einhawk LLC

The Dow-Gold Ratio Cyclicity Theory (DGRCT)

Cycles & Sine Waves Across All Scales

March, 2016

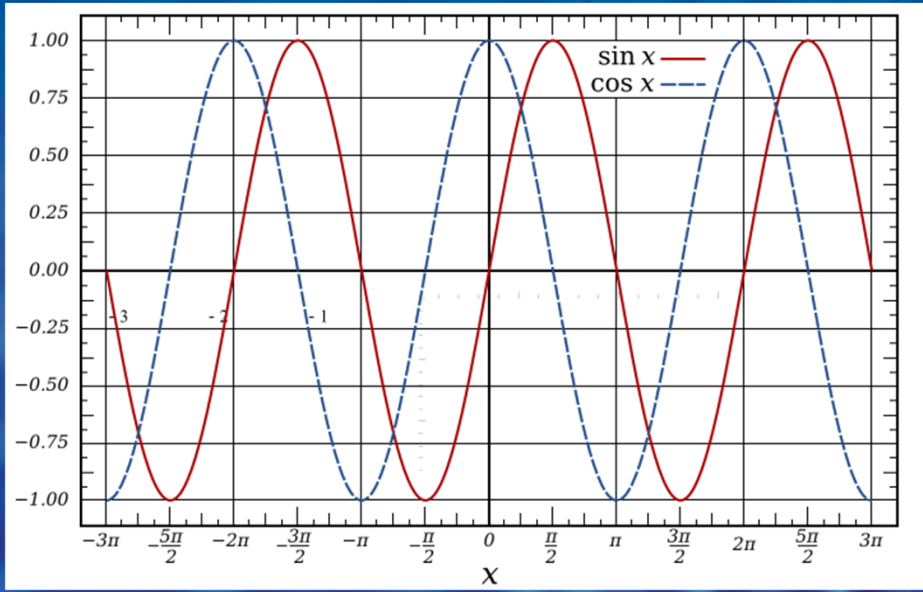
The sine wave appears at all scales across the universe.

Sine Wave Mathematical Definition

The sine wave or sinusoid is a mathematical curve that describes a smooth repetitive oscillation. It is named after the function sine, of which it is the graph. It occurs often in pure and applied mathematics, as well as physics, engineering, signal processing and many other fields. Its most basic form as a function of time (t) is:

y(t) = A\sin(2 \pi f t + \varphi) = A\sin(\omega t + \varphi)
where:

A = the amplitude, the peak deviation of the function from zero.
f = the ordinary frequency, the number of oscillations (cycles) that occur each second of time.
ω = 2πf, the angular frequency, the rate of change of the function argument in units of radians per second
\varphi = the phase, specifies (in radians) where in its cycle the oscillation is at t = 0.
When \varphi is non-zero, the entire waveform appears to be shifted in time by the amount \varphi/ω seconds. A negative value represents a delay, and a positive value represents an advance.



Source: https://en.wikipedia.org/wiki/Sine_wave#/media/File:Sine_and_Cosine.svg

Sine Wave

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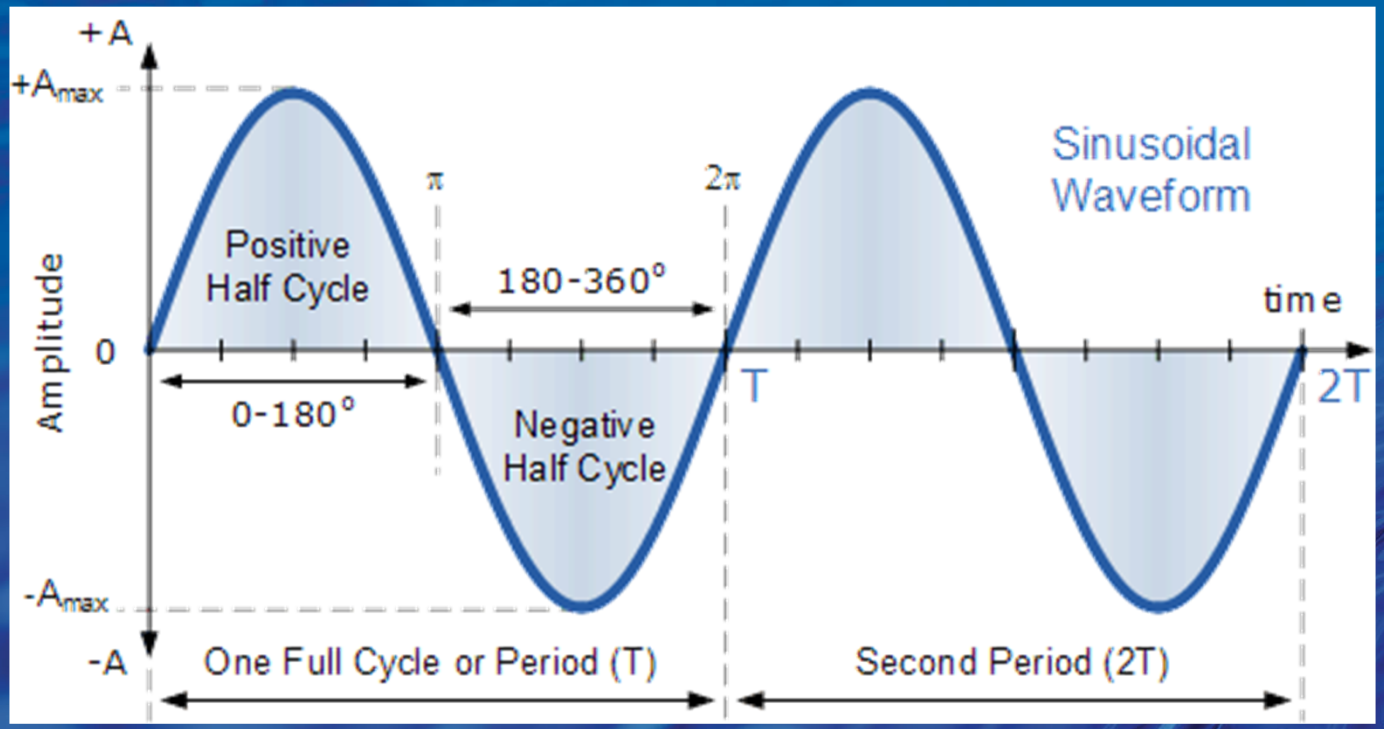
The sine wave appears in nature, human physiology, and financial markets in similar form and cyclicity.



Source: https://en.wikipedia.org/wiki/Sine_wave#/media/File:Sine_and_Cosine.svg

THE UNIVERSE

Scientific research continues to confirm understanding of expansion and contraction across the universe.

The Cyclic Model

- A cyclic model (or oscillating model) is any of several cosmological models in which the universe follows infinite, or indefinite, self-sustaining cycles. For example, the oscillating universe theory briefly considered by Albert Einstein in 1930 theorized a universe following an eternal series of oscillations, each beginning with a **big bang** and ending with a **big crunch**; in the interim, the universe would expand for a period of time before the gravitational attraction of matter causes it to collapse back in and undergo a bounce.
- In the 1920s, theoretical physicists, most notably Albert Einstein, considered the possibility of a cyclic model for the universe as an (everlasting) alternative to the model of an expanding universe. However, work by Richard C. Tolman in 1934 showed that these early attempts failed because of the **cyclic problem**: according to the Second Law of Thermodynamics, entropy can only increase. This implies that **successive cycles** grow longer and larger. Extrapolating back in time, cycles before the present one become shorter and smaller culminating again in a Big Bang and thus not replacing it. This puzzling situation remained for many decades until the early 21st century when the recently discovered **dark energy** component provided new hope for a **consistent cyclic cosmology.** In 2011, a five-year survey of 200,000 galaxies and spanning 7 billion years of cosmic time confirmed that "dark energy is driving our universe apart at accelerating speeds."
- One new cyclic model is a brane cosmology model of the creation of the universe, derived from the earlier ekpyrotic model. It was proposed in 2001 by Paul Steinhardt of Princeton University and Neil Turok of Cambridge University. The theory describes a universe exploding into existence not just once, but **repeatedly over time**. The theory could potentially explain why a mysterious, repulsive form of energy known as the cosmological constant, which is accelerating the expansion of the universe, is several orders of magnitude smaller than predicted by the standard Big Bang model.
- A different cyclic model relying on the notion of phantom energy was proposed in 2007 by Lauris Baum and Paul Frampton of the University of North Carolina at Chapel Hill.
- Other cyclic models include Conformal cyclic cosmology and Loop quantum cosmology.

SOURCE: https://en.wikipedia.org/wiki/Cyclic_model

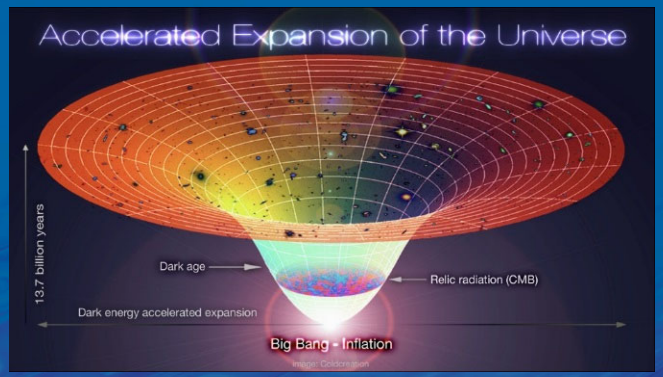
The Universe – Expansion & Contraction

- Up until about 1998 it was thought that the expansion of the universe was the result of whatever the initial conditions of the Big Bang might have been. The open problem in cosmology was whether the gravitational field attributable to all of the mass in the universe was sufficiently strong to bring the expansion to a stop, and perhaps to reverse it and cause a subsequent contraction. There were three possible cases: 1) continual expansion, 2) continual expansion decaying asymptotically to zero in infinite time and 3) an eventual cessation of expansion followed by contraction.
- However, it was discovered by observations of type 1A supernovas that the expansion of the universe is actually accelerating. That has resulted in the hypothesis of "dark energy" which supplies a force that counteracts gravity on large scales and results in an ever-increasing rate of expansion. Nobody know what dark energy is, if it really exists, and if it does exist what it is.
- You can add to the uncertainty the theory of inflation, which is also attributable to an unknown cause (some undefined scalar inflation field related to the physics of elementary particles). Whether or not inflation is a continuing process, or for that matter whether it is a correct theory, is still unknown.

Inflation (Cosmology)

- In physical cosmology, cosmic inflation, cosmological inflation, or just inflation is a theory of exponential expansion of space in the early universe. The inflationary epoch lasted from 10−36 seconds after the Big Bang to sometime between 10−33 and 10−32 seconds. Following the inflationary period, the Universe continues to expand, but at a less rapid rate.

- Inflation theory was developed in the early 1980s. It explains the origin of the large-scale structure of the cosmos. Quantum fluctuations in the microscopic inflationary region, magnified to cosmic size, become the seeds for the growth of structure in the Universe (see galaxy formation and evolution and structure formation). Many physicists also believe that inflation explains why the Universe appears to be the same in all directions (isotropic), why the cosmic microwave background radiation is distributed evenly, why the Universe is flat, and why no magnetic monopoles have been observed.



- While the detailed particle physics mechanism responsible for inflation is not known, the basic picture makes a number of predictions that have been confirmed by observation. The hypothetical field thought to be responsible for inflation is called the inflation.

- In 2002, three of the original architects of the theory were recognized for their major contributions; physicists Alan Guth of M.I.T., Andrei Linde of Stanford and Paul Steinhardt of Princeton shared the prestigious Dirac Prize "for development of the concept of inflation in cosmology.

Source: https://en.wikipedia.org/wiki/Inflation_(cosmology)

Inflation (Cosmology)

- The picture Jim Hartle and I developed, of the spontaneous quantum creation of the universe, would be a bit like the formation of bubbles of steam in boiling water. The idea is that the most probable histories of the universe, would be like the surfaces of the bubbles. Many small bubbles would appear, and then disappear again. These would correspond to mini universes that would expand, but would collapse again while still of microscopic size. They are possible alternative universes, but they are not of much interest since they do not last long enough to develop galaxies and stars, let alone intelligent life. A few of the little bubbles, however, with grow to a certain size at which they are safe from recollapse. They will continue to expand at an ever increasing rate, and will form the bubbles we see. They will correspond to universes that would start off expanding at an ever increasing rate. This is called inflation, like the way prices go up every year.

- The world record for inflation, was in Germany after the First World War. Prices rose by a factor of ten million in a period of 18 months. But that was nothing compared to inflation in the early universe. The universe expanded by a factor of million trillion in a tiny fraction of a second. Unlike inflation in prices, inflation in the early universe was a very good thing. It produced a very large, and uniform universe, just as we observe. However, it would not be completely uniform. In the sum over histories, histories that are very slightly irregular, will have almost as high probabilities as the completely uniform and regular history.. The theory therefore predicts that the early universe is likely to be slightly non-uniform. These irregularities would produce small variations in the intensity of the microwave background from different directions. The microwave background has been observed by the Map satellite, and was found to have exactly the kind of variations predicted. So we know we are on the right lines.

- The irregularities in the early universe, will mean that some regions will have slightly higher density than others. The gravitational attraction of the extra density, will slow the expansion of the region, and can eventually cause the region to collapse to form galaxies and stars. So look well at the map of the microwave sky. It is the blue print for all the structure in the universe. We are the product of quantum fluctuations in the very early universe. God really does play dice.

- We have made tremendous progress in cosmology in the last hundred years. The General Theory of Relativity, and the discovery of the expansion of the universe, shattered the old picture of an ever existing, and ever lasting universe. Instead, general relativity predicted that the universe, and time itself, would begin in the big bang. It also predicted that time would come to an end in black holes. The discovery of the cosmic microwave background, and observations of black holes, support these conclusions. This is a profound change in our picture of the universe, and of reality itself.

Source: http://www.dailygalaxy.com/my_weblog/2009/09/stephen-hawking-origins-of-the-universe-a-galaxy-classic.html

Black Hole

- A black hole is a geometrically defined region of space-time exhibiting such strong gravitational effects that nothing—including particles and electromagnetic radiation such as light—can escape from inside it. The theory of general relativity predicts that a sufficiently compact mass can deform space-time to form a black hole. The boundary of the region from which no escape is possible is called the event horizon. Although crossing the event horizon has enormous effect on the fate of the object crossing it, it appears to have no locally detectable features. In many ways a black hole acts like an ideal black body, as it reflects no light. Moreover, quantum field theory in curved space-time predicts that event horizons emit Hawking radiation, with the same spectrum as a black body of a temperature inversely proportional to its mass. This temperature is on the order of billionths of a kelvin for black holes of stellar mass, making it essentially impossible to observe.
- Black holes of stellar mass are expected to form when very massive stars collapse at the end of their life cycle. After a black hole has formed, it can continue to grow by absorbing mass from its surroundings. By absorbing other stars and merging with other black holes, supermassive black holes of millions of solar masses ($M_\odot$) may form. There is general consensus that supermassive black holes exist in the centers of most galaxies.

Source: http://discovermagazine.com/2014/sept/10-to-the-edge-and-back

Source: https://en.wikipedia.org/wiki/Black_hole

Timeline of the Universe and Earth's History

Galactic Years

about 61 galactic years ago	Big Bang
about 54 galactic years ago	Birth of the Milky Way
18.4 galactic years ago	Birth of the Sun
17–18 galactic years ago	Oceans appear on Earth
15 galactic years ago	Life begins on Earth
14 galactic years ago	Prokaryotes appear
13 galactic years ago	Bacteria appear
10 galactic years ago	Stable continents appear
7 galactic years ago	Eukaryotes appear
6.8 galactic years ago	Multicellular organisms appear
2.8 galactic years ago	Cambrian explosion
1 galactic year ago	Permian–Triassic extinction event
0.26 galactic years ago	Cretaceous–Paleogene extinction event
0.001 galactic years ago	Appearance of modern humans

Source: https://en.wikipedia.org/wiki/Galactic_year

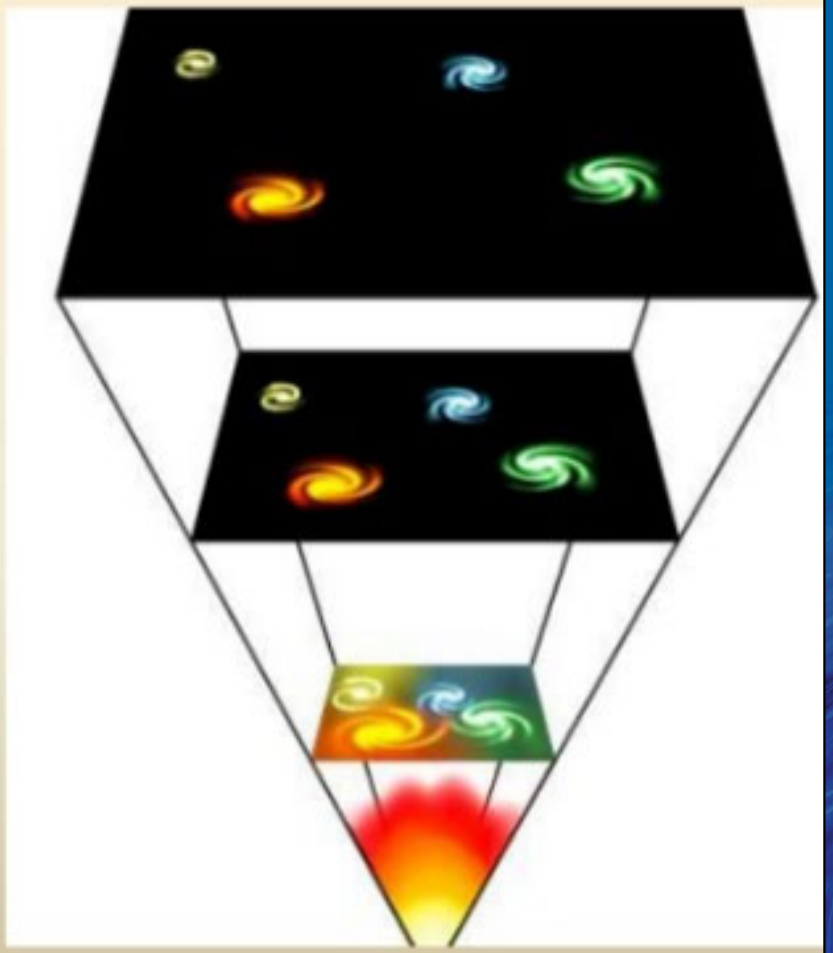
The galactic year, also known as a cosmic year, is the duration of time required for the Solar System to orbit once around the center of the Milky Way Galaxy. Estimates of the length of one orbit range from 225 to 250 million terrestrial years. The Solar System is traveling at an average speed of 828,000 km/h (230 km/s) or 514,000 mph (143 mi/s) within its trajectory around the galactic center, which is about one 1300th of the speed of light—a speed at which an object could circumnavigate the Earth's equator in 2 minutes and 54 seconds.

The galactic year provides a conveniently usable unit for depicting cosmic and geological time periods together. By contrast, a "billion-year" scale does not allow for useful discrimination between geologic events, and a "million-year" scale requires some rather large numbers.

The Big Bang

Expansion/Contraction of the Universe

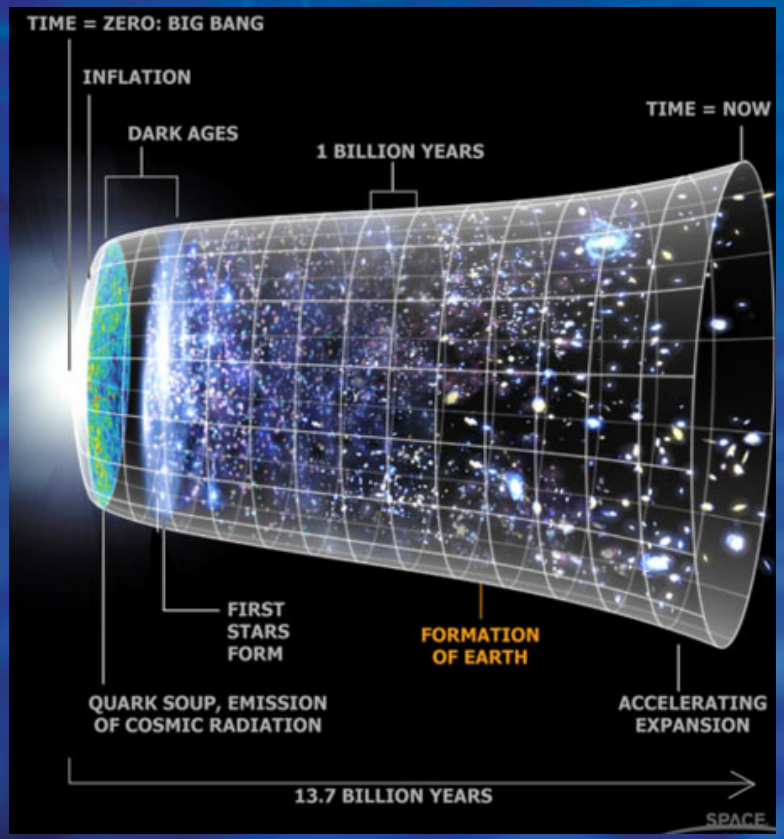
- The Big Bang provides the **energy** for the expansion.
- Gravity and matter counteract the energy of the **Big Bang**.
- If the density of the universe is sufficient, **expansion** should turn into a **contraction**.
- The cosmological constant must have a value of zero.
- The Big Bang is the model from 1929 to 1998.

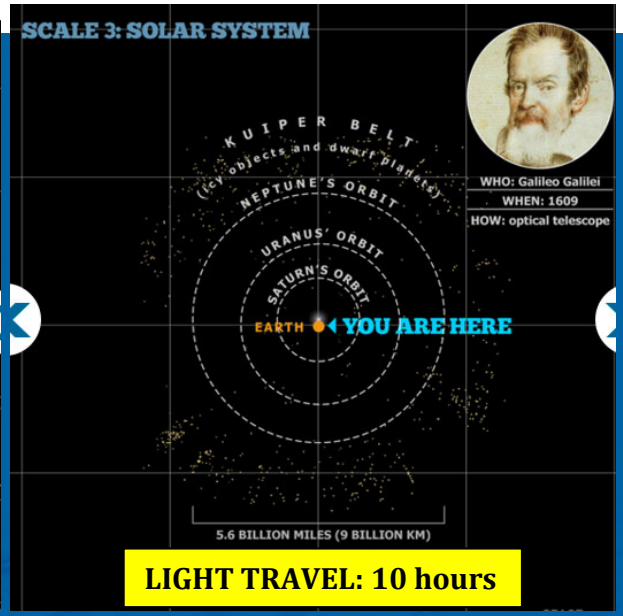


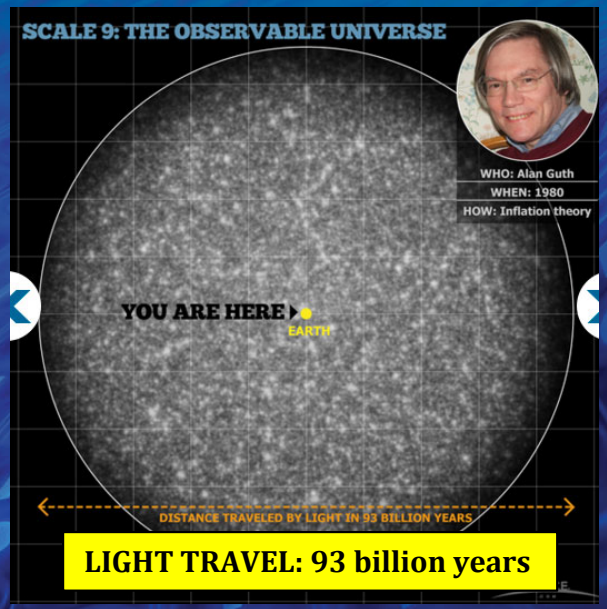
Source: http://www.slideshare.net/mmarty/accelerated-expansion-of-universe-and-evolving-ideas-about-gravity-34296540

Scale

Humans are small in relation to the universe, solar system, and the planet Earth.







http://www.space.com/13336-universe-history-structure-evolution-infographic.html

Expansion & Contraction Of The Universe

COSMIC INFLATION

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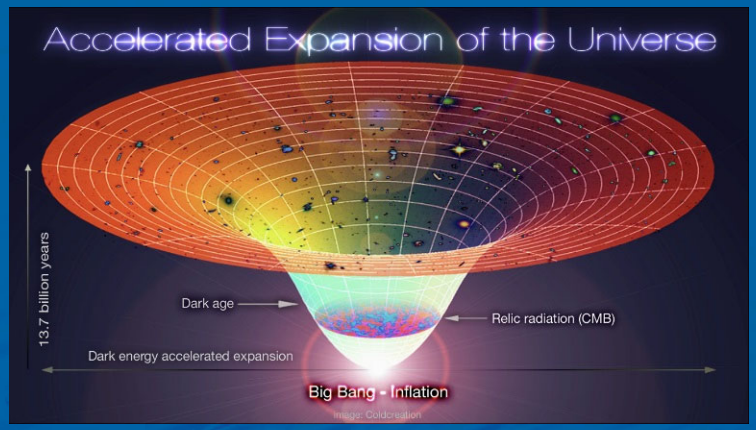
Source: https://en.wikipedia.org/wiki/Inflation_(cosmology)



BLACK HOLE

Black holes of stellar mass are expected to form when very massive stars **collapse** at the end of their life **cycle**. After a black hole has formed, it can continue to grow by absorbing mass from its surroundings.

Source: https://en.wikipedia.org/wiki/Black_hole

Source: http://discovermagazine.com/2014/sept/10-to-the-edge-and-back

The Cyclic Model

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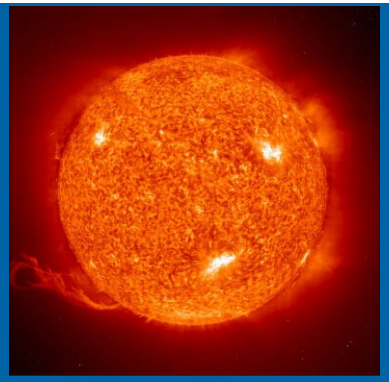
- Einstein (1930) theorized a universe following an eternal series of **oscillations**, each beginning with a **big bang** and ending with a **big crunch**; in the interim, the universe would **expand** for a period of time before the gravitational attraction of matter causes it to **collapse** back in and undergo a bounce.
- Dark Energy (early 21st century) provided new hope for a **consistent cyclic cosmology.**
- Brane Cosmology Model (2001): describes a universe exploding into existence not just once, but **repeatedly over time**.

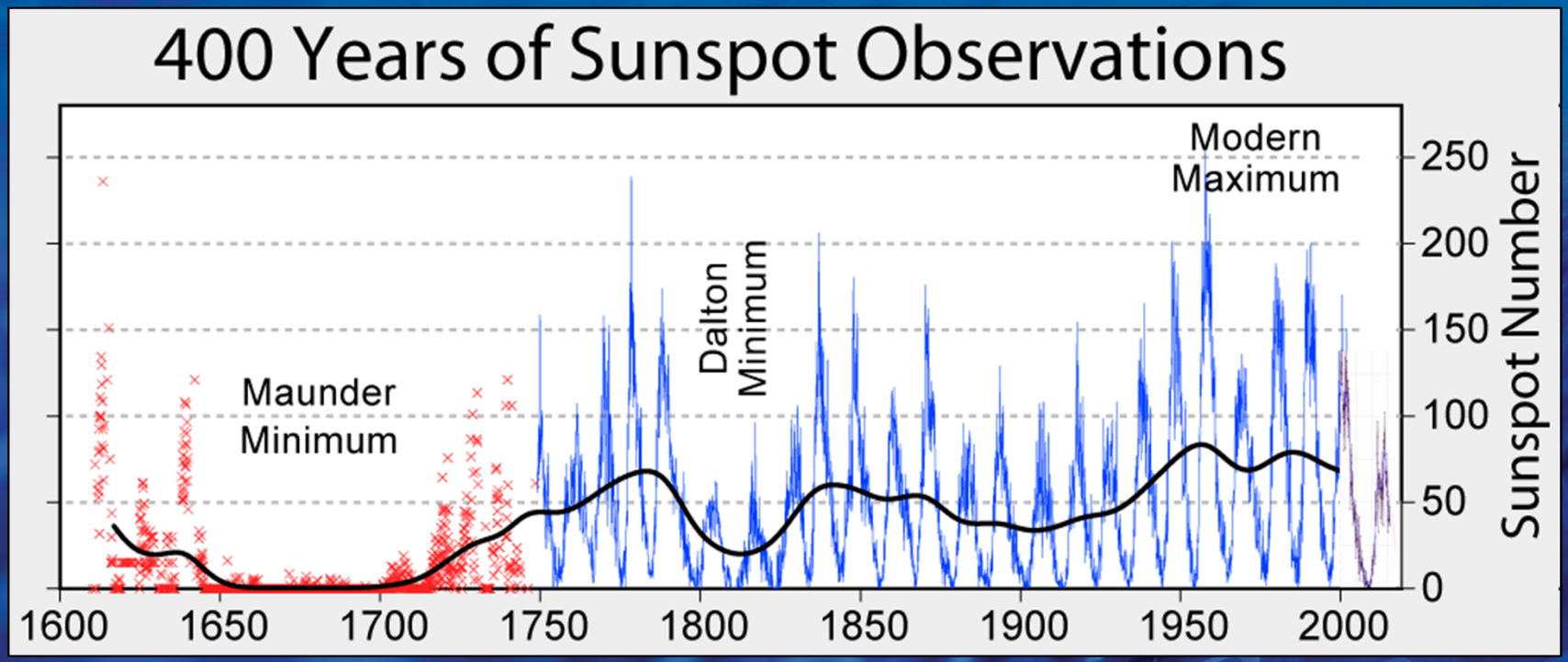
THE SUN

Historical solar data illustrates cyclicity on all scales.

Solar Cycle



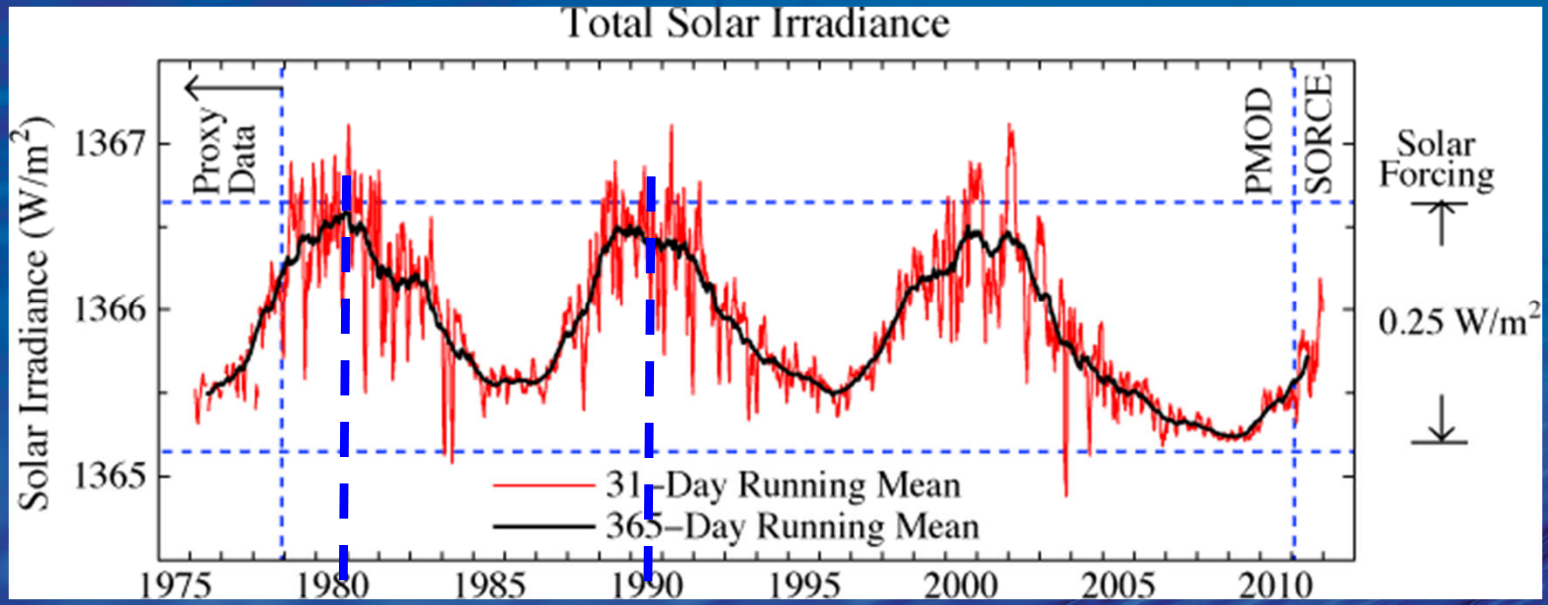
- The solar cycle or solar magnetic activity cycle is the nearly periodic 11-year change in the Sun's activity (including changes in the levels of solar radiation and ejection of solar material) and appearance (changes in the number of sunspots, flares, and other manifestations).
- They have been observed (by changes in the sun's appearance and by changes seen on Earth, such as auroras) for centuries.
- The changes on the sun cause effects in space, in the atmosphere and on the Earth's surface. While it is the dominant variable in solar activity, aperiodic fluctuations also occur.

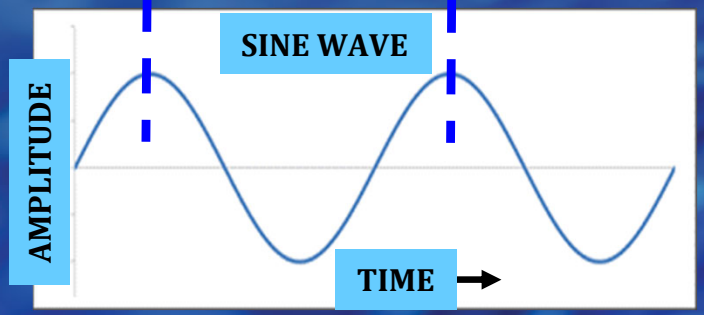


Source: https://en.wikipedia.org/wiki/Solar_cycle

Solar Irradiance

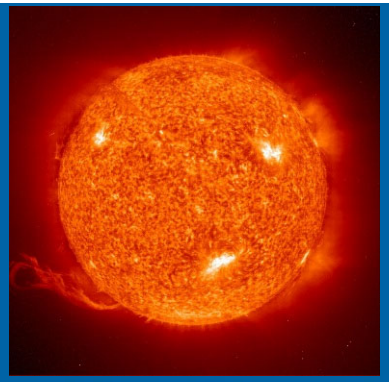
The power per unit area produced by the Sun in the form of electromagnetic radiation. Irradiance may be measured in space or at the Earth's surface after atmospheric absorption and scattering. Total solar irradiance (TSI), is a measure of the solar radiative power per unit area normal to the rays, incident on the Earth's upper atmosphere. The solar constant is a conventional measure of mean TSI at a distance of one Astronomical Unit (AU). Irradiance is a function of distance from the Sun, the solar cycle, and cross-cycle changes. Irradiance on Earth is most intense at points directly facing (normal to) the Sun.



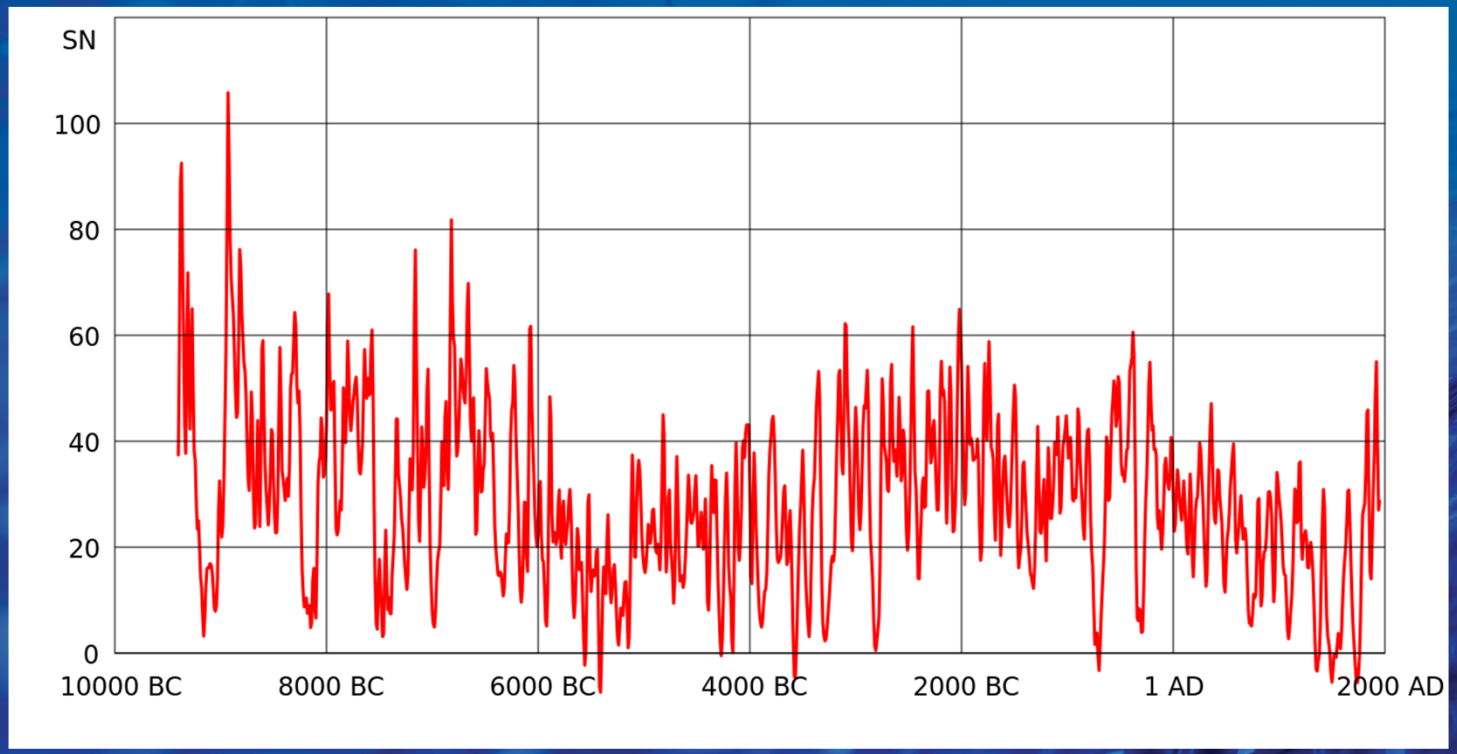


Source: https://en.wikipedia.org/wiki/Solar_cycle

Solar Cycle History



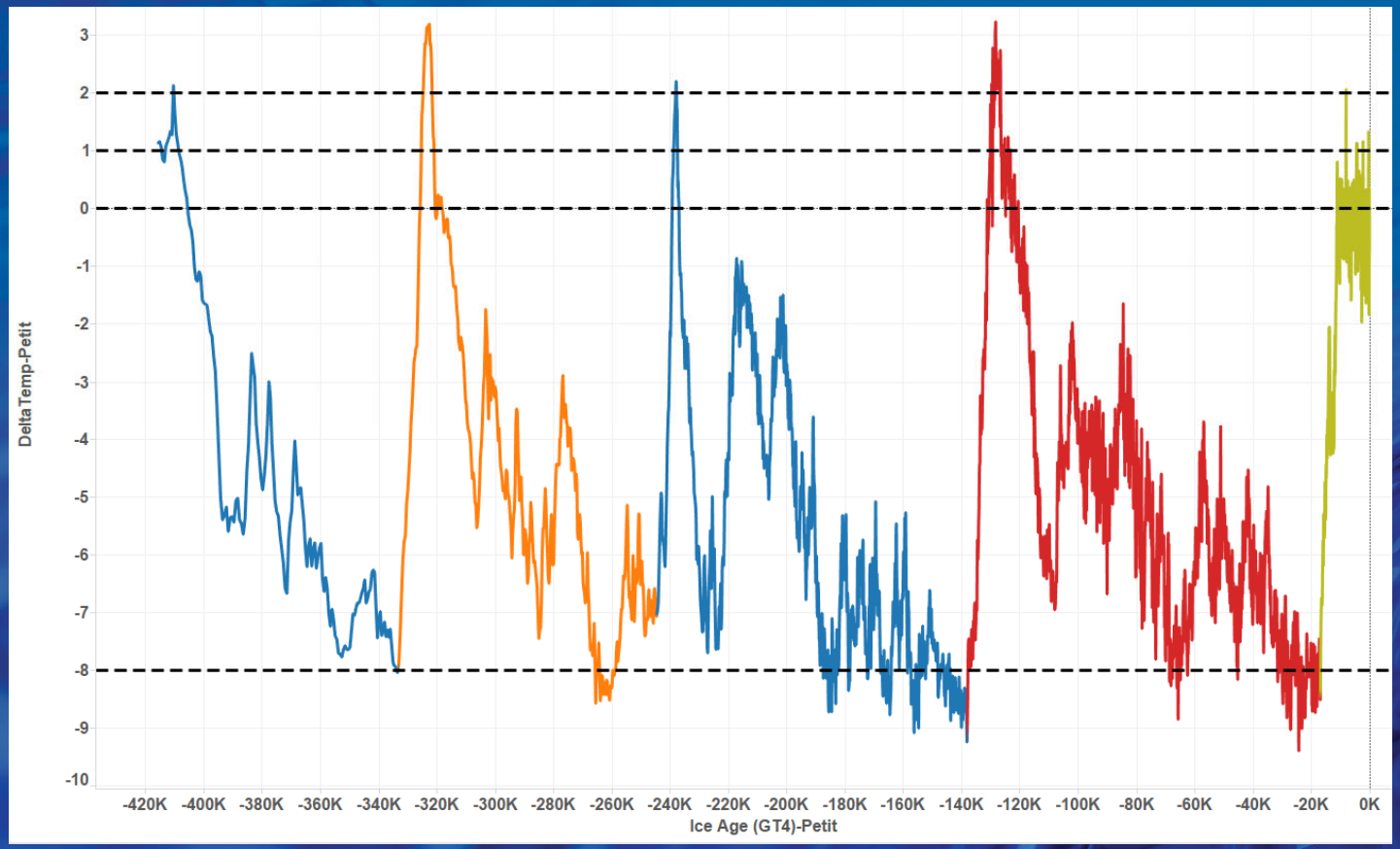
- Sunspot numbers over the past 11,400 years have been reconstructed using Carbon-14-based dendroclimatology. The level of solar activity beginning in the 1940s is exceptional – the last period of similar magnitude occurred around 9,000 years ago (during the warm Boreal period).
- The Sun was at a similarly high level of magnetic activity for only ~10% of the past 11,400 years. Almost all earlier high-activity periods were shorter than the present episode



Source: https://en.wikipedia.org/wiki/Solar_cycle

Solar Cycle History – Last 450,000 Years

- The recent completion of drilling at Vostok station in East Antarctica has allowed the extension of the ice record of atmospheric composition and climate to the past four glacial–interglacial cycles. The succession of changes through each climate cycle and termination was similar, and atmospheric and climate properties oscillated between stable bounds. Interglacial periods differed in temporal evolution and duration.
- Atmospheric concentrations of carbon dioxide and methane correlate well with Antarctic air-temperature throughout the record. Present-day atmospheric burdens of these two important greenhouse gases seem to have been unprecedented during the past 420,000 years.



Source: https://en.wikipedia.org/wiki/Solar_cycle

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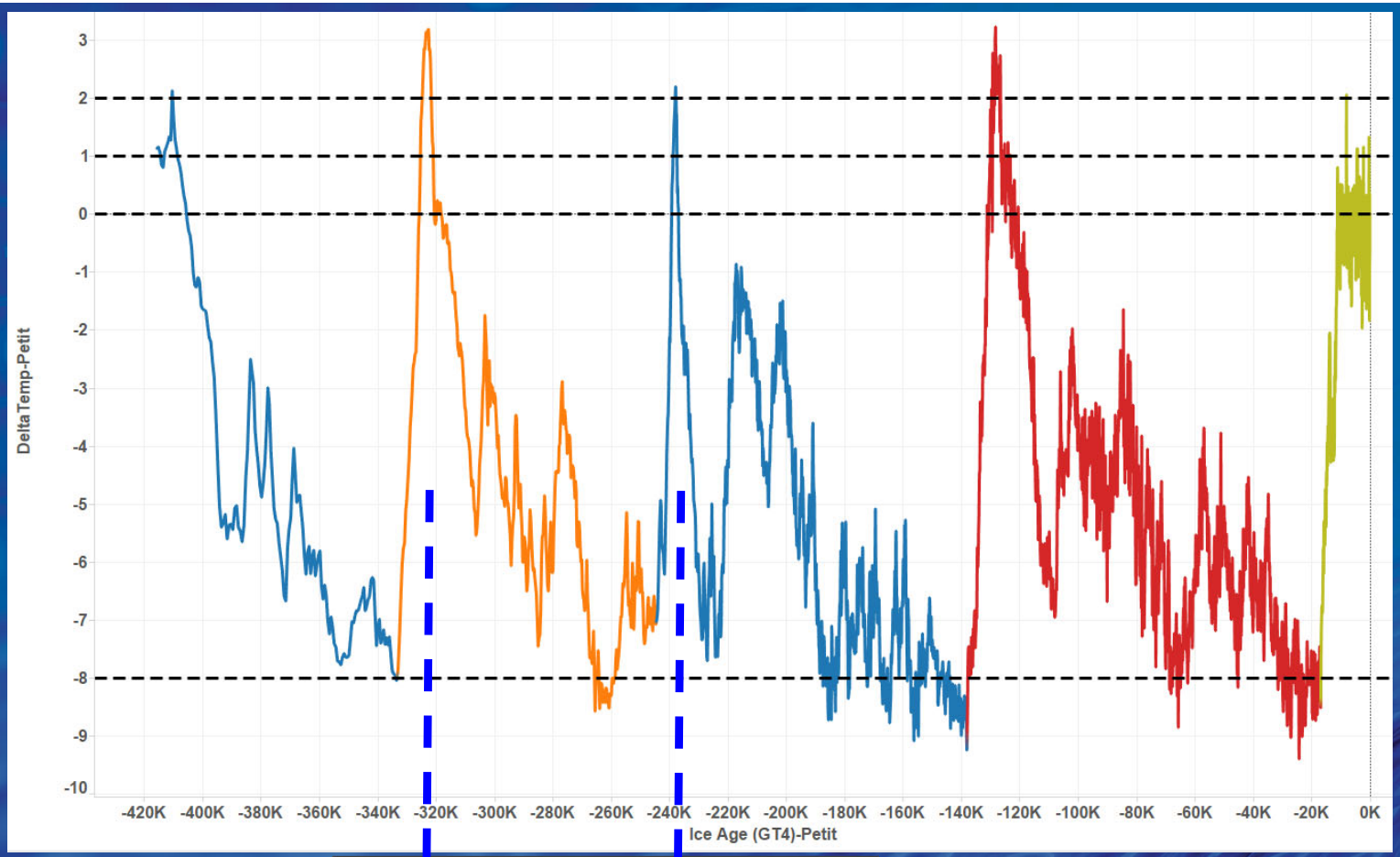

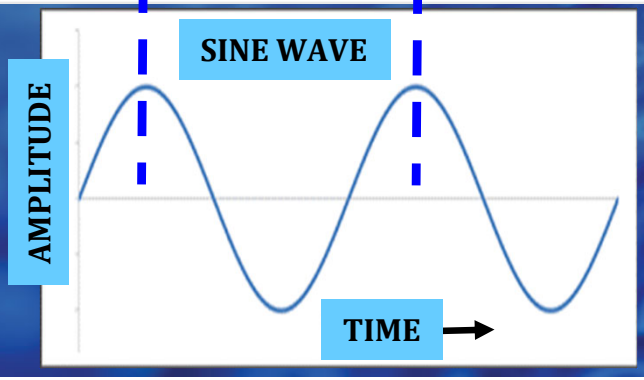

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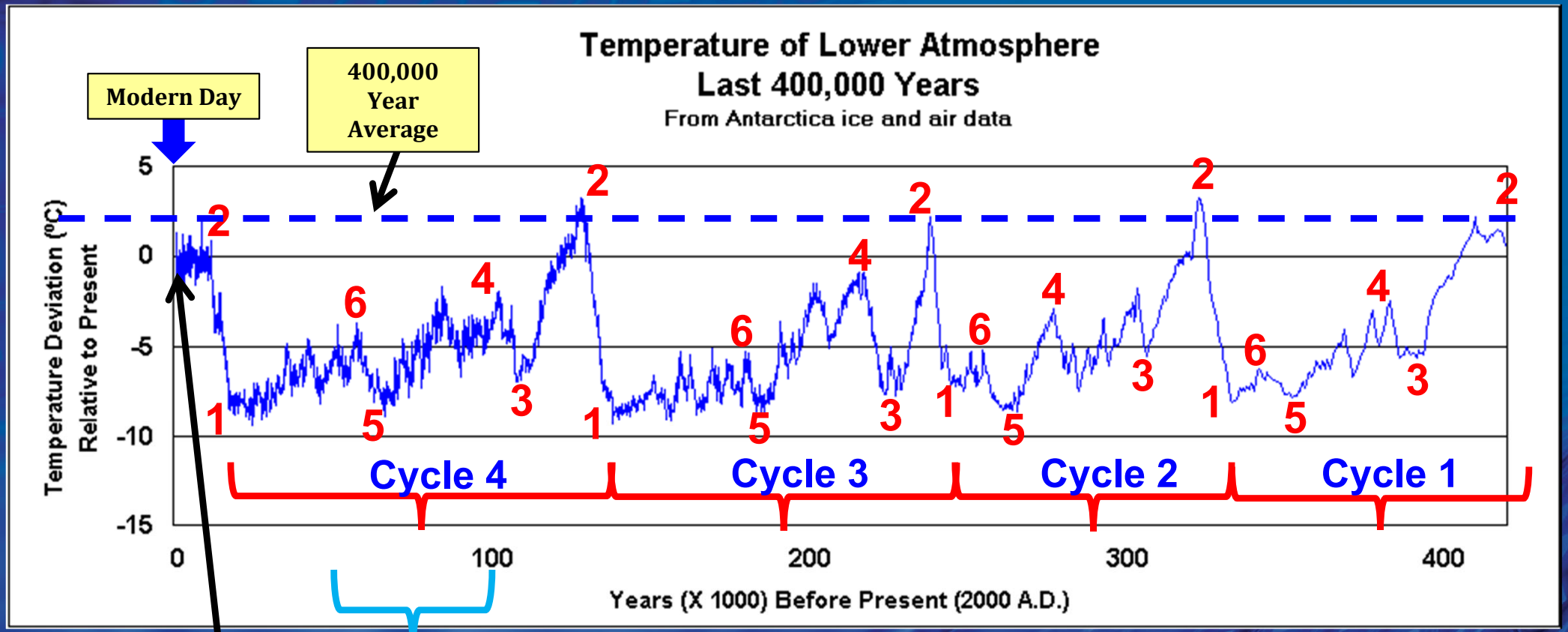


Current Temperatures are lower than the 400,000 year average. The top is "flat" like that in Cycle 1 versus a "V top" like in Cycles 2-4.

Modern humans evolved in Africa possibly from *Homo heidelbergensis* and migrated out of the continent some 50,000 to 100,000 years ago

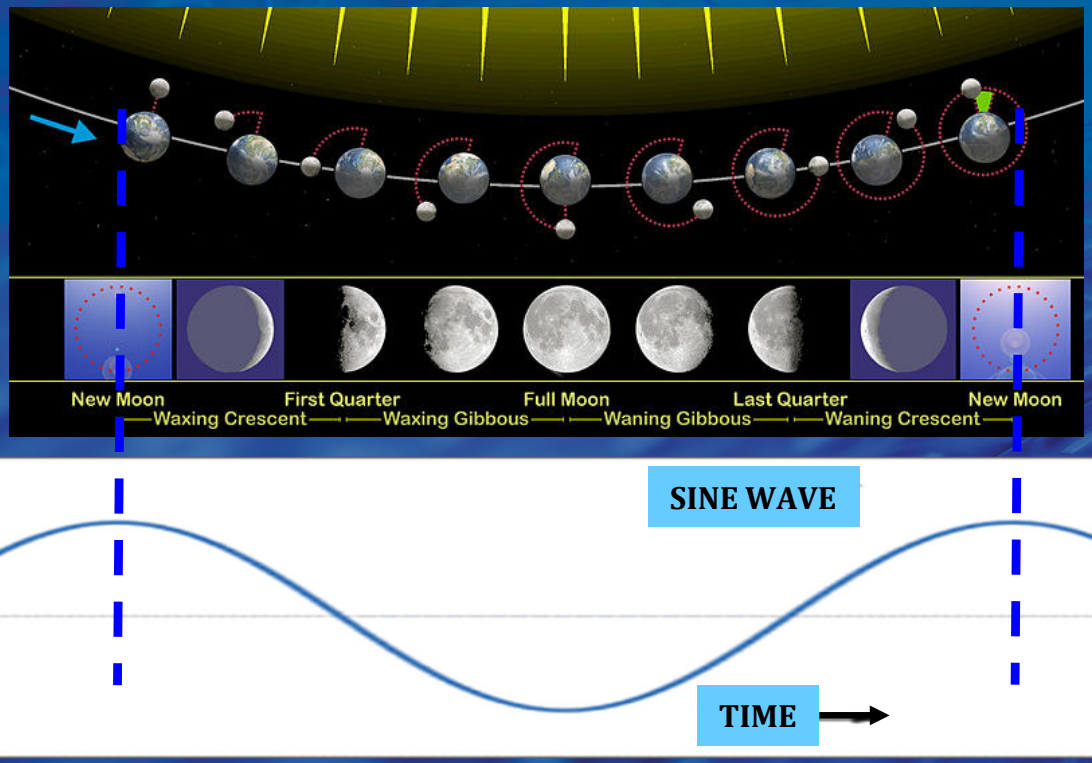
Conclusion:
The 400,000 year dataset and inherent cycles would indicate that a major "cooling" period lies ahead.

THE MOON

The moon's cyclicity has significant impact on the planet Earth and its inhabitants.

Lunar Cycle History

The lunar phase or phase of the moon is the shape of the illuminated (sunlit) portion of the Moon as seen by an observer on Earth. The lunar phases change cyclically as the Moon orbits the Earth, according to the changing positions of the Moon and Sun relative to the Earth. The Moon and the Earth are tidally locked, therefore the same lunar surface always faces Earth. This face is variously sunlit depending on the position of the Moon in its orbit. Therefore, the portion of this hemisphere that is visible to an observer on Earth can vary from about 100% (full moon) to 0% (new moon). The lunar terminator is the boundary between the illuminated and darkened hemispheres. Each of the 4 lunar phases is roughly 7 days (~7.4 days) each but varies slightly due to lunar apogee and perigee. Aside from some craters near the lunar poles such as Shoemaker, all parts of the Moon see around 14.77 days of sunlight, followed by 14.77 days of "night" (the "dark side" of the Moon is a reference to radio communication darkness, not visible light darkness).

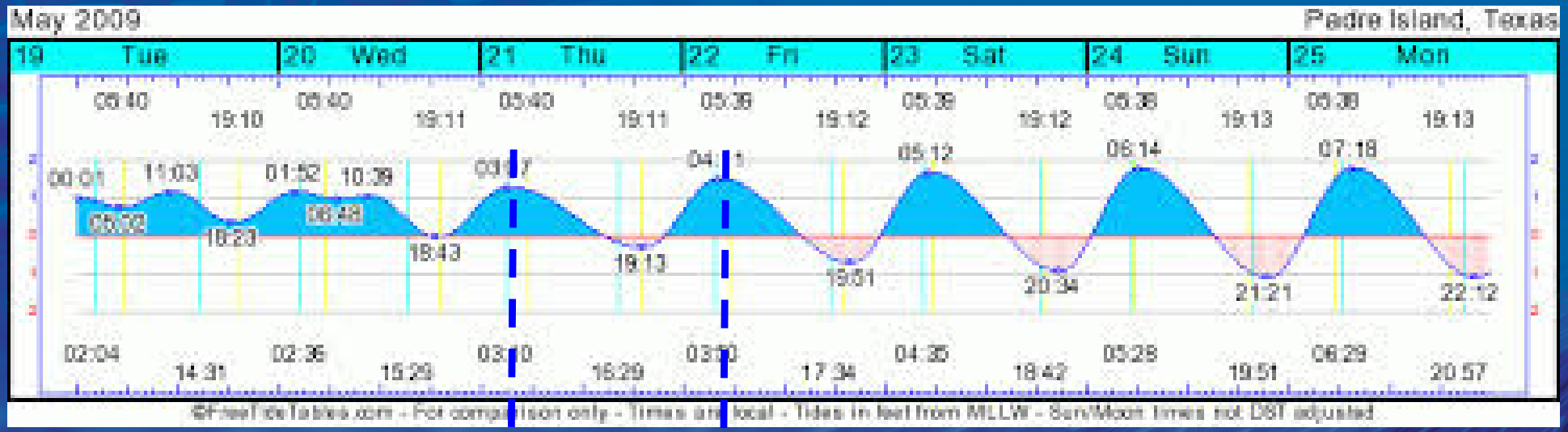


Source: https://en.wikipedia.org/wiki/Lunar_phase

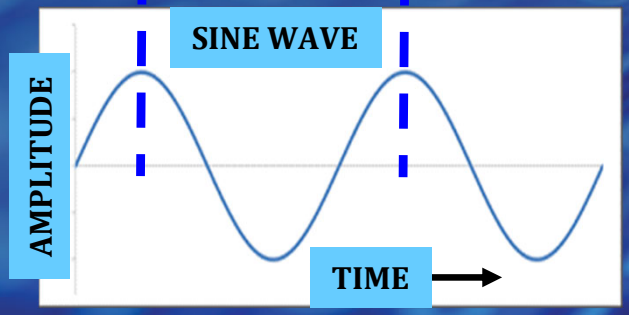
Tides

The moon is a major influence on the Earth's tides, but the sun also generates considerable tidal forces. Solar tides are about half as large as lunar tides and are expressed as a variation of lunar tidal patterns, not as a separate set of tides.

Tidal chart – Padre Island, Texas



Source: http://www.spadre.com/baycam.htm



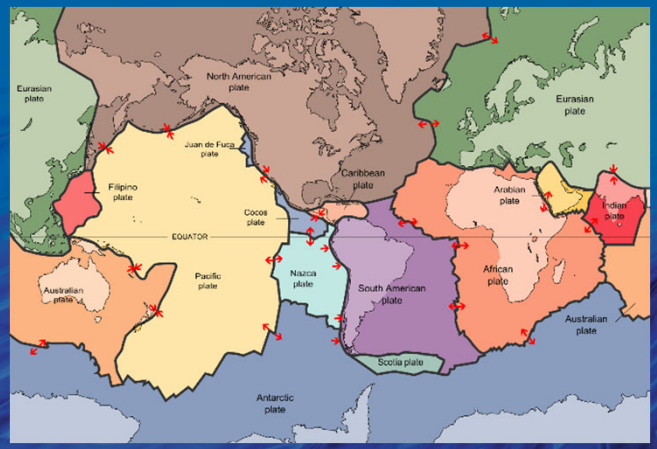
THE EARTH

The earth aligns with the cyclicity of the solar system.

Plate Tectonics

Plate tectonics is a scientific theory describing the large-scale motion of Earth's lithosphere. The theoretical model builds on the concept of continental drift developed during the first few decades of the 20th century. The geoscientific community accepted plate-tectonic theory after seafloor spreading was validated in the late 1950s and early 1960s.

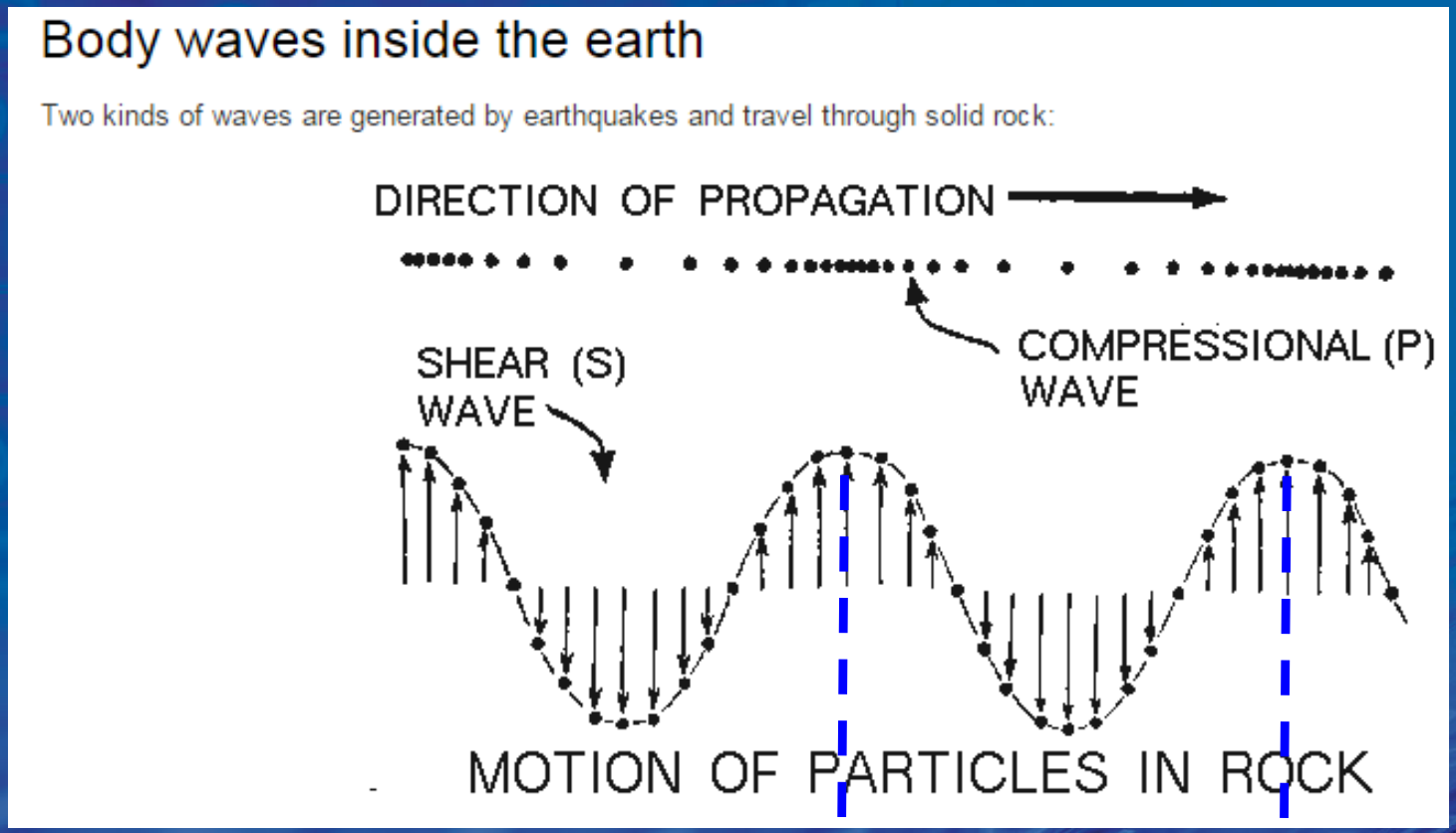
The lithosphere, which is the rigid outermost shell of a planet (the crust and upper mantle), is broken up into tectonic plates. The Earth's lithosphere is composed of seven or eight major plates (depending on how they are defined) and many minor plates. Where the plates meet, their relative motion determines the type of boundary: convergent, divergent, or transform. Earthquakes, volcanic activity, mountain-building, and oceanic trench formation occur along these plate boundaries. The relative movement of the plates typically ranges from zero to 100 mm annually.

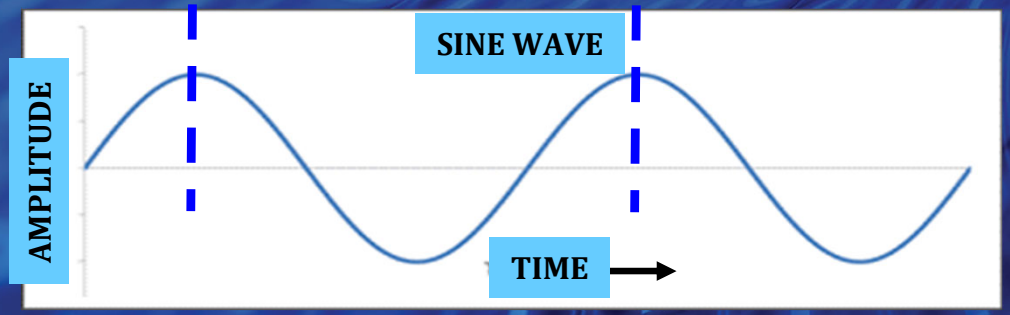


Tectonic plates are composed of oceanic lithosphere and thicker continental lithosphere, each topped by its own kind of crust. Along convergent boundaries, subduction carries plates into the mantle; the material lost is roughly balanced by the formation of new (oceanic) crust along divergent margins by seafloor spreading. In this way, the total surface of the lithosphere remains the same. This prediction of plate tectonics is also referred to as the conveyor belt principle. Earlier theories (that still have some supporters) propose gradual shrinking (contraction) or gradual expansion of the globe.

Source: https://en.wikipedia.org/wiki/Plate_tectonics

Earthquakes

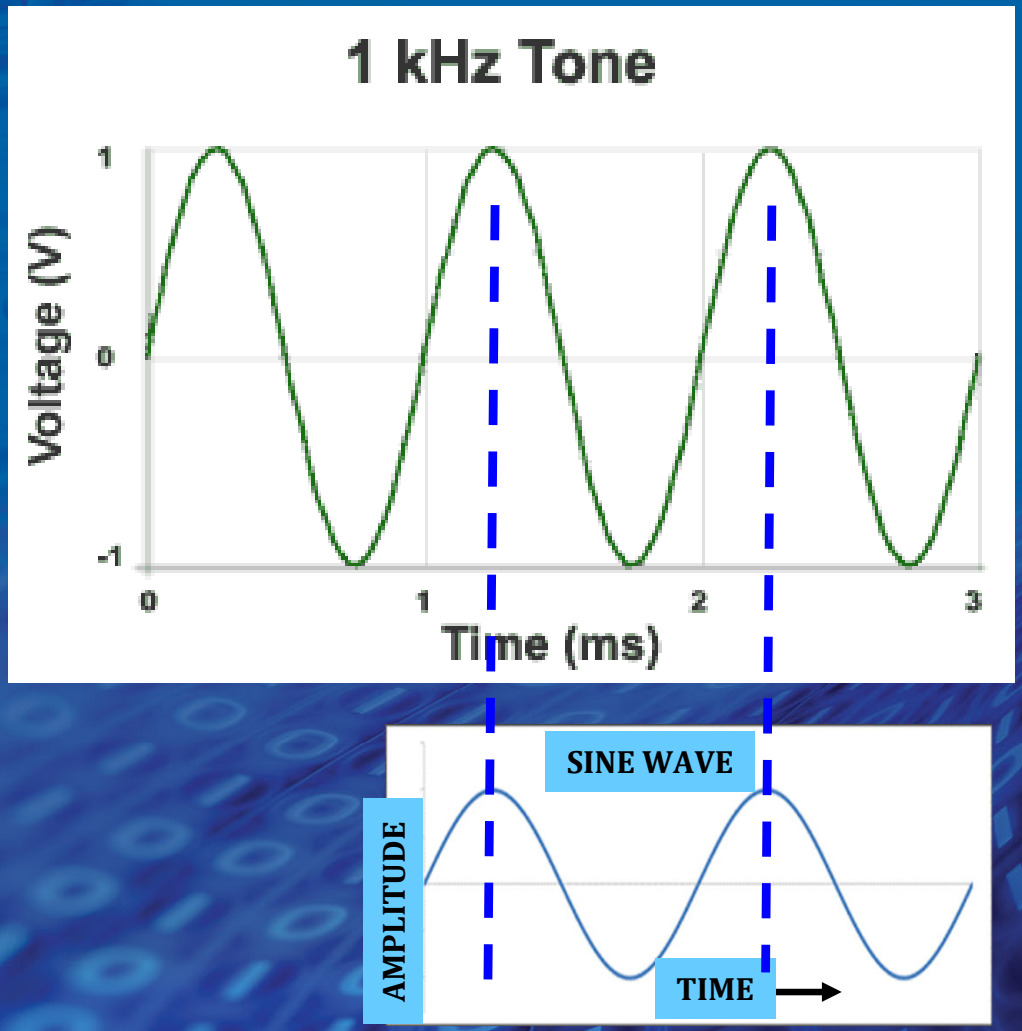




Source: http://earthquake.usgs.gov/regional/nca/1906/18april/earthwaves.php

Sound Waves

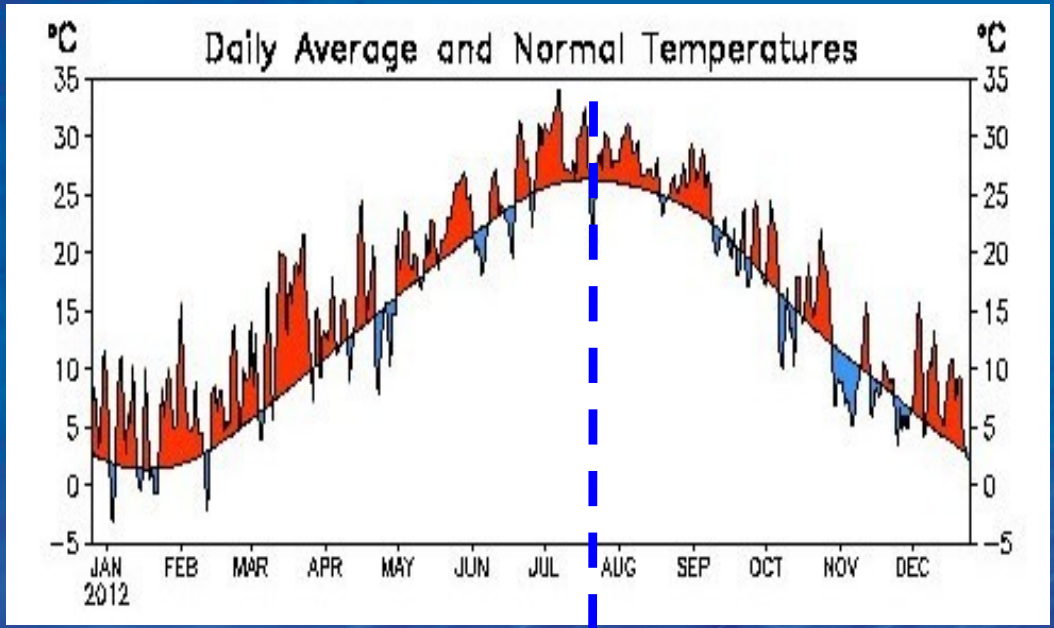
- Sound waves exist as variations of pressure in a medium such as air. They are created by the vibration of an object, which causes the air surrounding it to vibrate. The vibrating air then causes the human eardrum to vibrate, which the brain interprets as sound.
- Sound waves travel through air in much the same way as water waves travel through water. In fact, since water waves are easy to see and understand, they are often used as an analogy to illustrate how sound waves behave.
- Sound waves can also be shown in a standard x vs y graph, as shown to the right. This allows us to visualize and work with waves from a mathematical point of view. The resulting curves are known as the "waveform" (i.e. the form of the wave.)
- The wave shown here represents a constant tone at a set frequency. You will have heard this noise being used as a test or identification signal. This "test tone" creates a nice smooth wave which is ideal for technical purposes. Other sounds create far more erratic waves.

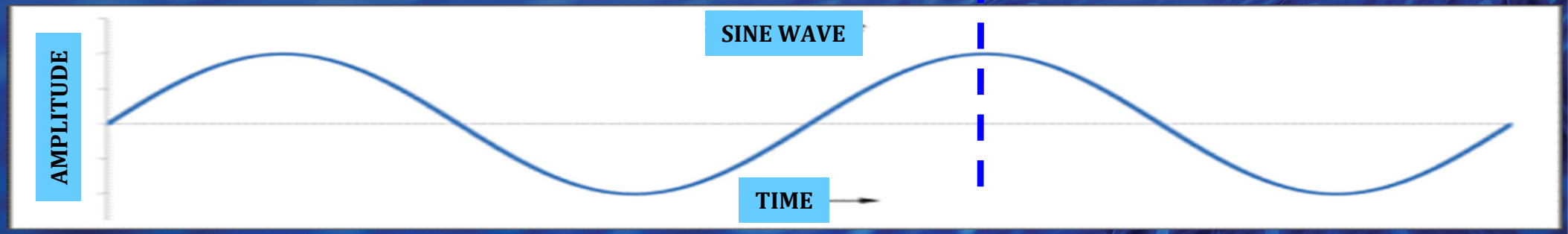


Source: http://www.mediacollege.com/audio/01/sound-waves.html

Temperature & Weather

Annual temperature– Washington D.C.



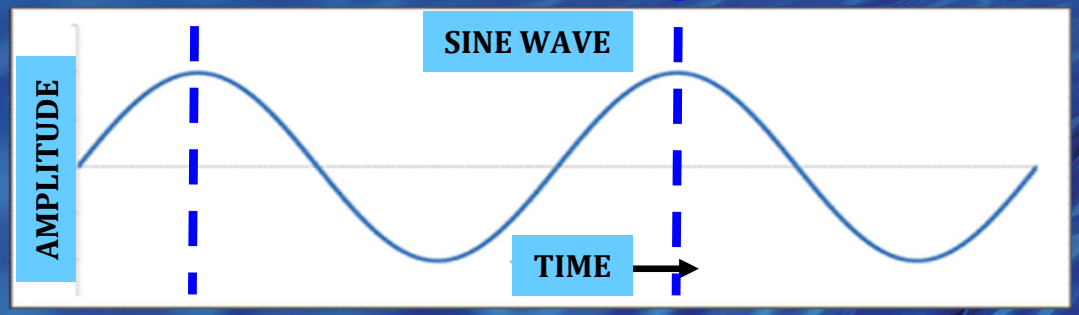


Source: http://regulus-starnotes.blogspot.com/2012/12/2012-climate-preview-record-yearly.html

THE HUMAN BEING

The human being aligns with the cyclicity of the planet Earth.

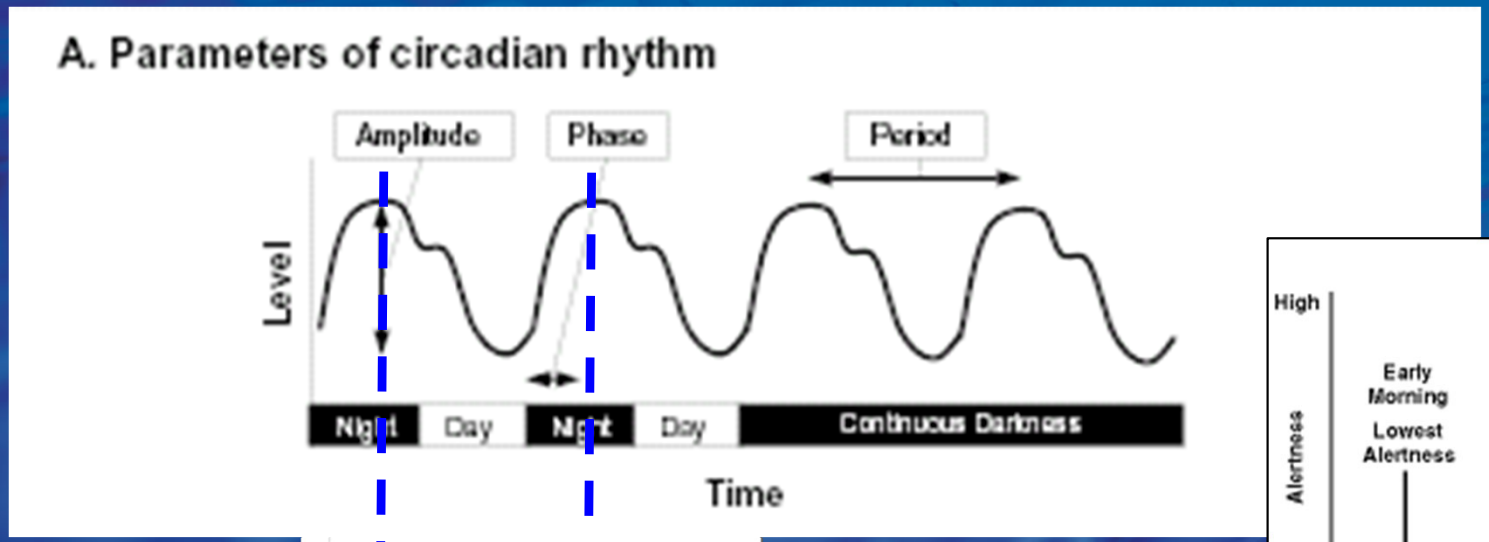
Human Heart Beat

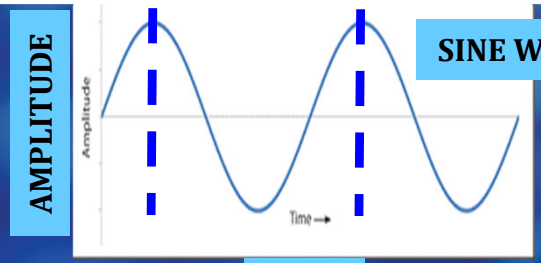


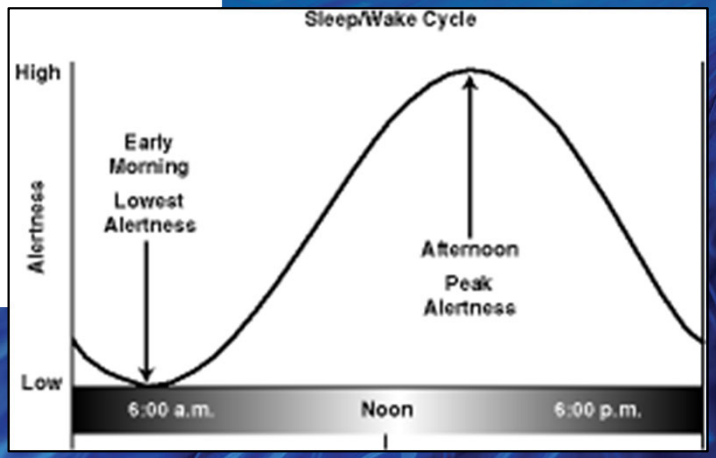
Circadian Rhythms

The daily light-dark cycle governs rhythmic changes in the behavior and/or physiology of most species. Studies have found that these changes are governed by a biological clock, which in mammals is located in two brain areas called the suprachiasmatic nuclei. The circadian cycles established by this clock occur throughout nature and have a period of approximately 24 hours. In addition, these circadian cycles can be synchronized to external time signals but also can persist in the absence of such signals. Studies have found that the internal clock consists of an array of genes and the protein products they encode, which regulate various physiological processes throughout the body. Disruptions of the biological rhythms can impair the health and well-being of the organism

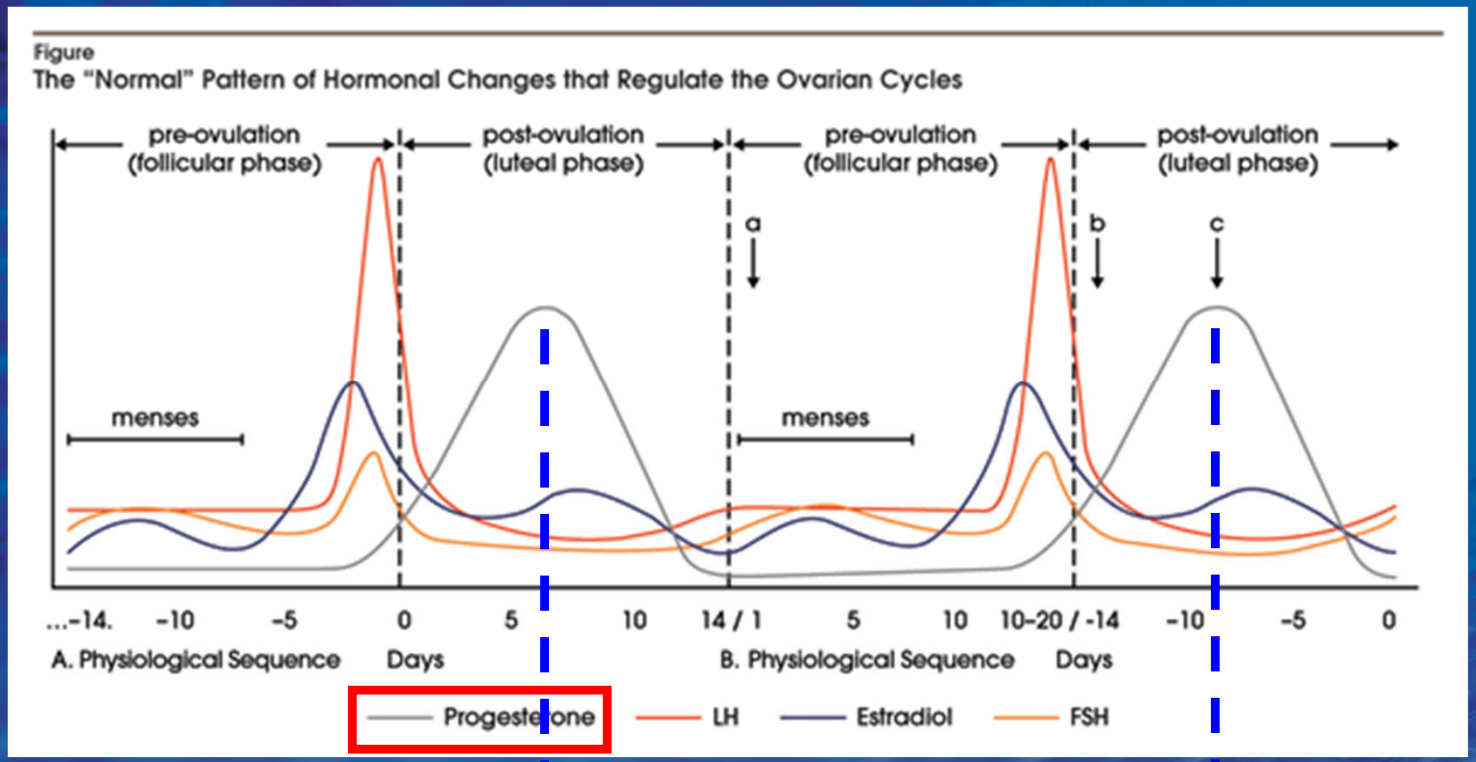
Source: http://pubs.niaaa.nih.gov/publications/arh25-2/85-93.htm

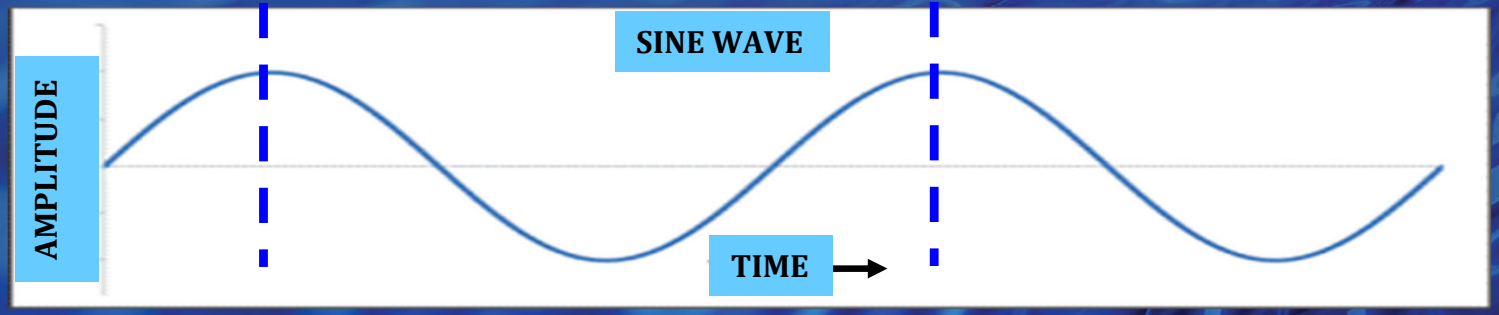






Ovarian Cycle





Source: http://primarypsychiatry.com/some-clues-to-the-etiology-of-premenstrual-syndromepremenstrual-dysphoric-disorder/

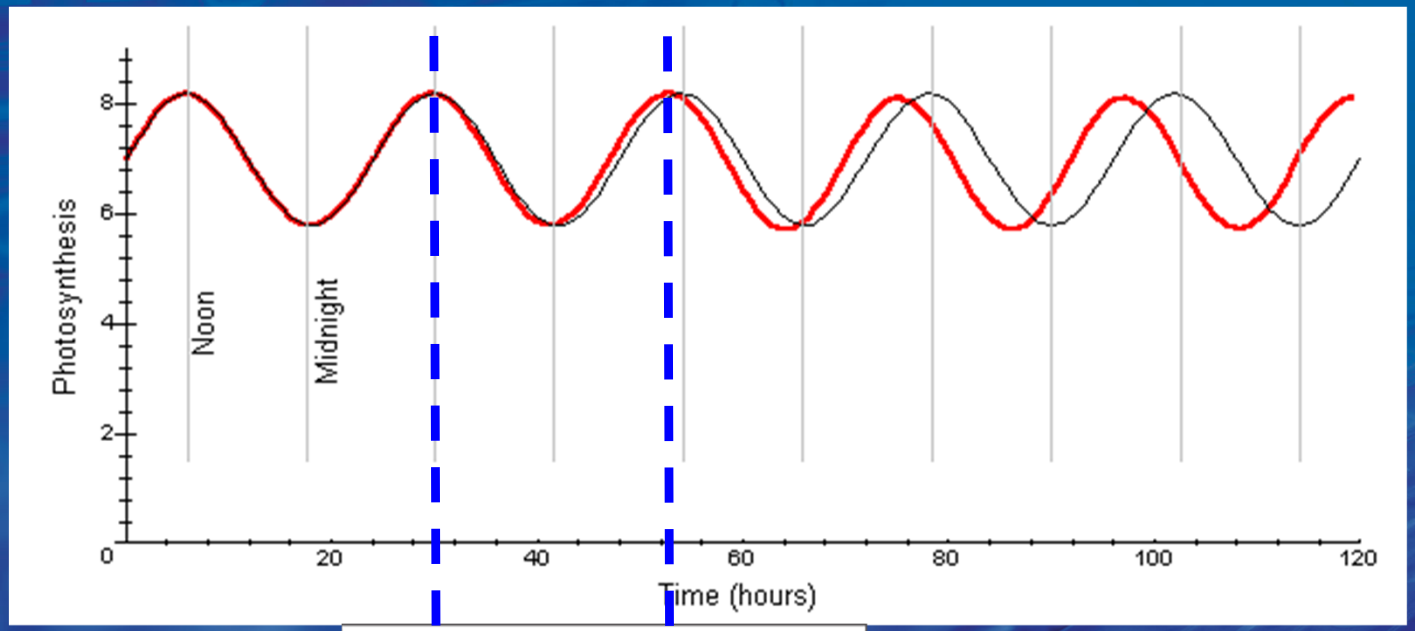
PLANT LIFE

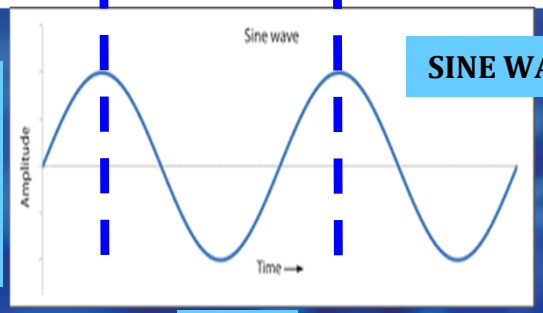
Plants, like humans, align with the cyclicity of the planet Earth.

Plant Photosynthesis (Circadian Rhythm)

Under normal conditions, photosynthesis and stomatal opening have circadian rhythms. We can graph the circadian rhythm of photosynthesis over time.

Source: http://www.tiem.utk.edu/~gross/bioed/webmodules/circadianrhythm.html





AMPLITUDE

SINE WAVE

TIME

HUMAN BEHAVIOR

Human beings, due to their mammalian design and brain's neocortex, behave collectively in herds.

Swarm, Crowd, & Herd Behavior

Swarm behavior, or swarming, is a collective behavior exhibited by entities, particularly animals, of similar size which aggregate together, perhaps milling about the same spot or perhaps moving en masse or migrating in some direction. It is highly interdisciplinary topic. As a term, swarming is applied particularly to insects, but can also be applied to any other entity or animal that exhibits swarm behavior. The term flocking is usually used to refer specifically to swarm behavior in birds, herding to refer to swarm behavior in quadrupeds, shoaling or schooling to refer to swarm behavior in fish. Phytoplankton also gather in huge swarms called blooms, although these organisms are algae and are not self-propelled the way animals are.

Source: https://en.wikipedia.org/wiki/Collective_behavior

Collective Behavior Types

Source: https://en.wikipedia.org/wiki/Collective_behavior

THE CROWD

The only class of events which all authors include is crowds; The classic treatment of crowds is Gustave LeBon, the author interpreted the crowds of the French Revolution as irrational reversions to animal emotion, and inferred from this that such reversion is characteristic of crowds in general. LeBon believed that crowds somehow induced people to lose their ability to think rationally and to somehow recover this ability once they had left the crowd. He speculated, but could not explain how this might occur; At the University of Chicago, Robert Park and Herbert Blumer agreed with the speculations of LeBon and other that crowds are indeed emotional. But to them a crowd is capable of any emotion, not only the negative ones of anger and fear; A number of authors modify the common-sense notion of the crowd to include episodes during which the participants are not assembled in one place but are dispersed over a large area. Turner and Killian refer to such episodes as diffuse crowds, examples being Billy Graham's revivals, panics about sexual perils, witch hunts and Red scares. Their expanded definition of the crowd is justified if propositions which hold true among compact crowds do so for diffuse crowds as well.

THE PUBLIC

Park distinguishes the crowd, which expresses a common emotion, from a public, which discusses a single issue. Thus, a public is not equivalent to all of the members of a society. Obviously, this is not the usual use of the word, "public." To Park and Blumer, there are as many publics as there are issues. A public comes into being when discussion of an issue begins, and ceases to be when it reaches a decision on it.

THE MASS

To the crowd and the public Blumer adds a third form of collective behavior, the mass. It differs from both the crowd and the public in that it is defined not by a form of interaction but by the efforts of those who use the mass media to address an audience. The first mass medium was printing.

THE SOCIAL MOVEMENT

several types are active social movements such as the French Revolution and expressive ones such as Alcoholics Anonymous. An active movement tries to change society; an expressive one tries to change its own members. The social movement is the form of collective behavior which satisfies least well the first definition of it which was offered at the beginning of this article. These episodes are less fluid than the other forms, and do not change as often as other forms do. Furthermore, as can be seen in the history of the labor movement and many religious sects, a social movement may begin as collective behavior but over time become firmly established as a social institution. For this reason, social movements are often considered a separate field of sociology.

Source: https://en.wikipedia.org/wiki/Collective_behavior

Crowd Behavior

Source: https://en.wikipedia.org/wiki/Collective_behavior

- **Contagion Theory** - the Contagion Theory was formulated by Gustave Le Bon. According to Le Bon crowds exert a hypnotic influence over their members. Shielded by their anonymity, large numbers of people abandon personal responsibility and surrender to the contagious emotions of the crowd. A crowd thus assumes a life of its own, stirring up emotions and driving people toward irrational, even violent action (LeBon 1895). Le Bon's Theory, although one of the earliest explanations of crowd behavior, is still accepted by many people outside of sociology. However, critics argue that the "collective mind" has not been documented by systematic studies. Furthermore, although collective behavior may involve strong emotions, such feelings are not necessarily irrational. Turner and Killian (1957) argue convincingly that the "contagion" never actually occurs and participants in collective behavior do not lose their ability to think rationally.
- **Convergence Theory** - whereas the Contagion Theory states that crowds cause people to act in a certain way, Convergence theory states that people who want to act in a certain way come together to form crowds. Developed by Floyd Allport (1924) and later expanded upon by Neil Miller and John Dollard (1941) as "Learning Theory," the central argument of all convergence theories is that collective behavior reveals the otherwise hidden tendencies of the individuals who take part in the episode. It asserts that people with similar attributes find other like-minded persons with whom they can release these underlying tendencies. People sometimes do things in a crowd that they would not have the courage to do alone because crowds can diffuse responsibility but the behavior itself is claimed to originate within the individuals. Crowds, in addition, can intensify a sentiment simply by creating a critical mass of like-minded people.
- **Emergent-Norm Theory** - according to Ralph Turner and Lewis Killian (1957), crowds begin as collectivities composed of people with mixed interests and motives. Especially in the case of less stable crowds—expressive, acting and protest crowds—norms may be vague and changing, as when one person decides to break the glass windows of a store and others join in and begin looting merchandise. When people find themselves in a situation that is vague, ambiguous, or confusing new norms "emerge" on the spot and people follow those emergent norms, which may be at odds with normal social behavior. Turner and Killian further argue that there are several different categories of participants, all of whom follow different patterns of behavior due to their differing motivations.
- **Value-added Theory** - Neil Smelser (1962) argues that collective behavior is actually a sort of release valve for built-up tension ("strain") within the social system, community, or group. If the proper determinants are present then collective behavior becomes inevitable. Conversely, if any of the key determinants are not present no collective behavior will occur unless and until the missing determinants fall into place. These are primarily social, although physical factors such as location and weather may also contribute to or hinder the development of collective behavior.
- **Complex Adaptive Systems theory** - Dutch scholar Jaap van Ginneken claims that contagion, convergence and emergent norms are just instances of the synergy, emergence and autopoiesis or self-creation of patterns and new entities typical for the newly discovered meta-category of complex adaptive systems. This also helps explain the key role of salient details and path-dependence in rapid shifts.

Crowd Behavior

- *"How flattering to the pride of man to think that the stars on their courses watch over him, and typify, by their movements and aspects, the joys or the sorrows that await him! He, in less proportion to the universe than the all-but invisible insects that feed in myriads on a summer's leaf are to this great globe itself, fondly imagines that eternal worlds were chiefly created to prognosticate his fate."*
- *"We go out of our course to make ourselves uncomfortable; the cup of life is not bitter enough to our palate, and we distill superfluous poison to put into it, or conjure up hideous things to frighten ourselves at, which would never exist if we did not make them."*
- *"We find that whole communities suddenly fix their minds upon one object, and go mad in its pursuit; that millions of people become simultaneously impressed with one delusion, and run after it, till their attention is caught by some new folly more captivating than the first."*

Charles McKay, *"Extraordinary Popular Delusions and the Madness of Crowds"*