MOVEMENTS AND LUNAR PHENOMENA pdf

1: The Movement of the Sun & Moon in the Sky | Sciencing

This unit focuses on the interactions and motions of the earth, sun, and moon that cause seasons, the lunar cycle and tides on earth. Most middle school age students have.

For example, rock layers show the sequence of geological events, and the presence and amount of radioactive elements in rocks make it possible to determine their ages. Analyses of rock formations and the fossil record are used to establish relative ages. In an undisturbed column of rock, the youngest rocks are at the top, and the oldest are at the bottom. Rock layers have sometimes been rearranged by tectonic forces; rearrangements can be seen or inferred, such as from inverted sequences of fossil types. The rock record reveals that events on Earth can be catastrophic, occurring over hours to years, or gradual, occurring over thousands to millions of years. Records of fossils and other rocks also show past periods of massive extinctions and extensive volcanic activity. Although active geological processes, such as plate tectonics link to ESS2. B and erosion, have destroyed or altered most of the very early rock record on Earth, some other objects in the solar system, such as asteroids and meteorites, have changed little over billions of years. Page Share Cite Suggested Citation: A Framework for K Science Education: Practices, Crosscutting Concepts, and Core Ideas. The National Academies Press. Major historical events include the formation of mountain chains and ocean basins, volcanic activity, the evolution and extinction of living organisms, periods of massive glaciation, and development of watersheds and rivers. Because many individual plant and animal species existed during known time periods e. C By the end of grade 2. Some events on Earth occur in cycles, like day and night, and others have a beginning and an end, like a volcanic eruption. Some events, like an earthquake, happen very quickly; others, such as the formation of the Grand Canyon, occur very slowly, over a time period much longer than one can observe. By the end of grade 5. Earth has changed over time. Understanding how landforms develop, are weathered broken down into smaller pieces , and erode get transported elsewhere can help infer the history of the current landscape. Local, regional, and global patterns of rock formations reveal changes over time due to Earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. By the end of grade 8. Major historical events include the formation of mountain chains and ocean basins, the evolution and extinction of particular living organisms, volcanic eruptions, periods of massive glaciation, and development of watersheds and rivers through glaciation and water erosion. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. By the end of grade Radioactive decay lifetimes and isotopic content in rocks provide a way of dating rock formations and thereby fixing the scale of geological time. Continental rocks, which can be older than 4 billion years, are generally much older than rocks on the ocean floor, which are less than million years old. Tectonic processes continually generate new ocean seafloor at ridges and destroy old seafloor at trenches. B and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Weather and climate are shaped by complex interactions involving sunlight, the ocean, the atmosphere, clouds, ice, land, and life forms. Earth is a complex system of interacting subsystems: The geosphere includes a hot and mostly metallic inner core; a mantle of hot, soft, solid rock; and a crust of rock, soil, and sediments. The atmosphere is the envelope of gas surrounding the planet. The hydrosphere is the ice, water vapor, and liquid water in the atmosphere, ocean, lakes, streams, soils, and groundwater. The presence of living organisms of any type defines the biosphere; life can be found in many parts of the geosphere, hydrosphere, and atmosphere. Solid rocks, for example, can be formed by the cooling of molten rock, the accumulation and consolidation of sediments, or the alteration of older rocks by heat, pressure, and fluids. These processes occur under different circumstances and produce different types of rock. Physical and chemical interactions among rocks, sediments, water, air, and plants and animals produce soil. In the carbon, water, and nitrogen cycles, materials cycle between living and nonliving forms and among the atmosphere, soil, rocks, and ocean. Weather and climate are driven by interactions of the geosphere, hydrosphere, and atmosphere, with inputs of energy from the sun. The tectonic and volcanic processes that create and build mountains and plateaus, for example, as well as the weathering and erosion processes that break down these structures and transport the products, all involve interactions among the geosphere, hydrosphere, and atmosphere. The resulting landforms and the habitats they provide affect the biosphere, which in turn modifies these habitats and affects the atmosphere, particularly through imbalances between the carbon capture and oxygen release that occur in photosynthesis, and the carbon release and oxygen capture that occur in respiration and in the burning of fossil fuels to support human activities. Earth exchanges mass and energy with the rest of the solar system. It gains or loses energy through incoming solar radiation, thermal radiation to space, and gravitational forces exerted by the sun, moon, and planets. Earth gains mass from the impacts of meteoroids and comets and loses mass from the escape of gases into space. Changes in part of one system can cause further changes to that system or to other systems, often in surprising and complex ways. A By the end of grade 2. Wind and water can change the shape of the land. The resulting landforms, together with the materials on the land, provide homes for living things. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. Rainfall helps shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. The top part of the mantle, along with the crust, forms structures known as tectonic plates link to ESS2. These changes can occur on a variety of time scales from sudden e. Tectonic plates are the top parts of giant convection cells that bring matter from the hot inner mantle up to the cool surface. Most continental and ocean floor features are the result of geological activity and earthquakes along plate boundaries. This history is still being written. Continents are continually being shaped and reshaped by competing constructive and destructive geological processes. North America, for example, has gradually grown in size over the past 4 billion years through a complex set of interactions with other continents, including the addition of many new crustal segments. B By the end of grade 2. Rocks, soils, and sand are present in most areas where plants and animals live. There may also be rivers, streams, lakes, and ponds. Maps show where things are located. One can map the shapes and kinds of land and water in any area. The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features where people live and in other areas of Earth. Plate tectonics can be viewed as the surface expression of mantle convection.

2: Search - Scootle

The astronomical movement of these three celestial bodies is responsible for a lot of the phenomena found on Earth, including day and night cycles and the tides. Heliocentricism The Earth slowly revolves around the sun in a set path known as an orbit.

Cameron [2] classifies these as 1 gaseous, involving mists and other forms of obscuration, 2 reddish colorations, 3 green, blue or violet colorations, 4 brightenings, and 5 darkening. Two extensive catalogs of transient lunar phenomena exist, [1] [2] with the most recent tallying 2, events going back to the 6th century. Of the most reliable of these events, at least one-third come from the vicinity of the Aristarchus plateau. A few of the more famous historical accounts of transient phenomena include the following: On June 18, , five or more monks from Canterbury reported an upheaval on the Moon shortly after sunset. From the midpoint of this division a flaming torch sprang up, spewing out, over a considerable distance, fire, hot coals, and sparks. Meanwhile the body of the moon which was below writhed, as it were, in anxiety, and, to put it in the words of those who reported it to me and saw it with their own eyes, the moon throbbed like a wounded snake. Afterwards it resumed its proper state. This phenomenon was repeated a dozen times or more, the flame assuming various twisting shapes at random and then returning to normal. Then after these transformations the moon from horn to horn, that is along its whole length, took on a blackish appearance. However, more recent studies suggest that it appears very unlikely the event was related to the formation of Crater Giordano Bruno, or was even a true transient lunar phenomenon at all. The millions of tons of lunar debris ejected from an impact large enough to leave a km-wide crater would have resulted in an unprecedentedly intense, week-long meteor storm on Earth. No accounts of such a memorable storm have been found in any known historical records, including several astronomical archives from around the world. Herschel attributed the phenomena to erupting volcanoes and perceived the luminosity of the brightest of the three as greater than the brightness of a comet that had been discovered on April His observations were made while an aurora borealis northern lights rippled above Padua , Italy. In , the experienced lunar observer and mapmaker J. Based on drawings made earlier by J. On November 2, , the Russian astronomer Nikolai A. Kozyrev observed an apparent half-hour "eruption" that took place on the central peak of Alphonsus crater using a inch cm reflector telescope equipped with a spectrometer. During this time, the obtained spectra showed evidence for bright gaseous emission bands due to the molecules C2 and C3. According to Willy Ley: The report was passed on to Houston and thence to the astronauts. Almost immediately, Michael Collins reported back: It seems to have a slight amount of fluorescence. While observations on the night of December 29, , were normal, unusually high albedo and polarization features were recorded the following night that did not change in appearance over the six minutes of data collection. While the viewing conditions for this region were close to specular, it was argued that the amplitude of the observations were not consistent with a specular reflection of sunlight. The favored hypothesis was that this was the consequence of light scattering from clouds of airborne particles resulting from a release of gas. The fractured floor of this crater was cited as a possible source of the gas. Explanations[edit] Explanations for the transient lunar phenomena fall in four classes: Outgassing[edit] Some TLPs may be caused by gas escaping from underground cavities. These gaseous events are purported to display a distinctive reddish hue, while others have appeared as white clouds or an indistinct haze. The majority of TLPs appear to be associated with floor-fractured craters, the edges of lunar maria , or in other locations linked by geologists with volcanic activity. However, these are some of the most common targets when viewing the Moon, and this correlation could be an observational bias. In support of the outgassing hypothesis, data from the Lunar Prospector alpha particle spectrometer indicate the recent outgassing of radon to the surface. These observations could be explained by the slow and visually imperceptible diffusion of gas to the surface, or by discrete explosive events. Impact events[edit] Impact events are continually occurring on the lunar surface. The most common events are those associated with micrometeorites , as might be encountered during meteor showers. Impact flashes from such events have been detected from multiple and simultaneous Earth-based observations. Impact events leave a visible scar on the surface, and these could be detected by analyzing before and after photos of sufficiently high resolution. No impact craters formed between the Clementine global resolution metre, selected areas metre and SMART-1 resolution 50 metre missions have been identified. One possibility is that electrodynamic effects related to the fracturing of near-surface materials could charge any gases that might be present, such as implanted solar wind or radiogenic daughter products. Alternatively, it has been proposed that the triboelectric charging of particles within a gas-borne dust cloud could give rise to electrostatic discharges visible from Earth. For instance, some reported transient phenomena are for objects near the resolution of the employed telescopes. Other non-lunar explanations include the viewing of Earth-orbiting satellites and meteors or observational error. The multitude of reports for transient phenomena occurring at the same place on the Moon could be used as evidence supporting their existence. However, in the absence of eyewitness reports from multiple observers at multiple locations on Earth for the same event, these must be regarded with caution. As discussed above, an equally plausible hypothesis for some of these events is that they are caused by the terrestrial atmosphere. If an event were to be observed at two different places on Earth at the same time, this could be used as evidence against an atmospheric origin. One attempt to overcome the above problems with transient phenomena reports was made during the Clementine mission by a network of amateur astronomers. Several events were reported, of which four of these were photographed both beforehand and afterward by the spacecraft. However, careful analysis of these images shows no discernible differences at these sites. Observations are currently being coordinated by the Association of Lunar and Planetary Observers and the British Astronomical Association to re-observe sites where transient lunar phenomena were reported in the past. By documenting the appearance of these features under the same illumination and libration conditions, it is possible to judge whether some reports were simply due to a misinterpretation of what the observer regarded as an abnormality. Furthermore, with digital images, it is possible to simulate atmospheric spectral dispersion , astronomical seeing blur and light scattering by our atmosphere to determine if these phenomena could explain some of the original TLP reports.

3: Moon - Wikipedia

The tide and the ebb phenomenon occurs due to the attraction force between the Moon, The Earth and the Sun, But the Moon is more effective than the Sun as it is the nearer to the Earth.

Knight compiled a list of 33 factors which influence or control day-to-day behavior of fresh and salt-water fish. Everything was taken into account that could possibly have any bearing on the matter. One by one the factors were examined and rejected. Three of them, however, merited further examination. They were sun, moon and tides. The moon had already been weighed and found wanting. Surely there could be no tidal movement in a trout stream. But the fact remained, however, that the tides had always guided salt-water fishermen to good fishing. Could it be that the prompting stimulus lay in the influence of the sun and moon which cause the ocean tides, rather than the actual tidal stages or flow? When the original research was being done only the approximate time of moon up - moon down were considered. Gradually, it became evident that there were also intermediate periods of activity that occurred midway between the two major periods. One convincing experiment was when Dr. Brown, a biologist at Northwestern University, had some live oysters flown to his lab near Chicago. Oysters open their shells with each high tide, and Dr. Brown wanted to see if this was due to the change in ocean levels or to a force from the moon itself. He put them in water and removed them from all sunlight. For the first week they continued to open their shells with the high tides from their ocean home. But by the second week, they had adjusted their shell-openings to when the moon was directly overhead or underfoot in Chicago. Knight first published his Solunar Tables in Then, and today, one must calculate the precise times from each table taking into account the geographic location east or west of a base point Time Zone , and adjusted for Daylight Savings Time when appropriate. The tables are rounded to the nearest 10 minutes. An example of the deviation in time in a particular state would be Texas here the times from El Paso on the western border and Hemphill on the eastern border is 51 minutes Hemphill is 51 minutes earlier than El Paso.

4: Whatever happened to Transient Lunar Phenomena? | Astronotes

In this lesson you will learn about how the movements of the Earth, Moon, and Sun affect different phenomena on Earth, including day and night, the seasons, tides, and phases of the Moon.

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An example of the deviation in time in a particular state would be Texas here the times from El Paso on the western border and Hemphill on the eastern border is 51 minutes Hemphill is 51 minutes earlier than El Paso. Both individual large fish He examined approximately of these catches. Over 90 percent were made during the dark of the moon new moon when the effects of of the periods appear to be greatest, and, more important, they were made during the actual times of the Solunar Periods. Initially, only the behavior of fish was considered. During to Knight made extensive studies of game birds and animals. As had been suspected, these also responded to the prompting stimulus of the periods. The closer they are to you at any given moment, the stronger the influence. Because of the interaction between the many lunar and solar cycles, no two days, months or years are identical. When you have a moonrise or moonset during that period the action will be even greater. He knows, also, that for some reason fish often go on the feed and take most any offering, be it live bait or artificial. This sort of thing happens, according to John Alden Knight the originator of the theory during a period. If the weather and feeding conditions are favorable the fish will be active for one to two hours. It has been documented that when this condition exists fish will bite on anything they see or smell. Limits are almost guaranteed provided there are fish in the vicinity. What amplifies the activity is the effect of a moonrise or moonset plus the specific monthly periods of New dark and Full light Moons. When the times coincide with a moon-rise or a moon-set the action can be spectacular. Finally, a change in the local weather coinciding with the periods will further enhance the activity. Every day will not show a clear-cut reaction to a period. In the case of fish, barometric fluctuations, particularly when the trend is down, often ruin fishing. All wildlife knows what to expect of the weather, and any bird, animal or fish can sense the approach of a storm. Cold fronts moving through drive all fish deeper and render them inactive. Adverse temperature, abnormal water conditions, all sorts of things will offset the effects of periods. However, every sportsman knows that it is beyond all reason to expect good fishing or hunting every day. The theory will point the way to the best in sport that each day has to offer, but in no sense is it a guarantee. If the barometer happens to be steady or rising, if the temperature is favorable 15 degrees higher than water temp then long and active response to a period can be expected. The times of new moon the dark of the moon , and there is no moon in the sky, is the time of maximum intensity. Ocean tides reflect this intensity in their magnitude. This maximum will last about three days, and wildlife respond with maximum activity. Thereafter the degree of intensity tapers off until it is at its minimum during the third quarter phase of the moon. Salt-water anglers argue that tides have a greater influence on fish feeding habits than the moon itself. It must be understood that the tides are governed by the phases and transit of the moon. Research has shown that a natural day for fish and many other animal species differ from our own. Their biological clock appears to coincide with lunar time, which is the time that it takes for the moon to reappear at a given point during one complete rotation of the earth an average of 24 hours and 53 minutes. This is called a Tidal Day and explains why the ocean tides are about an hour later each day - and why most fish, fresh water species included, will feed up to an hour later in relation to our solar clock each day. The major periods coincide with the upper and lower meridian passage of the resultant gravitational tidal force. The minor periods occur when these forces are rising or setting on either horizon, i. The major periods occur when these forces are at 0 and degrees apart. The times will change one minute for each 12 miles east or west of the base point. There is one day each month near the last quarter of the moon on which there is no moonrise. Thus there will always be a day on which a moonrise and a Solunar Time will not fit. Note also that moonrise can occur at any time during the day or night. It is always to plan your days on the water or in the field so that you are where the game is most likely to be during the periods. Library of Congress

5: Solunar Moon Phase Calendar Chart from The Sportsmen's Page

Start studying Earth Phenomena. Learn vocabulary, terms, and more with flashcards, games, and other study tools.

Ancient Zodiacs, Star Names, and Constellations: Thompson A Chronological History of Babylonian Astronomy Introduction "We have to reconstruct it [Babylonian astronomy] exclusively from texts and a few schematic drawings accompanying them. No instruments relating to astronomy have been found. These texts were written on clay in cuneiform script which was used in the Near East from ca. It was completely forgotten and only deciphered in the middle of the 19th century Since then, hundreds of thousands of clay tablets have been found in archaeological excavations, mostly in present-day Iraq. Among these are a few thousand [fragmented] tablets related to astronomy. Many have been published, but more still need to be worked on. And of course an unknown number of such texts is still buried under the sands of Iraq. The Role of Astronomy in Society and Culture. The two basic methods which characterise the Babylonian approach to astral phenomena are observation and computation. Both methods are found in the earliest cuneiform texts dealing with astral phenomena i. Whilst some texts are primarily either observational or mathematical it is common for both methods to be integrated within the same text. APIN series, and various observational texts i. A few texts i. However, Hermann Hunger points out that no principle is evident in the order of these celestial objects. In these texts we see a desire to find out how the skies are organised, and a belief that this organization can be understood and described in relatively simple ways. The use of observation is limited: An example for this are the so-called Three-stars-each texts which probably go back to between and BCE. They list, for each month of the Babylonian calendar, three constellations which are supposed to become visible in this month: This gives a neat scheme of 36 constellations from whose risings one could tell the time of year. However, it would not work in practice: Then, the Babylonian calendar is not easily attuned to the solar year so that helical risings of stars will not stay in the same month every year. And, just to indicate that we are far from a secure interpretation, the lists also include planets, which are subject to entirely different visibility conditions, independent of the time of the year; finally there are even variant forms of the list which have only ten constellations - instead of 12 - which makes an alignment with the months of the year impossible. The Three-stars-each lists may be seen as attempts to organise what is known about stars. At about the same time an astronomical text was compiled, called Mul-Apin which means Plough star after its first word. All appear within the protases of the celestial omens of the 2nd millennium period i. The Kassite Period and the Early Period saw the completion of the omen series Enuma Anu Enlil, the introduction of the circular then tabular star calendars "the three stars each," the compilation of the MUL. APIN series, and the start of a continuing series of observational texts: Reports to the Kings, and Astronomical Diaries. In some Sumerian texts dated circa BCE there are references to apparent stations of the moon called "houses. Even if the passages quoted refer to places in the sky, they could not be defined by fixed stars, because the moon is not in the same place on the same calendar date each year. The Sumerians undoubtedly watched the sky and defined and named some of the constellations and planets. Bendt Alster believed astronomical observations could be discerned in Sumerian compositions dating circa BCE, which refer to the movement of the heavenly bodies and the constellations. He believed that the cyclical return of the planets, and the sun and moon played an important role in Mesopotamian religion. Most of the names of celestial bodies were Sumerian throughout the later periods and some of them at least must have Sumerian origins. Some astronomical features include: Implementation of the "two ways" as a scheme for the division of the sky? Incorporation of informal astronomical knowledge into mythical themes. Names given to the sun, moon and a few stars and constellations. Circa BCE Uruk tablets contain several references to the "Festival of the Morning Goddess, Ianna" and the "Festival of the Evening Goddess, Ianna" - presumably in her identification with the planet Venus as morning star and evening star. Development establishment of lunar calendar by the Sumerians. At this early date Archaic Period the Sumerians were able to regulate an intercalated lunar calendar by inserting a 13th lunar month approximately every third year. Nisiba, goddess of grain and scribal arts is said to measure heaven and earth, to know the secrets of calculation and, together with Suen, to "count the days. Reference to heliacal rising of star marking the month - possibly Aldebaran in Taurus. Also, a system of named stars is indicated. Reference to celestial positioning of moon by use of lunar "houses"? Cylindrical Stone Jar Elamite Bestiary and pantheon iconography that are identifiable - from later Kassite kudurru - as possibly related to the stars. Early 20th-century British Assyriologists believed reference to celestial positioning of moon by use of lunar "houses". Probably due to early difficulties with the decipherment of texts and their dating. Several refer to the movements of the heavenly bodies and the constellations. Cylinder Seal From Elamite capitol of Susa Bestiary and pantheon iconography that are identifiable - from later Kassite kudurru - as possibly related to the stars. Circa BCE Circa BCE Sumerian records provide evidence for the government practice of arbitrarily inserting calendar months to keep in order to keep the traditional month of the barley harvest Nisanu of the Babylonians in the harvest season. Bestiary and pantheon iconography that are identifiable - from later Kassite kudurru - as related to the stars. Records [omens incorporated in the canonical series Enuma Anu Enlil] dating to Sargon of Agade imply observation of planetary movements and recognition of constellations? Most probably simply back-dated omens. From this period onwards many seals show forms which are possibly identifiable as being related to the stars. Circa BCE Sumerians possibly systematically name the more prominent stellar objects and develop a scheme of constellations linked to the twelve calendar months. Start of systematic naming of stars and constellations. Aids for establishing the months of the Babylonian calendar. Sun-Moon-Venus triplet on seals becomes more frequent. Possible reference to celestial positioning of moon by use of lunar "houses". Star names and constellations developed as reference points for the description of celestial omens. The computation of day and night appeared in two forms. An early form appears in the protases of the Enuma Anu Enlil omen series and also in the circular astrolabes. Circa BCE The rising and setting of the moon and its phases. Early Old Babylonian Period. Hammurabi imposed a single official lunar calendar upon the Babylonian Empire. First identifiable star-list appears in "Prayer to the Gods of the Night. Circa BCE The "three ways" established on the eastern horizon. The moon was also divided into 4 equal sectors for omen purposes; representing the 4 countries Akkad, Subartu, Elam, and Amurru. The use of heliacally rising stars along the eastern horizon and the introduction of Astrolabe texts. Between BCE the following things happened: Observations of daily risings, culminations, and settings. Composition of the circular and rectangular Astrolabes before BCE. A very primitive representation of the Venus phenomena by arithmetical sequences Tablet 63 of the great Omen Series. Calculations of the lengths of day and night by increasing and decreasing arithmetical series Tablet 14 of the great Omen Series. Circa BCE Observations of the heliacal risings of fixed stars. Establishment of system of paranatellonta - simultaneously rising stars on the eastern horizon. Refers to the Stars of Elam, Akkad and Amurru. Circa BCE Circular "astrolabes. Start of simple mathematical astronomy. Planetary movements of primary interest. This would place MUL. The period from BCE saw refinements in the development of non-mathematical astronomy including the introduction of 1 Astronomical Diaries, 2 Almanacs, and 3 the Goal Year Texts. The systematic observation of celestial phenomena i. Astronomy of the MUL. Apin compilation to the same period circa 13th-century BCE. Detailed study of the fixed stars, their risings, culminations, and settings. Calculations of the duration of daylight and the rising and setting of the moon by "linear methods". Recognition of the zodiac as path of the Moon, the Sun, and the planets. Establishment of zodiacal constellations. Position of the zodiac with regard to the zones of Enlil, Anu, and Ea. The seasons of the year established. Systematic observation and prediction of eclipses starting circa BCE. By about BCE the calendar had become astronomically regulated by the risings of stars and constellations. Circa BCE Babylonian constellations and star names fully developed. The tabular form of the "3 stars each" 12 stars of Ea, 12 stars of Anu, and 12 stars of Enlil. Lunar eclipses predicted with reasonable accuracy. Babylonian establishment of rules for lunar and planetary phenomena written down in Seleucid times in tablet TU II.

6: A Chronological History Of Babylonian Astronomy

A transient lunar phenomenon (TLP) refers to short-lived lights, colors, or changes in appearance of the lunar surface. Claims of short-lived phenomena go back at least years, with some having been observed independently by multiple witnesses or reputable scientists.

Moon There are said to be many unexplained occurrences and phenomenon in the Universe but us science-minded folk like to think we have solved most of those mysterious and unusual events here on Earth. Yet we humans are still baffled by many things, from the whys and hows, humans always search for a plausible and sometimes implausible answer to what plagues our curious minds. This is no different when it comes to deeper into space and it has been curiosity that has been expanding our ever growing knowledge of the extraterrestrial realm. But sometimes you can hit a very stubborn metaphorical brick wall and we can be left completely stumped by the strangeness of an event or occurrence and this definitely true of the very baffling Transient Lunar Phenomenon TLP. Image of the Moon with sites of TLP events marked. These occurrences are usually spotted by lone observers and mostly in the past by amateur astronomers but there have been studies on it to try and discover what they could actually be. In April he reported that he had spotted three red glowing spots on the dark side of the moon. Herschel was so determined that he seen these that he even had King George III come to try and see them through his telescope. From then there have been a vast number of recorded sightings by lone amateur and professional astronomers. The first serious attempt made by a professional body to catalogue sightings was by NASA before the Apollo 11 mission. They catalogued lunar events from until , one year before Neil Armstrong and Buzz Aldrin put their feet on its surface. NASA did not necessarily give much exposure to the concept of random unidentified , potentially hazardous flashes appearing on the moon before the Apollo missions for fear of the Apollo programme being cancelled due to the unexplained TLPs but they still where interested in finding out more about them, just in a more secretive and hushed manner. Within their findings they confirmed the occurrences of red colourations on the moon surfaces some occurring for several hours. This included the first mission to make it to the Moon and land there, Apollo 11 in Whilst circling the moon Houston radioed Apollo informing them of an observation of a TLP that astronomers in Germany had observed in the region of Aristarchus on the Moon. It seems to have a slight amount of fluorescence. The feature itself is already quite a prominent as it is already considered to be quite bright itself and easy to identify when it is highlighted by the occurrence of e arthshine on the Moon. This is when reflected sunlight from the Sun on the Earth lights up the dark portion of the Moon. Apollo 15 photo of Aristarchus crater the brighter of the two large craters near the top of the image. About 40 km across, Aristarchus is one of the brightest features in the Moon. Beside is Herodotus crater, closer to the camera which was looking south is the superb sinuous rille Vallis Schroteri. The gas leaks through to the surface via cracks or cavities and cause a period of colour change in the surface of the Moon often described as a hazy colouring with a reddish hue. This could very well be the answer for the occurrences spotted around the vicinity at Aristarchus as when Apollo 15 passed over this area, the astronauts noted and recorded a very significant rise in alpha particles caused by the decay of Radon This is a radioactive gas with a halflife of 3. This perhaps is what causes those red hazes that many have reported in the area. Is it a TLP, a meteor impact or a flaw on the original negative? Compare it to the next image. There is obviously no doubt that the Moon is obviously a victim at the hands of those high speed space rocks due to its pockmarked complexion. We have even observed meteorites impacting the Moon, notably in September It is very possible that a small meteorite has hit the surface of the moon causing a bright flash that would easily grab the attention of a lunar observer. The impact of a large meteorite on the lunar surface on 11 September , resulted in a bright flash, observed by scientists at the MIDAS observatory in Spain. Like shuffling your feet across a carpet to charge you with static, the fracturing of near surface materials could perhaps charge gas and dust and their ultimate discharge could give way to the observations that we are seeing from the Earth. The charging of lunar particles could in turn result in the levitation of the particles, again perhaps adding to what we could be seeing from Earth. Another very plausible reason could be the most simplest. But that does seem highly improbable that all sightings have such uninteresting origins. This theory had surfaced before in by H. Percy Wilkins but was later disproved by a study carried out by Barbara Middlehurst in No theory has been proved yet and there is no definite answer of how TLPs occur. With the effect of TLPs being so far irreproducible in a scientific experiment it may be some time before we can really pinpoint the cause of these strange events on the surface of the Moon.

7: 34 Examples of Natural Phenomena | Life Persona

The elliptical movement of an object around another object; orbit. Lunar Eclipse The blocking of sunlight to the moon that occurs when Earth is directly between the sun and the moon.

It comprises a sphere 20 pivoting about an inclined axis 8 on bearings 38, 60 integral with a support ring 23 mounted adjustable in a slide 26 and locked in the selected position by means of a screw 28 , of a local horizon disc 1 pivoting on bearings of the sphere 20 , of an ecliptic crown 31 fixed to a ring 21 also pivoting about the globe axis 8 , of a drive motoreducer 39 for driving either the ecliptic crown in rotation in the backward direction or the celestial sphere 20 in the direct direction thereby evidencing the referential change and renewing the relationship between apparent motions and real motions. The invention relates to uses of didactic equipment and to the representation of astronomical, physical and chemical phenomena, the professionals concerned by the astronomical phenomena and the periods of sunshine: Field of the Invention The invention pertains to apparatuses and a method to teach and show orbital phenomena and various movements studied in astronomy, physics and chemistry, and especially for the purpose of explaining and conducting experiments on how the relationship between apparent and real movements evolves when reference systems are changed, as a function of the properties of said reference system and the movements affecting it. Description of Related Art It is known that many armillary spheres propose static and dynamic representations of the solar system alone that are not in accordance with current astronomic data. It is known that some armillary spheres are more faithful to said data, but at the price of conventions and abstractions that misconstrue perceptible astronomic data that may be seen by a human viewer located somewhere on the surface of the earth as a first example, the earth is reduced to a virtual point located at the center of the sphere, with the observer himself being reduced to an eye placed in said center; as a second example, the local horizon plane from which the observer is supposed to make his observation is by convention represented by a flat crown located on the periphery and outside of the sphere, which ensures that the terrestrial horizon would be outside of the terrestrial globe and even beyond the stars. It is known that two-dimensional graphic representations show astronomic or physical phenomena, but that these representations are static, and do not allow adjustments, predictions or changes in point of view or reference system, nor do they allow reversible or progressive instruction. It is known that planetariums implement optical mechanisms that allow astronomic phenomena to be represented. Unfortunately, said equipment is heavy, voluminous, very expensive and merely retrieves stored data. On the one hand, the spectator passively watches a set presentation that reproduces only phenomena that can be observed in a night sky at a certain location on the earth at a given moment, the sky show being generated from a precise and thus topocentric horizon; on the, other hand, the spectator does not have a more complete, eccentric view of the movements and interactions in the solar system that can give him a better understanding of astronomy and, furthermore, of physics and chemistry, which planetariums do not cover. Practical display of the globe of the earth on the local horizon plane; Measurement of the meridian height of a star at any point on earth; Measurement of local sun time at any point on the earth; Measurement of longitude at any point on the earth; Measurement of local sidereal time; Definition of the location of sunrise and sunset at any point on the earth; Measurement of the local latitude angle; Practical representation of sunlight, its angle of attack on the local horizon plane and the shadow generated; Practical representation of the apparent vertical course of the sun on the ecliptic plane; Display of the time equation; BRIEF DESCRIPTION OF THE DRAWINGS Change of hemispheres by inverting the position of the poles; The invention is described in detail in the text below, with reference to the accompanying drawings provided as non-restrictive examples showing the following: Diagram of the horizon disk; FIG. Circular ring through which a primordial axis passes; FIG. Horizon disk in FIG. Diagrams illustrating a simplified version of the apparatus; FIG. Apparatus according to the invention, in which the rotation of the ecliptic ring is motorized; FIGS. Detailed view of the horizon disk of the apparatus; FIG. Time grid circles of the sphere of the apparatus; FIG. Graduation of two beginning-of-season circles; FIG. Graduation indicating the latitude on the local meridian; FIG. Graduation of the ecliptic ring; FIG. Detail of the time equation shown on the celestial sphere of the apparatus; FIGS. Adjustable-position hoop of the movements of the moon and embodiment details; FIGS. Detailed view of the mechanism to measure the variable length of twilight; FIGS. Mechanism to display the vertical path of the sun on the local meridian in comparison with the ecliptic ring; FIG. Mobile light source on the ecliptic ring; FIGS. A second tubular shaft, rotating and solidary with the cardinal axis included in the horizon disk, [illegible] line of the axis coinciding with the primordial axis allowing the horizon disk to rotate on itself. Both shafts thus make it possible to move the eccentric and the horizon plane, in a reversible manner or otherwise, and as needed, separately or together The access opening to the eccentric and the opening of the inside sphere is not visible after the two openings are aligned, it allows adjustment of the latitude angle of the horizon disk and introduction or removal of any required signs or objects. It comprises the following: A local universal celestial sphere 20 made in two parts 21, 22, of transparent plastic material, respectively representing the northern hemisphere 21 and the southern hemisphere 22; An outside support ring 23, cylindrical in section, to which is welded an upper pivot 24 and a lower pivot 25 of primordial rotation axis 8 of sphere 20; ring 23 is placed slidingly in a slide 26 solidary with a foot 27, immobilized using a knurled screw 28 in the position selected for a specific observation, northern hemisphere or southern hemisphere, because ring 23 makes it possible to reverse the position of the poles; A second ring 30, cylindrical in section, acts as a support for a flat ecliptic ring 31 made in two half-parts to facilitate assembly, the details of which are shown in FIG. Said ring 30 comprises an upper bearing 32 and a lower bearing 33 solidary with a pulley 34 making it possible to pivot around axis 8; it turns in its lower part on a shaft 35 engaged at its upper part in a bearing 36 fixed to sphere 20 along axis 8, its lower part 37 pivoting in a bearing 38 welded to ring A back-geared motor 39, on whose outlet shaft is mounted a pulley 40, drives pulley 34 in rotation by means of a belt 41 engaged in the corresponding groove of pulley Said back-geared motor is attached to a support 42 welded to support ring 23; back-geared motor 39 makes it possible to drive either the ecliptic in the backward direction, or celestial sphere 20 in the forward direction in rotation by crossing belt 41 on the pulleys or reversing the rotational direction of the back-geared motor, in cooperation either with a fastening screw 43 screwed into bearing 33 to drive the ecliptic in rotation, or a screw 44 screwed into bearing 36 of sphere 20 to drive it in rotation. As shown in FIGS. In this way, ecliptic crown 31 is made movable for the topocentric observer located at the primordial center of the local horizon disk, and the ecliptic crown is immobilized for the eccentric observer, and, by loosening screws 47, 48, the small ball 50 FIGS. Said inversion will be more clearly understood with the supplementary apparatus shown in FIGS. A hollow axis 59 acting as a pivot is engaged in a bearing 60 welded to the inside of support ring 23; said ring 23 is open to allow pivot 59 to pass. Pivot 59 is locked on bearing 60 using a screw 61; a second screw 65 locks sphere 20 in cooperation with handle 58 locking pivot 59 to tube A spring 62 was placed at the bottom of tube 59 to allow the pivot to be extracted if it is necessary to disassemble the sphere. A straight shaft 66, passes through tubular body 56 of the index and moves forward to the primordial center. On these three circles, the hours are interconnected by 24 segments 74 of time circles perpendicular to the first three circles, yellow, blue and red. The time grid thus formed makes it possible to read the local sun time regardless of the latitude, day and the month of observation because the trajectory of the sun always cuts said grid. It primarily makes it possible to predict the rising and setting times of the sun, the moon and all of the planets in the solar system, regardless of the present, past or future time It makes it possible to find the length of the day and night immediately at any location on the earth and at any time. It also makes it possible to define where on the earth and on what dates it will be daylight for 24 consecutive hours or more. The time equation has been traced on the sphere in the form of an infinity sign analogous curve between circles 72 and 73 of the two solstices, overmounting the local horizon meridian. Said curve gives a practical view of the difference between mean solar noon and true solar noon, i. This is characterized by hour graduations of the celestial equator yellow circle with a color other than the one used above for reading solar time. Said measurement is made by the correspondence of said graduation with a GAMMA index drawn on the zero degree of the ecliptic crown. Said device makes it possible to measure the time difference between two points on the earth selected at will. The time equation varies little from one day to the next. It is canceled out four times per year, on Apr. The greatest differences between mean noon and true noon are observed on Feb. The two half-parts of tubular ring 80 are secured together by two small pins 85, for example, made of plastic material, engaged in the ends opposite each other FIG. Ring 80 cuts ecliptic crown at two points 86, 87 which form lunar nodes and whose positions can be adjusted at their own rate. Said device allows a precise tracking of the movement of the moon through the sky and prediction and display of the eclipse mechanism. Said information is important, especially in biodynamic agriculture and for calculating tides tides are theoretically high when the moon passes over the meridian of the location. Spring tide periods take place when the moon and sun are either in conjunction or in opposition, i. For said purpose, graduations 92 have been drawn in degrees on the periphery of local horizon disk 1. Measurement is done in north or south degrees azimuth FIGS. The intersection of the horizon circle with the time grid indicates the onset of twilight; the intersection of a selected twilight circle yields the end of the corresponding type of twilight: The trajectory of the sun is provided as an example in thick lines: Said arrangement makes it possible to show clearly and understand said concept, which is difficult to perceive in abstract terms. Said mechanism consists of a small ball sliding on support ring 23 of the primordial axis of sphere 20 placed concentrically with and outside of the local horizon meridian, and rolling on ecliptic crown Said movement makes it possible, in a single rotation of the ecliptic crown, to display the rising and setting movement of represented by ball between the two solstices circles 72, 73 FIG. The small ball is preferably made of plastic material in two parts , FIG. Said device consists of placing a localized light source representing the sun on the inside edge of the ecliptic crown It consists of a small electric bulb fed by a small, adequate and interchangeable electric battery placed in a housing made of plastic material. Said housing comprises a slide fastened with slight pressure to the inside edge of the crown of ecliptic 31, said slide making it possible to move the "sun" over the entire length of said crown. When said light source is above horizon disk 1, and sheds light on it, it is "DAYTIME;" when said source is occulted by the horizon disk, it is "NIGHTTIME;" it remains above the horizon disk for longer or shorter periods; it is higher or lower, which provides a practical illustration of the concept of the seasons. Said light source faithfully reproduces the shadows generated by the sun and their evolution throughout the day and during the year. It makes it possible to read the local sun time on a sun dial placed at the primordial center of the device, according to the shadow produced by said source. Moreover, the comparison between the real shadow produced by the sun at time "t" and the shadow produced by the light source of the apparatus makes it possible to determine the date and time, or the latitude and place of observation. Axes , each comprise a bearing surface to which is engaged a rounded-groove pulley , locked in rotation by a screw endowed with a large head wherein a milled groove serves as a guide for a half-ring to which a second ring representing the ecliptic is welded; to the base of half-ring is welded an axis endowed with a bearing surface engaged in a hole placed in pulley inclined along primordial axis 8, said axis containing a hole acting as a bearing for an axis welded under a ring supporting an equatorial ring perpendicular to primordial axis 8 on two hinges from which a local horizon disk pivots. Pulleys , are driven in synchronism by a belt Pulley is made unitary with axis by a screw whose head is extended by a shaft the free end of which accommodates a small ball representing the sun, fastened to a shouldered bearing surface Plate protrudes on each side beyond the pulleys through handles , When vertical handle is held while pushing on handle , the apparent movement of the sun revolving around the earth is observed. When vertical handle is held while pushing on handle , the real movement of the earth around the sun is observed. Said method of representation makes it possible to understand how apparent and real movements reverse when the reference system topocentric or exocentric is changed. As mentioned in the description of FIG. The most favorable angle, for example, for an exocentric observer watching the earth rotate on itself corresponds to the horizontal and immobile ecliptic crown. The device makes it possible to observe the progressive passing from the northern hemisphere to the southern hemisphere and to display the progressive transformation of the manifestations of the different celestial phenomena, in their form as well as in the areas in which they occur, for example, the reversing of different lunar phase figures, constellations of the zodiac, the rising and setting of different stars. The primordial center 4 of said disk 1 is embodied by the intersection of the two perpendicular diameters whose ends shown on the disk indicate the orientation, for example, of the cardinal points: Said horizon disk is designed to accommodate signs, graphics or objects embodying astronomic or topographic concepts such as azimuth graduation, the meridian of the location, compasses, the celestial equator or physical and chemical concepts such as the nucleus, electron, etc. The ecliptic crown 31 may further be made of a material allowing figurines of stars to slide on its inside edge. The didactic method gives the student the ability to change observation reference systems, i. The didactic method advantageously uses an orbital plane embodied using an "eccentric" circular ring 5 distinguished by its inside edge 6 representing an orbit, for example, the ecliptic, and located opposite outside edge 7 of horizon disk 1, distinguished by the ability of said ring to be endowed with various signs or objects representing celestial bodies, nuclei, electrons, particles, or scientific information such as the equinox point, graduations, signs of the zodiac, etc. Said zodiac strip is preferably made of transparent plastic material mounted on the outside edge of ecliptic crown 31 using a slide 86 FIG. The relative movement of said strip around the crown occurs in 26, years and shows the staggering of the zodiac signs with the constellations of the same name. The didactic method advantageously uses a second virtual axis known as cardinal axis 9, distinguished by the fact that it is contained in the horizon disk and that it coincides with the east-west orientation line of the same disk, distinguished by the fact that primordial axis 8 is perpendicular to it, that their intersection coincides with primordial center 4, and that horizon disk 1 can pivot around it, just as with primordial axis 8. The didactic method advantageously uses a meridian plane of the horizon disk embodied by the scanning of the line of primordial axis 8 in its rotation around the line of cardinal axis 9. The didactic method advantageously uses the latitude of the horizon plane for example, of the local horizon plane in astronomy embodied by the angle formed by the line of the primordial axis with the north-south orientation line of the horizon disk. In the didactic method, eccentric ring 5 can to be used as a track for the orbital displacement of various bodies such as electrons, or, for example, the sun, moon and planets in astronomy. The didactic method advantageously uses a virtual spherical zone embodied, for example, through the scanning of the aforementioned eccentric ring during a rotational movement around the primordial axis, thus offering the topocentric and immobile observer 3 on horizon plane 1, itself immobile, the representation of orbital movements, for example, revolution movements of the planets shown on eccentric ring 5 making it possible, for example, to use said method in astronomy to show the phenomenon of day, night and the seasons. The didactic method advantageously uses a partial occultation of eccentric ring 5 obtained by the scanning of horizon disk 1 during its rotational movement around primordial axis 8, making it possible, for example, to represent the phenomenon of day and night in astronomy at any location and during any season. The didactic method advantageously uses a first transparent sphere known as inside sphere 10 which encompasses horizon disk 1 whose diameter is almost equal to that of the sphere, horizon disk 1 thus encompassed having a cardinal axis 9 whose two ends 11 are unitary with said sphere Virtual primordial axis 8 of the inside sphere is embodied by a first tubular shaft 12, rotating and solidary with eccentric ring 5 in at least one point, using any means allowing the unobstructed scanning around the horizon disk for example, one or more hoops A second rotating tubular shaft 14 solidary with cardinal axis 9 included in horizon disk 1 and whose axis line coincides with primordial axis 8 allows the horizon disk to rotate on itself, inside sphere 10 possibly being endowed with an opening making it possible to use any means to adjust the latitude angle of horizon disk 1 and to introduce or remove any required signs or objects. The didactic method uses a second transparent sphere known as the outside sphere 15, which encompasses the first sphere 10 having a larger allowing the free internal rotation of at least one eccentric ring 5. The first and second aforementioned rotating tubular shafts protrude outside of sphere 15 with optional double, simultaneous or independent setting into motion.

8: Solunar theory by John Alden Knight | SolunarForecast - Solunar Theory

The winter solstice on Dec. 21, coincided with a lunar eclipse. NASA states on its website that the last time a lunar eclipse occurred during a solstice was in and won't happen again until

Volcanic features Lunar nearside with major maria and craters labeled The dark and relatively featureless lunar plains, clearly seen with the naked eye, are called maria Latin for "seas"; singular mare , as they were once believed to be filled with water; [63] they are now known to be vast solidified pools of ancient basaltic lava. Although similar to terrestrial basalts, lunar basalts have more iron and no minerals altered by water. Several geologic provinces containing shield volcanoes and volcanic domes are found within the near side "maria". This raises the possibility of a much warmer lunar mantle than previously believed, at least on the near side where the deep crust is substantially warmer because of the greater concentration of radioactive elements. They have been radiometrically dated to having formed 4. Although only a few multi-ring basins have been definitively dated, they are useful for assigning relative ages. Because impact craters accumulate at a nearly constant rate, counting the number of craters per unit area can be used to estimate the age of the surface. The finer regolith, the lunar soil of silicon dioxide glass, has a texture resembling snow and a scent resembling spent gunpowder. A secondary cratering process caused by distal ejecta is thought to churn the top two centimetres of regolith a hundred times more quickly than previous models suggestedâ€”on a timescale of 81, years. They are characterized by a high albedo, appear optically immature i. Their shape is often accentuated by low albedo regions that wind between the bright swirls. Presence of water Main article: Lunar water Liquid water cannot persist on the lunar surface. When exposed to solar radiation, water quickly decomposes through a process known as photodissociation and is lost to space. However, since the s, scientists have hypothesized that water ice may be deposited by impacting comets or possibly produced by the reaction of oxygen-rich lunar rocks, and hydrogen from solar wind , leaving traces of water which could possibly persist in cold, permanently shadowed craters at either pole on the Moon. However, later radar observations by Arecibo , suggest these findings may rather be rocks ejected from young impact craters. The spectrometer observed absorption lines common to hydroxyl , in reflected sunlight, providing evidence of large quantities of water ice, on the lunar surface. The inclusions were formed during explosive eruptions on the Moon approximately 3. Although of considerable selenological interest, this announcement affords little comfort to would-be lunar colonistsâ€”the sample originated many kilometers below the surface, and the inclusions are so difficult to access that it took 39 years to find them with a state-of-the-art ion microprobe instrument. Analysis of the findings of the Moon Mineralogy Mapper M3 revealed in August for the first time "definitive evidence" for water-ice on the lunar surface. The main lunar gravity features are mascons , large positive gravitational anomalies associated with some of the giant impact basins , partly caused by the dense mare basaltic lava flows that fill those basins. There are some puzzles: Magnetic field of the Moon The Moon has an external magnetic field of about 1â€” nanoteslas , less than one-hundredth that of Earth. The Moon does not currently have a global dipolar magnetic field and only has crustal magnetization, probably acquired early in its history when a dynamo was still operating. This is supported by the apparent location of the largest crustal magnetizations near the antipodes of the giant impact basins.

9: Transient Lunar Phenomenon

A transient lunar phenomenon (TLP) or lunar transient phenomenon (LTP) is a short-lived light, color, or change in appearance on the surface of the Moon. Claims of short-lived lunar phenomena go back at least 1, years, with some having been observed independently by multiple witnesses or reputable scientists.

All of these objects move and we can see these movements. We notice the Sun rises in the eastern sky in the morning and sets in the western sky in the evening. We observe different stars in the sky at different times of the year. When ancient people made these observations, they imagined that the sky was actually moving while the Earth stood still. In , Nicolaus Copernicus Figure He also suggested that the Earth rotates once a day on its axis. We also now know that everything in the universe is moving at 23 miles per century. In this lesson you will learn about how the movements of the Earth, Moon, and Sun affect different phenomena on Earth, including day and night, the seasons, tides, and phases of the Moon. Explain solar and lunar eclipses. Describe the phases of the Moon and explain why they occur. The Earth rotates once on its axis about every 24 hours. If you were to look at Earth from the North Pole, it would be spinning counterclockwise. As the Earth rotates, observers on Earth see the Sun moving across the sky from east to west with the beginning of each new day. When we look at the Moon or the stars at night, they also seem to rise in the east and set in the west. As Earth turns, the Moon and stars change position in our sky. This is called a day. As Earth rotates, the side of Earth facing the Sun experiences daylight, and the opposite side facing away from the Sun experiences darkness or night time. Since the Earth completes one rotation in about 24 hours, this is the time it takes to complete one day-night cycle. As the Earth rotates, different places on Earth experience sunset and sunrise at a different time. As you move towards the poles, summer and winter days have different amounts of daylight hours in a day. For example, in the Northern hemisphere, we begin summer on June Therefore, areas north of the equator experience longer days and shorter nights because the northern half of the Earth is pointed toward the Sun. Since the southern half of the Earth is pointed away from the Sun at that point, they have the opposite effectâ€"longer nights and shorter days. For people in the Northern hemisphere, winter begins on December Remember that seasons are caused by the This results in one part of the Earth being more directly exposed to rays from the Sun than the other part. The part tilted away from the Sun experiences a cool season, while the part tilted toward the Sun experiences a warm season. Seasons change as the Earth continues its revolution, causing the hemisphere tilted away from or towards the Sun to change accordingly. When it is winter in the Northern hemisphere, it is summer in the Southern hemisphere, and vice versa. Solar Eclipses[edit] Figure A solar eclipse occurs when the new moon passes directly between the Earth and the Sun Figure This casts a shadow on the Earth and blocks our view of the Sun. When only a portion of the Sun is out of view, it is called a partial solar eclipse. Solar eclipses are rare events that usually only last a few minutes. Birds may begin to sing, and stars will become visible in the sky. During a solar eclipse, the corona and solar prominences can be seen. Photo of a total solar eclipse. During a solar eclipse, never look directly towards the sun even if the sun cannot be seen, as its harmful rays can damage your eyes badly. Always use special glasses which filter out the harmful sun rays when seeing a solar eclipse. A Lunar Eclipse[edit] A lunar eclipse occurs when the full moon moves through the shadow of the Earth Figure This can only happen when the Earth is between the Moon and the Sun and all three are lined up in the same plane, called the ecliptic. The umbra is the inner, cone shaped part of the shadow, in which all of the light has been blocked. In the penumbra, the light is dimmed but not totally absent. The formation of a lunar eclipse. Partial lunar eclipses occur at least twice a year, but total lunar eclipses are less common. The moon glows with a dull red coloring during a total lunar eclipse. The Phases of the Moon[edit] The Moon does not produce any light of its ownâ€"it only reflects light from the Sun. As the Moon moves around the Earth, we see different parts of the near side of the Moon illuminated by the Sun. This causes the changes in the shape of the Moon that we notice on a regular basis, called the phases of the Moon. As the Moon revolves around Earth, the illuminated portion of the near side of the Moon will change from fully lit to completely dark and back again. This phase happens when Earth is between the Moon and the Sun. About one week later, the Moon enters the quarter-moon phase. When the Moon moves between

Earth and the Sun, the side facing Earth is completely dark. This is called the new moon phase, and we do not usually see the Moon at this point. Sometimes you can just barely make out the outline of the new moon in the sky. This is because some sunlight reflects off the Earth and hits the moon. Before and after the quarter-moon phases are the gibbous and crescent phases. During the gibbous moon phase, the moon is more than half lit but not full. During the crescent moon phase, the moon is less than half lit and is seen as only a sliver or crescent shape. It takes about The phases of the Moon. As the Earth rotates on its axis, the areas directly in line with the Moon will experience high tides. Each place on Earth experiences changes in the height of the water throughout the day as it changes from high tide to low tide. There are two high tides and two low tides each tidal day. The first picture shows what is called a spring tide. Confusingly, this tide has nothing to do with the season "Spring", but means that the tide waters seem to spring forth. During a spring tide, the Sun and Moon are in line. This happens at both the new moon and the full moon. The high tide produced by Sun adds to the high tide produced by the Moon. So spring tides have higher than normal high tides. This water is shown on the picture as the gray bulges on opposite sides of the Earth. Notice that perpendicular to the gray areas, the water is at a relatively low level. The places where the water is being pulled out experience high tides, while the areas perpendicular to them experience low tides. Since the Earth is rotating on its axis, the high-low tide cycle moves around the globe in a hour period. The second picture shows a neap tide. A neap tide occurs when the Earth and Sun are in line but the Moon is perpendicular to the Earth. This happens when the moon is at first or last quarter moon phase. In this case, the pull of gravity from the Sun partially cancels out the pull of gravity from the Moon, and the tides are less pronounced. Neap tides produce less extreme tides than the normal tides. This is because the high tide produced by the Sun adds to the low tide area of the Moon and vice versa. So high tide is not as high and low tide is not as low as it usually might be. Lesson Summary[edit] As the Earth rotates on its axis and revolves around the Sun, several different effects are produced. When the new moon comes between the Earth and the Sun along the ecliptic, a solar eclipse is produced. When the Earth comes between the full moon and the Sun along the ecliptic, a lunar eclipse occurs. Observing the Moon from Earth, we see a sequence of phases as the side facing us goes from completely darkened to completely illuminated and back again once every Also as the Moon orbits Earth, it produces tides aligned with the gravitational pull of the Moon. The Sun also produces a smaller solar tide. When the solar and lunar tide align, at new and full moons, we experience higher than normal tidal ranges, called spring tides. At first and last quarter moons, the solar tide and lunar tide interfere with each other, producing lower than normal tidal ranges called neap tides. Review Questions[edit] The globe is divided into time zones, so that any given hour of the day in one time zone occurs at a different time in other time zones. Explain how the positions of the Earth, Moon, and Sun vary during a solar eclipse and a lunar eclipse. Draw a picture that shows how the Earth, Moon, and Sun are lined up during the new moon phase. Why are neap tides less extreme than spring tides?

MOVEMENTS AND LUNAR PHENOMENA pdf

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