figure drawing. Humans are endlessly varied in form, pose, and expression—making figure drawing the ultimate practice in observation and interpretation. Whether you're capturing a friend's likeness, illustrating a dynamic gymnast mid-flip, or conveying the gentle curve of a pregnant form, understanding anatomy and gesture lends both credibility and emotional depth to your art. Working from basic facial layouts to full-body proportions builds a visual toolkit you'll use in character design, storytelling, and fine art alike. Materials: Begin with an HB or 2H pencil for light construction lines, then switch to 2B–4B for contours, shading, and texture. A kneaded eraser helps lift highlights without damaging the paper. Block-In Shapes: Heads start as spheres plus jaw blocks; bodies begin with cylinders (limbs) and boxes (torso, pelvis). This "mass and volume" approach underlies the Andrew Loomis method of head construction for consistent results in any angle. Learn more in this head-drawing primer on Creative Bloq. Proportions 101: The classical "eight-head rule" divides the adult figure into eight equal head-lengths—from crown to heel—offering a reliable scaffold for height and segment placement. For a quick guide, see Tuts+'s Human Anatomy Fundamentals. Gesture First: Sketch an energetic "action line" to capture movement, then flesh in masses around it. This gesture-driven workflow avoids stiffness and brings figures to life, as detailed in Creative Bloq's Gesture Drawing overview. Key Focus: Balanced features, eyes on the midline, thirds division of face height. Tip: Draw a vertical center line and a horizontal eye-line at the middle of your oval. Divide the distance from brow to nose and nose to chin equally to locate the mouth—reference Artyfactory's proportions guide. Full guide → How to Draw a Human Face Key Focus: Cranium sphere, jaw block, tilt and rotation planes. Tip: Start with a circle, slice off the sides to create the side planes, then attach a jaw "block" beneath. Establish a centerline to guide head rotation. Full guide → How to Draw a Head Learn More: Andrew Loomis's head construction techniques via Creative Bloq. Key Focus: Feature alignment, ear-to-eye positioning, forehead-chin curve. Tip: Use a straight vertical line for the face plane; map brow, nose tip, and chin along it. Place the ear between the brow and nose base for accurate profiles—see Stan Prokopenko's profile tutorial. Full guide → How to Draw a Side Profile Key Focus: Eight-head proportions, shoulder-hip width ratio. Tip: Sketch a vertical spine with eight head-unit markers. Use an inverted triangle for the ribcage and a box for the pelvis, then connect with fluid lines for the torso. Full guide → How to Draw a Human Body Learn More: Basic body proportions on Tuts+. Key Focus: S-curve spine, narrower shoulders, wider hips, gentle tapering of limbs. Tip: Emphasize the spine's subtle S-curve; draw light, flowing lines rather than rigid shapes. Full guide → How to Draw a Female Body Key Focus: Broad shoulders, narrow waist, defined muscle blocks. Tip: Block in the torso as a wide rectangle and the pelvis as a narrower box, then overlay cylinders for limbs and angled planes for muscle groups. Full guide → How to Draw a Masculine Body Key Focus: Shifted center of gravity, arched lower back, enlarged abdomen. Tip: Draw a soft backward spine curve before adding the belly's rounded form—avoid treating pregnancy as "just a circle," and instead observe posture changes in this DragoArt tutorial. Full guide → How to Draw a Pregnant Woman Key Focus: Shortened torso, softened posture, wrinkle placement, texture. Tip: Lower the shoulders, shorten limb proportions subtly, and use light hatching or stippling to indicate facial wrinkles and skin folds—see this step-by-step grandma portrait guide. Full guide → How to Draw a Grandma Key Focus: Gesture of drawing pose, tool handling, head tilt. Tip: Capture the line of action from shoulder through elbow to wrist, anchoring the hand-pencil interaction for authenticity. Full guide → How to Draw an Artist Key Focus: Dynamic twist, line of action, muscle flex. Tip: Establish the primary action line—whether a split leap or backbend—and build limb masses around it. Time-limited gesture drills (5–10 minutes) help internalize these dynamic forms. Full guide → How to Draw a Gymnast Learn More: Proko's Dynamic Poses lesson. Thumbnail Warm-Up: Spend 1–2 minutes per thumbnail capturing head turns and body poses to explore angles and proportions. Figure Grid: Lay out a 2×5 grid—top row for heads, bottom row for full bodies—to practice consistency. Interplay Sketch: Combine two subjects—perhaps the pregnant woman holding her belly as the artist sketches her—to convey narrative and emotion. Background Hints: Lightly suggest a studio easel, gymnastics mat, or living-room setting with simple lines so your figures shine. You've built strong foundations in proportion, construction, and gesture. To deepen your anatomy insights, explore Proko's immersive Figure Drawing Fundamentals Course, covering muscle anatomy, surface forms, and advanced gestural techniques—perfect for elevating your portraits and full-figure work. ✓Showcase your talent and win big in Artists Network prestigious art competitions! Discover competitions in a variety of media and enter for your chance to win cash prizes, publication in leading art magazines, global exposure, and rewards for your hard work. Plus, gain valuable feedback from renowned jurors. Let your passion shine through - enter an art competition today! Human figure drawing by William-Adolphe Bouguereau. I bring you your very own mini-encyclopedia of figure drawing! There is so much to know and love…and sometimes be overwhelmed by (?!) if you are just starting out with human figure drawing. Even if you have experience, it can still be a new challenge every time you pick up a pencil and get ready to sketch. But it is an exciting challenge and one that I find irresistible because at the end of a drawing session you have something that people recognize immediately and respond to so passionately to. The figure is truly the keystone of art and you deserve your share of it! So enjoy these in-depth "chapters" on the body–from poses that are emotive for different reasons to how true are the proportions of Leonardo's Vitruvian man. Get out your sketchbook and learn the human body from all the right angles. Courtney Woman Crouching by Egon Schiele, 1918. Figure drawings from Old Masters and contemporary artists alike can be some of the most moving and expressive artworks that you might come across. Not only is this because the artists arrive at emotive figure drawing poses that are visually dynamic and interesting, but also because of these gesture drawings are often found at the foundation of each finished work. Imagine drawing figures without acknowledging the stance and position of the body–it would be like painting without color or gradation. There would be something inherently lacking in the figure sketch. Instead, the most powerful way of drawing human figures is to zero in on those minute positions, bold gestures, and overarching shapes of the body. What is most exciting about embarking on a figure drawing tutorial is that there are so many benefits to the exploration. Live drawing sessions with models are a popular and rewarding way of keeping basic figure drawing skills sharp. Such occasions also allow an artist to make a series of work in a relatively short period of time. These could possibly lead to more formal works in the studio, or they can be given as gifts or even sold. You also get the opportunity to be part of a drawing movement–networking with other artists as part of a community that value the creativity of figure drawing. Most importantly, figure drawing artists never run out of inspiration. The human form holds a whole world of inspiration in its arms, legs, and torso. Whether compressed or sprawling, standing upright or arms akimbo, from exploring figure drawing proportions to focusing on that all-important gesture of the body, there is always something to delve further into if you take the figure as your subject. And in the end that is what is most inspiring–that no matter how many figure sketches you create or how many times you draw figures, there is always a fresh way of looking and a new way of experiencing the figure in your work. Leaning Figure (Claudia) by Dan Gheno, 2007, graphite, 24 x 18. Many artists face a great deal of difficulty trying to fit an entire figure drawing on their papers or canvases. There is no rule that says you must draw the entire figure, but this is a particularly terrifying issue for those artists drawing an académie or trying to fit several figures within a complicated perspective layout. In both cases, I find it very helpful to mark on my paper the top, middle, and bottom of the figure. Finding the midpoint of the figure, one can draw back and forth from the top to the bottom, working back toward its center. Many artists subconsciously shorten their figures as they move perilously close to the bottom of the paper. If you don't have time to restart the drawing and you have no other choice, it is better to let the feet run off the page, with all the other body parts correctly proportioned, than to turn your model into a modern-day version of the short-legged Toulouse-Lautrec. I try to trust my gut as much as possible during this early stage of a human figure drawing or sketch. Only when I'm satisfied with the general placement and action of the figure do I begin to zero in on individual forms and details, and only then do I begin to optically measure the proportions of the model. Most often, I use the head size as my unit of measurement when drawing figures. It's a good idea to repeat each of your measurements at least twice to confirm accuracy. Then cross-check your head measurements by comparing large anatomical units such as legs against arms, the torso against leg units, and the overall figure length against its width. In a seated pose, a model may begin with perfect posture, and then several minutes later end up slumped forward. You have several options: When working alone, ask the model to adjust the figure drawing pose and/or take more breaks if the pose is difficult. Unfortunately, it's more problematic if you are drawing in a group situation. Looking around the studio, you may notice that your fellow artists have drawn the model in different states of tiredness. The best solution is to wait until the model resumes the pose after a five-minute break. Refreshed, the model will likely return to the original gesture. You can also adjust your figure drawing to reflect the pose when the model gets tired. But stick to it! Whatever you do, never change your figure sketch back and forth, trying to chase the shifting movements of the model. At all times, be sure to find the middle point of the figure-wherever that may be (usually near the crotch on the standing figure). And don't forget to mark it lightly on your paper. That way, if the upper part of your figure begins to grow larger as you concentrate on the details there, you'll catch your mistake before you run out of paper for the feet. –Dan Gheno Figure drawing by Prud'hon. Studying the range of figure drawings-both finished and partially finished–that Prud'hon made over a 40-year period allows us to reconstruct a methodology for how they were started, developed, and completed. This helps in understanding their ineffable quality–the rare combination of delicacy and structural strength that is essentially his. Prud'hon's figure drawings are densely constructed and built up in distinct layers. These layers or stages include linear thoughts-such as contour designation and hatching–as well as broad tonal passages of stumping, rubbing, and graining. They are built up in strata and go through stages in which the figure drawing is first established, then effaced, restated, and refined. Mixing lines, tones, and additive and subtractive techniques, Prud'hon presented us with a full range of the expressive possibilities of chalk and paper. Prud'hon's distinctive choices started right at the outset, beginning with his selection of black and white chalk on blue paper. Although hardly unique to Prud'hon, this cold tonality sets up a completely different emotive key than the more common warmth of red chalk on cream paper. Aside from its color characteristics, the blue paper also gave Prud'hon a solid middle tone from which to begin and locates the drawing directly in the center of the tonal range from the start. The other conspicuous element of Prud'hon's beginnings is that he made full use of both the black and the white chalk right from the outset. When working on toned paper, many artists spend much more time developing the darks initially, only adding the white chalk toward the end in the form of restricted highlights. But Prud'hon got the lights and the darks in his figure sketches going at the same time, using the white chalk extensively from the start, and this allowed him to establish his uncanny sense of luminosity early on. It seems clear from the partially finished figure drawings that he would begin with a tentative, airy contour to establish the basic proportions, gesture, and positioning of the figure on the paper. He would then attack the major plane breaks with extraordinarily free and vigorous hatching. What is so impressive about these initial marks is that despite their élan, they are perfectly placed and anatomically informed. He used his marks variously to run down the length of a bone, to pick out a subcutaneous landmark, or to begin to carve out the planes of a major muscle mass. This amount of accuracy, combined with such swiftness of delivery, speaks of knowledge of the body so deeply ingrained that he was able to make these notations in a split second, with his hand in constant motion. At this stage, the figure sketches were completely linear–made up of a dense network of lines, slashes, and quickly jotted down notations for anatomical landmarks. The mark-making came out of his initial training in tracing and copying engravings. He would then home in on a selected part of the drawing–usually starting from the top–and take a stump and rub down all the marks in that section, transforming them into broad tonal washes. Occasionally, he would stump down the entire figure drawing. But the number of partially finished drawings in which there are both linear and rubbed-down areas seems to indicate that he usually developed the drawings in sections. After this early process of stumping, the drawing started to make a radical shift from linear to tonal and began reading more like a soft grisaille painting than a line drawing. This rubbing down of the surface gave the drawing a breadth and a freedom more reminiscent of ink wash than dry chalk. And although this initial stumping served largely to divide the figure into its basic planes of light and dark, the black and white chalks also began blending into those seamless gray halftones, which would survive into the final stages of the drawing. –Ephraim Rubenstein The Vitruvian Man by Leonardo da Vinci, pen and ink drawing, 1487. Leonardo's figure drawing The Vitruvian Man is an icon of such stature that Dr. Martin Kemp referred to it as "probably the most famous drawing in the world." Here we will focus only on the theories of proportion proposed by Vitruvius as understood and elaborated on by Leonardo. Leonardo's human figure drawing measures about 13½ x 9¾ inches (344 x 245 mm) and is executed in light brown watered ink on a soft, warm, gray paper. It is one of the earliest of his drawings on human proportion and was done during Leonardo's first Milanese period. What follows is an assessment, line by line, of the accuracy of Vitruvius' theories as interpreted and illustrated by Leonardo using both his drawing and mine. In order to clarify Leonardo's transcription of Vitruvius we have separated and enumerated each of the theories with bold numbers in the text. Leonardo begins his interpretation of Vitruvius with, "the measurements of the human body are distributed by Nature as follow:" 1. "4 fingers make one palm." Perfect; a simple measurement with a caliper or compass will confirm this. Just below the figure and the second paragraph (which is only a single sentence) is a horizontal line with markings at both ends. The words diti (fingers) are written directly under four spaces, defined by five small lines, indicating the width of the fingers. And next to that the word palmi (palms) written directly under five spaces, defined by six small lines, the width of each measures exactly four fingers. 2. "4 palms make one foot." Not quite; the length of the foot in both Leonardo's drawing and mine is less than three palms. 3. "6 palms make one cubit." Correct. I have found that in verifying Leonardo's theories one should trust in the ratio of the module to the part being measured. However, in this case, as the cubit is not part of the body but an ancient form of measurement (18 to 22 inches), we must rely on the accepted measurement of the cubit. So, if the width of a man's palm is approximately 3.25 inches, then six palms would measure 19 inches, which fits into the width of a cubit. And if we measure this same man of average height at his shoulders we would find that the width of his shoulders, between 18 and 20 inches, would enter into the height of a man four times, proving the theory in numbers 4 and 13. 4. "4 cubits make a man's height." Usually correct. 5. "And 4 cubits make one pace and 24 palms make one cubit." Variable; One cubit at 18 inches x 4 = 72 inches or 6 feet, but a pace, according to the definition, is smaller at 58 inches–less than 5 feet. The conclusion here is to stick to the anatomical modules to establish a canon, and as for the second part, the measurement is slightly less than 24 palms in a whole man. 6. "If you open your legs so much as to decrease your height by 1/14…the space between the legs will be an equilateral triangle." Variable: In Leonardo's drawing, the decrease–the distance from the feet which rest on the bottom of the equilateral triangle to the feet resting on the bottom of the square=-measures slightly more than 1/14, but in my drawing the decrease measures more than 1/17 of the total height of the figure. However, in both drawings the equilateral triangles are perfect. Go figure! 7. In order to bring further clarity to the text, I have rearranged Leonardo's text by combining a portion of the last sentence in the first paragraph to the single sentence of the second paragraph. "…and spread and raise your arms till your middle fingers touch the level of the top of your head you must know that the center of the outstretched limbs will be in the navel…" and, "The length of a man's outspread arms is equal to his height." Perfect. A man standing perfectly erect in a square, stretching his arms upward, will find that his middle fingers touch the top level of the square level with his head, at the exact point where the circle intersects the square. And his navel will be at the compass point of this perfect circle. In addition, we will find that the length of a second set of his horizontally outstretched arms will be equal to his whole height. Leonardo was the first (after Vitruvius) to comprehend and combine these theories together and the first to combine the circle and the square together in a single drawing, not by trying to square the circle, but by projecting it outside the square. In so doing he surpassed others before him and those who followed. 8. "From the roots of the hair to the bottom of the chin is the tenth of a man's height." Variable. In this Leonardo quotes Vitruvius' words verbatim but contradicts it to measure 9 faces in several other examples. But even here in both Leonardo's and my figure drawing the full figure measures only slightly larger than 9 faces. 9. "From the bottom of the chin to the top of his head is one-eighth of his height." Correct. This is the standard, acceptable, and reliable measurement, which works perfectly in Leonardo's and my figure sketch. 10. "From the top of the breast to the top of his head will be one-sixth of a man." Correct. The measurement must be taken at the pit of the throat formed by the manubrum, the top of the sternum. It is perfect in Leonardo's drawing and mine. 11. "From the top of the breast to the roots of the hair will be the seventh part of the whole man." Variable, and correct. This forms an unusual module and it measures slightly more in Leonardo's drawing and slightly less in mine. 12. "…from the nipples to the top of the head will be the fourth part of a man." Correct. Perfect in both Leonardo's and my drawing. 13. "The greatest width of the shoulders contains in itself the fourth part of a man." Correct. Perfect, in both Leonardo's and my drawings and proven in several other examples. 14. "From the elbow to the tip of the hand will be the fifth part of a man." Variable. In both Leonardo's and my drawing it measures no more than one-fourth of a man. 15. "…and from the elbow to the angle of the armpit will be the eighth part of a man." Correct. This should mean that the module is roughly equal to the size of the head; I find it slightly more in both Leonardo's and my drawing. 16. "The whole hand will be the tenth part of a man." Variable. We already have proven that the hand is equal to the face and is closer to one-ninth of the whole man. 17. "The beginning of the genitals marks the middle of the man." Perfect. This point is the pubis symphasis where the two halves of the pelvis come together in front. This bony landmark is a standard, reliable reference point and is proven several times over in these pages. 18. "The foot is the seventh part of a man." Variable. Here Leonardo parts from Vitruvius. Vitruvius states unequivocally on several occasions that the foot is one-sixth of the whole height of a man. In both Leonardo's and my drawing the measurement is closer to seven than to six. 19. "From the sole of the foot to below the knee will be the fourth part of a man." Perfect in both Leonardo's drawing and mine. 20. "From below the knee to the beginning of the genitals will be the fourth part of a man." If we take 19 and 20 together, they will equal two-fourths, and make half a man. See 17 to verify the center of a man. 21. "The distance from the bottom of the chin to the nose and from the roots of the hair to the eyebrows is, in each case the same, and like the ear, a third of the face." Perfect. –Anthony Panzera Drawing of the usually unclothed human form This article includes a list of references, related reading, or external links, but its sources remain unclear because it lacks inline citations. Please help improve this article by introducing more precise citations. (June 2024) (Learn how and when to remove this message) Figure drawing by Leonardo da Vinci A figure drawing is a drawing of the human form in any of its various shapes and postures, using any of the drawing media. The term can also refer to the act of producing such a drawing. The degree of representation may range from highly detailed, anatomically correct renderings to loose and expressive sketches. A life drawing is a drawing of the human figure, traditionally nude, from observation of a live model. Creating life drawings, or life studies, in a life class, has been a large element in the traditional training of artists in the Western world since the Renaissance. A figure drawing may be a composed work of art or a figure study done in preparation for a more finished work, such as a painting.[1]:Ch. 8 Figure drawing is arguably the most difficult subject an artist commonly encounters, and entire courses are dedicated to the subject. The human figure is one of the most enduring themes in the visual arts, and the human figure can be the basis of portraiture, illustration, sculpture, medical illustration, and other fields. An artist's mannequin is often used to train beginner artists on a standard set of proportions while developing their use of perspective and posture Artists take a variety of approaches to drawing the human figure. They may draw from live models or from photographs,[2] from mannequin puppets, or from memory and imagination. Most instruction focuses on the use of models in "life drawing" courses. The use of photographic reference—although common since the development of photography—is often criticized or discouraged for its tendency to produce "flat" images that fail to capture the dynamic aspects of the subject. Drawing from imagination is often lauded for the expressiveness it encourages, and criticized for the inaccuracies introduced by the artist's lack of knowledge or limited memory in visualizing the human figure; the experience of the artist with other methods has a large influence on the effectiveness of this approach. In developing the image, some artists focus on the shapes created by the interplay of light and dark values on the surfaces of the body. Others take an anatomical approach, beginning by approximating the internal skeleton of the figure, overlaying the internal organs and musculature, and covering those shapes with the skin, and finally (if applicable) clothing; the study of human internal anatomy is usually involved in this technique. Another approach is to loosely construct the body out of geometric shapes, e.g., a sphere for the cranium, a cylinder for the torso, etc. Then refine those shapes to more closely resemble the human form. For those working without visual reference (or as a means of checking one's work), proportions commonly recommended in figure drawing are:[3] An average person is generally 7-and-a-half heads tall (including the head). This can be illustrated to students in the classroom using paper plates to visually demonstrate the length of their bodies. An ideal figure, used for an impression of nobility or grace, is drawn at 8 heads tall. A heroic figure used in the depiction of gods and superheroes is eight-and-a-half heads tall. Most of the additional length comes from a bigger chest and longer legs. These proportions are most useful for a standing model. Poses which introduce foreshortening of various body parts will cause them to differ. Sitting woman, drawing in black crayon, school of Rembrandt (17th century) The French Salon in the 19th century recommended the use of Conté crayons, which are sticks of wax, oil and pigment, combined with specially formulated paper. Erasure was not permitted; instead, the artist was expected to describe the figure in light strokes before making darker, more visible marks. Figure drawing by Lovis Corinth. Before 1925 A popular modern technique is the use of a charcoal stick, prepared from special vines, and a rougher form of paper. The charcoal adheres loosely to the paper, allowing very easy erasure, but the final drawing can be preserved using a spray-on "fixative" to keep the charcoal from rubbing off. Harder compressed charcoal can produce a more deliberate and precise effect, and graduated tones can be produced by smudging with the fingers or with a cylindrical paper tool called a stump. A graphite pencil is also commonly used for figure drawing. For this purpose, artists' pencils are sold in various formulations, ranging from 9B (very soft) to 1B (medium soft), and from 1H (medium hard) to 9H (very hard). Like charcoal, it can be erased and manipulated using a stump. Ink is another popular medium. The artist will often start with a graphite pencil to sketch or outline the drawing, then the final line work with a pen or brush, and permanent ink. The ink may be diluted with water to produce gradations, a technique called ink wash. The pencil marks may be erased after the ink is applied, or left in place with the dark inks overpowering them. Some artists draw directly in ink without the preparation of a pencil sketch, preferring the spontaneity of this approach despite the fact that it limits the ability to correct mistakes. Matisse is an artist known to have worked in this way. A favored method of Watteau and other 17th and 18th-century artists of the Baroque and Rococo eras was to start with a colored ground of tone halfway between white and black, and to add shade in black and highlights in white, using pen and ink or "crayon". Further information: History of the nude in art Nude study by Annibale Carracci The human figure has been the subject of drawings since prehistoric times. While the studio practices of the artists of antiquity are largely a matter of conjecture, that they often drew and modeled from nude models is suggested by the anatomical sophistication of their works. An anecdote related by Pliny describes how Zeuxis reviewed the young women of Agrigentum naked before selecting five whose features he would combine in order to paint an ideal image.[4] The use of nude models in the medieval artist's workshop is implied in the writings of Cennino Cennini, and a manuscript of Villard de Honnecourt confirms that sketching from life was an established practice in the 13th century.[4] The Carracci, who opened their Accademia degli Incamminati in Bologna in the 1580s, set the pattern for later art schools by making life drawing the central discipline.[5] The course of training began with the copying of engravings, then proceeded to drawing from plaster casts, after which the students were trained in drawing from a live model. In the late 18th century, students in Jacques-Louis David's studio followed a rigorous program of instruction. Mastery in drawing was considered a prerequisite to painting. For about six hours each day, students drew from a model who remained in the same pose for one week.[6] "Eighteenth-century drawings, like that attributed to Jacques-Louis David, were usually executed on tinted paper in red or black chalk with white highlights and a darkened ground. The models' poses tended to be active: standing figures seem about to stir and even seated figures gesticulate dramatically. Close observation of the model's body was secondary to the rendering of his gesture, and many drawings - consistent with academic theory - seem to present a representative figure rather than a specific body or face. In comparison, academies produced in the nineteenth century [...] were typically executed in black chalk or charcoal on white paper and are meticulous depictions of the particularities and idiosyncrasies of the body of the live model. Evidence of the artist's hand is minimized and, although reclining or seated poses are rare, even standing poses are comparatively static..."[7] Before the late 19th century, women were generally not admitted to figure drawing classes.[8][9] Further information: Academic art An academy figure is a carefully executed drawing or painting of the nude human body, typically at half life size, completed as an exercise in an art school or academy.[10] The drawing class, Michiel Sweerts, 1660 Young Student Drawing, Jean Siméon Chardin, c. 1738 Thomas Rowlandson, Drawing from Life at the Royal Academy, c. 1808–1810 École des beaux-arts, late 19th century Christian Krohg (1852–1925), seated center, lecturing a class at Statens kunstakademi in Oslo The Anatomy Class at the Ecole des Beaux Arts, François Sallé, 1888 Pedro Américo, Academy, c. 1870 Historical accounts reveal that nude models for aspiring female artists were largely unavailable. Women were barred from certain institutions because it was considered improper and possibly even dangerous for them to study from nude models.[9] Though men were given access to both male and female nudes, women were confined to learning anatomy from casts and models. It was not until 1893 that female students were allowed access to life drawing at the Royal Academy in London,[11] and even then the model was required to be partially draped.[12] The limited access to nude figures impeded the careers and development of female artists. The most prestigious forms of painting required in-depth knowledge of anatomy that was systematically denied to women,[12] who were thereby relegated to less-regarded forms of painting such as genre, still life, landscape, and portraiture. In Linda Nochlin's essay, "Why have There Been No Great Women Artists" she identifies the restricted access that women had to nude figure drawing as a historically significant barrier to women's artistic development.[12] Figure drawing instruction is an element of most fine art and illustration programs. Academies of fine art in Italy have a scuola libera del nudo ("free school of the nude") which forms part of the degree program but is also open to outside students.[13] In a typical figure drawing studio classroom, the students sit around a model either in a semicircle or a full circle. No two students have exactly the same view, thus their drawing will reflect the perspective of the artist's unique location relative to the model. The model often poses on a stand, to enable students to more easily find an unobstructed view. Depending on the type of pose, furniture and/or props may be used. These are typically included in the drawing, to the extent that they are visible to the artist. However, backgrounds are commonly ignored unless the objective is to learn about placement of figures in an environment. Individual brings your sketch to life." As you move to finer details, observe how muscles shift between poses. Where are the areas of tension and relaxation? Scribble lightly to find the edge of shapes rather than outlining heavily. Consider the mood of the pose. Is the model exuding serenity, tension, or contemplation? Convey this through the tilt of the head, the arch of the back, or the placement of the hands. In longer poses, refine shapes, add textures, and consider how light and shadow enhance the volume of the figure. Embrace the imperfections and subtle shifts in the model's stance. Remember, each drawing session is a chance to grow. Over time, you'll develop a keen eye for anatomy and the ability to capture the essence of the human form. This practice will enhance every aspect of your art, whether you're drawing from life or imagination. Once you're comfortable with the basics, it's time to explore more advanced techniques. Try abstracting the human figure, breaking it down into simpler shapes, and incorporating unique elements that challenge traditional perceptions. Start by simplifying the body into fundamental shapes like cylinders, spheres, and cones. This approach, inspired by artists like Burne Hogarth, helps you focus on structure and movement rather than minute details. Explore shape interactions (e.g., cylinder arm to sphere shoulder) Experiment with textures using varying strokes and patterns Create compositions emphasizing specific body parts Merge human figures with other elements (mechanical parts, nature) Play with color and light to exaggerate or diminish aspects Remember, abstracting the human figure isn't about discarding realism entirely, but finding new ways to express its essence. Keep pushing your boundaries and let your curiosity guide you. This experimental approach will enhance both your technical skills and enrich the emotional depth of your work. Placing human figures in varied environments adds a storytelling element to your art. It provides context and emphasizes the actions, emotions, and relationships expressed by the figures. Start by observing how people interact with their surroundings in daily life. Notice how lighting, posture, and attire change based on the environment. When drawing, rough out the environment first. Establish the foreground, middle ground, and background using simple shapes. This ensures your figures are appropriately scaled and positioned. Environmental Factor Impact on Figure Lighting Affects shadows, mood Architecture Influences perspective, scale Weather Determines clothing, posture Objects Creates interactions, context Consider how the environment influences the figure's posture and appearance. A person in a busy market might have an energetic stride, while someone in a tranquil garden might appear more relaxed. Pay attention to perspective. The angle of buildings or placement of trees will affect how your figures relate to the scene. Use perspective lines to guide their positioning and enhance depth. Focus on the interaction between figures and their surroundings. How does a person sit on a park bench or hold a book? These details create a cohesive and immersive scene. By continually observing and practicing how figures interact with their environments, your drawings will become more engaging and story-driven. Let each element work together to tell a cohesive, compelling story. The key to mastering figure drawing is continuous practice and observation. By focusing on proportions, gesture, anatomy, perspective, and the interplay between figures and their surroundings, you can create artwork that resonates with viewers on multiple levels. Hogarth B. Dynamic Figure Drawing. Watson-Guptill; 1996. Bridgman GB. Bridgman's Complete Guide to Drawing from Life. Sterling; 2009. Loomis A. Figure Drawing for All It's Worth. Titan Books; 2011. Hampton M. Figure Drawing: Design and Invention. Michael Hampton; 2009. Simblet S. Anatomy for the Artist. DK; 2001. Drawing a body is difficult – even daunting – for many beginners. Trying to create an anatomically correct figure is not always easy. But don't worry, in this detailed guide, we will share some simple methods to make drawing a body more achievable. The body is integral to many aspects of artmaking; you need it for any character you might want to create or even in environmental scenes with people in the background. So studying and practising how to draw a body is important. You want to feel comfortable creating stylized figures in whatever poses and designs you would like. The body is difficult to capture though art as there are many components to consider. You must remember to engage the fundamentals of art, specifically considering form, structure, and composition – as well as understanding proportions and figure anatomy, body movements, and stylization. To make this scary process easier to approach, we'll break it down into some simple steps. As well as this, you could try out our specialized course, 'Figure Drawing For Beginners'. Sketch Of A Body [@rheatibbey] Before you can begin adding personality and stylization to the bodies your draw, it is integral to understand the proportions of human anatomy. Getting the body proportionally correct can be difficult, but there are a few shape-work techniques you can use to sketch the human body. These will help you learn how to sketch a very front-facing body, but luckily they can still be used as a basis for drawing other angles as well. How To Draw A Body [@art_bymemo] First, you have to consider the body as it is in real life; a connection and chain of joints. Drawing the body becomes easier when you break it down into these parts. There is a general rule, devised during the Renaissance, that the ideal human body is eight heads long. This rule helps you to map out the general shape of the human body. However, this rule can make adding more flow to your body difficult. As you move on to creating more expressive characters, you can become more liberal with using eight equal parts, and using different sizing and angles of these guidelines to better suit your character's body language. But, to begin with, we will put eight equal parts. When you are drawing, try to keep a vertical line of flow through your eight segments, showing the posture and positioning of your body's figure. This almost acts like your drawing's spine. The Eight-Head Rule For Drawing A Body The eight parts represent different elements of the human body; The head The shoulders and upper chest The lower chest and stomach The pubic bones The thighs The knees The shins And finally, the feet Each body is extremely different, and therefore some of these steps may vary depending on what you are trying to achieve. Additionally, the male and female body proportions have a different overall shape, meaning that the linework for each will differ. To begin with, draw the head in the first segment. This is typically an oval shape; however, you can adjust the proportions to match whatever figure and body type you want to achieve. Starting with the head may feel unnatural, but it really helps you get the flow of the body, as you work your way down from head to toe. Even when not following the Renaissance eight-head rule, I still like to start with plotting down the head as it is a good starting spot and removes any complications, allowing you to immediately understand the sizing and proportions of the body you will be creating. You could also check out our detailed guide on the Loomis method for drawing the head. For a male figure, the head may have a square jaw shape, to really emphasize the bone structure immediately within your drawing! The neck will also be quite broad. For a female figure, the head is a softer egg-like shape, with a less harsh jaw than a male figure. The neck on the female body will be a slimmer connection. For sketching beneath the head, you can begin by drawing a sort of trapezium shape that takes up the space in parts two and three of your segments. This shape represents the chest and stomach area of the body. The top-right corners of the trapezium shape show where the shoulder joints sit, so you can draw small circles to represent this motion. You can also draw an oval shape in the trapezium to highlight where the rib cage would be. (PRO TIP) As the male body typically has broader shoulders, keep the top half of the trapezium wide. Also, the male figure has a less curvy waist, so make sure the bottom half of the trapezium does not taper inwards too much. A typically female shape will taper more inwards towards the bottom half to highlight the curves of the waist. Beneath this first shape, you can now draw a smaller trapezium in the fourth segment. This shape marks out the placement of the body's pelvic area. Within this trapezium shape, you can also add an upside-down triangle shape to map out the pubic area. Now that the upper and lower half of the torso have been drawn create connecting lines between them. This will be a sort of curve (or more straight line for a male body) to reveal the curve of your body. For a male body, create a sort of square shape that only just tapers outwards towards the end of the body to establish smaller hip bones. For a feminine body type, this trapezium will be vertically flipped and smaller in comparison to the one above! This is to create a sort of hourglass figure; however, you can adjust the size and dynamics of this linework to create whatever body type you wish to achieve. It's now time to move on to the legs! This step can be achieved by plotting out the shapes that you want, generally placing the thighs in the fifth and sixth segments, and the calves and feet in the seventh and eighth. Additionally, try marking out the knee joint at around the sixth horizontal line marker. You can then connect the legs to the hips, making them flow smoothly into the body. When drawing a male body, the legs may be more similarly sized to the hips. This would mean removing any curve from the waist, instead creating a more parallel and straight look, making the hips, thighs, and calves appear as a more similar size; apart from the skinnier area around the knees and the ankles. For a female body, the upper thighs would connect with the hips at a wider, more curveous angle. Also, the thighs will most likely be thicker than the calves. To draw the arms, you will look back to the shoulder markings you made earlier! This reveals where the arms will begin. Typically, the upper arm should take up about one and a half segments, with the forearm only filling one, and the hands taking up roughly half a segment. For a character standing completely straight and front-on, this would leave the hands hitting a bit above your drawing's knees to keep everything in proportion to the body! Male arms will stem off of broader shoulders and have half more muscle definition. These arms will most likely be tighter to the body, due to the less broad shoulders. After following these basic guidelines, you will have an outline of a human figure, including all the significant features and joints that characterize the body. This is an easy method to correctly capture the human body through proportionally correct anatomical linework. However, now that you have an understanding of where the main joints and connections of the body are, you may want to endeavour to add details outside of just a simple mannequin-like sketch. You can do this by overlaying linework with more flow and human-like features. How to Draw a Male Body – Adding Finishing Touches How to Draw a Female Body – Adding Finishing Touches To gain a thorough understanding of how to draw bodies in many different ways, such as gesture drawings or action shots, it is important to practice, practice, practice!!! Get out some reference images and try to use and adapt the eight-head rule to help map out your proportions. Studying the human form through visuals is one of the most important ways of learning how to draw a body. Make sure you try several different poses and angles to deepen your understanding of the body! There are many different ways you can practise, using online references, live references, or even your imagination if you are feeling brave! All of these are extremely important steps in helping you get really comfortable with drawing the human figure. As you experiment with poses, you can try out new things like maybe someone sitting down, dancing, or lying down. You can also try out different body shapes and types, maybe your character is short, or abnormally tall. When you are practicing and sketching, you can create any body shape you want, using the general eight-head rule, and following some reference images! If you are feeling particularly stumped as to how to draw certain body movements, you could even try tracing over reference image and studying the linework to really understand the flow and positioning of the human body. If you use Procreate for your drawings then don't forget to check the best online Procreate courses here and our guide on how to trace on Procreate. We also have some amazing guide on Procreate tips that you might like. Gesture drawing is a great method of practice as it is a significant exercise that can help you fully grasp how to draw a body. The practice of gesture drawing involves making a quick and simplified sketch of your subject matter (typically a human body). When gesture drawing, you are trying to plot down the main elements of the figure in quick and simple linework to capture the general feel of the body and the pose you are trying to communicate. This is very helpful in allowing you to get a feel for the flow of the body and how to visually communicate body language, gestures, and poses, in a very simplified manner. For the most beneficial gesture drawing, all you really need is a pen and paper, or maybe a drawing tablet or an Apple Pencil and iPad, and some sort of reference. This can simply be an online reference image of the human figure, or if you want to get creative, you could find a class to attend. Then, all that's left to do is start sketching the body as simply and quickly as you can, ignore specific details, and instead try to draw the flow of the body and its overall shape. Remember to give yourself a time limit, ranging from half an hour to under a minute. As well as this, don't use an eraser. Just let your pencil flow as you try to capture the essence of the body. This time limit and lack of eraser will force you to really try and quickly plot down the main elements of the human form, making you more easily grasp any important details and therefore providing you with a better understanding of how to draw a body. Five Character Design Sketches of Human Body [@art_bymemo] Now that you know how to draw a body using these helpful techniques, you may want to know how to make these drawings feel like your own. Stylization involves you finding your specific and individual style of drawing, and sticking to it consistently throughout your artwork. There are countless ways of drawing a body, and everyone will find their own style through practice. One method you can use to find your style is to test out different ways of drawing a body until you find something that works for you, adapting it until it becomes your own. Experiment with linework; try different sketching styles, like using harsh confident linework or smooth-flowing lines. Because styles are so limitless, there are so many methods you can use to learn how to stylize your body; so especially effective method would be to check out our 'How to Stylize Characters' course. Stylizing A Human Body Drawing [@art_bymemo] Drawing a body is a difficult task, especially because there are so many different components to consider. However, if you remember to break it down into sections, thinking of the body as a series of joints, muscles, and bones, you can begin to wrap your head around how to draw a body. Hopefully, after practising and studying the human body, you will feel comfortable and familiar with this important yet difficult type of drawing. By following the steps and practices given above, you can go ahead and create whatever character you wish to, using figure drawing, anatomy, and proportions to create an interesting and stylized human body! Share — copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt — remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution — You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Human figure drawing is a fundamental skill that many artists seek to master. It encompasses understanding anatomy, movement, and proportion to create lifelike representations of the human form. By honing this skill, artists can elevate their work and convey emotion, action, or narrative through their figures. Effective human figure drawing combines various techniques and materials tailored to the artist's style. Artists can choose from graphite, charcoal, or digital tools, each offering unique benefits. Practicing with anatomical references can enhance accuracy and understanding of body dynamics, allowing for more expressive and compelling artwork. Achieving proficiency in human figure drawing requires dedication and practice. Engaging in targeted exercises helps artists build their skills and confidence, ultimately leading to a deeper appreciation for the human body as a subject. Understanding anatomy and proportions is essential for figure drawing skills. Various materials can be utilized based on the artist's preference. Regular practice is essential for improvement in human figure drawing. Drawing the human form requires a solid grasp of anatomy and proportions. These core elements enable an artist to create accurate and expressive figure drawings. A foundational knowledge of human anatomy is crucial for figure drawing. The major skeletal structures, muscle groups, and overall body systems define how the figure moves and exists in space. Key components include: Skeletal Structure: Familiarity with the bones helps visualize the body's internal framework. Muscle Groups: Understanding how muscles function and connect gives insight into movement and form. Body Planes: Recognizing the planes (frontal, sagittal, transverse) aids in creating accurate perspective. Studying anatomy through life drawing, anatomy textbooks, or 3D models enriches an artist's skill set. Accurate proportions create realism in figure drawings. Understanding proportion involves knowing the relative size and scale of different body parts in relation to one another. Standard proportions include: Head as a Unit: Traditionally, the human body is about 7-8 heads tall. Limb Lengths: Arms and legs follow specific length ratios that vary based on posture and movement. Width Measurements: The width of the shoulders should align proportionally with the pelvis to maintain balance. Practicing against established guidelines helps artists develop a keen eye for proportion and create compelling compositions. Selecting the appropriate materials and techniques is crucial for effective figure drawing. The choice of drawing tools and mediums directly influences the artist's ability to achieve desired results in texture, detail, and expression. When drawing the human figure, various tools can enhance the artist's ability to capture form and movement. Pencils are a fundamental choice, with ranges from H (hard) to B (soft) providing different effects. A soft pencil like 2B allows for deeper shading and smoother lines, while harder pencils help in achieving fine details. Charcoal is another popular medium, valued for its rich black tones and versatility. Compressed charcoal creates bold lines, while vine charcoal is softer and better for light sketching. The application techniques, such as blending with fingers or a blending stump, can produce varied textures. Aside from pencils and charcoal, artists can choose from various mediums to express different styles. Graphite can yield smooth, precise lines and is often combined with other materials for depth. Charcoal and graphite may be used in tandem to create dynamic contrasts on the page. Other mediums to consider include ink, pastels, and digital tools. Pastels provide vibrant colors and can be blended for softer transitions. Digital mediums enable artists to explore limitless color options and editing capabilities. Each medium offers unique textures and effects, allowing for experimentation and personal expression. Mastering drawing techniques are essential for anyone looking to improve their skills in human figure drawing. Mastering these techniques can greatly enhance the artist's ability to capture form, movement, and depth. Gesture drawing focuses on capturing the essence and movement of the human figure. It emphasizes quick sketches that capture the basic shapes and flow of the body in a short amount of time. Key aspects include: Basic Shapes: Artists begin by breaking down the figure into simple shapes such as circles, rectangles, and lines. This helps establish proportions. Line Quality: Varying line weights can convey different aspects of movement and energy. Thicker lines may depict more weight, while thinner lines suggest lightness. Practicing gesture drawing regularly develops an artist's ability to quickly and accurately represent dynamic poses, ensuring a more lifelike outcome in figure drawing. Shading and rendering techniques add depth and volume to figure drawings. They transform flat sketches into three-dimensional representations through effective use of light and shadow. Key techniques include: Hatching and Cross-Hatching: These involve creating lines in varying densities to build up areas of shadow. Blending: Softening edges and gradients using materials like tortillons or fingers can create smooth transitions between light and dark. Highlighting: Identifying the light source allows artists to leave areas blank or apply lighter shades to simulate highlights, enhancing realism. Combining these shading techniques helps to create more expressive and visually engaging figures, making the drawing more captivating. Dynamic human figures convey movement and life. To achieve this, artists focus on capturing gesture and incorporating techniques like foreshortening. Gesture drawing is essential for representing dynamic poses. It emphasizes the flow and movement of the human figure rather than intricate details. This practice involves quick sketches that prioritize action over form. Artists often use short times, typically from 30 seconds to 5 minutes, for each gesture drawing. This method encourages spontaneity. Focus on the line of action and the primary shapes in the figure. Tips for capturing dynamic poses: Use fluid lines that indicate movement. Simplify the shapes while maintaining proportions. Practice regularly to improve observational skills. Foreshortening creates the illusion of depth and adds realism to dynamic drawings. It involves drawing parts of the figure closer to the viewer larger than those further away. This technique enhances the sense of perspective and movement. To effectively apply foreshortening: Study reference images that showcase foreshortened limbs. Practice sketching poses from various angles. Break down the figure into simple shapes to visualize depth. Use guidelines to maintain proportion and orientation. By understanding how limbs and torsos recede in space, artists can create more dynamic and engaging representations. Foreshortening contributes significantly to the overall impression of motion in gesture drawings. Practicing figure drawing through practical exercises enhances skills in human figure drawing. Two effective methods include participating in life drawing classes and conducting quick sketches. Each approach contributes to an artist's ability to capture the human body accurately. Life drawing classes provide structured environments for learning. In these sessions, artists sketch live models, which enhances their understanding of human anatomy and proportions. The presence of a model allows focus on gestures, poses, and movement. Key elements of life drawing include: Observation: Encourages artists to study the model's physical characteristics closely. Proportions: Understanding the relationship between different body parts aids in creating realistic figures. Techniques: Various mediums, such as charcoal or pencil, help to develop skills for shading and contour. Consistent attendance in these classes fosters improvement and a deeper appreciation for the human form. Quick sketches, or gesture drawings, focus on capturing the essence and movement of the human figure in a limited time. Typically, these sketches range from 30 seconds to 5 minutes. This practice emphasizes: Speed: Artists learn to draw quickly, honing their ability to depict action and form efficiently. Simplicity: Capturing the basic shapes of the body fosters an understanding of overall structure. Fluidity: Quick sketching encourages a loose, confident style, allowing for creative expression. Understanding human anatomy is crucial for effective figure drawing. By utilizing reference images and exploring art history, artists can enhance their skills and create more accurate representations of the human form. Reference images serve as essential tools for figure drawing. They provide artists with a visual guide that aids in capturing proportions, poses, and anatomical details. Sources for Reference Images: Photos: Use high-resolution photographs from a variety of angles. Life Drawing Sessions: Attend live models for direct observation. Online Databases: Websites like Unsplash and Pexels offer free to use images. When selecting images, focus on clarity and relevance to the pose or anatomy being studied. Artists should analyze these images to understand muscle structure and joint movement, which greatly aids in achieving realism in their work. Art history provides valuable insights into figure drawing techniques and styles. By examining the works of renowned artists, one can learn different approaches to human representation. Key Artists to Study: Michelangelo: Known for his incredible understanding of anatomy. Degas: His studies of movement capture the essence of human grace. Ingres: Exemplifies precision in form and line. Exploring various styles and techniques not only inspires creativity but also informs the artist's own methods. Artists should analyze how these masters constructed their forms and the poses to enhance their own figure drawing skills. Developing skill in human figure drawing requires a consistent and focused approach. Structuring practice sessions and utilizing targeted tutorials can significantly enhance growth. The following subsections outline effective methods for building proficiency. A structured learning path helps ensure consistent progress. It can include several core components: Foundations: Start with basic shapes and forms. Understanding how to break down the body into simple geometries is essential. Proportions: Focus on the proportions of the body. Knowing the standard measurements, such as head height relative to the body, aids in accuracy. Stick Figures: Utilize stick figures to practice movement and gesture. They enable quick exploration of poses without getting bogged down in details. Incremental Goals: Set small, achievable goals, such as mastering one body part each week. This keeps motivation high and progress measurable. Tracking advancements through a sketchbook can also enhance retention and showcase growth over time. Engaging with specific drawing tutorials can provide valuable insights into technique and style. Here are some recommended resources: YouTube Channels: Channels like Proko and Drawabox offer structured lessons on human anatomy and proportions. Online Courses: Websites like Skillshare and Udemy provide comprehensive courses that cover figure drawing fundamentals to advanced techniques. Books: "Figure Drawing: Design and Invention" by Michael Hampton is excellent for understanding anatomy and proportions. Other titles include "The Natural Way to Draw" by Kimon Nicolaides which emphasizes observational skills. Practice Exercises: Follow tutorials that include practice exercises, such as timed gesture drawing sessions. These encourage rapid sketching and help with fluidity. Incorporating these resources into a regular practice routine can help refine skills and reinforce learning effectively. Follow UsFrom amateur to beyond join us on this epic adventure Previous Article 10 Cutting-Edge AI Video Makers Reshaping Content Creation Next Article Discovering Yourself: Art as a Personality Mirror How to Draw a Human Figure? It's my endeavours to be honest. An ambition of mine is to be able to sketch human figures quickly in my sketchbook as I do with everything else. With this thought in mind, I'm challenging myself (As well as you!) to break down the process of drawing a human figure. I want to understand what techniques and tools I need to adopt to be able to develop my own style in order to understand this challenging subject. As a result, I draw great comfort that I fall in line with the great artists over the centuries who have also struggled with this area of drawing. Van Gogh, for example, began his prolific art career drawing figures in static poses. During the first two years of his career he spent ALL of it mastering drawing. He struggled with problems of proportion as you can see from the drawing on the left (Carpenter, 1880. Rijksmuseum Kröller-Müller, Otterlo) with a sketch, two years later of an old man sitting in a chair (Old Man Reading 1882, Van Gogh Museum, Amsterdam) where he'd clearly mastered his proportion problems. It took him two years of practice! Perhaps, herein lies the first lesson to take forward on consistently practicing. (I love uncovering the stories of the great artists by the way as it teaches us so much about the journey they undertook to get to the famous artworks we come to know, love and respect.) Why is drawing the human figure so difficult? Drawing the human figure, in theory, should not be any less challenging than drawing anything else. All drawing is based on proportion. Landscapes, sketching objects or a still life, buildings and street scenes and humans! Drawing humans depends heavily on correct proportions – so no more so perhaps than other drawings. For example, ever found human heads challenging to draw?! I do! Its baffling why this is so. In answer to why this is, we over emphasise the features, not the foreheads and hair because that is where our day to day focus lies when interacting with one another. We have to re-train our brains to understand the science of proportion in an un-emotive way. That is why you will often see me sketching the head last in my drawings! I need the rest of the body to gauge the size of the head. So the first lesson for the beginner getting started drawing the human figure, has got to be a focus on simple shapes and then on proportion. The American artist, Burne Hogarth stated that "There are three kinds of forms in the human figure: Ovoid forms – egg, ball and barrel masses; Column forms – cylinder, cone; Spatulate forms – box, slab and wedge blocks." So true! I will be exploring how to use simple shapes to get started and then use them to build an understanding of proportion. My Guide on How to Draw A Human Figure In Three Simple Steps The Stick Man I am going to show you how to combine everything from scratch starting with the stick man I referenced from the onset of this post! Really? Yes. Believe it or not stick men and drawing them form an important part of learning how to draw the human figure. Especially if you are a beginner. In 1912 the art world was outraged by a painting called "Nude Descending a Staircase" by a surrealist artist called Marcel DuChamp. I remember seeing this painting at the age of 19 and being equally affronted that something that looked like multiple cardboard men had become such a sensation, especially having come through studying the Renaissance painters and Masters on human shape and form. His semi abstract nude, however, had an extraordinary sense of movement. Duchamp shifted attention from art work per se and managed to capture the ideas that lay behind them. We can still tell that this is a human form and shape. Why include this painting in this article and what does it have to do with stick men and drawing the human figure? To me this painting symbolises not only deconstructing the human figure but it also stripping it right back to basic shapes. It is not particularly transcribed in an accurate way. The genius result, however, is that the nude descending is still recognisable as a human form. The stick man for me is as basic as you can get. Everyone can draw a stick man and it is usually the most popular comment I hear "I can just about draw a stick man." Let's start there then. I'm going to show you how I use the stick man as my starting point and then build a representational human in the below video. How to Build Your Stick man! One of the first things I have noticed about drawing stick men is that you quickly define what type of human drawing you could finally produce. You could be representational with your stick man or more cartoon like. I seem to veer between the two in my sketchbooks. I like to get as close to accurate as I can and enjoy deconstructing an image in order to capture it. If you feel artist's block coming on from the thought of this idea, or you are a total beginner new to all of this, then pull out a magazine and draw the stick man shape you see on the page with a marker pen over a human figure. I show you how to do this in my online Sketch from Scratch course. The important thing to note about drawing the human figure you need to start from something, and there are many ways to de-mystify it. Everyone develops a different approach and I'm sharing mine. In the video accompanying this article I run through a basic 5 step approach. Take a human shape from a photograph or magazine and then, looking at the picture visualise how you would draw a simple stick man shape to represent the drawing. Start with a simple stick man as I have done Try and give them something to do. Mine is getting into the water to swim. If you have more time, practice lots and lots of stick men drawings on the page. Doodle them on a page. Keep it simple. Play with them on a page over and over again. Draw a page of different stick men in different poses. Seriously. When I first started I would find my children's comic books and bedtime stories and trace over the characters in them into stick man shapes. I was fascinated by the movement and shape and oddity of my stickmen. Importantly, however, it gave me a sense of movement and also short-circuited worrying about foreshortening or perspective. Major challenges we all face when drawing human beings. "Fleshing" out your stick men Remembering the points I made earlier on in this post, now start to fill out your stick man using shapes and blocks, remembering to add curves for the limbs and basic filled out shapes. Don't worry that you are scribbling on or around the actual initial stick man. This exercise is all about getting you used to building layers around the stick man shape. Again as you familiarise yourself with step 2 of this process take some time simply quickly sketching shapes and forms around them. You may find that by the end of an exercise like this one you abandon needing to draw a stick man to help you. Practice Mark Making For those of you that have followed me for a while you will have seen me advocate mark making as part of your regular sketchbook habit. Following on from the stick man phase, I have filled a page, as Burne Hogarth advocates, with spheres, triangles, circles and lines to practice. Fill a page with shapes Have a go simply filling a few pages with a variety of shapes. On a new page, then have a go putting some of these shapes together into a human body likeness as I have done below. Use reference photos of people. Practice drawing cylinders to support you start thinking in a 3D way. I've used baby squares for hands and triangles or rectangles for legs. You could even trace over magazine pictures with a marker pen to get a feel for proportion and shape. Building Shape and Proportion Just to encourage you that employing this methodology works, here is a run through of a page of figures I have drawn as a time lapse. (You can see me rubbing out my second head drawing – which is something I am still practising to get right.) Notice how I draw the figures employing refined rectangles and shapes. I always find it helpful seeing the shapes in the drawings of others. Have a go yourself employing this technique despite the challenge of foreshortening and perspective of the figure sitting on the rock. Just look beyond your literal understanding of the scene – i.e girl sitting on rock, and simply look at the size and spacing of the shapes. When stuck always think first about the shapes that you see. My confidence has grown out of the practice I have put in drawing humans in blocks of shapes! My brain then automatically identifies the shapes visually. I would recommend setting aside a double page of your sketchbook and having a go sketching multiple figures. Perhaps the same person but from different angles or a mix of figures. I've filled an entire sketchbook full of figure drawing practice which I share in my online "Sketch from Scratch" course, drawing people which you can access here! Refining your sketch further What started off as a stick man may now look to be fleshed out drawing with shape and tone. Think about the context of the environment in which your figure sits. Are they clothed, are they wearing something bright or colourful, are they sitting or doing something specific? Build the layer. I've kept mine simple in her swim suit. Don't be afraid to use lots of lines and marks on the paper to support you build shape, you can always erase these out later! As you become adept at sketching the human figure understanding the anatomy that lies beneath it will become of more interest and your drawings will be more natural. That's the best thing about drawing, there is always so much further to go! Never stop learning. The anatomy of the human figure and Leonardo Da Vinci Leonardo Da Vinci is a master for all of us. He dissected corpses, something that was banned at the time, to learn from the source about the workings of the human body. The human body fascinated him. Before he painted The Last Supper, he drew hundreds of studies. His anatomical studies of muscles and arms is only the start of an extensive fascination of dissecting the human body and figure. As you become more familiar with the human body your drawing will become easier and more fluid so as you draw make sure you really pay attention and look at the anatomy in front of you. Life drawing is an excellent activity to support you develop this knowledge! You will instinctively be able to head to drawing directly on the paper in your own style as you get to know the subject material better. Believe it or not basic stick men can get you started on complicated human poses too. When you get stuck imagine the stick man pose and build your drawing from there. You can draw lines at a slant to describe tilts of shoulders or limbs for example. This too can support you with foreshortening and perspective by drawing lines relative to a pose. As a sketch artist, you don't necessarily need masses of detail to hint at a person in the distance. A basic skeletal frame in the shape of a stick man can sometimes be all that is necessary for the brain to work out that it is a human in an environment. The human figures you may draw can simply be blocks on a page with hints of clothes or gestures. This is especially useful to portray people at a distance or figures in groups. If you want to draw on the fly, especially for urban sketching, it is useful to have a quick and easy way to draw people without having to include lots of detail. Start a simple drawing of a person today. I explore all of this in my online sketching course taking you from a stick man to a human figure in 3 simple steps. Check it out here if you are interested in learning how to draw human figures in the simple steps. The course includes an hour tutorial as well as supporting pdfs to get you started. Draw quickly and almost don't think about it! As a sketchbook artist I have learned to draw quickly. I'm a big fan of getting as much as possible down on paper. Any technique to help me do this is welcomed. When it comes to the human figure there are a few rules that are helpful. Use a way to measure the body. For example, the adult body consists of eight "head sizes" in length. Break down your shape sketching further by filling in detail with further shapes. Like this. Of course you won't go around drawing like this in reality but this is the basic first step to get you thinking about proportions. Like Van Gogh you will then need to practice. The other benefit of this technique is that it gives you enough room on the page. How many of us have started to draw and realise that we run out of room to complete a full figure? Most frustrating! When starting to draw try to lay down to tackle the human figure in the whole. You will then naturally be able to gauge sizing and shaping as you become more experienced. You could even start drawing a stick man on the page to ensure you get everything down. (You can see I have sketched the stick man below in the image above.) They help anchor the drawing further.) This leads neatly onto my second lesson area of using an environment or setting to help you build your confidence drawing the human figure. The human figure in a setting or environment If you have ever flipped through my very early sketchbooks you will see that there are practically NO humans and lots of objects. This is rightly the place to start if you are a sketchbook beginner for lots of reasons. The thought of drawing a human let alone capturing the likeness was always a daunting one. To break this down I started to explore how I could add people into my sketching. I have included a 7 minute video as part of this section taking you through my personal progress and confidence building when it has come to drawing the human figure. I have gradually built human figure sketching into the environments of my sketchbook and you can too! Why is using a setting a good place to start when drawing the human figure? You keep your drawing momentum going. A sketchbook page can have many things going on within it. You take the pressure of yourself to capture a perfect human character on the page. Drawing the environment within which the figure moves, sits, or interacts with, supports you to tell the story without needing to focus too much on the accurate detail of a human figure. Using the setting or environment for your figure means that you can start to make use of fundamental drawing skills. The brain picks up the clues from the narrative references of your picture! The dinner plate in front of the little girl in the video is a simple circle line with fork drawn in less than a minute but immediately referencing where the subjects are. You build your experience. As you can see from the first sketch I talk about in the video, I begin with shapes and proportions on a page here are my guidance notes on how to evolve into exploring human figures more confidently. You can use the environment to support you gauge the proportion and dynamics of your figure. You develop a distinctive figure drawing style that compliments everything else that you draw. So taking our basic knowledge of drawing shapes and proportions on a page here are my guidance notes on how to evolve into exploring human figures more confidently. You can use the environment to support you gauge the proportion and dynamics of your figure. Start small and simple to begin with I love how placing a person in an environment brings added credibility to your drawing! These two sketches depicting a Saturday morning were done on the spot, in my small sketchbook. Watching TV and going for a bike ride. The yellow chair and bicycle help me anchor my figures. Forget for a moment that the sketches themselves may feel or seem advanced. It helps to look for abstract shapes, the angles and curves and spaces of the person and objects surrounding them that help you get them down on paper. I used the clothes (folds of lumpy dressing gown) and angular shapes of the bicycle to help me in these two sketches but also broke down the shapes I could see. Remember too that a good place to start when sketching people is with friends and family as you are more likely to be comfortable with them. The small sketchbook format can support you draw faster than a larger piece of paper. Quick drawing practice to help you to practice looking Observation and practice is key. An exercise I run through on my Sketch from Scratch People course is a page full of human characters in different poses but drawn in the space of 30 seconds to a minute per person on the page. A sketchbook page is the best place for this type of exercise. This may very well start with stick men, which is not a bad place to start. I envy a good stick man! Look as much as you possibly can, as this will support your brain develop your hand to memory skill. Imagine the stick man as the skeleton of the figure you are drawing. Remember the earlier action point when it comes to stick man drawing. Don't worry about any specific details. Now take that stick man principle and sketch around it whilst placing it within an environment. I know it may not seem like it but the below sketch of cartwheels was built on this premise. Even the trees are a bit stick man. Look how simple the environment was to sketch! A horizon line and brush strokes for trees with a splash of green colour. Sketch the same person in different poses! Moving on from the little girl cartwheeling, I also stop to discuss drawing the same person in different poses in my video. I think that this is a great technique to employ because people never stay still! At the start of live people sketching I'd get frustrated that I couldn't capture people quick enough so had to think how I could convey this on a page. Taking a double page spread of your sketchbook split it into 3 sections and use the occasion to practice! A couple of things you can focus on to support you: a) If the figure is moving, loosen up your style. Your lines should be loose and applied relatively quickly. (Remember the stick men exercise of between 30 seconds to 1 minute?) This feeds into your experience of sketching quickly.) You may opt for ink as you grow in confidence which is a great medium for conveying movement. I particular love how the artist @sultaketch achieves fluidity in her human sketching using ink and bright colour. I also use paint too, a light wash that flows with the shape of the person sketched to emphasise movement. Sketches will appear more dynamic, even if the subject is only playing Lego or watching TV. Simple poses can often be the most impactful. b)Pay attention to the fold of the clothes. Observing where they fold or hang can make a big difference to the dynamic of a picture. Zig zags imply creasing or bends of a body. Skirts or dresses are more complex. Different textures ranging from wool through to cotton may enable you to use different types of pencil stroke. You also want to use the way light falls across figures to help you (as I have done in the sketch of the two children in chairs!) Keep it simple. c) Practice movement by changing the gestures for the sketches. Arm angles may change. The head may turn for different sides. Try and portray them in different poses to convey movement. But most of all practice whenever and however you can. My one piece of advice is that you may as well enjoy it and build the human figure into the anatomy of your daily sketching. Get used to going through a process that helps you uncover your style even if its a bumpy journey to get there finding it. "Every portrait that is painted with feeling is a portrait of the artist, not of the sitter. The sitter is merely the accident, the occasion. It is not he who is revealed by the painter; it is rather the painter who, on the coloured canvas, reveals himself." The Picture of Dorian Grey. Oscar Wilde How right Oscar Wilde is. We can all aim to become more perfectionists when sketching the human figure but its way more fun to just put your individual interpretation on the people we depict. If you'd like to support your drawing further why not join me in my learning community and explore Sketching the Human Figure from Scratch in my online course. I go into greater depth. Click to access How to Draw the Human Figure. , the free encyclopedia that anyone can edit. 107,583 active editors 7,025,586 articles in English Sir William Gordon-Cumming (20 July 1848 – 20 May 1930) was a Scottish landowner, soldier and socialite. He was the central figure in the royal baccarat scandal of 1891. He joined the British Army in 1868 and saw service in South Africa, Egypt and the Sudan; he served with distinction and rose to the rank of lieutenant-colonel. An adventurer, he also hunted in the US and India. A friend of Edward, Prince of Wales, for over 20 years, in 1890 he attended a house party at Tranby Croft, where he took part in a game of baccarat at the behest of the prince. During the course of two nights' play he was accused of cheating, which he denied. After news of the affair leaked out, he sued five members of the party for slander; Edward was called as a witness. The case was a public spectacle in the UK and abroad, but the verdict went against Gordon-Cumming and he was ostracised from polite society. After the court case he married an American heiress, but their relationship was unhappy. (Full article...) Recently featured: Great Wilbraham (causewayed enclosure) Henry de Hinuber Hurricane Claudette (2003) Archive By email More featured articles About Postcard with a Fula woman ... that François-Edmond Fortier published more than 3,300 postcards of French West Africa (example pictured) between 1901 and 1920? ... that a language riot broke out between members of Our Lady of the Rosary in 1917? ... that Oleksandr Rodin's opera Kateryna was staged despite barricades, bombings, and an air-raid alarm? ... that Paul Among the People treats the Pauline epistles as sources comparable to Homer, Aristophanes and Virgil on Greco-Roman attitudes? ... that Gyula Kakas competed at two Olympics in gymnastics, set the Hungarian pole-vault record, and played for a national-champion football club? ... that a lyric in Beautiful Chaos was praised for "spreading queer joy"? ... that defending champions Bermuda did not compete in the women's football tournament at the 2015 Island Games? ... that Vatican Taekwondo has no registered athletes or coaches? ... that Iceland's entry for Eurovision in 2025 brought out a line of Ash Wednesday costumes? 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Ongoing: Gaza war Russian invasion of Ukraine timeline Sudanese civil war timeline Recent deaths: Andrea Gibson Raymond Guiot Felix Baumgartner Fauja Singh Bradley John Murdoch Frank Barrie Nominate an article July 20 Forensic experts at the site of the Suruç bombing 1807 – French brothers Claude and Nicéphore Niépce received a patent for their Pyréolophore, one of the world's first internal combustion engines. 1951 – Abdullah I of Jordan was assassinated while visiting the Al-Aqsa Mosque in Jerusalem. 1976 – The Viking 1 lander became the first spacecraft to successfully land on Mars and perform its mission. 1997 – USS Constitution, one of the United States Navy's original six frigates, sailed for the first time in 116 years after a full restoration. 2015 – A suicide attack (aftermath pictured) in Suruç, Turkey, for which Islamic State of Iraq and the Levant (ISIL) claimed responsibility, killed 34 people and injured 104 others. Alexander the Great (b. 356 BC)Amanda Clement (d. 1971)Bruce Lee (d. 1973)Gisele Bündchen (b. 1980) More anniversaries: July 19 July 20 July 21 Archive By email List of days of the year About C/2022 E3 (ZTF) is a non-periodic comet from the Oort cloud that was discovered by the Zwicky Transient Facility (ZTF) in 2022. With a comet nucleus of around 1 kilometre (0.6 mi) in diameter, C/2022 E3 rotates on its axis once every 8.5 to 8.7 hours. Its tails of dust and gas extended for millions of kilometers and, during January 2023, an anti-tail was also visible. The comet reached its most recent perihelion in January 2023, at a distance of 1.11 AU (166 million km; 103 million mi) from the sun, and the closest approach to Earth was a few weeks later, at a distance of 0.28 AU (42 million km; 26 million mi). The comet reached magnitude 5 and was visible with the naked eye under moonless dark skies. This photograph of C/2022 E3 was taken in January 2023 and released by the Italian National Institute for Astrophysics. Photograph credit: Alessandro Bianconi; National Institute for Astrophysics Recently featured: Passion fruit Basilica of St Paul, Rabat Clouded Apollo Archive More featured pictures Community portal – The central hub for editors, with resources, links, tasks, and announcements. Village pump – Forum for discussions about Wikipedia itself, including policies and technical issues. Site news – Sources of news about Wikipedia and the broader Wikimedia movement. Teahouse – Ask basic questions about using or editing Wikipedia. Help desk – Ask questions about using or editing Wikipedia. Reference desk – Ask research questions about encyclopedic topics. Content portals – A unique way to navigate the encyclopedia. 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Many other Wikipedias are available; some of the largest are listed below. 1,000,000+ articles العربية Deutsch Español فارسی Français Italiano Nederlands 日本語 Polski Português Русский Svenska Українська Tiếng Việt 中文 250,000+ articles Bahasa Indonesia Bahasa Melayu Bân-lâm-gú Български Català Čeština Dansk Eesti Ελληνικά Esperanto Euskara עברית Հայերեն Magyar Norsk bokmål Română Simple English Slovenčina Srpski Srpskohrvatski Suomi Türkçe Oʻzbekcha 50,000+ articles Asturianu Azərbaycanca [illegible] Bosanski کوردی Frysk Gaeilge Galego Hrvatski ქართული Kurdî Latviešu Lietuvių [illegible] Македонски [illegible] Norsk nynorsk [illegible] Shqip Slovenščina [illegible] اردو Retrieved from " 2This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.Find sources: "1807" – news · newspapers · books · scholar · JSTOR (November 2015) (Learn how and when to remove this message) Calendar year Years Millennium 2nd millennium Centuries 18th century 19th century 20th century Decades 1780s 1790s 1800s 1810s 1820s Years 1804 1805 1806 1807 1808 1809 1810 vte February 7: Napoleon leads French troops into Russia in winter, and fights the Battle of Eylau. June 14: Napoleon triumphs over Russia's General Benningsen, at the Battle of Friedland. 1807 (MDCCCVII) was a common year starting on Thursday of the Gregorian calendar and a common year starting on Tuesday of the Julian calendar, the 1807th year of the Common Era (CE) and Anno Domini (AD) designations, the 807th year of the 2nd millennium, the 7th year of the 19th century, and the 8th year of the 1800s decade. As of the start of 1807, the Gregorian calendar was 12 days ahead of the Julian calendar, which remained in localized use until 1923. Calendar year 1807 by topic Humanities Archaeology Architecture Art Literature Poetry Music By country Australia Brazil Canada Denmark France Germany New Zealand Norway Russia South Africa Sweden United Kingdom United States Other topics Rail transport Science Sports Lists of leaders Sovereign states Sovereign state leaders Territorial governors Religious leaders Law Birth and death categories Births Deaths Establishments and disestablishments categories Establishments Disestablishments Works category Works vte 1807 in various calendarsGregorian calendar1807MDCCCVIIAb urbe condita2560Armenian calendar1256ԹՎ ՌՄԾԶAssyrian calendar6557Balinese saka calendar1728–1729Bengali calendar1213–1214Berber calendar2757British Regnal year47 Geo. 3 – 48 Geo. 3Buddhist calendar2351Burmese calendar1169Byzantine calendar7315–7316Chinese calendar丙寅年 (Fire Tiger)4504 or 4297 — to —丁卯年 (Fire Rabbit)4505 or 4298Coptic calendar1523–1524Discordian calendar2973Ethiopian calendar1799–1800Hebrew calendar5567–5568Hindu calendars - Vikram Samvat1863–1864 - Shaka Samvat1728–1729 - Kali Yuga4907–4908Holocene calendar11807Igbo calendar807–808Iranian calendar1185–1186Islamic calendar1221–1222Japanese calendarBunka 4(文化４年)Javanese calendar1733–1734Julian calendarGregorian minus 12 daysKorean calendar4140Minguo calendar105 before ROC民前105年Nanakshahi calendar339Thai solar calendar2349–2350Tibetan calendar[illegible](male Fire-Tiger)1933 or 1552 or 780 — to —[illegible](female Fire-Hare)1934 or 1553 or 781 Wikimedia Commons has media related to 1807. January 7 – The United Kingdom of Great Britain and Ireland issues an Order in Council prohibiting British ships from trading with France or its allies.[1] January 20 – The Sierra Leone Company, faced with bankruptcy because of the imminent abolition of the slave trade in British colonies, petitions the British government for purchase and transfer of its property to the Crown; Parliament approves the transfer on July 29, and it takes effect on January 1, 1808.[2] February 3 – Napoleonic Wars and Anglo-Spanish War: Battle of Montevideo – The British Army captures Montevideo from the Spanish Empire, as part of the British invasions of the Río de la Plata. February 7 – Napoleon leads the forces of the French Empire in an invasion of the Russian Empire, and begins fighting at the Battle of Eylau against Russian and Prussian forces.[3] February 8 – Battle of Eylau: Napoleon fights a hard but inconclusive battle against the Russians under Bennigsen. February 10 – The Survey of the Coast (renamed the United States Coast Survey in 1836 and the United States Coast and Geodetic Survey in 1878) is established; work begins on August 3, 1816. February 17 – Henry Christopher is elected first President of the State of Haiti, ruling the northern part of the country. February 19 – Burr conspiracy: In Alabama, former Vice President of the United States Aaron Burr is tried for conspiracy, but acquitted. February 23 – The Slave Trade Act is passed in the House of Commons of the United Kingdom by an overwhelming majority.[4] March 2 – The United States Congress passes the Act Prohibiting Importation of Slaves "into any port or place within the jurisdiction of the United States ... from any foreign kingdom, place, or country" (to take effect January 1, 1808). March 25 The United Kingdom Slave Trade Act becomes law abolishing the slave trade in most of the British Empire[5] with effect from 1 May (slavery itself is abolished in British colonies in 1833). The Swansea and Mumbles Railway in South Wales, at this time known as the Oystermouth Railway, becomes the first passenger-carrying railway in the world. March 29 – H. W. Olbers discovers the asteroid Vesta. April 4–12 – Froberg mutiny: The British suppress a mutiny at Fort Ricasoli, Malta, by men of the irregularly-recruited Froberg Regiment. April 14 – African Institution holds its first meeting in London; it is intended to improve social conditions in Sierra Leone. May 22 – A grand jury indicts former Vice President of the United States Aaron Burr for treason.[6] May 24 – Siege of Danzig ends after 6 weeks with Prussian and Russian defenders capitulating to French forces. May 29 – Selim III, Ottoman Emperor since 1789, is deposed in favour of his nephew Mustafa IV. May 31 – Primitive Methodism originates in an All Day of Prayer at Mow Cop, in the north midlands of England.[7] June 9 – The Duke of Portland is chosen as Prime Minister after the United Kingdom general election. June 10 – The Battle of Heilsberg ends in a draw. June 14 – Battle of Friedland: Napoleon decisively defeats Bennigsen's Russian army. June 22 – Chesapeake–Leopard affair: British Royal Navy fourth rate HMS Leopard attacks and boards United States Navy frigate USS Chesapeake off Norfolk, Virginia, seeking deserters. This act of British aggression plays a role in the run-up to the War of 1812. July 5 – A disastrous British attack is mounted against Buenos Aires, during the second failed invasion of the Río de la Plata. July 7–9 – The Treaties of Tilsit are signed between France, Prussia and Russia. Napoleon and Russian Emperor Alexander I ally together against the British. The Prussians are forced to cede more than half their territory, which is formed into the Duchy of Warsaw in their former Polish lands, and the Kingdom of Westphalia in western Germany. The Free City of Danzig is also formed (established September 9 by Napoleon). July 13 – With the death of Henry Benedict Stuart, the last Stuart claimant to the throne of the United Kingdom, Jacobitism comes to an effective end. July 20 – Nicéphore Niépce is awarded a patent by Napoleon Bonaparte for the Pyréolophore, the world's first internal combustion engine, after it successfully powers a boat upstream on the river Saône in France. August 17 – The North River Steamboat, Robert Fulton's first American steamboat, leaves New York City for Albany on the Hudson River, inaugurating the first commercial steamboat service in the world. September 1 – Former U.S. Vice President Aaron Burr is acquitted of treason. He had been accused of plotting to annex parts of Louisiana and Mexico, to become part of an independent republic. September 2–7 – Battle of Copenhagen: The British Royal Navy bombards Copenhagen with fire bombs and phosphorus rockets, to prevent the Dano-Norwegian navy from surrendering to Napoleon; 30% of the city is destroyed, and 2,000 citizens are killed. September 7 – Robert Morrison, the first Protestant missionary to China, arrives in Guangzhou (Canton).[8] September 13 – Beethoven's Mass in C major, Op. 86, is premiered, commissioned by Nikolaus I, Prince Esterházy, and displeasing him.[9] September 27 – Napoleon purchases the Borghese art collection, including the Antinous Mondragone, and brings it to Paris.[10] October 9 – Prussian Reform Movement: Serfdom is abolished by the October edict. October 13 – The Geological Society of London is founded. October 30 – El Escorial Conspiracy: Ferdinand, Prince of Asturias is arrested for conspiring against his father Charles IV of Spain. November 24 – Battle of Abrantes, Portugal: The French under Jean-Andoche Junot take the town. November 29 – Portuguese Queen Maria I and the Court embark at Lisbon, bound for Brazil. Rio de Janeiro becomes the Portuguese capital. December 5–11 – Napoleonic Wars: Raid on Griessie – A British Royal Navy squadron attacks the Dutch port of Griessie on Java in the Dutch East Indies, eliminating the last Dutch naval force in the Pacific and concluding the Java campaign of 1806–1807.[11] December 17 – Napoleonic Wars: France issues the Milan Decree which confirms the Continental System (i.e. no European country is to trade with the United Kingdom). December 22 – The United States Congress passes the Embargo Act, a trade embargo on all foreign nations. Battle of Hingakaka between two factions of Māori people, the largest battle ever fought in New Zealand, and the last fought there without firearms.[12] In 1807 or 1808 is fought the Battle of Moremonui, first of the Musket Wars. Robert E. Lee January 13 – Napoleon Bonaparte Buford, American general, railroad executive (d. 1883) January 19 – Robert E. Lee, American Confederate general (d. 1870) January 28 – Robert McClure, Irish-born Arctic explorer (d. 1873) February 10 – Lajos Batthyány, 1st Prime Minister of Hungary (d. 1849) February 27 – Henry Wadsworth Longfellow, American poet (d. 1882)[13] March 1 – Wilford Woodruff, American religious leader (d. 1898) March 14 – Josephine of Leuchtenberg, Queen of Sweden and Norway (d. 1876) April 2 – William F. Packer, American politician (d. 1870) April 3 – Jane Digby, English adventurer (d. 1881) April 20 – John Milton, Governor of Florida (d. 1865) April 26 – Charles Auguste Frossard, French general (d. 1875) May 28 – Louis Agassiz, Swiss-born zoologist and geologist (d. 1873) June 6 – Adrien-François Servais, Belgian musician (d. 1866) June 16 – John Westcott, American surveyor and politician (d. 1888) Giuseppe Garibaldi July 4 – Giuseppe Garibaldi, Italian patriot (d. 1882) August 11 – David Rice Atchison, American politician (d. 1886) August 15 – Jules Grévy, 4th President of France (d. 1891) August 18 – Charles Francis Adams Sr., American historical editor, politician and diplomat (d. 1886) September 2 – Fredrika Runeberg, Finnish writer (d. 1879)[14] September 7 – Henry Sewell, 1st Premier of New Zealand (d. 1879) September 16 – John Lenthall, American naval architect and shipbuilder (d. 1882) October 8 – Harriet Taylor, English philosophical writer (d. 1858)[15] October 26 – Barbu Catargiu, 1st Prime Minister of Romania (d. 1862) October 29 – Anđeo Kraljević, Herzegovinian Catholic bishop (d. 1879) October 30 – Christopher Wordsworth, Bishop of Lincoln (d. 1885) November 16 – Eduard von Fransecky, Prussian general (d. 1890) December 8 – Friedrich Traugott Kützing, German pharmacist, botanist and phycologist (d. 1893) December 17 – John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1892) Pasquale Paoli February 1 – Sir Thomas Troubridge, 1st Baronet, British admiral (b. c. 1758) February 5 – Pasquale Paoli, Corsican patriot, military leader (b. 1725) February 27 – Louise du Pierry, French astronomer (b.1746) March 10 – Jean Thurel, French soldier (b. 1698) April 4 – Jérôme Lalande, French astronomer (b. 1732) April 10 – Duchess Anna Amalia of Brunswick-Wolfenbüttel, regent of Weimar and Eisenach (b. 1739) May 10 – Jean-Baptiste Donatien de Vimeur, comte de Rochambeau, French soldier (b. 1725) May 13 – Eliphalet Dyer, American statesman, judge (b. 1721) May 17 – John Gunby, Maryland soldier in the American Revolutionary War (b. 1745) May 18 – John Douglas, Scottish Anglican bishop, man of letters (b. 1721) June 9 – Andrew Sterett, American naval officer (b. 1778) Angelica Kauffman July 13 – Henry Benedict Stuart, Italian-born cardinal, Jacobite claimant to the British throne (b. 1725) July 19 – Uriah Tracy, American politician and congressman from Connecticut, 1793 until 1807 (b. 1755) September 14 – George Townshend, 1st Marquess Townshend, British field marshal (b. 1724) October 22 – Jean-François Houbigant, French perfumer (b. 1752) November 2 – Louis Auguste Le Tonnelier de Breteuil, Prime Minister of King Louis XVI of France (b. 1730) November 5 – Angelica Kauffman, Swiss painter (b. 1741) November 8 Darejan Dadiani, Georgian queen consort (b. 1738) Pierre-Alexandre-Laurent Forfait, French engineer, hydrographer, politician, and Minister of the Navy (1799–1801) (b. 1752) November 23 – Jean-François Rewbell, French politician (b. 1747) November 26 – Oliver Ellsworth, American founding father and 3rd Chief Justice of the United States Supreme Court (b. 1745) December 19 – Friedrich Melchior, Baron von Grimm, German writer (b. 1723) December 21 – John Newton, English cleric, hymnist (b. 1725) December 29 – Diogo de Carvalho e Sampayo, Portuguese diplomat, scientist (b. 1750) ^ William S. Dudley, ed. The Naval War of 1812: A Documentary History (Naval Historical Center, 1985) p34 ^ Stephen Tomkins, The Clapham Sect: How Wilberforce's Circle Transformed Britain (Lion Books, 2012) p200 ^ William Hodgson, The Life of Napoleon Bonaparte, Once Emperor of the French, who Died in Exile, at St. Helena, After a Captivity of Six Years' Duration (Orlando Hodgson, 1841) p384 ^ "William Wilberforce (1759–1833)". Retrieved January 18, 2021. ^ "Abolition of the Slave Trade 1807". BBC. Archived from the original on October 11, 2007. Retrieved September 11, 2007. ^ "The Aaron Burr Treason Trial" (PDF). ^ Farndale, W. E. (1950). The Secret of Mow Cop: a new appraisal of the origins of Primitive Methodism. London: Epworth Press. ^ "Sketch of the Canton Protestant Mission", by Rev. John Chalmers, in The Chinese Recorder and Missionary Journal, Volume 7 (American Presbyterian Mission Press, 1876) p174 ^ Marston, Nicholas (2006). Beethoven: Mass in C major, Op. 86 (PDF) (CD). Hyperion Records. CDH55263. Retrieved May 15, 2015. ^ Francis Haskell and Nicholas Penny, Taste and the Antique: The Lure of Classical Sculpture, 1500-1900 (Yale University Press, 1982) p281 ^ Clowes, William Laird (1997) [1900]. The Royal Navy: A History from the Earliest Times to 1900. Vol. V. Chatham Publishing. ISBN 1-86176-014-0. ^ Anderson, Atholl (2022). "War is their principal profession: On the frequency and causes of Maori warfare and migration, 1250–1850 CE". In Clark, Geoffrey; Litster, Mirani (eds.). Archaeological Perspectives on Conflict and Warfare in Australia and the Pacific. Canberra: ANU Press. p. 51. ISBN 978-1-76046-489-9. Retrieved March 29, 2025 – via Google Books. ^ Calhoun, Charles C (2004). Longfellow: A Rediscovered Life. Boston: Beacon Press. p. 5. ISBN 978-0807070260. ^ "Fredrika Runeberg". Svenska Litteratursällskapet i Finland. Archived from the original on May 6, 2014. Retrieved May 14, 2014. ^ Robson, Ann P. "Mill [née Hardy; other married name Taylor], Harriet". Oxford Dictionary of National Biography (online ed.). Oxford University Press. doi:10.1093/ref:odnb/38051. (Subscription or UK public library membership required.) Retrieved from " 3Second-largest asteroid of the main asteroid belt This article is about the asteroid. For the Roman goddess, see Vesta (mythology). For other uses, see Vesta (disambiguation). 4 VestaTrue color image of Vesta taken by Dawn. The massive Rheasilvia Crater dominates Vesta's south pole.DiscoveryDiscovered byHeinrich Wilhelm OlbersDiscovery date29 March 1807DesignationsMPC designation(4) VestaPronunciation/ˈvɛstə/[1]Named afterVestaMinor planet categoryMain belt (Vesta family)AdjectivesVestanVestian[a]Symbol (historically astronomical, now astrological)Orbital characteristics[6]Epoch 13 September 2023(JD 2453300.5)Aphelion2.57 AU (384 million km)Perihelion2.15 AU (322 million km)Semi-major axis2.36 AU (353 million km)Eccentricity0.0894Orbital period (sidereal)3.63 yr (1325.86 d)Average orbital speed19.34 km/sMean anomaly169.4°Inclination7.1422° to ecliptic5.58° to invariable plane[7]Longitude of ascending node103.71°Time of perihelion26 December 2021[8]Argument of perihelion151.66°SatellitesNoneEarth MOID1.14 AU (171 million km)Proper orbital elements[9]Proper semi-major axis2.36151 AUProper eccentricity0.098758Proper inclination6.39234°Proper mean motion99.1888 deg / yrProper orbital period3.62944 yr(1325.654 d)Precession of perihelion36.8729 (2343 years) arcsec / yrPrecession of the ascending node−39.5979 (2182 years) arcsec / yrPhysical characteristicsDimensions572.6 km × 557.2 km × 446.4 km[10]Mean diameter525.4±0.2 km[10]Flattening0.2204Surface area(8.66±0.2)×105 km2[b][11]Volume7.4970×107 km3[10]Mass(2.590271±0.000058)×1020 kg[12]Mean density3.456±0.035 g/cm3[10]Equatorial surface gravity0.22 m/s2 (0.022 g0)Equatorial escape velocity0.36 km/sSynodic rotation period0.2226 d (5.342 h)[6][13]Equatorial rotation velocity93.1 m/s[c]Axial tilt29°North pole right ascension20h 32m[d]North pole declination48°[d]Geometric albedo0.423[15]Temperaturemin: 75 K (−198 °C)max: 250 K (−23 °C)[16]Spectral typeV[6][17]Apparent magnitude5.1[18] to 8.48Absolute magnitude (H)3.20[6][15]Angular diameter0.70″ to 0.22″ Vesta (minor-planet designation: 4 Vesta) is one of the largest objects in the asteroid belt, with a mean diameter of 525 kilometres (326 mi).[10] It was discovered by the German astronomer Heinrich Wilhelm Matthias Olbers on 29 March 1807[6] and is named after Vesta, the virgin goddess of home and hearth from Roman mythology.[19] Vesta is thought to be the second-largest asteroid, both by mass and by volume, after the dwarf planet Ceres.[20][21][22] Measurements give it a nominal volume only slightly larger than that of Pallas (about 5% greater), but it is 25% to 30% more massive. It constitutes an estimated 9% of the mass of the asteroid belt.[23] Vesta is the only known remaining rocky protoplanet of the kind that formed the terrestrial planets.[24] Numerous fragments of Vesta were ejected by collisions one and two billion years ago that left two enormous craters occupying much of Vesta's southern hemisphere.[25][26] Debris from these events has fallen to Earth as howardite–eucrite–diogenite (HED) meteorites, which have been a rich source of information about Vesta.[27][28][29] Vesta is the brightest asteroid visible from Earth. It is regularly as bright as magnitude 5.1,[18] at which times it is faintly visible to the naked eye. Its maximum distance from the Sun is slightly greater than the minimum distance of Ceres from the Sun,[e] although its orbit lies entirely within that of Ceres.[30] NASA's Dawn spacecraft entered orbit around Vesta on 16 July 2011 for a one-year exploration and left the orbit of Vesta on 5 September 2012[31] en route to its final destination, Ceres. Researchers continue to examine data collected by Dawn for additional insights into the formation and history of Vesta.[32][33] Vesta, Ceres, and the Moon with sizes shown to scale Heinrich Olbers discovered Pallas in 1802, the year after the discovery of Ceres. He proposed that the two objects were the remnants of a destroyed planet. He sent a letter with his proposal to the British astronomer William Herschel, suggesting that a search near the locations where the orbits of Ceres and Pallas intersected might reveal more fragments. These orbital intersections were located in the constellations of Cetus and Virgo.[34] Olbers commenced his search in 1802, and on 29 March 1807 he discovered Vesta in the constellation Virgo—a coincidence, because Ceres, Pallas, and Vesta are not fragments of a larger body. Because the asteroid Juno had been discovered in 1804, this made Vesta the fourth object to be identified in the region that is now known as the asteroid belt. The discovery was announced in a letter addressed to German astronomer Johann H. Schröter dated 31 March.[35] Because Olbers already had credit for discovering a planet (Pallas; at the time, the asteroids were considered to be planets), he gave the honor of naming his new discovery to German mathematician Carl Friedrich Gauss, whose orbital calculations had enabled astronomers to confirm the existence of Ceres, the first asteroid, and who had computed the orbit of the new planet in the remarkably short time of 10 hours.[36][37] Gauss decided on the Roman virgin goddess of home and hearth, Vesta.[38] Vesta was the fourth asteroid to be discovered, hence the number 4 in its formal designation. The name Vesta, or national variants thereof, is in international use with two exceptions: Greece and China. In Greek, the name adopted was the Hellenic equivalent of Vesta, Hestia (4 Εστία); in English, that name is used for 46 Hestia (Greeks use the name "Hestia" for both, with the minor-planet numbers used for disambiguation). In Chinese, Vesta is called the 'hearth-god(dess) star', 灶神星 Zàoshénxīng, naming the asteroid for Vesta's role, similar to the Chinese names of Uranus, Neptune, and Pluto.[f] Upon its discovery, Vesta was, like Ceres, Pallas, and Juno before it, classified as a planet and given a planetary symbol. The symbol represented the altar of Vesta with its sacred fire and was designed by Gauss.[39][40] In Gauss's conception, now obsolete, this was drawn . His form is in the pipeline for Unicode 17.0 as U+F777 .[41][42][g] The asteroid symbols were gradually retired from astronomical use after 1852, but the symbols for the first four asteroids were resurrected for astrology in the 1970s. The abbreviated modern astrological variant of the Vesta symbol is (U+26B6 ⚶).[41][h] After the discovery of Vesta, no further objects were discovered for 38 years, and during this time the Solar System was thought to have eleven planets.[44] However, in 1845, new asteroids started being discovered at a rapid pace, and by 1851 there were fifteen, each with its own symbol, in addition to the eight major planets (Neptune had been discovered in 1846). It soon became clear that it would be impractical to continue inventing new planetary symbols indefinitely, and some of the existing ones proved difficult to draw quickly. That year, the problem was addressed by Benjamin Apthorp Gould, who suggested numbering asteroids in their order of discovery, and placing this number in a disk (circle) as the generic symbol of an asteroid. Thus, the fourth asteroid, Vesta, acquired the generic symbol ④. This was soon coupled with the name into an official number–name designation, ④ Vesta, as the number of minor planets increased. By 1858, the circle had been simplified to parentheses, (4) Vesta, which were easier to typeset. Other punctuation, such as 4) Vesta and 4, Vesta, was also briefly used, but had more or less completely died out by 1949.[48] SPHERE image is shown on the left, with a synthetic view derived from Dawn images shown on the right for comparison.[49] Photometric observations of Vesta were made at the Harvard College Observatory in 1880–1882 and at the Observatoire de Toulouse in 1909. These and other observations allowed the rotation rate of Vesta to be determined by the 1950s. However, the early estimates of the rotation rate came into question because the light curve included variations in both shape and albedo.[50] Early estimates of the diameter of Vesta ranged from 383 kilometres (238 mi) in 1825, to 444 km (276 mi). E.C. Pickering produced an estimated diameter of 513 ± 17 km (319 ± 11 mi) in 1879, which is close to the modern value for the mean diameter, but the subsequent estimates ranged from a low of 390 km (242 mi) up to a high of 602 km (374 mi) during the next century. The measured estimates were based on photometry. In 1989, speckle interferometry was used to measure a dimension that varied between 498 and 548 km (309 and 341 mi) during the rotational period.[51] In 1991, an occultation of the star SAO 93228 by Vesta was observed from multiple locations in the eastern United States and Canada. Based on observations from 14 different sites, the best fit to the data was an elliptical profile with dimensions of about 550 km × 462 km (342 mi × 287 mi).[52] Dawn confirmed this measurement.[i] These measurements will help determine the thermal history, size of the core, role of water in asteroid evolution and what meteorites found on Earth come from these bodies, with the ultimate goal of understanding the conditions and processes present at the solar system's earliest epoch and the role of water content and size in planetary evolution.[53] Vesta became the first asteroid to have its mass determined. Every 18 years, the asteroid 197 Arete approaches within 0.04 AU of Vesta. In 1966, based upon observations of Vesta's gravitational perturbations of Arete, Hans G. Hertz estimated the mass of Vesta at (1.20±0.08)×10−10 M☉ (solar masses).[54] More refined estimates followed, and in 2001 the perturbations of 17 Thetis were used to calculate the mass of Vesta to be (1.31±0.02)×10−10 M☉.[55] Dawn determined it to be 1.3029×10−10 M☉. Vesta orbits the Sun between Mars and Jupiter, within the asteroid belt, with a period of 3.6 Earth years,[6] specifically in the inner asteroid belt, interior to the Kirkwood gap at 2.50 AU. Its orbit is moderately inclined (i = 7.1°, compared to 7° for Mercury and 17° for Pluto) and moderately eccentric (e = 0.09, about the same as for Mars).[6] True orbital resonances between asteroids are considered unlikely. Because of their small masses relative to their large separations, such relationships should be very rare.[56] Nevertheless, Vesta is able to capture other asteroids into temporary 1:1 resonant orbital relationships (for periods up to 2 million years or more) and about forty such objects have been identified.[57] Decameter-sized objects detected in the vicinity of Vesta by Dawn may be such quasi-satellites rather than proper satellites.[57] Olbers Regio (dark area) defines the prime meridian in the IAU coordinate system. It is shown here in a Hubble shot of Vesta, because it is not visible in the more detailed Dawn images.Claudia crater (indicated by the arrow at the bottom of the closeup image at right) defines the prime meridian in the Dawn/NASA coordinate system. Vesta's rotation is relatively fast for an asteroid (5.342 h) and prograde, with the north pole pointing in the direction of right ascension 20 h 32 min, declination +48° (in the constellation Cygnus) with an uncertainty of about 10°. This gives an axial tilt of 29°.[58] Two longitudinal coordinate systems are used for Vesta, with prime meridians separated by 150°. The IAU established a coordinate system in 1997 based on Hubble photos, with the prime meridian running through the center of Olbers Regio, a dark feature 200 km across. When Dawn arrived at Vesta, mission scientists found that the location of the pole assumed by the IAU was off by 10°, so that the IAU coordinate system drifted across the surface of Vesta at 0.06° per year, and also that Olbers Regio was not discernible from up close, and so was not adequate to define the prime meridian with the precision they needed. They corrected the pole, but also established a new prime meridian 4° from the center of Claudia, a sharply defined crater 700 metres across, which they say results in a more logical set of mapping quadrangles.[59] All NASA publications, including images and maps of Vesta, use the Claudian meridian, which is unacceptable to the IAU. The IAU Working Group on Cartographic Coordinates and Rotational Elements recommended a coordinate system, correcting the pole but rotating the Claudian longitude by 150° to coincide with Olbers Regio.[60] It was accepted by the IAU, although it disrupts the maps prepared by the Dawn team, which had been positioned so they would not bisect any major surface features.[59][61] Relative sizes of the four largest asteroids. Vesta is second from left. This graph was using the Legacy Graph Extension, which is no longer supported. It needs to be converted to the new Chart extension. The mass of 4 Vesta (blue) compared to other large asteroids: 1 Ceres, 2 Pallas, 10 Hygiea, 704 Interamnia, 15 Eunomia and the remainder of the Main Belt. The unit of mass is ×1018 kg. Other objects in the Solar system with well-defined masses within a factor of 2 of Vesta's mass are Varda, Gǃkúnǁ'hòmdímà, and Salacia (245, 136, and 492±108 kg, respectively). No moons are in this range: the closest, Tethys (Saturn III) and Enceladus (Saturn II), are over twice and less than half of Vesta's mass. Vesta is the second most massive body in the asteroid belt, although it is only 28% as massive as Ceres, the most massive body.[62][23] Vesta is, however, the most massive body that formed in the asteroid belt, as Ceres is believed to have formed between Jupiter and Saturn. Vesta's density is lower than those of the four terrestrial planets but is higher than those of most asteroids, as well as all of the moons in the Solar System except Io. Vesta's surface area is about the same as the land area of Pakistan, Venezuela, Tanzania, or Nigeria; slightly under 900,000 km2 (350,000 sq mi; 90 million ha; 220 million acres). It has an only partially differentiated interior.[63] Vesta is only slightly larger (525.4±0.2 km[10]) than 2 Pallas (512±3 km) in mean diameter,[64] but is about 25% more massive. Vesta's shape is close to a gravitationally relaxed oblate spheroid,[58] but the large concavity and protrusion at the southern pole (see 'Surface features' below) combined with a mass less than 5×1020 kg precluded Vesta from automatically being considered a dwarf planet under International Astronomical Union (IAU) Resolution XXVI 5.[65] A 2012 analysis of Vesta's shape[66] and gravity field using data gathered by the Dawn spacecraft has shown that Vesta is currently not in hydrostatic equilibrium.[10][67] Temperatures on the surface have been estimated to lie between about −20 °C (253 K) with the Sun overhead, dropping to about −190 °C (83.1 K) at the winter pole. Typical daytime and nighttime temperatures are −60 °C (213 K) and −130 °C (143 K), respectively. This estimate is for 6 May 1996, very close to perihelion, although details vary somewhat with the seasons.[16] Further information: List of geological features on Vesta Before the arrival of the Dawn spacecraft, some Vestan surface features had already been resolved using the Hubble Space Telescope and ground-based telescopes (e.g., the Keck Observatory).[68] The arrival of Dawn in July 2011 revealed the complex surface of Vesta in detail.[69] Geologic map of Vesta (Mollweide projection).[70] The most ancient and heavily cratered regions are brown; areas modified by the Veneneia and Rheasilvia impacts are purple (the Saturnalia Fossae Formation, in the north)[71] and light cyan (the Divalia Fossae Formation, equatorial),[70] respectively; the Rheasilvia impact basin interior (in the south) is dark blue, and neighboring areas of Rheasilvia ejecta (including an area within Veneneia) are light purple-blue;[72][73] areas modified by more recent impacts or mass wasting are yellow/orange or green, respectively. Main articles: Rheasilvia and Veneneia Northern (left) and southern (right) hemispheres. The "Snowman" craters are at the top of the left image; Rheasilvia and Veneneia (green and blue) dominate the right. Parallel troughs are seen in both. Colors of the two hemispheres are not to scale;[j] and the equatorial region is not shown. South pole of Vesta, showing the extent of Rheasilvia crater. The most prominent of these surface features are two enormous impact basins, the 500-kilometre-wide (311 mi) Rheasilvia, centered near the south pole; and the 400-kilometre-wide (249 mi) Veneneia. The Rheasilvia impact basin is younger and overlies the Veneneia.[74] The Dawn science team named the younger, more prominent crater Rheasilvia, after the mother of Romulus and Remus and a mythical vestal virgin.[75] Its width is 95% of the mean diameter of Vesta. The crater is about 19 km (12 mi) deep. A central peak rises 23 km (14 mi) above the lowest measured part of the crater floor and the highest measured part of the crater rim is 31 km (19 mi) above the crater floor low point. It is estimated that the impact responsible excavated about 1% of the volume of Vesta, and it is likely that the Vesta family and V-type asteroids are the products of this collision. If this is the case, then the fact that 10 km (6 mi) fragments have survived bombardment until the present indicates that the crater is at most only about 1 billion years old.[76] It would also be the site of origin of the HED meteorites. All the known V-type asteroids taken together account for only about 6% of the ejected volume, with the rest presumably either in small fragments, ejected by approaching the 3:1 Kirkwood gap, or perturbed away by the Yarkovsky effect or radiation pressure. Spectroscopic analyses of the Hubble images have shown that this crater has penetrated deep through several distinct layers of the crust, and possibly into the mantle, as indicated by spectral signatures of olivine.[58] Subsequent analysis of data from the Dawn mission provided much greater detail on Rheasilvia's structure and composition, confirming it as one of the largest impact structures known relative to its parent body size.[74] The impact clearly modified the pre-existing very large, Veneneia structure, indicating Rheasilvia's younger age.[74] Rheasilvia's size makes Vesta's southern topography unique, creating a flattened southern hemisphere and contributing significantly to the asteroid's overall oblate shape.[69] Rheasilvia's ~22 km (14 mi) central peak stands as one of the tallest mountains identified in the Solar System.[74] Its base width of roughly 180 km (110 mi) and complex morphology distinguishes it from the simpler central peaks seen in smaller craters.[77] Numerical modeling indicates that such a large central structure within a ~505 km (314 mi) diameter basin requires formation on a differentiated body with significant gravity. Scaling laws for craters on smaller asteroids fail to predict such a feature; instead, impact dynamics involving transient crater collapse and rebound of the underlying material (potentially upper mantle) are needed to explain its formation.[77] Hydrocode simulations suggest the impactor responsible was likely 60–70 km (37–43 mi) across, impacting at speeds of around 5.4 km/s.[78] Models of impact angle (around 30-45 degrees from vertical) better match the detailed morphology of the basin and its prominent peak.[74] Crater density measurements on Rheasilvia's relatively unmodified floor materials and surrounding ejecta deposits, calibrated using standard lunar chronology functions adapted for Vesta's location, place the impact event at approximately 1 billion years ago.[79][70] This age makes Rheasilvia a relatively young feature on a protoplanetary body formed early in Solar System history. The estimated excavation of ~1% of Vesta's volume[74] provides a direct link to the Vesta family of asteroids (Vestoids) and the HED meteorites. Since Vesta's spectral signature matches that of the Vestoids and HEDs, this strongly indicates they are fragments ejected from Vesta most likely during the Rheasilvia impact.[27][79] The Dawn mission's VIR instrument helped to confirm the basin's deep excavation and compositional diversity. VIR mapping revealed specific variations across the basin consistent with the mixing of different crustal layers expected in the HED meteorites. Signatures matching the eucrites (shallow crustal basalts) and diogenites (deeper crustal orthopyroxenes) were identified, which usually correlate with specific morphological features like crater walls or slump blocks.[80][27] The confirmed signature of olivine-rich material, which were first hinted at by Hubble observations is strongest on the flanks of the central peak and in specific patches along the basin rim and walls, suggesting it is not uniformly distributed but rather exposed in distinct outcrops.[81][80] As the dominant mineral expected in Vesta's mantle beneath the HED-like crust,[10] the presence of olivine indicates the Rheasilvia impact penetrated Vesta's entire crust (~20–40 km (12–25 mi) thick in the region) and excavated material from the upper mantle.[81] Furthermore, the global stresses resulting from this massive impact are considered the likely trigger for the formation of the large trough systems, like Divalia Fossa, that encircle Vesta's equatorial regions.[82][69] The crater Aelia Feralia Planitia, an old, degraded impact basin or impact basin complex near Vesta's equator (green and blue). It is 270 km (168 mi) across and predates Rheasilvia (green at bottom) Several old, degraded craters approach Rheasilvia and Veneneia in size, although none are quite so large. They include Feralia Planitia, shown at right, which is 270 km (168 mi) across.[83] More-recent, sharper craters range up to 158 km (98 mi) Varronilla and 196 km (122 mi) Postumia.[84] Dust fills up some craters, creating so-called dust ponds. They are a phenomenon where pockets of dust are seen in celestial bodies without a significant atmosphere. These are smooth deposits of dust accumulated in depressions on the surface of the body (like craters), contrasting from the Rocky terrain around them.[85] On the surface of Vesta, we have identified both type 1 (formed from impact melt) and type 2 (electrostatically made) dust ponds within 0°–30°N/S, that is, Equatorial region. 10 craters have been identified with such formations.[86] The "snowman craters" are a group of three adjacent craters in Vesta's northern hemisphere. Their official names, from largest to smallest (west to east), are Marcia, Calpurnia, and Minucia. Marcia is the youngest and cross-cuts Calpurnia. Minucia is the oldest.[70] "Snowman" craters by Dawn from 5,200 km (3,200 mi) in 2011Detailed image of the "Snowman" craters The majority of the equatorial region of Vesta is sculpted by a series of parallel troughs designated Divalia Fossae; its longest trough is 10–20 kilometres (6.2–12.4 mi) wide and 465 kilometres (289 mi) long. Despite the fact that Vesta is a one-seventh the size of the Moon, Divalia Fossae dwarfs the Grand Canyon. A second series, inclined to the equator, is found further north. This northern trough system is named Saturnalia Fossae, with its largest trough being roughly 40 km (25 mi) wide and over 370 km (230 mi) long. These troughs are thought to be large-scale graben resulting from the impacts that created Rheasilvia and Veneneia craters, respectively. They are some of the longest chasms in the Solar System, nearly as long as Ithaca Chasma on Tethys. The troughs may be graben that formed after another asteroid collided with Vesta, a process that can happen only in a body that is differentiated,[82] which Vesta may not fully be. Alternatively, it is proposed that the troughs may be radial sculptures created by secondary cratering from Rheasilvia.[87] A section of Divalia Fossae, with parallel troughs to the north and southA computer-generated view of a portion of Divalia Fossae Compositional information from the visible and infrared spectrometer (VIR), gamma-ray and neutron detector (GRaND), and framing camera (FC), all indicate that the majority of the surface composition of Vesta is consistent with the composition of the howardite, eucrite, and diogenite meteorites.[88][89][90] The Rheasilvia region is richest in diogenite, consistent with the Rheasilvia-forming impact excavating material from deeper within Vesta. The presence of olivine within the Rheasilvia region would also be consistent with excavation of mantle material. However, olivine has only been detected in localized regions of the northern hemisphere, not within Rheasilvia.[32] The origin of this olivine is currently unclear. Though olivine was expected by astronomers to have originated from Vesta's mantle prior to the arrival of the Dawn orbiter, the lack of olivine within the Rheasilvia and Veneneia impact basins complicates this view. Both impact basins excavated Vestian material down to 60–100 km, far deeper than the expected thickness of ~30–40 km for Vesta's crust. Vesta's crust may be far thicker than expected or the violent impact events that created Rheasilvia and Veneneia may have mixed material enough to obscure olivine from observations. Alternatively, Dawn observations of olivine could instead be due to delivery by olivine-rich impactors, unrelated to Vesta's internal structure.[91] Pitted terrain has been observed in four craters on Vesta: Marcia, Cornelia, Numisia and Licinia.[92] The formation of the pitted terrain is proposed to be degassing of impact-heated volatile-bearing material. Along with the pitted terrain, curvilinear gullies are found in Marcia and Cornelia craters. The curvilinear gullies end in lobate deposits, which are sometimes covered by pitted terrain, and are proposed to form by the transient flow of liquid water after buried deposits of ice were melted by the heat of the impacts.[71] Hydrated materials have also been detected, many of which are associated with areas of dark material.[93] Consequently, dark material is thought to be largely composed of carbonaceous chondrite, which was deposited on the surface by impacts. Carbonaceous chondrites are comparatively rich in mineralogically bound OH.[90] Cutaway schematic of Vestan core, mantle, and crust Eucrite meteorites A large collection of potential samples from Vesta is accessible to scientists, in the form of over 1200 HED meteorites (Vestan achondrites), giving insight into Vesta's geologic history and structure. NASA Infrared Telescope Facility (NASA IRTF) studies of asteroid (237442) 1999 TA10 suggest that it originated from deeper within Vesta than the HED meteorites.[94] Vesta is thought to consist of a metallic iron–nickel core, variously estimated to be 90 km (56 mi)[63] to 220 km (140 mi)[10] in diameter, an overlying rocky olivine mantle, with a surface crust of similar composition to HED meteorites. From the first appearance of calcium–aluminium-rich inclusions (the first solid matter in the Solar System, forming about 4.567 billion years ago), a likely time line is as follows:[95][96][97][98][99] Timeline of the evolution of Vesta 2–3 million years Accretion completed 4–5 million years Complete or almost complete melting due to radioactive decay of 26Al, leading to separation of the metal core 6–7 million years Progressive crystallization of a convecting molten mantle. Convection stopped when about 80% of the material had crystallized Extrusion of the remaining molten material to form the crust, either as basaltic lavas in progressive eruptions, or possibly forming a short-lived magma ocean. The deeper layers of the crust crystallize to form plutonic rocks, whereas older basalts are metamorphosed due to the pressure of newer surface layers. Slow cooling of the interior Vesta is the only known intact asteroid that has been resurfaced in this manner. Because of this, some scientists refer to Vesta as a protoplanet.[100] Composition of the Vestan crust (by depth)[101] A lithified regolith, the source of howardites and brecciated eucrites. Basaltic lava flows, a source of non-cumulate eucrites. Plutonic rocks consisting of pyroxene, pigeonite and plagioclase, the source of cumulate eucrites. Plutonic rocks rich in orthopyroxene with large grain sizes, the source of diogenites. On the basis of the sizes of V-type asteroids (thought to be pieces of Vesta's crust ejected during large impacts), and the depth of Rheasilvia crater (see below), the crust is thought to be roughly 10 kilometres (6 mi) thick.[102] Findings from the Dawn spacecraft have found evidence that the troughs that wrap around Vesta could be graben formed by impact-induced faulting (see Troughs section above), meaning that Vesta has more complex geology than other asteroids. The impacts that created the Rheasilvia and Veneneia craters occurred when Vesta was not yet solid enough to equalize its shape, distorting its once rounded shape and prohibiting it from being classified as a dwarf planet today.[citation needed] Vesta's surface is covered by regolith distinct from that found on the Moon or asteroids such as Itokawa. This is because space weathering acts differently. Vesta's surface shows no significant trace of nanophase iron because the impact speeds on Vesta are too low to make rock melting and vaporization an appreciable process. Instead, regolith evolution is dominated by brecciation and subsequent mixing of bright and dark components.[103] The dark component is probably due to the infall of carbonaceous material, whereas the bright component is the original Vesta basaltic soil.[104] Some small Solar System bodies are suspected to be fragments of Vesta caused by impacts. The Vestian asteroids and HED meteorites are examples. The V-type asteroid 1929 Kollaa has been determined to have a composition akin to cumulate eucrite meteorites, indicating its origin deep within Vesta's crust.[28] Vesta is currently one of only eight identified Solar System bodies of which we have physical samples, coming from a number of meteorites suspected to be Vestan fragments. It is estimated that 1 out of 16 meteorites originated from Vesta.[105] The other identified Solar System samples are from Earth itself, meteorites from Mars, meteorites from the Moon, and samples returned from the Moon, the comet Wild 2, and the asteroids 25143 Itokawa, 162173 Ryugu, and 101955 Bennu.[29][k] Animation of Dawn's trajectory from 27 September 2007 to 5 October 2018 Dawn · Earth · Mars · 4 Vesta · 1 Ceres First image of asteroids (Ceres and Vesta) taken from Mars. The image was made by the Curiosity rover on 20 April 2014. Animation of Dawn's trajectory around 4 Vesta from 15 July 2011 to 10 September 2012 Dawn · 4 Vesta In 1981, a proposal for an asteroid mission was submitted to the European Space Agency (ESA). Named the Asteroidal Gravity Optical and Radar Analysis (AGORA), this spacecraft was to launch some time in 1990–1994 and perform two flybys of large asteroids. The preferred target for this mission was Vesta. AGORA would reach the asteroid belt either by a gravitational slingshot trajectory past Mars or by means of a small ion engine. However, the proposal was refused by the ESA. A joint NASA–ESA asteroid mission was then drawn up for a Multiple Asteroid Orbiter with Solar Electric Propulsion (MAOSEP), with one of the mission profiles including an orbit of Vesta. NASA indicated they were not interested in an asteroid mission. Instead, the ESA set up a technological study of a spacecraft with an ion drive. Other missions to the asteroid belt were proposed in the 1980s by France, Germany, Italy and the United States, but none were approved.[106] Exploration of Vesta by fly-by and impacting penetrator was the second main target of the first plan of the multi-aimed Soviet Vesta mission, developed in cooperation with European countries for realisation in 1991–1994 but canceled due to the dissolution of the Soviet Union. Artist's conception of Dawn orbiting Vesta In the early 1990s, NASA initiated the Discovery Program, which was intended to be a series of low-cost scientific missions. In 1996, the program's study team recommended a mission to explore the asteroid belt using a spacecraft with an ion engine as a high priority. Funding for this program remained problematic for several years, but by 2004 the Dawn vehicle had passed its critical design review[107] and construction proceeded.[citation needed] It launched on 27 September 2007 as the first space mission to Vesta. On 3 May 2011, Dawn acquired its first targeting image 1.2 million kilometres (0.75×10^6 mi) from Vesta.[108] On 16 July 2011, NASA confirmed that it received telemetry from Dawn indicating that the spacecraft successfully entered Vesta's orbit.[109] It was scheduled to orbit Vesta for one year, until July 2012.[110] Dawn's arrival coincided with late summer in the southern hemisphere of Vesta, with the large crater at Vesta's south pole (Rheasilvia) in sunlight. Because a season on Vesta lasts eleven months, the northern hemisphere, including anticipated compression fractures opposite the crater, would become visible to Dawn's cameras before it left orbit.[111] Dawn left orbit around Vesta on 4 September 2012 11:26 p.m. PDT to travel to Ceres.[112] NASA/DLR released imagery and summary information from a survey orbit, two high-altitude orbits (60–70 m/pixel) and a low-altitude mapping orbit (20 m/pixel), including digital terrain models, videos and atlases.[113][114][115][116][117][118] Scientists also used Dawn to calculate Vesta's precise mass and gravity field. The subsequent determination of the J2 component yielded a core diameter estimate of about 220 km (140 mi) assuming a crustal density similar to that of the HED.[113] Dawn data can be accessed by the public at the UCLA website.[119] Albedo and spectral maps of 4 Vesta, as determined from Hubble Space Telescope images from November 1994 Elevation map of 4 Vesta, as determined from Hubble Space Telescope images of May 1996 Elevation diagram of 4 Vesta (as determined from Hubble Space Telescope images of May 1996) viewed from the south-east, showing Rheasilvia crater at the south pole and Feralia Planitia near the equator Vesta seen by the Hubble Space Telescope in May 2007 The 2006 IAU draft proposal on the definition of a planet listed Vesta as a candidate.[120] Vesta is shown fourth from the left along the bottom row. Vesta comes into view as the Dawn spacecraft approaches and enters orbit: Vesta from 100,000 km(1 July 2011) Vesta from 41,000 km(9 July 2011) In orbit at 16,000 km(17 July 2011) In orbit from 10,500 km(18 July 2011) The northern hemisphere from 5,200 km(23 July 2011) In orbit from 5,200 km(24 July 2011) In orbit from 3,700 km(31 July 2011) Full rotation(1 August 2011) Composite greyscale image Cratered terrain with hills and ridges(6 August 2011) Densely cratered terrain near terminator(6 August 2011) Vesta's craters in various states of degradation, with troughs at bottom(6 August 2011) Hill shaded central mound at the south pole of Vesta(2 February 2015) Detailed images retrieved during the high-altitude (60–70 m/pixel) and low-altitude (~20 m/pixel) mapping orbits are available on the Dawn Mission website of JPL/NASA.[121] Annotated image from Earth's surface in June 2007 with (4) Vesta Its size and unusually bright surface make Vesta the brightest asteroid, and it is occasionally visible to the naked eye from dark skies (without light pollution). In May and June 2007, Vesta reached a peak magnitude of +5.4, the brightest since 1989.[122] At that time, opposition and perihelion were only a few weeks apart.[123] It was brighter still at its 22 June 2018 opposition, reaching a magnitude of +5.3.[124] Less favorable oppositions during late autumn 2008 in the Northern Hemisphere still had Vesta at a magnitude of from +6.5 to +7.3.[125] Even when in conjunction with the Sun, Vesta will have a magnitude around +8.5; thus from a pollution-free sky it can be observed with binoculars even at elongations much smaller than near opposition.[125] In 2010, Vesta reached opposition in the constellation of Leo on the night of 17–18 February, at about magnitude 6.1,[126] a brightness that makes it visible in binocular range but generally not for the naked eye. Under perfect dark sky conditions where all light pollution is absent it might be visible to an experienced observer without the use of a telescope or binoculars. Vesta came to opposition again on 5 August 2011, in the constellation of Capricornus at about magnitude 5.6.[126][127] Vesta was at opposition again on 9 December 2012.[128] According to Sky and Telescope magazine, this year Vesta came within about 6 degrees of 1 Ceres during the winter of 2012 and spring 2013.[129] Vesta orbits the Sun in 3.63 years and Ceres in 4.6 years, so every 17.4 years Vesta overtakes Ceres (the previous overtaking was in April 1996).[129] On 1 December 2012, Vesta had a magnitude of 6.6, but it had decreased to 8.4 by 1 May 2013.[129] Conjunction of Ceres and Vesta near the star Gamma Virginis on 5 July 2014 in the Constellation of Virgo. Ceres and Vesta came within one degree of each other in the night sky in July 2014.[129] 3103 Eger 3551 Verenia 3908 Nyx 4055 Magellan Asteroids in fiction Diogenite Eucrite List of former planets Howardite Vesta family (vestoids) List of tallest mountains in the Solar System ^ Marc Rayman of the JPL Dawn team used "Vestian" (analogous to the Greek cognate Hestian) a few times in 2010 and early 2011 in his Dawn Journal, and the Planetary Society continued to use that form for a few more years.[2] The word had been used elsewhere, e.g. in Tsiolkovsky (1960) The call of the cosmos. However, otherwise the shorter form "Vestan" has been used by JPL.[3] Most modern print sources also use "Vestan". [4][5]Note that the related word "Vestalian" refers to people or things associated with Vesta, such as the vestal virgin, not to Vesta herself. ^ Calculated using the known dimensions assuming an ellipsoid. ^ Calculated using (1) the known rotation period (5.342 h)[6] and (2) the equatorial radius Req (285 km)[10] of the best-fit biaxial ellipsoid to Asteroid 4 Vesta. ^ A topocentric coordinates computed for the selected location: Greenwich, United Kingdom[14] ^ On 10 February 2009, during Ceres perihelion, Ceres was closer to the Sun than Vesta, because Vesta has an aphelion distance greater than Ceres's perihelion distance. (10 February 2009: Vesta 2.56 AU; Ceres 2.54 AU)[34] ^ 爐神星 is the closest Chinese approximation of the Latin pronunciation vesta. ^ Some sources contemporaneous to Gauss invented more elaborate forms, such as and .[43][44] A simplification of the latter from c. 1930, ,[45] never caught on. ^ This symbol can be seen in the top of the most elaborate of the earlier forms, . It dates from 1973, at the beginning of astrological interest in asteroids.[46] ^ The data returned will include, for both asteroids, full surface imagery, full surface spectrometric mapping, elemental abundances, topographic profiles, gravity fields, and mapping of remnant magnetism, if any.[53] ^ that is, blue in the north does not mean the same thing as blue in the south. ^ Note that 6 Hebe may be the parent body for H chondrites, one of the most common meteorite types. ^ "Vesta". Dictionary.com Unabridged (Online). n.d. ^ Schenk, P. (2016). "Dawn Spacecraft Photos". ^ a b c d e f g h i j Russell, C. T.; et al. (2012). "Dawn at Vesta: Testing the Protoplanetary Paradigm" (PDF). Science. 336 (6082): 684–686. Bibcode:2012Sci...336..684R. doi:10.1126/science.1219381. PMID 22582253. S2CID 206540168. ^ "surface ellipsoid 286.3x278.6x223.2". Wolfram-Alpha: Computational Knowledge Engine. ^ Konopliv, A. S.; et al. (2014). "The Vesta gravity field, spin pole and rotation period, landmark positions, and ephemeris from the Dawn tracking and optical data". Icarus. 240: 118–132. Bibcode:2014Icar..240..103K. doi:10.1016/j.icarus.2013.09.005. PDF copy ^ Harris, A. W. (2006). Warner, B. D.; Pravec, P. (eds.). "Asteroid Lightcurve Derived Data. EAR-A-5-DDR-DERIVED-LIGHTCURVE-V8.0". NASA Planetary Data System. Archived from the original on 9 April 2009. Retrieved 26 December 2013. ^ "Asteroid 4 Vesta". TheSkyLive. Retrieved 16 December 2022. ^ Tedesco, E. F.; Noah, P. V.; Noah, M.; Price, S. D. (2004). "Infra-Red Astronomy Satellite (IRAS) Minor Planet Survey. IRAS-A-FPA-3-RDR-IMPS-V6.0". NASA Planetary Data System. Archived from the original on 9 April 2009. Retrieved 15 March 2007. ^ a b Mueller, T. G.; Metcalfe, L. (2001). "ISO and Asteroids" (PDF). ESA Bulletin. 108: 38. Bibcode:2001ESABu.108...39M. Archived (PDF) from the original on 11 September 2005. ^ Neese, C.; Ed. (2005). "Asteroid Taxonomy EAR-A-5-DDR-TAXONOMY-V5.0". NASA Planetary Data System. Archived from the original on 10 March 2007. Retrieved 25 December 2013. ^ a b Menzel, Donald H. & Pasachoff, Jay M. (1983). A Field Guide to the Stars and Planets (2nd ed.). Boston, MA: Houghton Mifflin. p. 391. ISBN 978-0-395-34835-2. ^ "In Depth - 4 Vesta". NASA Solar System Exploration. 10 November 2017. Retrieved 13 December 2022. ^ "Dawn Mission Overview". NASA. Archived from the original on 16 October 2011. Retrieved 14 August 2011. ^ Lang, Kenneth (2011). The Cambridge Guide to the Solar System. Cambridge University Press. p. 372, 442. ISBN 9780521198578. ^ Russell, C. T.; et al. (2011). "Exploring the smallest terrestrial planet: Dawn at Vesta" (PDF). EPSC Abstracts. Vol. 6. EPSC-DPS2011-97-1. EPSC-DPS Joint Meeting 2011. Archived (PDF) from the original on 20 March 2012. ^ a b Pitjeva, E. V. (2005). "High-Precision Ephemerides of Planets—EPM and Determination of Some Astronomical Constants" (PDF). Solar System Research. 39 (3): 176–186. Bibcode:2005SoSyR..39..176P. doi:10.1007/s11208-005-0033-2. S2CID 120467483. Archived from the original (PDF) on 31 October 2008. ^ Amos, Jonathan (11 May 2012). "Asteroid Vesta is 'last of a kind' rock". BBC News. ^ Jutzi, M.; E. Asphaug; P. Gillet; J.-A. Barrat; W. Benz (14 February 2013). "The structure of the asteroid 4 Vesta as revealed by models of planet-scale". Nature. 494 (7436): 207–210. Bibcode:2013Natur.494..207J. doi:10.1038/nature11892. PMID 23407535. S2CID 4410838. ^ Cook, Jia-Rui. "Dawn Reality-Checks Telescope Studies of Asteroids". Archived from the original on 2 May 2014. Retrieved 30 April 2014. ^ a b McSween, H. Y.; R. P. Binzel; M. C. De Sanctis; et al. (27 November 2013). "Dawn; the Vesta–HED connection; and the geologic context for eucrites, diogenites, and howardites". Meteoritics & Planetary Science. 48 (11): 2090–21–4. Bibcode:2013M&PS...48.2090M. doi:10.1111/maps.12108. S2CID 131100157. ^ a b Kelley, M. S.; et al. (2003). "Quantified mineralogical evidence for a common origin of 1929 Kollaa with 4 Vesta and the HED meteorites". Icarus. 165 (1): 215–218. Bibcode:2003Icar..165..215K. doi:10.1016/S0019-1035(03)00149-0. ^ a b c "Mars Rover Spots Ceres and Vesta". NASA. 2011. Archived from the original on 29 June 2011. Retrieved 30 July 2011. ^ "Ceres, Pallas, Vesta, and Hygiea". Gravity Simulator. Archived from the original on 17 June 2008. Retrieved 31 May 2008. ^ "Mission > Mission Status – Dawn Mission Overview". JPL. Archived from the original on 11 May 2013. Retrieved 6 September 2012. ^ a b Ammannito, E.; M. C. De Sanctis; E. Palomba; et al. (2013). "Olivine in an unexpected location on Vesta's surface". Nature. 504 (7478): 122–125. Bibcode:2013Natur.504..122A. doi:10.1038/nature12665. PMID 24196707. S2CID 4464889. ^ Cook, Jia-Rui. "It's Complicated: Dawn Spurs Rewrite of Vesta's Story". Archived from the original on 2 May 2014. Retrieved 30 April 2014. ^ Littmann, Mark (2004). Planets Beyond: Discovering the Outer Solar System. Dover Books on Astronomy. Courier Dover Publications. p. 21. ISBN 978-0-486-43602-9. ^ Lynn, W. T. (February 1907). "The discovery of Vesta". The Observatory. 30: 103–105. Bibcode:1907Obs....30..103L. ^ Dunnington, Guy Waldo; Gray, Jeremy; Dohse, Fritz-Egbert (2004). Carl Friedrich Gauss: Titan of Science. The Mathematical Association of America. p. 76. ISBN 978-0-88385-547-8. ^ Rao, K. S.; Berghe, G. V. (2003). "Gauss, Ramanujan and Hypergeometric Series Revisited". Historia Scientiarum. 13 (2): 123–133. ^ Schmadel, Lutz D. (2003). Dictionary of Minor Planet Names: Prepared on Behalf of Commission 20 Under the Auspices of the International Astronomical Union. Springer. p. 15. ISBN 978-3-540-00238-3. ^ von Zach, Franz Xaver (1807). Monatliche correspondenz zur beförderung der erd- und himmels-kunde. Vol. 15. p. 507. ^ Carlini, Francesco (1808). Effemeridi astronomiche di Milano per l'anno 1809. ^ a b Bala, Gavin Jared; Miller, Kirk (18 September 2023). Unicode request for historical asteroid symbols (PDF) (Report). Unicode Consortium. Retrieved 26 September 2023 – via unicode.org. ^ "Proposed new characters". unicode.org. The Pipeline. Unicode Consortium. Retrieved 6 November 2023. ^ Encke, J. F. (ed.). Berliner Astronomisches Jahrbuch für das Jahr 1811. p. 250. ^ Canovai, Stanislao; del-Ricco, Gaetano (1810). Elementi di fisica matematica. p. 149. ^ Koch, Rudolf (1955) [1930]. The Book of Signs (reprint ed.). Dover. ^ Bach, Eleanor (1973). Ephemerides of the asteroids: Ceres, Pallas, Juno, Vesta, 1900–2000. Celestial Communications. Bibcode:1973eacp.book.....B. ^ Wells, David A. (1851). Bliss, George Jr. (ed.). "The Planet Hygiea". Annual of Scientific Discovery for the year 1850, quoted by spaceweather.com archives, 2006-09-13. Retrieved 18 January 2008. ^ Hilton, James L. When Did the Asteroids Become Minor Planets? (Report). Archived from the original on 24 March 2008 – via U.S. Naval Observatory website, particularly the discussion of Gould, B. A. (1852). "On the Symbolic Notation of the Asteroids". Astronomical Journal. 2: 80. Bibcode:1852AJ......2...80G. doi:10.1086/100212. and immediate subsequent history. Also, the discussion of C. J. Cunningham (1988) Introduction to Asteroids explains the parenthetical notation. ^ "New SPHERE view of Vesta". www.eso.org. Retrieved 25 June 2018. ^ McFadden, L. A.; Emerson, G.; Warner, E. M.; Onukwubiti, U.; Li, J.-Y. "Photometry of 4 Vesta from its 2007 Apparition". Proceedings, 39th Lunar and Planetary Science Conference. League City, Texas. Bibcode:2008LPI....39.2546M. 10–14 March 2008 ^ Hughes, D. W. (September 1994). "The Historical Unravelling of the Diameters of the First Four Asteroids". Quarterly Journal of the Royal Astronomical Society. 35 (3): 331. Bibcode:1994QJRAS..35..331H. ^ Povenmire, H. (September 2001). "The January 4, 1991 Occultation of SAO 93228 by Asteroid (4) Vesta". Meteoritics & Planetary Science. 36 (Supplement): A165. Bibcode:2001M&PSA..36Q.165P. doi:10.1111/j.1945-5100.2001.tb01534.x. ^ a b "Dawn-NASA-NSSDCA-Spacecraft-Details". Archived from the original on 23 May 2022. Retrieved 13 December 2022. ^ Hertz, Hans G. (19 April 1968). "Mass of Vesta". Science. 160 (3825): 299–300. Bibcode:1968Sci...160..299H. doi:10.1126/science.160.3825.299. PMID 17788233. S2CID 2555834. ^ Kovačević, A. (January 2005). "Determination of the mass of (4) Vesta based on new close approaches". Astronomy and Astrophysics. 430 (1): 319–325. Bibcode:2005A&A...430..319K. doi:10.1051/0004-6361:20035872. ^ Christou, A. A. (2000). "Co-orbital objects in the main asteroid belt". Astronomy and Astrophysics. 356: L71 – L74. Bibcode:2000A&A...356L..71C. ^ a b Christou, A. A.; Wiegert, P. (January 2012). "A population of Main Belt Asteroids co-orbiting with Ceres and Vesta". Icarus. 217 (1): 27–42. arXiv:1110.4810. Bibcode:2012Icar..217...27C. doi:10.1016/j.icarus.2011.10.016. ISSN 0019-1035. S2CID 59474402. ^ a b Thomas, P. C.; et al. (1997). "Vesta: Spin Pole, Size, and Shape from HST Images". Icarus. 128 (1): 88–94. Bibcode:1997Icar..128...88T. doi:10.1006/icar.1997.5736. ^ a b Hand, Eric (2012). "Space missions trigger map wars". Nature. 488 (7412): 442–443. Bibcode:2012Natur.488..442H. doi:10.1038/488442a. PMID 22914146. ^ "IAU WGCCRE Coordinate System for Vesta | USGS Astrogeology Science Center". Astrogeology.usgs.gov. 15 November 2013. Retrieved 25 June 2014. ^ Li, Jian-Yang; Mafi, Joseph N. "Body-Fixed Coordinate Systems for Asteroid (4) Vesta" (PDF). Planetary Data System. Archived (PDF) from the original on 8 November 2015. ^ Baer, James; Chesley, Steven R. (2008). "Astrometric masses of 21 asteroids, and an integrated asteroid ephemeris". Celestial Mechanics and Dynamical Astronomy. 100 (1): 27–42. Bibcode:2008CeMDA.100...27B. doi:10.1007/s10569-007-9103-8. ^ a b Park, R. S.; Ermakov, A. I.; Konopliv, A. S.; Vaughan, A. T.; Rambaux, N.; Bills, B. G.; Castillo-Rogez, J. C.; Fu, R. R.; Jacobson, S. A.; Stewart, S. T.; Toplis, M. J. (23 April 2025). "A small core in Vesta inferred from Dawn's observations". Nature Astronomy: 1–11. doi:10.1038/s41550-025-02533-7. ISSN 2397-3366. ^ Carry, B.; et al. (2010). "Physical properties of (2) Pallas". Icarus. 205 (2): 460–472. arXiv:0912.3626v1. Bibcode:2010Icar..205..460C. doi:10.1016/j.icarus.2009.08.007. S2CID 119194526. ^ "The IAU draft definition of "planet" and "plutons"". IAU. August 2006. Archived from the original on 9 January 2010. Retrieved 16 December 2009. (XXVI) ^ Fu, R. R.; Hager, B. H.; Ermakov, A. I.; Zuber, M. T. (2013). "Early Viscous Relaxation of Asteroid Vesta and Implications for Late Impact-Driven Despinning" (PDF). 44th Lunar and Planetary Science Conference (1719): 2115. Bibcode:2013LPI....44.2115F. Archived (PDF) from the original on 26 July 2014. ^ Asmar, S. W.; Konopliv, A. S.; Park, R. S.; et al. (2012). "The Gravity Field of Vesta and Implications for Interior Structure" (PDF). 43rd Lunar and Planetary Science Conference (1659): 2600. Bibcode:2012LPI....43.2600A. Archived (PDF) from the original on 20 October 2013. ^ Zellner, N. E. B.; Gibbard, S.; de Pater, I.; et al. (2005). "Near-IR imaging of Asteroid 4 Vesta" (PDF). Icarus. 177 (1): 190–195. Bibcode:2005Icar..177..190Z. doi:10.1016/j.icarus.2005.03.024. Archived from the original (PDF) on 23 November 2008. ^ a b c Jaumann, R.; et al. (2012). "Vesta's Shape and Morphology". Science. 336 (6082): 687–690. Bibcode:2012Sci...336..687J. doi:10.1126/science.1219122. PMID 22582254. S2CID 206540010. ^ a b c d Williams, D. A.; Yingst, R. A.; Garry, W. B. (December 2014). "Introduction: The geologic mapping of Vesta". Icarus. 244: 1–12. Bibcode:2014Icar..244....1W. doi:10.1016/j.icarus.2014.03.001. hdl:2286/R.I.28071. ^ Williams, D. A.; et al. (2014). "The geology of the Marcia quadrangle of asteroid Vesta: Assessing the effects of large, young craters". Icarus. 244: 74–88. Bibcode:2014Icar..244...74W. doi:10.1016/j.icarus.2014.01.033. hdl:2286/R.I.28061. S2CID 5505009. ^ Scully, J. E. C.; Yin, A.; Russell, C. T.; et al. (December 2014). "Geomorphology and structural geology of Saturnalia Fossae and adjacent structures in the northern hemisphere of Vesta". Icarus. 244: 23–40. Bibcode:2014Icar..244...23S. doi:10.1016/j.icarus.2014.01.013. hdl:2286/R.I.28070. Archived from the original on 21 July 2018.—Scully, J. E. C.; et al. (2014). "Sub-curvilinear gullies interpreted as evidence for transient water flow on Vesta" (PDF). 45th Lunar and Planetary Science Conference (1777): 1796. Bibcode:2014LPI....45.1796S. ^ Schäfer, M.; Nathues, A.; Williams, D. A.; et al. (December 2014). "Imprint of the Rheasilvia impact on Vesta – Geologic mapping of quadrangles Gegania and Lucaria" (PDF). Icarus. 244: 60–73. Bibcode:2014Icar..244...60S. doi:10.1016/j.icarus.2014.06.026. hdl:2286/R.I.28060. Archived from the original (PDF) on 28 April 2019. Retrieved 24 September 2019. ^ Kneissl, T.; Schmedemann, N.; Reddy, V.; et al. (December 2014). "Morphology and formation ages of mid-sized post-Rheasilvia craters – Geology of quadrangle Tuccia, Vesta". Icarus. 244: 133–157. Bibcode:2014Icar..244..133K. doi:10.1016/j.icarus.2014.02.012. hdl:2286/R.I.28058. ^ a b c d e Schenk, P.; et al. (2012). "The Geologically Recent Giant Impact Basins at Vesta's South Pole". Science. 336 (6082): 694–697. Bibcode:2012Sci...336..694S. doi:10.1126/science.1223272. PMID 22582256. S2CID 206541950. ^ "Rheasilvia – Super Mysterious South Pole Basin at Vesta is Named after Roman Mother". Universe Today. 21 September 2011. Retrieved 8 August 2019. ^ Binzel, R. P.; et al. (1997). "Geologic Mapping of Vesta from 1994 Hubble Space Telescope images". Icarus. 128 (1): 95–103. Bibcode:1997Icar..128...95B. doi:10.1006/icar.1997.5734. ^ a b c Ivanov, B. A.; Melosh, H. J. (2013). "Rheasilvia impact basin on Vesta: Constraints on formation models from the central peak topography". Journal of Geophysical Research: Planets. 118 (7): 1545–1555. Bibcode:2013JGRE..118.1545I. doi:10.1002/jgre.50108. ^ Bowling, T. J.; Richard, G.; Melosh, H. J. (2013). "Numerical simulations of the Rheasilvia impact basin on Vesta". Journal of Geophysical Research: Planets. 118 (8): 1622–1639. Bibcode:2013JGRE..118.1622B. doi:10.1002/jgre.20113. ^ a b Marchi, S.; McSween, H. Y.; O'Brien, D. P. (2012). "The Violent Collisional History of Vesta". Science. 336 (6082): 690–694. Bibcode:2012Sci...336..690M. doi:10.1126/science.1218757. PMID 22582255. ^ a b Clenet, H.; Jutzi, M.; Barrat, J.-A.; et al. (2014). "Constraints on Vesta's crustal structure and evolution from VIR/Dawn data". Icarus. 244: 146–157. Bibcode:2014Icar..244..146C. doi:10.1016/j.icarus.2014.04.010. ^ a b Buczkowski, D. L.; Raymond, C. A.; Williams, D. A.; et al. (2012). "Large-scale troughs on Vesta: A signature of planetary tectonics". Geophysical Research Letters. 39 (18): L18205. Bibcode:2012GeoRL..3918205B. doi:10.1029/2012GL052959. ^ Garry, W.B.; Sykes, M.; Buczkowski, D.L.; et al. (March 2012). Geologic Mapping of Av-10 Oppia Quadrangle of Asteroid 4 Vesta (PDF). 43rd Lunar and Planetary Science Conference, held 19–23 March 2012 at The Woodlands, Texas. id.2315. Bibcode:2012LPI....43.2315G. LPI Contribution No. 1659. Archived (PDF) from the original on 24 April 2014. —Garry, W. B.; Sykes, M.; Buczkowski, D. L.; et al. (2012). "Geologic Mapping of Av-10 Oppia Quadrangle of Asteroid 4 Vesta" (PDF). EGU General Assembly 2012, held 22–27 April 2012 in Vienna, Austria. Vol. 14. p. 5711. Bibcode:2012EGUGA..14.5711G. EGU2012-5711-1. Archived (PDF) from the original on 8 April 2014. ^ "Nomenclature Search Results / Target: VESTA / Feature Type: Crater, craters". Gazetteer of Planetary Nomenclature. IAU. ^ Skibba, J. Kelly (25 June 2014). "Eros's puzzling surface". Sky and Telescope. Retrieved 18 October 2023 – via skyandtelescope.org. The asteroid Eros has more than 250 'ponds' thought to form when electrostatically levitated dust comes to rest. ^ Parekh, R.; Otto, K.A.; Matz, K.D.; Jaumann, R.; Krohn, K.; Roatsch, T.; et al. (28 February 2022) [1 November 2021]. "Formation of ejecta and dust pond deposits on asteroid Vesta". Journal of Geophysical Research: Planets. 126 (11): e2021JE006873. doi:10.1029/2021JE006873. ^ Hirata, N. (2023). "Secondary Cratering From Rheasilvia as the Possible Origin of Vesta's Equatorial Troughs". Journal of Geophysical Research: Planets. 128 (3). arXiv:2303.14955. Bibcode:2023JGRE..12807473H. doi:10.1029/2022JE007473. hdl:20.500.14094/0100482053. Retrieved 4 March 2024. ^ De Sanctis, M. C.; et al. (2012). "Spectroscopic Characterization of Mineralogy and Its Diversity Across Vesta". Science. 336 (6082): 697–700. Bibcode:2012Sci...336..697D. doi:10.1126/science.1219270. PMID 22582257. S2CID 11645621. ^ Prettyman, T. H.; et al. (2012). "Elemental Mapping by Dawn Reveals Exogenic H in Vesta's Regolith". Science. 338 (6104): 242–246. Bibcode:2012Sci...338..242P. doi:10.1126/science.1225354. PMID 22997135. S2CID 206542798. ^ a b Reddy, V.; et al. (2012). "Color and Albedo Heterogeneity of Vesta from Dawn". Science. 336 (6082): 700–704. Bibcode:2012Sci...336..700R. doi:10.1126/science.1219088. PMID 22582258. S2CID 1326996. ^ Clément, H.; Jutzi, M.; Barrat, J.-A.; et al. (2014). ^ Palomba, E.; Longobardo, A.; De Sanctis, M. C.; et al. (September 2015). "Detection of new olivine-rich locations on Vesta". Icarus. 258: 120–134. Bibcode:2015Icar..258..120P. doi:10.1016/j.icarus.2015.06.011. ^ Denevi, B. W.; et al. (2012). "Pitted Terrain on Vesta and Implications for the Presence of Volatiles". Science. 338 (6104): 246–249. Bibcode:2012Sci...338..246D. CiteSeerX 10.1.1.656.1476. doi:10.1126/science.1225374. PMID 22997131. S2CID 22892716. ^ De Sanctis, M. C.; et al. (2012). "Detection of Widespread Hydrated Materials on Vesta by the VIR Imaging Spectrometer on board the Dawn Mission". The Astrophysical Journal Letters. 758 (2): L36. Bibcode:2012ApJ...758L..36D. doi:10.1088/2041-8205/758/2/L36. ^ "A look into Vesta's interior". Max-Planck-Gesellschaft. 6 January 2011. ^ Ghosh, A.; McSween, H. Y. (1998). "A Thermal Model for the Differentiation of Asteroid 4 Vesta, Based on Radiogenic Heating". Icarus. 134 (2): 187–206. Bibcode:1998Icar..134..187G. doi:10.1006/icar.1998.5956. ^ Righter, K.; Drake, M. J. (1997). "A magma ocean on Vesta: Core formation and petrogenesis of eucrites and diogenites". Meteoritics & Planetary Science. 32 (6): 929–944. Bibcode:1997M&PS...32..929R. doi:10.1111/j.1945-5100.1997.tb01582.x. S2CID 128684062. ^ Drake, M. J. (2001). "The eucrite/Vesta story". Meteoritics & Planetary Science. 36 (4): 501–513. Bibcode:2001M&PS...36..501D. doi:10.1111/j.1945-5100.2001.tb01892.x. S2CID 128394153. ^ Sahijpal, S.; Soni, P.; Gagan, G. (2007). "Numerical simulations of the differentiation of accreting planetesimals with 26Al and 60Fe as the heat sources". Meteoritics & Planetary Science. 42 (9): 1529–1548. Bibcode:2007M&PS...42.1529S. doi:10.1111/j.1945-5100.2007.tb00589.x. S2CID 55463404. ^ Gupta, G.; Sahijpal, S. (2010). "Differentiation of Vesta and the parent bodies of other achondrites". J. Geophys. Res. Planets. 115 (E8): E08001. Bibcode:2010JGRE..115.8001G. doi:10.1029/2009JE003525. S2CID 129905814. ^ Cook, Jia-Rui (29 March 2011). "When Is an Asteroid Not an Asteroid?". NASA/JPL. Archived from the original on 29 June 2011. Retrieved 30 July 2011. ^ Takeda, H. (1997). "Mineralogical records of early planetary processes on the HED parent body with reference to Vesta". Meteoritics & Planetary Science. 32 (6): 841–853. Bibcode:1997M&PS...32..841T. doi:10.1111/j.1945-5100.1997.tb01574.x. ^ Yamaguchi, A.; Taylor, G. J.; Keil, K. (1995). "Metamorphic History of the Eucritic Crust of 4 Vesta". Meteoritical Society. 30 (5): 603. Bibcode:1995Metic..30..603Y. ^ Pieters, C. M.; Ammannito, E.; Blewett, D. T.; et al. (2012). "Distinctive space weathering on Vesta from regolith mixing processes". Nature. 491 (7422): 79–82. Bibcode:2012Natur.491...79P. doi:10.1038/nature11534. PMID 23128227. S2CID 4407636. ^ McCord, T. B.; Li, J.-Y.; Combe, J.-P.; et al. (2012). "Dark material on Vesta from the infall of carbonaceous volatile-rich material". Nature. 491 (7422): 83–86. Bibcode:2012Natur.491...83M. doi:10.1038/nature11561. PMID 23128228. S2CID 2058249. ^ Rayman, Marc (8 April 2015). Now Appearing At a Dwarf Planet Near You: NASA's Dawn Mission to the Asteroid Belt (Speech). Silicon Valley Astronomy Lectures. Foothill College, Los Altos, CA. Archived from the original on 14 November 2021. Retrieved 7 July 2018. ^ Ulivi, Paolo; Harland, David (2008). Robotic Exploration of the Solar System: Hiatus and Renewal, 1983–1996. Springer Praxis Books in Space Exploration. Springer. pp. 117–125. ISBN 978-0-387-78904-0. ^ Russell, C. T.; Capaccioni, F.; Coradini, A.; et al. (October 2007). "Dawn Mission to Vesta and Ceres" (PDF). Earth, Moon, and Planets. 101 (1–2): 65–91. Bibcode:2007EM&P..101...65R. doi:10.1007/s11038-007-9151-9. S2CID 46423305. Archived (PDF) from the original on 27 September 2011. Retrieved 13 June 2011. ^ Cook, Jia-Rui C.; Brown, Dwayne C. (11 May 2011). "NASA's Dawn Captures First Image of Nearing Asteroid". NASA/JPL. Archived from the original on 29 January 2012. Retrieved 14 May 2011. ^ Vega, Priscilla; Brown, Dwayne (16 July 2011). "NASA's Dawn Spacecraft Enters Orbit Around Asteroid Vesta". NASA. Archived from the original on 19 July 2012. Retrieved 17 July 2011. ^ Dawn mission timeline Archived 19 October 2013 at the Wayback Machine ^ Mid-continent Research for Education and Learning: McREL (27 September 2010). "Dawn Mission: Mission". Dawn Journal. Retrieved 29 March 2011. ^ "Dawn has Departed the Giant Asteroid Vesta". NASA JPL. NASA. 5 September 2012. Retrieved 5 September 2012. ^ a b Russell, C. T.; et al. (2013). "Dawn completes its mission at 4 Vesta". Meteoritics & Planetary Science. 48 (11): 2076–2089. Bibcode:2013M&PS...48.2076R. doi:10.1111/maps.12091. ^ Roatsch, Thomas; et al. (2012). "High resolution Vesta High Altitude Mapping Orbit (HAMO) Atlas derived from Dawn framing camera images". Planetary and Space Science. 73 (1): 283–286. Bibcode:2012P&SS...73..283R. doi:10.1016/j.pss.2012.08.021. ^ Roatsch, Thomas; et al. (2013). "High-resolution Vesta Low Altitude Mapping Orbit Atlas derived from Dawn Framing Camera images". Planetary and Space Science. 85: 293–298. Bibcode:2013P&SS...85..293R. doi:10.1016/j.pss.2013.06.024. ^ "NASA's Journey Above Vesta". DLR Institute of Planetary Research video with NASA JPL imagery. NASA. 16 September 2011. Archived from the original on 22 April 2021. Retrieved 18 September 2011. ^ "DLR public Dawn products site". Archived from the original on 16 October 2015. ^ "NASA Dawn". ^ "Dawn Public Data". Dawn [website]. Univ. California, Los Angeles. Retrieved 6 March 2015. ^ Gingerich, Owen (2006). "The Path to Defining Planets" (PDF). Dissertatio cum Nuncio Sidereo Ill. Tertia. Vol. VIII, no. 16. pp. 4–5. Archived (PDF) from the original on 15 March 2015. Retrieved 13 March 2007. ^ "Dawn Mission website of JPL/NASA". 22 October 2018. ^ Bryant, Greg (2007). "Sky & Telescope: See Vesta at Its Brightest!". Retrieved 7 May 2007. ^ "Vesta Finder". Sky & Telescope. Archived from the original on 12 June 2007. Retrieved 7 May 2007. ^ Harrington, Philip S. (21 October 2010). Cosmic Challenge: The Ultimate Observing List for Amateurs. Cambridge University Press. p. 75. ISBN 9781139493680. ^ a b James, Andrew (2008). "Vesta". Southern Astronomical Delights. Retrieved 6 November 2008. ^ a b Yeomans, Donald K.; Chamberlin, Alan B. "Horizons Ephemeris". JPL Solar System Dynamics. Retrieved 9 January 2010. ^ "Elements and Ephemeris for (4) Vesta". Minor Planet Center. Archived from the original on 4 March 2016. ^ "2012 Astronomy Special". Nightskyonline.info. Archived from the original on 20 April 2012. Retrieved 23 November 2012. ^ a b c d T. Flanders – Ceres and Vesta: July 2012 – April 2013 – Sky & Telescope. The Dawn Mission to Minor Planets 4 Vesta and 1 Ceres, Christopher T. Russell and Carol A. Raymond (Editors), Springer (2011), ISBN 978-1-4614-4903-4 Keil, K.; Geological History of Asteroid 4 Vesta: The Smallest Terrestrial Planet in Asteroids III, William Bottke, Alberto Cellino, Paolo Paolicchi, and Richard P. Binzel (editors), University of Arizona Press (2002), ISBN 0-8165-2281-2 Wikimedia Commons has media related to Vesta (asteroid). This video explores Vesta's landscape, history and planet-like characteristics. Interactive 3D gravity simulation of the Dawn spacecraft in orbit around Vesta Archived 11 June 2020 at the Wayback Machine Vesta Trek – An integrated map browser of datasets and maps for 4 Vesta JPL Ephemeris Views of the Solar System: Vesta HubbleSite: Hubble Maps the Asteroid Vesta Encyclopædia Britannica, Vesta – full article HubbleSite: short movie composed from Hubble Space Telescope images from November 1994. Adaptive optics views of Vesta from Keck Observatory 4 Vesta images at ESA/Hubble Archived 22 January 2009 at the Wayback Machine Dawn at Vesta (NASA press kit on Dawn's operations at Vesta) NASA video Archived 22 April 2021 at the Wayback Machine Vesta atlas 4 Vesta at AstDyS-2, Asteroids—Dynamic Site Ephemeris · Observation prediction · Orbital info · Proper elements · Observational info 4 Vesta at the JPL Small-Body Database Close approach · Discovery · Ephemeris · Orbit viewer · Orbit parameters · Physical parameters Portals: Stars Spaceflight Outer space Science Retrieved from " 4 The following pages link to 4 Vesta External tools (link count transclusion count sorted list) · See help page for transcluding these entries Showing 50 items. View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Asteroid (links | edit) Apparent magnitude (links | edit) Comet (links | edit) Classical Kuiper belt object (links | edit) Deep Space 1 (links | edit) Earth (links | edit) Erosion (links | edit) Geology (links | edit) Galilean moons (links | edit) Giant planet (links | edit) Galileo project (links | edit) Interplanetary spaceflight (links | edit) Kuiper belt (links | edit) Human spaceflight (links | edit) Moon (links | edit) Mercury (planet) (links | edit) Meteorite (links | edit) Near-Earth object (links | edit) Oort cloud (links | edit) Olympus Mons (links | edit) Planet (links | edit) Planets beyond Neptune (links | edit) Plutino (links | edit) Planetary nomenclature (links | edit) Ring system (links | edit) Plate tectonics (links | edit) Ruthenium (links | edit) Sun (links | edit) Solar System (links | edit) Space exploration (links | edit) Space colonization (links | edit) Trans-Neptunian object (links | edit) Jupiter trojan (links | edit) Tau Ceti (links | edit) Venus (links | edit) Zodiacal light (links | edit) 1800s (decade) (links | edit) 1807 (links | edit) 433 Eros (links | edit) NEAR Shoemaker (links | edit) Ion thruster (links | edit) Jupiter (links | edit) Geochemistry (links | edit) Callisto (moon) (links | edit) Europa (moon) (links | edit) List of hypothetical Solar System objects (links | edit) Basalt (links | edit) Vulcan (hypothetical planet) (links | edit) Triton (moon) (links | edit) Pluto (links | edit) View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500) Retrieved from " WhatLinksHere/4_Vesta" Figure drawing can, at first, seem like a challenge. However, figure drawings can be broken down into their constituent steps to make the task seem more approachable. In this guide, we'll give you a process to help you improve your figure drawings instantly, to create lively figures with accuracy. Then, we'll also give you some tips to help you understand the anatomy of the figure and how to make your practice more efficient. Disclaimer: Fine Art Tutorials is a reader supported site. When you make purchases through links on this site, we may earn a small commission at no extra cost to you. Edgar Degas: Jockey Figure drawing is the act of drawing a human figure or form. This can be done from life, using a live model, or from reference materials such as photographs or video. Usually the whole figure is included, drawn in various poses and postures, as opposed to just a headshot. Artists will use any kind of drawing media to create a figure drawing, graphite, charcoal and coloured pencil being just three examples. Leon Bakst: Model Figure drawing has been practised by artists for centuries, with the earliest examples dating back to ancient Greece and Rome. It was a crucial skill for artists during the Renaissance period, as they were commissioned to depict religious scenes and portraits of important figures. Today, figure drawing is still a fundamental part of traditional art training and can also be seen in contemporary art, in various styles and mediums. For example, the relatively recent art movement of Classical Realism aims to depict the human figure in a realistic and lifelike way, using traditional drawing techniques and materials. Leonardo da Vinci: The proportions of the human figure (The Vitruvian Man) Leonardo da Vinci is known for his numerous figure drawings, including his famous Vitruvian Man, which explores the proportions of the human body. Michelangelo is also renowned for his figure drawings, as well as his sculptures such as the iconic David. Other notable artists known for their figure drawings include Edgar Degas and Egon Schiele. To create a convincing figure drawing, it is important to have a basic understanding of human anatomy and proportions. This includes knowing the location and function of various muscles and bones, as well as how they interact with each other to create movement. It also involves understanding the general proportions of the figure, such as the size of the head in relation to the torso, legs and rest of the body. This knowledge can help inform the accuracy and realism of your figure drawings, but it also allows for more stylised and expressive interpretations. Whilst it helps to have knowledge of anatomy, it can also help to start a drawing with more simplistic forms, then render details as and when you need them. Check out our guide on the best anatomy books for artists to find a comprehensive list of instructional textbooks and workbooks. There are a number of places to find references for figure drawing, here are just a few. Mannequins (or manikins) are poseable wooden or plastic figures that represent the proportions and range of motion of the human body. You could even use props with your mannequin to help you further develop the reference in order to translate it to your artwork, and position lighting so that the light source is hitting the figure in the same direction as in your drawing. Although mannequins are simple in form, they can be useful as a basic reference. Of course, you may need to supplement details in your figure drawing by looking online at reference images. There are also virtual mannequin software programs available, such as Magic Poser. These digital references allow you to easily pose your mannequin and adjust factors such as lighting in a similar way to using physical mannequins. However, the range of motion on the Magic Poser app is much better than with a regular mannequin. Plus, they have a free web version available that has lots of features and is easy to use. There are a wealth of reference images available online, from photographs to video references. Websites such as Posemaniacs and Line of Action provide free figure drawing references, with a range of different models, poses and lighting setups. Working from a live model is arguably the best way to improve your figure drawing skills. You can observe the figure in real time, capturing the subtleties of movement, lighting and gesture. Many art schools and community centres offer life drawing classes or sessions, often with a variety of models who hold a pose for a set amount of time. Whilst drawing from reference, it is important to remember to measure and sight in order to accurately convey the proportions of the figure in your artwork. This can be done using a pencil or brush, holding it up against the reference image or model in order to gauge size and placement on the page. You could also use gridded paper for more accuracy. The first step in creating a figure drawing is creating a gesture drawing. Gesture drawings serve well as the first step of the process, because it allows the artist to capture the gesture and pose quickly and accurately, before working on filling the rest of the figure in. The first step, then, is to mark the top and bottom of the figure, draw a line halfway between the body vertically and horizontally, as a point of reference. The line of action shows the positioning of the body and how weight is displaced. It should follow the angle of the spine through the torso and through to the leg that the reference is leaning on. The line of action in the drawing above is the darker vertical line that is slightly curved. Mark the angles of the form horizontally to show how the shoulders, hips and knees tilt. From the line of action and these angle lines, you can build the figure. Draw the basic outline of the figure and outline the main shadow masses. Because we've already mapped out the positioning of the main joints and angles of the body's position, it's mainly a case of joining it all up. Next draw the halftones of the figure, then slowly increase the contrast in areas that are darker. Use a tortillion to blend the midtones into the lighter areas and the shadows into the midtones. Continue refining the light and dark areas to create a three dimensional appearance. You can add as many details as you see fit. Try using some alternative shading techniques, like cross hatching or stippling to add interest to the drawing. Set a timer for 2-5 minutes and do quick gesture drawings of a figure, focusing on capturing the action and movement rather than rendering details. Repeat this exercise with different poses and references. Take a break from references and try creating figures based on imagination and memory. This can help improve understanding of anatomy and proportions, as well as allowing for more creative figure drawings. Challenge yourself by incorporating foreshortening or dynamic poses into your imaginative figure drawings, or try drawing complicated clothing and textures. Keep practising and experimenting to continue improving your figure drawing skills. For further study, there are a variety of books to read, 'Figure Drawing Atelier: Lessons in the Classical Tradition: An Instructional Sketchbook' by Juliette Aristides is a fantastic workbook. Juliette offers insight into the atelier approach and methods that show artists how to successfully draw the figure. Another great book is 'Figure Drawing for Artists: Making Every Mark Count' by Steve Hutson. This book will walk you through drawing a figure from start to finish, from the very first marks you make on the page. Learn the elements of drawing, from the structure to gestures and perspective, so you can confidently capture the form of your subject in your drawings. Taking figure drawing classes with a live model is an excellent way to improve your skills and acquire knowledge of anatomy and proportions. However, there are various online courses available on Skillshare. This comprehensive Skillshare course: 'Gesture / An Introduction to the Art of Figure Drawing' by Brent Eviston covers everything, from the line of action, to rendering each part of the body, to shading in the light and shadow. This is a popular drawing course and offers over 11 hours worth of instruction. Learn from anatomical diagrams and photographs and receive award winning instruction. If you're interested in learning more about drawing, check out our complete list of drawing tutorials. Figure drawing can, at first, seem like a challenge. 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In this comprehensive guide, we will take you from stick figures to masterpieces by exploring the art of drawing the human figure. Whether you are a beginner or have some experience, you will find valuable tips and techniques to enhance your artistic abilities. Drawing the human figure can be challenging, but with the right guidance, anyone can achieve impressive results. This guide will cover everything from fundamental anatomy to capturing realistic proportions and adding depth and dimension to your drawings. We will dive into the intricacies of facial features, body proportions, and different poses to elevate your figure drawing game. Join us on this artistic journey as we unravel the secrets behind creating lifelike and expressive human figures on paper. With our step-by-step instructions and insightful tips, you will gain the confidence to bring your drawings to life. So grab your sketchbook, sharpen your pencils, and let's embark on this creative adventure together! Keywords: drawing the human figure, comprehensive guide, improve, skills, tips and techniques.Portraits, comic strips, clothing designs, or even a child's drawing - whatever you want to draw, someday you might need to depict humans. Despite the prevalence, people make many mistakes or may have no idea how to draw humans at all. Others think that they will not succeed because it seems difficult. But ready-made schemes and a bit of practice makes everything possible! Portraits, comic strips, clothing designs, or even a child's drawing - whatever you want to draw, someday you might need to depict humans. Despite the prevalence, people make many mistakes or may have no idea how to draw humans at all. Others think that they will not succeed because it seems difficult. But ready-made schemes and a bit of practice makes everything possible! In this article you will learn how to portray a human figure from scratch, choose proper materials for drawing and know the difference between female and male figures. Moreover, we will analyze the basic points of drawing a face. In this article you will learn how to portray a human figure from scratch, choose proper materials for drawing and know the difference between female and male figures. Moreover, we will analyze the basic points of drawing a face. WHAT HUMAN DRAWING BEGINS WITH Any sketch and drawing always begins with selecting the style and choosing the materials for it. First, think about what exactly you want to draw. This way you will decide on your drawing technique and materials you need to get started. Then comes the choice of material. Beginners are better to begin with a graphite pencil. It is easier to use when erasing supportive lines, does not require any special skills and is pretty affordable. 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There is also a similar course for drawing on a tablet. These courses are designed both for complete beginners and for those who already have a basic understanding of drawing. If you have already selected the style, technique and materials, then it's time to move on to the simplest step-by-step human drawing tutorials. It is important not only to observe all proportions of the person, but also to properly place your figure(s) on paper so that all other objects fit and have comparable sizes with a figure. If you have already selected the style, technique and materials, then it's time to move on to the simplest step-by-step human drawing tutorials. It is important not only to observe all proportions of the person, but also to properly place your figure(s) on paper so that all other objects fit and have comparable sizes with a figure. DRAWING HUMANS WITH GRAPHITE PENCIL Now we know that the easiest way to start your experience of drawing a human is using a graphite pencil and a piece of paper. If you haven't done any drawing before, a course for beginners is a great way to learn the basics of working with a graphite pencil. This is an excellent opportunity to learn how to distinguish pencils by hardness, acquire simple shapes and figures, discover how to create simple drawings and, among other things, draw a human figure.It is best to start with HB, i.e. a medium-hard pencil. All other pencils are important for drawing details, adding shadows and shadows, applying different shades for different lines. Pencils of different hardness are used for drawing details, adding shadows and halftones and applying shades for various lines. Now we know that the easiest way to start your experience of drawing a human is using a graphite pencil and a piece of paper. If you haven't done any drawing before, a course for beginners is a great way to learn the basics of working with a graphite pencil. This is an excellent opportunity to learn how to distinguish pencils by hardness, acquire simple shapes and figures, discover how to create simple drawings and, among other things, draw a human figure.It is best to start with HB, i.e. a medium-hard pencil. All other pencils are important for drawing details, adding shadows and shadows, applying different shades for different lines. Pencils of different hardness are used for drawing details, adding shadows and halftones and applying shades for various lines. Well, prepare your HB pencil and get ready to draw. To depict a human you must know basic anatomical proportion rules: Well, prepare your HB pencil and get ready to draw. To depict a human you must know basic anatomical proportion rules: The arms end in the middle of the thigh line;The knee is right in the middle of the leg;The elbows are aligned with the waist line;The width of an adult's shoulders is approximately equal to the size of two head lengths;The legs are four times the length of the head;The hips in women are equal to 1.25 size of the head, and in men 1.5. The arms end in the middle of the thigh line;The knee is right in the middle of the leg;The elbows are aligned with the waist line;The width of an adult's shoulders is approximately equal to the size of two head lengths;The legs are four times the length of the head;The hips in women are equal to 1.25 size of the head, and in men 1.5. These basic rules can easily be remembered when you draw a human from a ready-made scheme. These basic rules can easily be remembered when you draw a human from a ready-made scheme. Draw a vertical axis and divide it into 9 equal segments. These are auxiliary lines that help maintain the correct proportions of the body. The top segment is for the head, respectively, it ends with the neck line. The hip line is fifth if counted down from it. Usually it is located just below the fourth line. In this way you observe the proportionality of the legs and head size. Leave the bottom segment for the feet and divide the rest in half. The dividing line is for the knees. The middle of the torso is for the waist and elbow lines, respectively. Sketch the clothing outline. Then your figure will attain a realistic look. Add folds to make the clothes look natural. Now draw the hands and feet. It's easier to draw a person with his arms behind his back, so there is no need to draw the hands and fingers, which can be quite difficult for a beginner. Moving on to the face. We will talk about this in more detail later. Remove the auxiliary lines that make your drawing sloppy and indistinct. Human figure is done! THE DIFFERENCE BETWEEN FEMALE AND MALE FIGURES The step-by-step tutorials are universal and are suitable for both male and female figures. But the faces and proportions of a male and a female are still different. First such thing is the width of the hips. As it has been said before, the hips in women are equal to 1.25 size of the head, and in men 1.5. Females are usually drawn with a curved shoulder line, which makes the image more delicate and fragile. Male figures are more masculine when female figures have specific feminine curves. Those features mostly depend on the artist's wishes.The faces of people of different sexes vary considerably. Males usually have a larger face, which is squared at the top and has sharp angles at the bottom, whereas a female portrait is characterized by curved forehead, cheek and neck outlines. The step-by-step tutorials are universal and are suitable for both male and female figures. But the faces and proportions of a male and a female are still different. First such thing is the width of the hips. As it has been said before, the hips in women are equal to 1.25 size of the head, and in men 1.5. Females are usually drawn with a curved shoulder line, which makes the image more delicate and fragile. Male figures are more masculine when female figures have specific feminine curves. Those features mostly depend on the artist's wishes.The faces of people of different sexes vary considerably. Males usually have a larger face, which is squared at the top and has sharp angles at the bottom, whereas a female portrait is characterized by curved forehead, cheek and neck outlines. The eyebrows are different as well. Females tend to have thinner and neater eyebrows as they take more care of their face and pluck their eyebrows. Moreover, males are generally much more hairy. You should definitely take this aspect into account.When depicting females' eyes, it is important to pay special attention to the eyelashes. They have to be longer and more rounded than in males. It is due to the fact that females emphasize their eyes with makeup.Generally speaking, all these features are very individual, especially when drawing from life, because everybody has unique faces and figures. The eyebrows are different as well. Females tend to have thinner and neater eyebrows as they take more care of their face and pluck their eyebrows. Moreover, males are generally much more hairy. You should definitely take this aspect into account.When depicting females' eyes, it is important to pay special attention to the eyelashes. They have to be longer and more rounded than in males. It is due to the fact that females emphasize their eyes with makeup.Generally speaking, all these features are very individual, especially when drawing from life, because everybody has unique faces and figures. The most important part of any human image is their face. It is the face that reflects the person's emotions and feelings, conveys the mood and turns your drawing into a real portrait, creating the effect of presence. Many artists spend years building up skills in portraying a face. Our pastel painting course devotes special attention to drawing faces. But if we're not talking about precise face depicting. Our task is to give a personality to a human using the step-by-step tutorials. This way you can learn how to draw a face from scratch easily and quickly. The most important part of any human image is their face. It is the face that reflects the person's emotions and feelings, conveys the mood and turns your drawing into a real portrait, creating the effect of presence. Many artists spend years building up skills in portraying a face. Our pastel painting course devotes special attention to drawing faces. But if we're not talking about precise face depicting. Our task is to give a personality to a human using the step-by-step tutorials. This way you can learn how to draw a face from scratch easily and quickly. Same as with a figure, any face also has specific proportions, knowing which you can build an anatomically correct image. Auxiliary axes are often used for this purpose. There are two main axes. Draw a horizontal line that divides the face oval in half. This line is for the eyes. A vertical axis is the axis of symmetry. To draw a complete face, we need three more auxiliary lines. Draw horizontal lines to divide your face into 3,5 parts. The upper line is for the hairline, the second one is for the eyebrows, and the last one is for the nose, respectively.The only thing left is to draw the mouth. Divide the lower part, which is the distance from the nose to the chin, in half. That is the line of the bottom lip. Everyone knows that the eyes are the mirror of the soul, so they should look as realistic as possible. It is important that the distance between the eyes was equal to the width of one eye. To do so, you need to divide the eye line into 8 equal segments, each eye will then occupy 2/8 of that distance and the indents from the edges will be 1/8. Same as with the figure, all auxiliary lines must be erased after the drawing is completed. Same as with a figure, any face also has specific proportions, knowing which you can build an anatomically correct image. Auxiliary axes are often used for this purpose. There are two main axes. Draw a horizontal line that divides the face oval in half. This line is for the eyes. A vertical axis is the axis of symmetry. To draw a complete face, we need three more auxiliary lines. Draw horizontal lines to divide your face into 3,5 parts. 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It is not a surprise that a child wishes to draw themselves, their mother or a cartoon character Elsa so that everyone understands who that is at once. Children do not seek to recreate a realistic image, but to bring life to the imaginary little humans with the help of different colors and imagination. For a child, it may be difficult to create a scheme divided into equal parts, calculate proportions and draw axes. Therefore, you may use a simplified version by sacrificing the realism of the resulting drawing. Thus, to draw a boy or a girl the child needs to remember that they should always visually divide their human into a few segments: head, torso and legs. They can start from an oval for the head, then leave some space for the neck and outline two rectangles that are going to be the torso and legs of the human. Help your child to place these simple shapes correctly so that the neck is not way too long or missing at all, and the legs are not shorter than the head. Next, work with the torso outline to make it more rounded and separate the legs (it is better to start with basic pants). Then draw the arms with the sleeves on, and don't forget about the hands and feet. These can be schematically drawn with small circles. When the child learns how to draw those well, then it is high time to gradually move on to the step-by-step tutorials for adults above. Many children adore drawing. When drawing they embody their most darling fantasies on paper, bring their favorite cartoon characters to life and draw their families. It is not a surprise that a child wishes to draw themselves, their mother or a cartoon character Elsa so that everyone understands who that is at once. Children do not seek to recreate a realistic image, but to bring life to the imaginary little humans with the help of different colors and imagination. For a child, it may be difficult to create a scheme divided into equal parts, calculate proportions and draw axes. Therefore, you may use a simplified version by sacrificing the realism of the resulting drawing. Thus, to draw a boy or a girl the child needs to remember that they should always visually divide their human into a few segments: head, torso and legs. They can start from an oval for the head, then leave some space for the neck and outline two rectangles that are going to be the torso and legs of the human. Help your child to place these simple shapes correctly so that the neck is not way too long or missing at all, and the legs are not shorter than the head. Next, work with the torso outline to make it more rounded and separate the legs (it is better to start with basic pants). Then draw the arms with the sleeves on, and don't forget about the hands and feet. These can be schematically drawn with small circles. When the child learns how to draw those well, then it is high time to gradually move on to the step-by-step tutorials for adults above. Did you like the article? Visit our website and choose your drawing course! Published by Armored Pencil on 22 September, 2023 Last Updated on 29 November, 2024 by Armored Pencil I'm seeing more and more visits coming to this post and I realized that this was not as elaborate as other posts. As I am digging more into this subject myself I am going to grow this page with learnings and other finds that could help fellow artists. Updated since 10-09-2024 Armored Pencil Drawing the human figure is a foundational skill for artists, whether you're a beginner or an experienced illustrator. The human body is a complex and fascinating subject, filled with intricate forms and subtle nuances that can seem daunting to capture on paper or screen. In this short guide, we will break down the process of drawing the human figure into manageable steps, demystifying the art of figure drawing and providing you with the tools to confidently bring the human form to life in your artwork. Quickposes: A tool designed for timed practice, it includes facial expressions as part of its vast reference database. JustSketch.Me: A 3D modeling tool that allows you to adjust facial expressions on digital characters, providing a customizable reference for artists. Another cool thing I found is the book "Figure drawing for all it's worth" by Andrew Loomis: which can be downloaded right here. Although I do recommend actually buying the book as a physical copy allows you to read it, experiment with it on paper and have it next to you when you draw. Before we delve into the drawing process, let's discuss the materials and tools you'll need for successful figure drawing: Paper: Start with a good-quality sketchbook or drawing paper. You can choose between smooth or textured paper, depending on your preferred style. Pencils: A range of pencils from H (hard) to B (soft) and charcoal pencils for shading will be essential. Erasers: Invest in both kneaded and vinyl erasers for precision erasing. Drawing Mannequin or Reference: Having a drawing mannequin or access to human figure references (photographs or life drawing sessions) is extremely helpful. Ruler and Protractor: These tools can help maintain accurate proportions and angles in your drawings, but it's probably best to do without them! Or just a digital equivalent of all the above. Now, let's move on to the step-by-step process of drawing the human figure. Begin with simple shapes to establish the basic proportions of the human figure. Start with an oval for the head and an elongated oval for the torso. Draw a vertical line down the center to represent the body's midline. Sketch a stick figure skeleton over your basic shapes. This will serve as the framework for your figure. Pay attention to the proportions of body parts like arms, legs, and the spine. The head typically fits around 7-8 times into the height of the total body. Now, flesh out your figure by adding basic muscle shapes. Study anatomy references to understand how muscles and bones interact. Keep your lines loose, and don't worry about details just yet. Refine the details of the face, hands, and feet. Pay close attention to the placement and size of facial features. And the positioning of fingers and toes. Start shading your figure to give it depth and volume. Use a range of pencils to achieve different tones. Pay attention to the direction of light and shadow to make the figure look three-dimensional. Add finer details like wrinkles, hair, and clothing. Pay attention to the texture of the skin and fabrics. Use various line weights and techniques to create texture and depth. Take a step back and evaluate your drawing after each step. Make any necessary corrections to proportions, anatomy, or shading before you continue. Use your erasers to clean up any smudges or unwanted lines. Drawing the human figure is a skill that requires practice and patience. Breaking down the process into these manageable steps. Continually studying anatomy and real-life references, you can improve your figure-drawing abilities over time. Remember that practice is the key to success! So, keep your sketchbook handy, and don't be afraid to explore different styles and techniques. Whether you aspire to create lifelike portraits or stylized character art, mastering the art of figure drawing will undoubtedly enhance your artistic repertoire. Need some tutorials? Below is an excellent course I took that can help you significantly! SPONSORED MESSAGE Half price $29 instead of $59 – 51% OFF I'm focussing more on studying the human figure now and absorbing what ever resource is on my list. The book from Jack Faragasso "Mastering Drawing the human figure. From Life, Memory & Imagination" is a highly recommended one by other artists! If you want a physical copy of the book Andrew Loomis "Figure Drawing for All It's Worth" you can buy it here. You can find the PDF at the top of this blog.

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