

Teacher Notes--- THE SUN

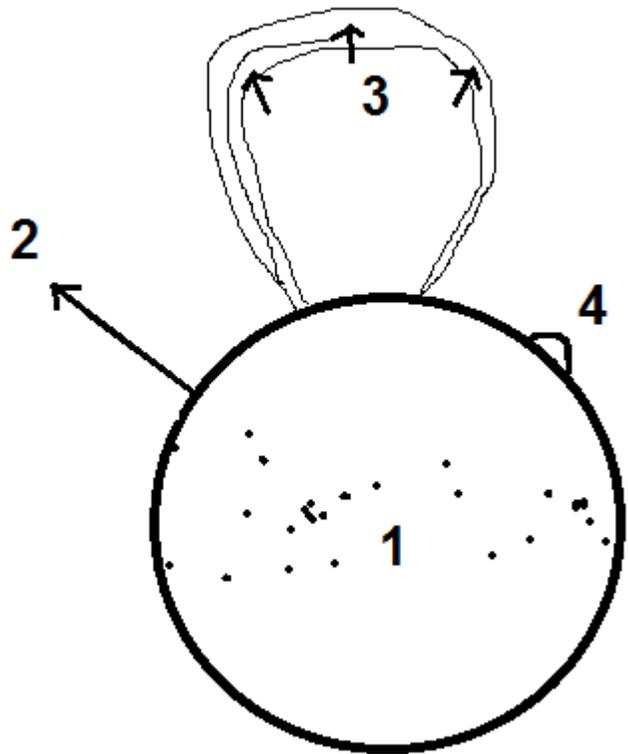
Sun- YELLOW star that is average AGE and average temperature & is SMALLER than average

A. SUN PHENOMENA

1. **Sunspot**- cool, dark area on the sun [like a ticking time bomb that will explode someday]
 - a) Happens in an 11-year cycle—called the Cycle of Solar Activity
 - b) Caused by twisted magnetic fields
 - c) At the end of a cycle, the sun's poles get reversed and the twisting starts all over again
 - d) Cycle labels:
 - (1) **Sunspot maximum**- largest number of spots (several per day)
 - (2) **Sunspot minimum**- fewer sunspots (1 every two weeks)
 - e) Sunspots showed us that the sun rotates on an axis
 - (1) Equator--- 24-day rotation
 - (2) Poles--- 30-day rotation
 - (3) 200 million year revolution

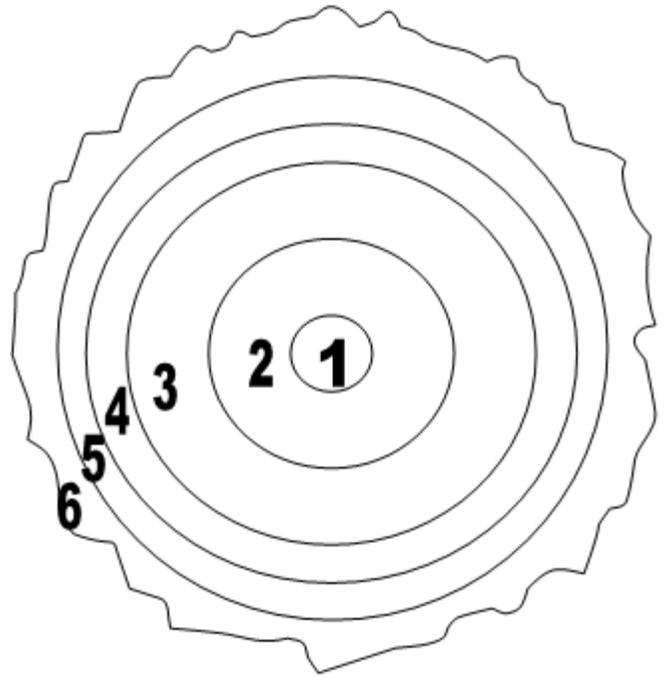
2. **Solar flare**- a magnetic storm that explodes particles and gases STRAIGHT OUT from the surface of the Sun.
 - a) Messes up tv, radio, cell phones, aviation, electric grids, satellite, and space communications
 - b) Flares interact with earth's magnetic poles making auroras
 - (1) **Aurora borealis**- northern lights
 - (2) **Aurora australis**- southern lights[neutrinos from solar flares follow magnetic field toward the poles, then charged particles collide with particles in ionosphere creating light. Sound is claimed by some as well]

3. **Prominence**- massive balloon shaped explosion of gas and particles that erupts from the surface of the sun AKA coronal mass ejections (CMEs)
4. **Coronal loop**- gases held up in a magnetic loop- reach from sunspot to sunspot
5. **Solar wind** –
 - a) streaming electrically charged ATOMIC PARTICLES that constantly escape from the Sun through coronal holes, which are weak spots in the Sun's MAGNETIC field.
 - b) It is FASTER and much HOTTER than Earth's wind.
 - c) Solar wind is traveling at about 1 MILLION miles an hour by the time it gets close to Earth.
 - d) If it BLEW on the Earth's surface, it would obliterate all LIFE, but Earth's magnetic field and atmosphere PROTECT the planet.



B. SUN'S INTERNAL STRUCTURE

1. **Core**- fusion occurs here
2. **Radiative zone**- electromagnetic waves (energy) bounce around like a pinball, taking 100,000 years to escape
3. **Convection zone**- heat rises and cold sinks
4. **Photosphere**- visible surface of the sun
5. **Chromosphere**- the bottom of the sun's atmosphere (see through)
6. **Corona** (crown)- the top of the sun's atmosphere (see through)



C. How FUSION works:

1. Hydrogen and hydrogen FUSE to make HELIUM in the core. It takes 4 hydrogens to make 1 helium. What happens to the missing matter?
2. Tiny bits of MATTER are transformed into enormous ENERGY.
3. Particles and dangerous ionizing ELECTROMAGNETIC WAVES bounce around like a pinball machine for 1 MILLION years trying to get out.
4. Once it finally gets to the sun's surface, it has transformed into much safer electromagnetic waves –INFRARED (heat) and VISIBLE (light).