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# The Sun's Surface And Subsurface Investigating Shape And Irradiance Lecture Notes In Physics V 599

**student guide to activity 1: features of the sun** - the sun's photosphere. granulations are rising and falling columns of hot gases that look like fluffy marsh-mallows arranged in a honeycomb pattern. the tops of these granules form the sun's "surface." although we refer to the sun's "surface" as the photo-sphere, you probably know that the sun has no solid surface, unlike earth ... **the sun worksheet - northland preparatory academy** - the convection zone is the outermost layer of the sun's interior. hot gases rise from the bottom of the convection zone and gradually cool as they approach the top. cooler gases sink, forming loops of gas that move heat toward the sun's surface. the sun's atmosphere consists of the photosphere, the chromosphere, and the corona. the inner ... **sun's period of rotation - mrsienceut** - buried just below the sun's surface, that prevent the flow of hot gases from below. like a horseshoe magnet, sunspots have both a magnetic north and south pole. the spot where the magnetic field is located cools slightly compared to its surroundings. because the spot is cooler, it looks darker. **sunlight warms earth's surface - mill river schools** - sunlight warms earth's surface physical science (energy), kindergarten . kindergarten students explore the effect of sunlight on earth's natural surfaces of sand, soil, rock and water. students learn that surfaces in sunlight are warmer than those surfaces in the shade. in addition, students explore how the color and material of a surface ... **layers of the sun - eye on the sky** - sun's surface where it is cooler. the sun's convection zone is a bubbling 2 millions degrees fahrenheit. the photosphere, the sun's visible surface, is the next layer of the sun. the bubbling motion of the convection layer makes the granular patterns we see on the photosphere. the granules may look small in pictures, but scientists **determining the sun's surface temperature with iphone** - determining the sun's surface temperature with iphone p. d. mullen and c. n. woods department of physics and astronomy, university of georgia, athens, georgia 30602 (dated: 8 december 2015) the principles behind blackbody radiation make it possible for one to measure the surface temper- **mon tues, july sun and processes - george mason university** - b) the region of convecting gases below the visible surface of the sun c) the middle layer of the sun's atmosphere d) the visible "surface" of the sun if granulation on the sun's surface is a result of convective motion below it, and material is upwelling at the centers of granular cells and returning in the regions **tracking sunspots - solar and heliospheric observatory** - you are about ready to start observing and tracking sunspots across the sun using real images. you can then use this information to determine the rate of the sun's rotation. some sunspot facts: • sunspots are dark, cooler areas on the sun's surface that indicate areas of strong magnetic activity **the sun heats up 820 questions - barrenschoools** - heat from the center of the sun slowly bubbles to the surface. the sun's surface looks like a rapidly boiling pot of water. the temperature at the surface is about 7,000 degrees fahrenheit. streams of gas, called flares, can explode from the sun's surface. those streams of gas soar through space and sometimes collide with earth's atmosphere. **sunlight and its properties - university of nevada, las vegas** - sun's core converts hydrogen to helium. • a nuclear fusion releases a tremendous amount of thermal energy according to einstein's formula: • the radiation from the inner core is not visible since it is absorbed by a layer of hydrogen atoms closer to the sun's surface. =e mc<sup>2</sup> **tth hw06 key - institute for astronomy** - a) cooler regions of the sun's high corona. b) the shadows of cool, dark curtains of matter, hanging above the solar surface. c) cooler, darker regions on the sun's surface. d) hotter, deeper regions in the sun's atmosphere. 13. what specific physical effect was used to verify the existence of intense magnetic fields in sunspots? **the sun? what features can you see on - ms. day's 7th ...** - what features can you see on the sun? pg 149 • features on or just above the sun's surface include sunspots, prominences, and solar flares • sunspots are areas of gas on the sun's surface that are cooler than the gases around them. sun spots look small, but they can be larger than earth. **homework #5 - university of illinois** - how does the average density of the sun compare to that of the planet jupiter? question 3: (5 points) granulation or the mottled appearance of the whole solar surface is an indication of what physical process at work in the sun? n m l k j 1. the visible "surface" of the sun. n m l k j 2. the middle layer of the sun's atmosphere. n m l k j **the sun our extraordinary ordinary - george mason university** - are happening in the sun's core? 5. does the sun have a solid surface? 6. since the sun is so bright, how is it possible to see its dim outer atmosphere? 7. where does the solar wind come from? 8. what are sunspots? why do they appear dark? 9. what is the connection between sunspots and the sun's magnetic field? 10. **sun cookies v1 - front page | lawrence hall of science** - sunspots appear on the sun's surface as dark spots, usually in pairs. sunspots are areas with a lot of magnetic activity. since magnets always have a north pole and a south pole, two sunspots usually appear together, where one sunspot is the north end and the other is the south end. both sunspots are a little cooler than **the sun - nasa** - the sun many spacecraft have explored the sun's environment, but none have gotten any closer to its surface than approximately two-thirds of the distance from earth to the sun. pioneers 5-11, the pioneer venus orbiter, voyagers 1 and 2, and other spacecraft have all sampled the solar environment. **explore a moment in the dynamic life of our sun. sun ...** - sun's visible "surface" 6,000°c explore a moment in the dynamic life of our sun. sun images were taken on the same day using different

instruments. composite of the nasa sdo/aia 4500 photosphere image and a coronal image taken during the 2006 solar eclipse, used with permission by miroslav kolibal, hana druckmüllerová, miloslav ... **our star - the sun** - the sun's "surface" — the photosphere — is a 500-kilometer-thick (300-mile-thick) region, from which most of the sun's radiation escapes outward and is detected as the sunlight we observe here on earth about eight minutes after it leaves the sun. sunspots in the photosphere are areas with strong magnet- **the sun in the electromagnetic spectrum** - the image shows a portion of the layer of the sun's atmosphere known as the chromosphere, just above the sun's surface. most of the uv light comes from the sunspot "active regions", where we can sometimes see loops, large prominences rising high above the surface of the sun. at the north and south poles of the sun, less uv light is emitted ... **earth, sun, and moon - be awesome at pattison** - 2 earth, sun, and moon • features: sunspots and solar flares are features on the sun's surface they are dark areas that are cooler than the rest of the sun's surface. the number of sunspots changes about every 11 years. **6. light: the cosmic messenger agenda** - if the sun's surface became much hotter (while the sun's size remained the same), the sun would emit more ultraviolet light but less visible light than it currently emits. 1. yes, because the visible light would be absorbed by the sun's warmer surface. 2. yes, because the sun's warmer surface would emit more ultraviolet light and less ... **chapter 8 questions - niu** - chapter 8 questions 8-1. at what color is the sun's radiation most intense? a) blue-green x b) red-orange c) yellow d) red 8-2. what is the layer of the sun that we normally see called? **the sun - caltech astronomy** - •the sun's surface features (including sunspot numbers) vary in an 11-year cycle; it is really a 22-year cycle in which the surface magnetic field increases, decreases, and then increases again with the opposite polarity •there are probably also longer period cycles. **the sun: a magnetic plasma diffuser that controls earth's ...** - the sun's surface is "smoke" from the furnace that powers the sun. each year 50 trillion metric tons of protons (hydrogen ions) reach the sun's surface and are flung out into space by the solar wind. this is a small fraction of the hydrogen "smoke" (protons + electrons) generated in the nuclear furnace at the sun's core [18]. **astro 301/fall 2006 (50405) introduction to astronomy** - luminosity of a star rises rapidly as its surface temperature rises start with stefan-boltzmann law flux  $f$  at surface of star =  $\sigma T^4$  but in last lecture we defined flux  $f$  at surface of star = (luminosity of star) / (surface area  $4\pi r^2$  of star) equate the 2 expressions for flux at surface of star **the sun is still news - multiverse > home** - the sun's magnetism the sun, like earth, generates a magnetic field that extends out into space. however, the sun's magnetic field changes both its shape and intensity over the surface, and over time, much more rapidly. why is that? we'll need to learn some basics about how the solar **for kids ages 6-13 and the adults they learn with!** - maximum - the most active part of the sun's 11-year sunspot cycle. during solar maximum, the sun's surface and atmosphere are very magnetically active. there are many sunspots (see max's freckles) and a higher chance of violent solar storms that can enhance auroras, damage satellites, endanger astronauts and cause power blackouts. **18 our sun - nmsu astronomy** - and re-enters the photosphere are cooler than the rest of the sun's surface. these cool places appear darker, and therefore are called "sunspots". figure 18.3: sunspots are a result of the sun's differential rotation. the number of sunspots rises and falls over an 11 year period. this is the amount of **the sun the surface of the sun - uf astronomy** - the surface of the sun •visible surface is photosphere •temp range 6500k at base to 4400k at top of photosphere -effective  $\sim$  5700k •granular structure - gas motion carry's energy to surface •dark cool regions are called sunspots surface of sun the chromosphere of the sun •outside photosphere •temperature starts to rise -4 ... **how fast does the sun spin? 4 - space math at nasa** - near-side surface of the sun is bulging out of the page at you! we are going to neglect this distortion and estimate how many days it takes the sun to spin once around on its axis. the radius of the sun is 696,000 kilometers. problem 1 - using the information provided in the images, calculate the speed of the sun's **the structure of the sun - noaa / nws space weather ...** - into the solar system, well beyond earth. in studying the structure of the sun, solar physicists divide it into four domains: the interior, the surface atmospheres, the inner corona, and the outer corona. section 1.—the interior the sun's interior domain includes the core, the radiative layer, and the convective layer (figure 2-1). **model the sun and earth - lawrence hall of science** - 11,000 earths to reach from our planet's surface to the sun's surface! light travels at an extremely high speed of 299,792 kilometers per second, but the sun is so far away, its light still takes over 8 minutes to reach earth! if you could somehow fly a boeing 747 jet through space, its speed is so much less than the **why is the sun important to us? last time - formation of ...** - •they are tested against the sun's observable quantities! • we can indirectly measure sound waves moving through the interior! • these can be used to probe conditions in the interior of the sun! "observing" the solar interior! • helioseismology is the study of how the sun's "surface" vibrates up and down! **4 layers of the sun - niu - nicadd** - • surface of the sun hot, turbulent with electric/magnetic storms which throw out energetic particles • chromosphere low density, high  $t$  glows red (h atom emission) seen in eclipse • corona even lower density and higher  $t$  (over 1,000,000 degrees) and higher velocity • solar wind protons escaping sun's gravity so largest velocity. can **earth-sun relationship earth movements and positions** - (variations in the angle at which the sun's rays hit the earth) 3. conditions on the sun's surface (variations in the emission of solar radiation from the sun) 4 earth-sun relationship proximity: the earth is the third planet from the sun. 5 earth s u n too hot too cold diagram is not to scale. just right for life **objectives key terms - platteville wi 53818** - spherical shape, different locations

on earth's surface receive different amounts of solar energy. near the equator, the sun's rays strike the surface most directly. at latitudes farther from the equator the rays strike earth's surface at lower angles, causing the same amount of solar energy to be spread over a larger area (figure 34-6). **a poynting-robertson-like drag at the sun's surface - arxiv** - the sun's internal rotation  $\Omega(\theta)$  has previously been measured using helioseismology techniques and found to be a complex function of co-latitude,  $\theta$ , and radius,  $r$ . from helioseismology and observations of apparently "rooted" solar magnetic tracers we know that the surface rotates more slowly than much of the interior. **our star, the sun - department of physics and astronomy** - the lowest of three main layers in the sun's atmosphere • the sun's atmosphere has three main layers - the photosphere - the chromosphere - the corona • everything below the solar atmosphere is called the solar interior • the visible surface of the sun, the photosphere, is the lowest layer in the solar atmosphere **ch3 distribution of solar - university of washington** - surface depends on orientation of that area with respect to the sun's rays. the orientation of the surface can be described by a vector pointing in the local vertical direction. if  $\theta$  is the angle between the local vertical and the sun's rays, then  $I$ , the total flux of solar radiation striking the square meter of surface, is  $I = I_0 \cos(\theta)$ . **key concept the sun is our local star. - classzone** - the sun, it is often called the sun's surface. convection currents beneath the photosphere cause it to have a bumpy texture. chromosphere the chromosphere is the thin middle layer of the sun's atmosphere. it gives off a pinkish light. corona the sun's outermost layer is called the corona, **why does the sun shine? why is the sun very dense on the ...** - why does the sun shine? a) it is on fire. b) chemical energy c) gravitational energy d) nuclear fusion e) nuclear fission chapter 14-16 review ... the sun's visible surface, or photosphere, has regions of strong magnetic field called a) granulation. b) magnetic traps. c) magnetic lines. d) sunspots. **ast 105 hw #3 solution - stony brook university** - 25. if the sun's surface became much hotter (while the sun's size remained the same), the sun would emit more ultraviolet light but less visible light than it currently emits. answer: this statement does not make sense. if the sun's surface becomes much hotter, the ratio between the amount of ultraviolet light and visible light will change. **the sun is hot fireball of gas. we observe its outer ...** - close to the sun's surface. the apparent position of the star in the sky gets shifted with respect to other fixed stars whose light does not go near the sun's surface. it is less than a second of arc!! to observe this one must compare the stellar positions during total eclipse and **astronomy 82 - problem set #1 - ucla** - a little confusing, since the sun's surface doesn't "produce" energy ... it merely radiates it away after the energy has made its way all the way through the sun's structure and out into the photosphere. nonetheless, just look at the units of power and of flux to figure out the relation to surface area:  $p = f a$ , so  $a = p / f$ . thus,  $a = p/f = 109w$  **appendix d: solar radiation - university of minnesota** - d - 2 basic earth-sun angles the position of a point  $p$  on the earth's surface with respect to the sun's rays is known at any instant if the latitude,  $l$ , and hour angle,  $h$ , for the point, and the sun's declination angle, **sunlight and its properties - university of nevada, las vegas** - surface. • air mass ( $am$ ) ratio is the optical path length through earth's atmosphere relative to the minimum path. this ratio is approximately equal to the inverse of the sine of the sun's altitude angle  $\beta$ . -  $am_0$  means no atmosphere -  $am_1$  means the sun is directly overhead. -  $am_{1.5}$  (an air mass ratio of 1.5) is often **of the - stanford university** - dissecting the sun's turmoil magnetism is a key to understanding many of the frenetic things happening on and above the sun, as told on the facing page. atmospheric imaging assembly ( $aia$ ) the magnetic field is tightly anchored in the sun's surface. when a flare erupts, the surface itself generally remains unperturbed.

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