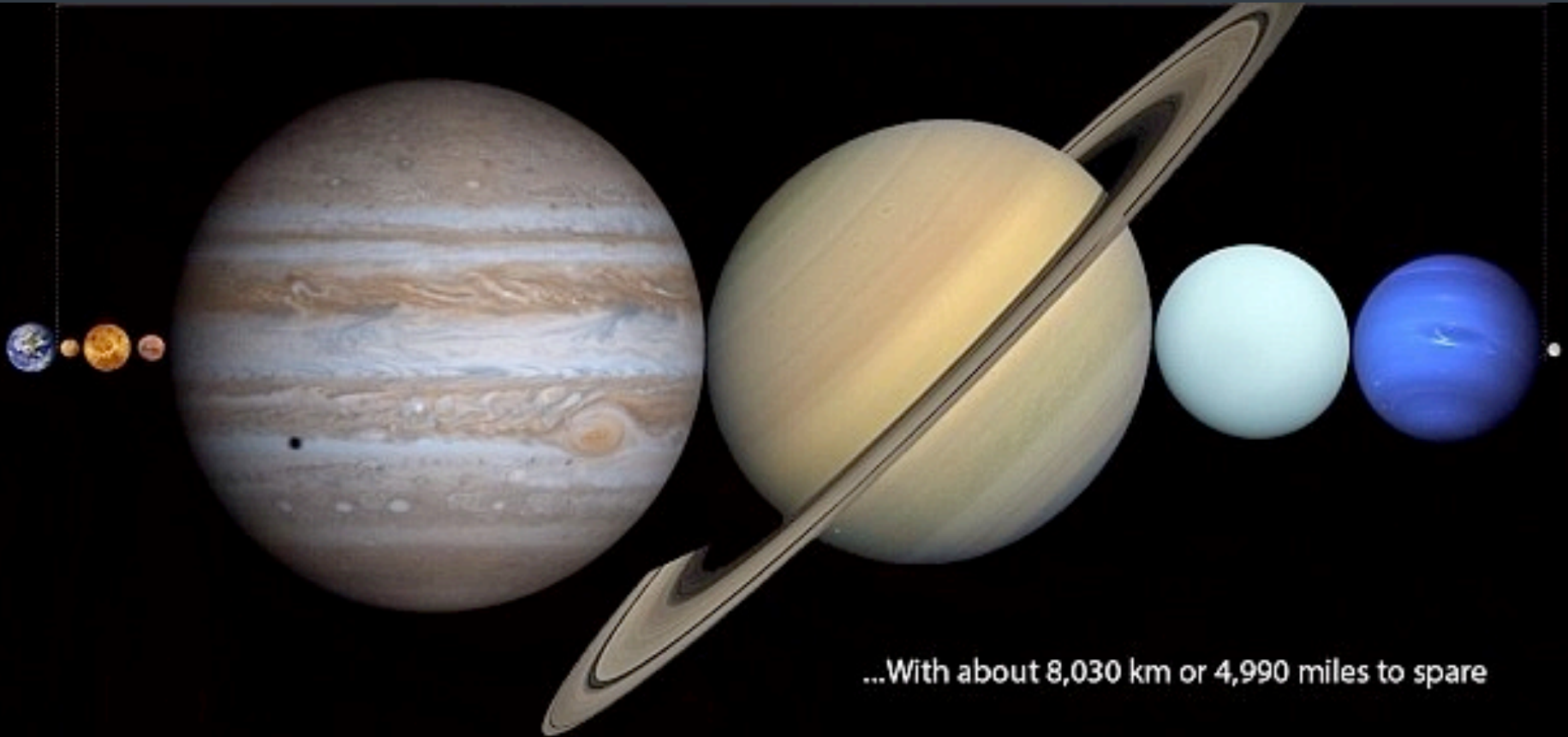
Distance from the Earth to the Sun

You thought the distance from the Earth to the Moon was far (384,000 km)? The Sun is even farther away, 149,600,000 km. This is defined as 1 astronomical unit, or 1 AU.

Scientific Notation

How do you expand the following?

$$6.18 * 10^3$$

(Show this on the board!)

$$4.15 * 10^{-4}$$

Scientific Notation

How do you expand the following?

$$6.18 * 10^3$$

$$6180$$

$$4.15 * 10^{-4}$$

Scientific Notation

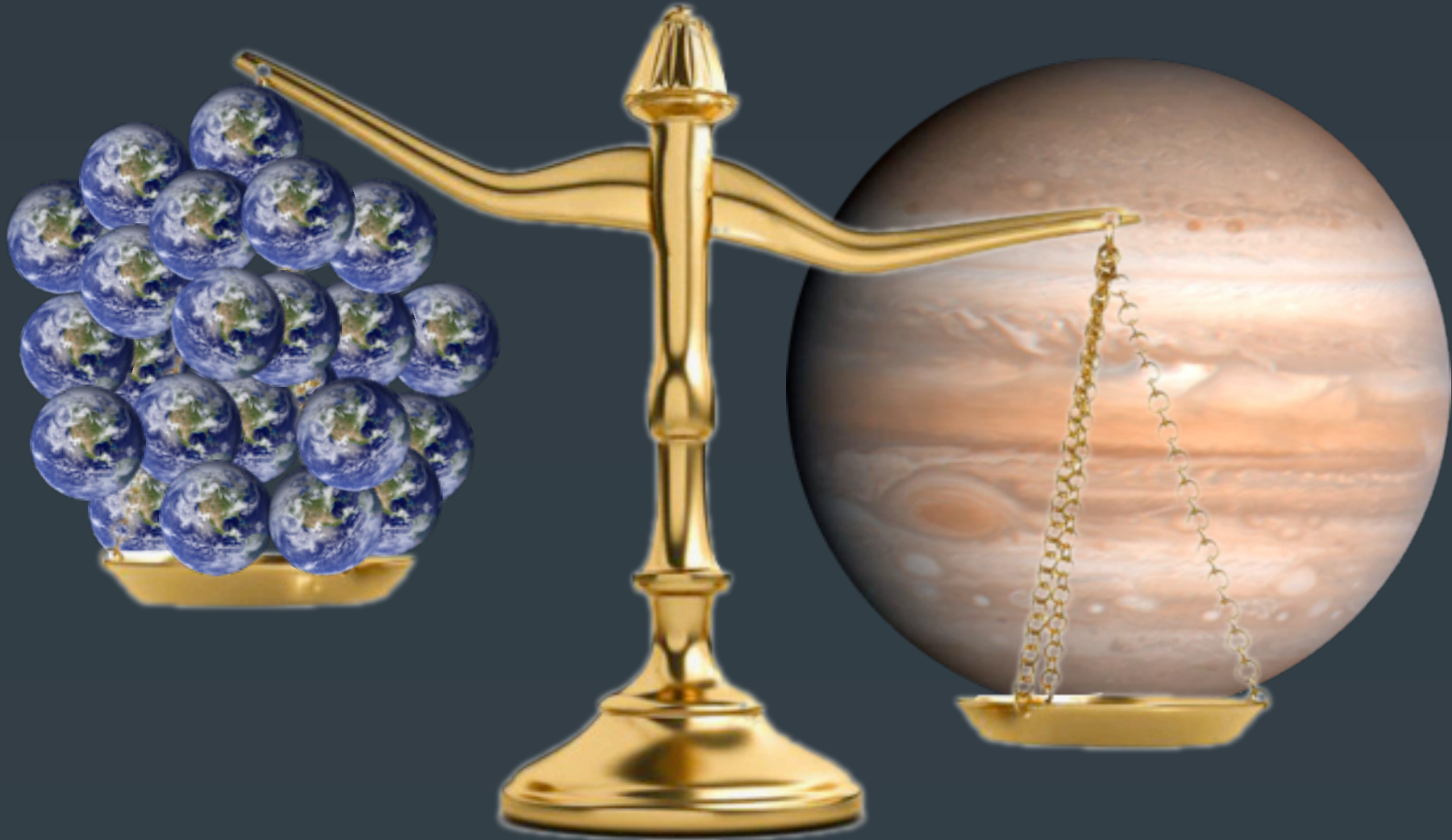How do you expand the following?

$6.18 * 10^3$

6180

$4.15 * 10^{-4}$

0.000415

How Many Earths Would Make a...

How many Earth masses is one Jupiter mass? Or, how many Earths would you have to squish together to make a Jupiter?

How Many Earths Would Fit Across...

Compare: You know how big Earth is (12,700 km in diameter). How many times bigger is each other planet? That is, how many Earth diameters fit into each other planet's diameter?

Visualize: Scale it down to something you can hold. What if the Earth were just 8 cm in diameter? How big would each of the other planets be?

How Many AUs Would Fit Between...

Compare: You know how far Earth is from the Sun (150,000,000 km). How much farther is each other planet? That is, how many AUs fit into each other planet's semimajor axis? Note the Moon's semimajor axis is the distance from the Moon to the Earth.

Visualize: Scale it down to something that can fit in this room (well, maybe). What if the Earth were just 3 m from the Sun? How far would each of the other planets be?
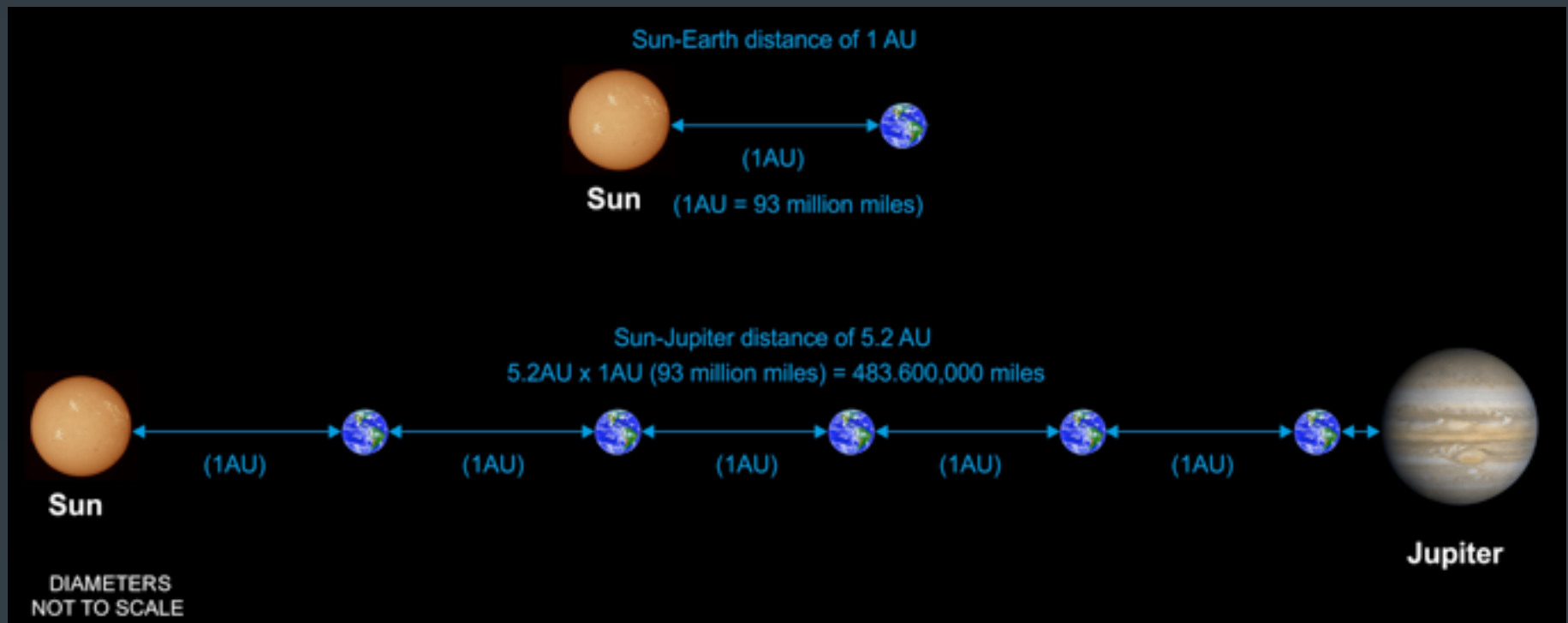
Fin
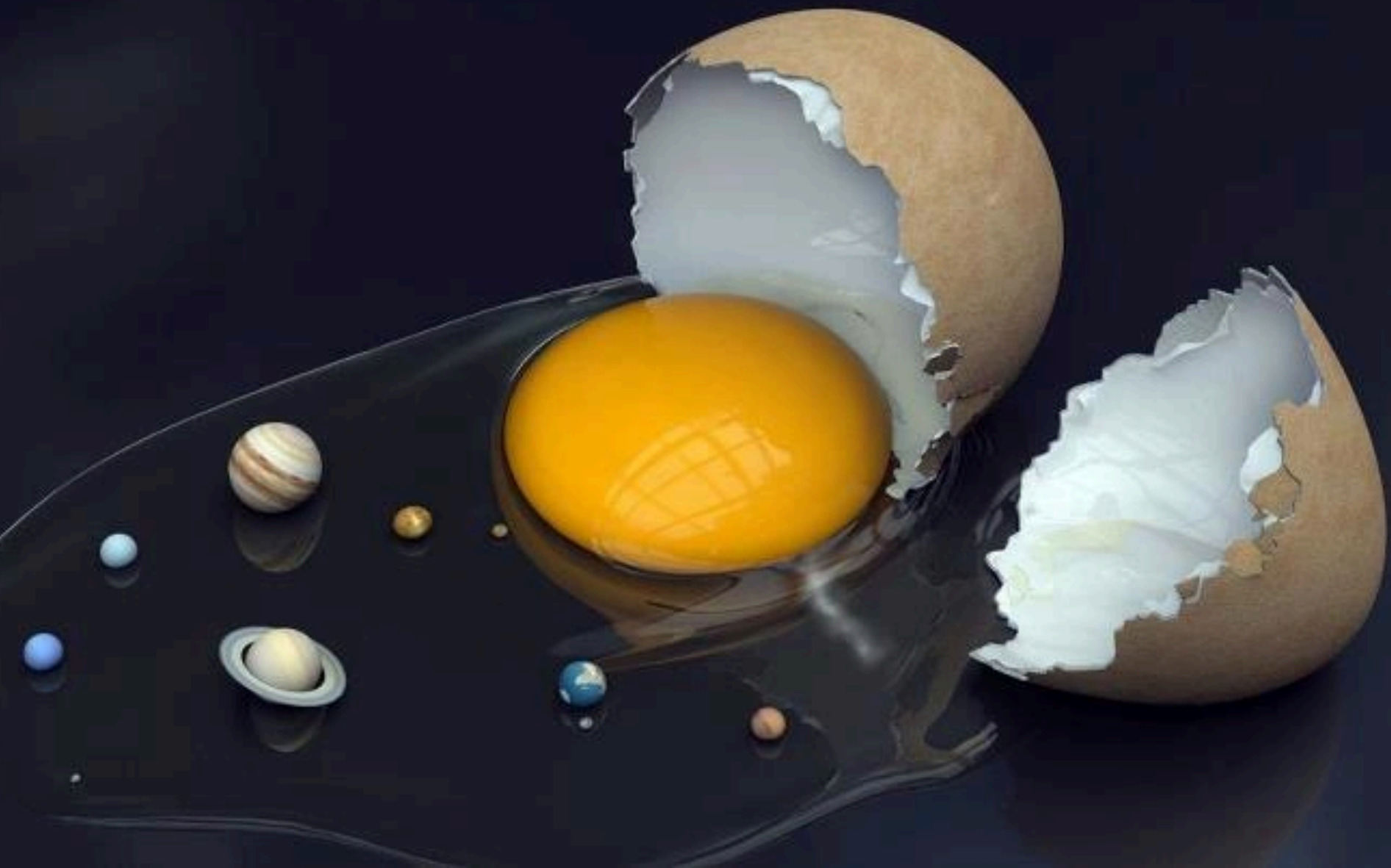
Scientific Notation

How do you expand the following?

$$6.18 * 10^3$$

Scientific Notation

How do you expand the following?

significant digits

where to move
the decimal

$6.18 * 10^3$

Scientific Notation

How do you expand the following?

significant digits

$6.18 * 10^3$

6.18

Scientific Notation

How do you expand the following?

where to move the decimal   + : right
                               - : left

$$6.18 * 10^3$$

6.18

Scientific Notation

How do you expand the following?

$$6.18 * 10^3$$

6.180

Scientific Notation

How do you expand the following?

$$6.18 * 10^3$$

$$6\ 180.$$

Scientific Notation

How do you expand the following?

$$6.18 * 10^3$$

$$6180$$