Seasons: *How the heck do they work?*

PLAGIARISM QUIZ: HOW'D YOU DO?

1. A student quotes a sentence from a NASA website, citing the website
2. A student copies specific facts from the lab manual, without citing it
3. A student copies their whole writeup from a NASA website, citing the website
4. A student paraphrases information from a website, without citing it
5. A student states that sun is yellow, without stating a source
6. A student uses a fact from wikipedia, and cites it

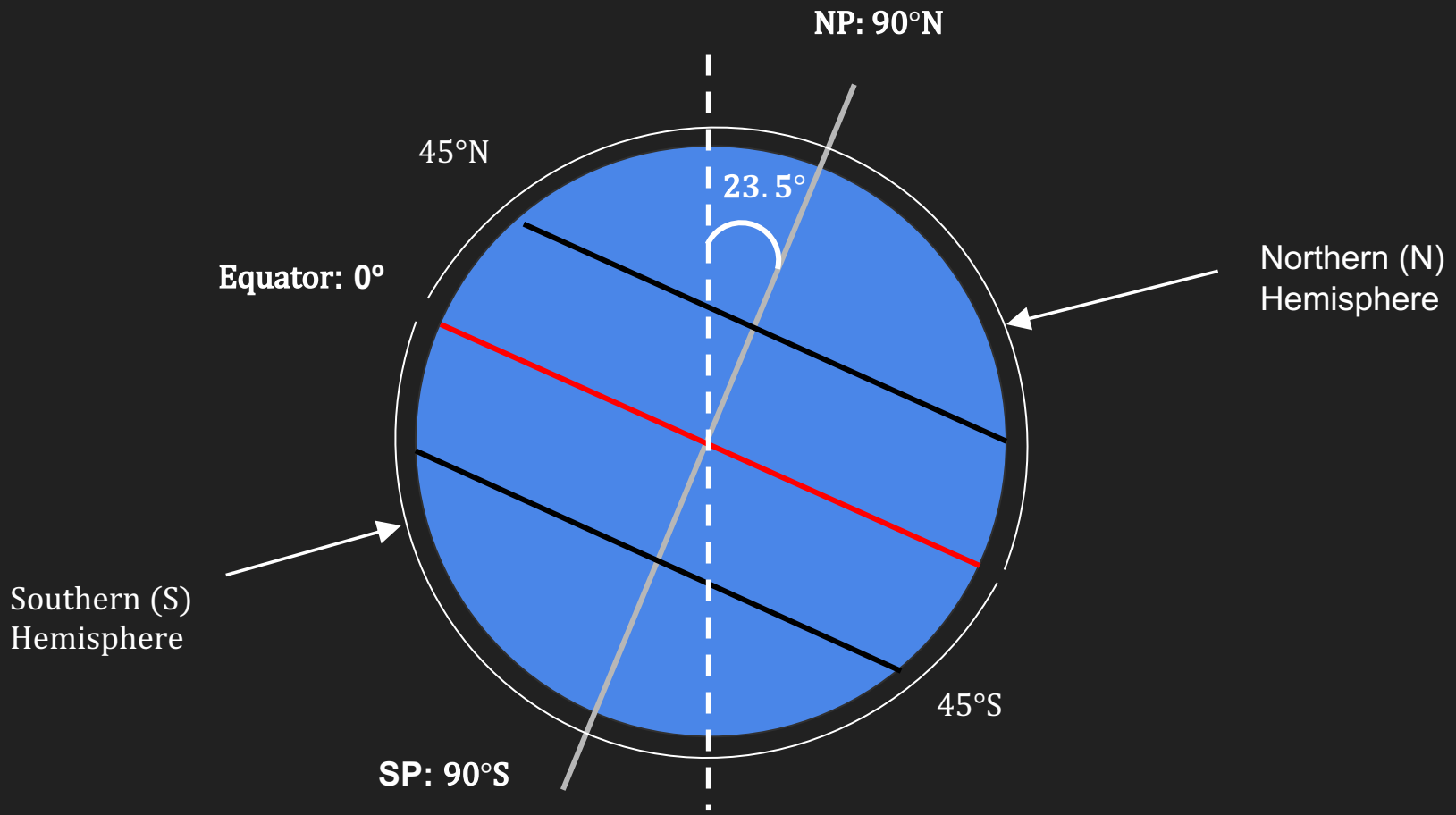
One Hypothesis: The Earth is closer to the sun in the summer and further away in the winter.

- For this to make sense, the Earth's orbit cannot be circular. *Why?*
- Aphelion - *maximum* distance from the sun (~152 million km)
- Perihelion - *minimum* distance from the sun (~147 million km)
- Change between peri/aphelion: ~3%. Is this enough to cause our seasons?

Exercise #1:

- Each group should have a binder with images of the sun in Jan./July.
- DO NOT TAKE THE PAGES OUT OF THE SLEEVES.
- This exercise should test our hypothesis.
- Make sure you are measuring the full diameter...

Geography: Latitudes



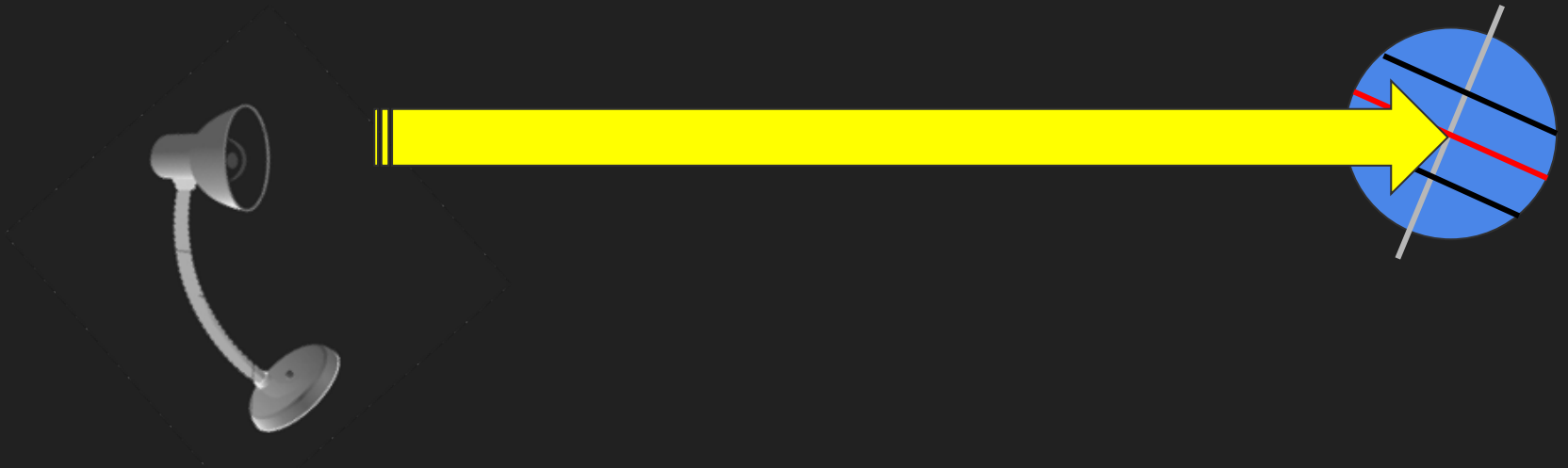
Exercise #2

- How does the temperature change with Latitude only (in general)? Why is this true?
- How does it change with elevation? Why?
- How do the seasons affect temperature changes at particular Latitudes?

All answers can be found using Table 2.1!
You don't need to look anything up.

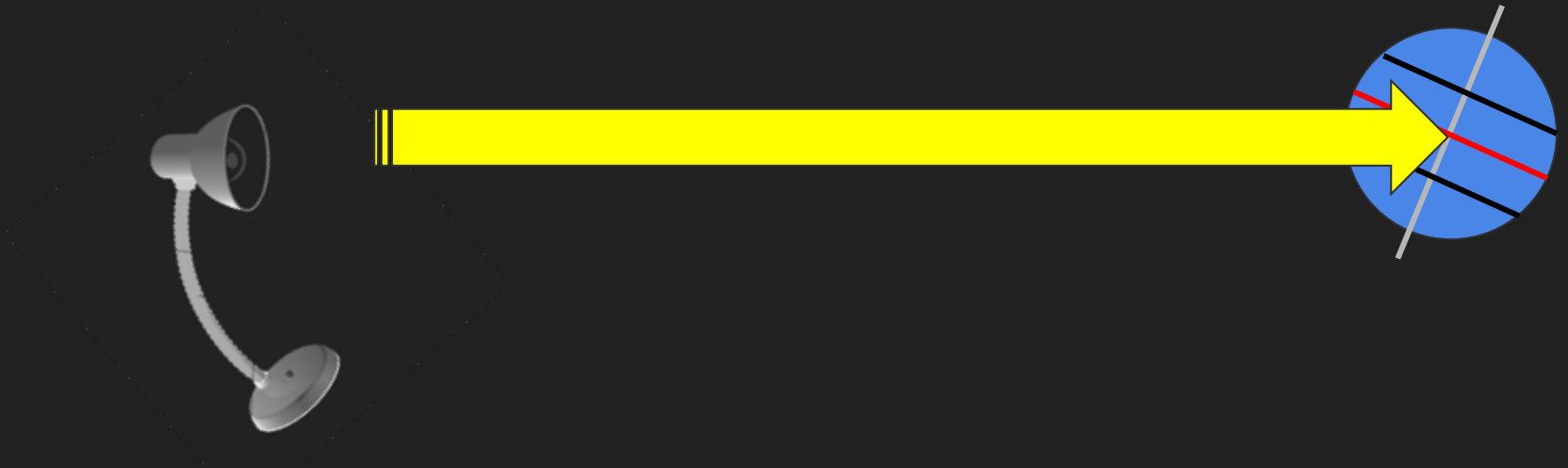
Experiment #3: Setup

- Scale: ***1 cm = 1 million km*** (place the sun/earth at their average distance, 150 million kilometers, or 1.5 meters, apart)
- Be sure to line up the sun (lamp) so that the light is completely horizontal and hits the center of the earth (the sphere).



Experiment #3: Tips

- Things will not turn out perfectly (why?), but you should see general trends.
- Measure the full arc lengths before you start! This will make things easier.
- DO NOT just flip the numbers between the Arctic/Antarctic Circles, or between the 2 solstices. **You WILL get the answer wrong**!



Exercise #3: Experiment 1

Exercise #3: Experiment 2

Exercise #3: Experiment 3

Calculating daytime hours:

$$\frac{L_{daytime\ arc}}{L_{daytime\ arc} + L_{nighttime\ arc}} \times 24\ hours$$

Calculating nighttime hours:

$$24\ hours - daytime\ hours$$

Exercise #4

Area Formulas:

$$Circle: \pi R^2 \qquad Ellipse: \frac{\pi ab}{4}$$