Basic ideas to remember:

* Sunlight is energy that hits the Earth as heat.
* The more direct the ray, the more concentrated the light and the hotter it will feel.
* The Earth is tilted TOWARDS the sun in the summer and AWAY in the winter. Summer is warmer with longer days / Winter is cooler with shorter days.

**Exercise #1 - Distance**

A. Ranking for Northern Hemisphere

Greatest distance: 1 – Summer 2 – Fall 3 – Spring 4 – Winter

B. Ranking for Southern Hemisphere

Greatest distance: 1 – Winter 2 – Spring 3 – Fall 4 – Summer

Take away from exercise #1: Distance does **not** affect seasons. Northern and Southern hemisphere is opposite of one another due to the tilt of the Earth, therefore have opposite seasons.

**Exercise #2 - Flashlights**

A. Ranking order of size of illuminated area

Largest: 1 – D 2 - B 3 – A 4 – C

B. Ranking order of brightness of light

Brightest: 1 – C 2 – A 3 – B 4 – D

C. Ranking order for temperature

Coolest: 1 – D 2 – B 3 – A 4 – C

Take away form exercise #2: The more intense the light, the brighter the beam. The brighter the beam, the more heat it would produce. More heat is produced when a beam of light is more direct and concentrated.

**Exercise #3 – Size of light reflected**

A. Rank the size of light from the larges to smallest

Largest: 1 – D 2 – C and A are same 3 – B

B. Rank brightness of light

Brightest: 1 – B 2 – C and A are same 3 – D

C. Rank based on the amount of heat hitting the planet

Coolest: 1 – D 2 – C and A are same 3 – B

Take away from exercise #3: First note that the Earth is not tilted on its axis. The most intense /direct light is at the equator (B) and is the brightest. This would mean B has the smallest illuminated area and the most heat would be produced there. Conversely, D is the largest and has the most INDIRECT light and is the largest area illuminated. The temperature would be least here. A and C are at the same latitude and therefore the same temperature ON THIS EXERCISE ONLY.

**Exercise # 4 – Amount of light based on latitude**

A. Rank time it takes to complete a full rotation

Longest time: 1 – E, D, A, B, C – they are all the same / a day is a day…

B. Rank time each location spends in daylight

Longest time: 1 – C 2 – B 3 – A 4 – D 5 – E

C. Heat generated at each location

Coolest: 1 – E 2 – C 3 – B 4 – D 5 - A

Take away from exercise #4: One rotation = 24 hour period / 1 day. The amount of time spent in the daylight does not determine how hot it will be. The direct rays from the sun best indicate the heat the area will experience.

**Exercise #5 – Tilt of the earth**

A. Rank time the X spends in daylight in 24 hour period

Longest time: 1 – E 2 – B 3 – C 4 – A 5 – D

B. Rank the amount of heat that will reach each X

Coolest: 1 – E 2 – B 3 – C 4 – A 5 – D

Take away from exercise #5: The earth rotates on its axis. The amount of direct sunlight hitting the X changes based on the tilt of the axis. The more the earth is tilted toward the sun (getting more direct rays) the more heat it will experience.