I'm not a bot



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What Is the Significance of the Melodic Minor Scale? The Melodic Minor scale is an essential concept in classical music theory, traditionally taught as a scale that ascends in a specific melodic motion and descends using the natural minor (Aeolian mode). The name "Melodic Minor" stems from this emphasis on the scale's melodic direction, making it
unique in Western 12-tone music. Unlike most scales, it shifts based on its motion, a characteristic that finds broader application in Indian classical music, where this type of melodic change is more prevalent. However, the significance of the melodic minor scale extends beyond this classical definition. Rather than being just an altered form of the
natural minor scale, the melodic minor stands as a versatile 7-note scale system. What sets it apart is its unique harmonic potential, which makes it an invaluable tool for composers and improvisers alike. One important feature of the melodic minor scale is that it is the only other scale, besides the major scale, that is composed entirely of whole and half
steps, without consecutive half steps. This results in a familiar, yet distinctly different sound from the major scale, which creates similar harmonic structures but introduces a fresh set of emotional and musical possibilities. This subtle difference makes the
melodic minor scale a powerful resource for creating unique melodies and harmonies. Another key aspect of the melodic minor scale is that it contains a built-in pentatonic scale. This pentatonic scale, derived from the 4th, 5th, 6th, root, and 2nd notes of the melodic minor, provides a simplified, consonant framework that musicians
can use to create fluid and open-sounding melodies. Pentatonic scales avoid the tension-creating minor 2nd and tritone intervals, making them universally appealing and easy to play. For guitarists, the melodic minor scale offers a wealth of possibilities. In standard tuning, the open strings of the guitar form a pentatonic scale, which means that the
harmonic structures derived from the melodic minor scale are readily accessible. This makes exploring the melodic minor scale particularly intuitive for guitar players looking for an alternative to the major scale are readily accessible. This makes exploring the melodic minor scale are readily accessible. This makes exploring the melodic minor scale are readily accessible.
close relationship to the major scale, combined with its subtle differences, gives musicians a powerful tool for exploring new musical territories. Whether you're looking for fresh harmonies or just an alternative to the major scale, the melodic minor scale is an indispensable resource. by Henry Bahrou - Guitarist, Music Theorist, Music Academy Director
Guitar Lessons in Brighton How To Memorize Major Scales - Book The Melodic Minor Scale? This great scale to use for ii-V-I progressions or while holding minor chord in the left hand. I have said that it is one of the most important scales to learn, because it is a parent scale to many modes, such as the Super Locrian Scale. To play the Melodic Minor
Scale you only need to flatten the 3rd note of the regular major scale. Notes below: C - D - Eb - F - G - A - B It would seem that what gives this scale its unique sound is the natural 6th and 7th notes contrasted AGAINST the flattened 3rd. Here is a sound of the
melodic minor scale: The reason you need to learn the Melodic Major scale is because is a parent scale to other scales. In other words, several other scales come from the Melodic Minor Scale, called the
Dorian b2.But as far as I'm concerned, its still the Melodic Minor Scale (in C)Lydian Dominant (Mixolydian #4) Altered Scale (Super Locrian)hold a minor chord in the left, start from
the 5th note of the scale for a nice soundbegin a ii-V-1 progression, then start the Melodic Minor Scale while ending the scale on the IOr just need a scale to play (start on the 3). See the last video on this page!!If you want to practice this scale I have a video below showing just one
of the ways I practice the scale. I begin by showing the notes of the scale in C. Then I show the notes to the melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic scale in G. After that we show a video where a jazz artist plays a G melodic sc
its not knowing the SCALE that is important. Learning to play the scale is only the FIRST STEP, in the second step the EAR must recognize the SHAPE and sound of the scale regardless of key (difficult for most), the third step is hearing when to use it appropriately (even more difficult). Don't run from challenges folks. Embrace it!!!!!! The Melodic
Minor Scale differs from the Natural Minor Scale by the sixth and seventh notes, which are raised one semitone (see scale degree overview below). This scale is kind of peculiar since it is sometimes played differently ascending and descending and descending and descending. Jazz: The sixth and seventh notes are always raised, exactly as the pictures below illustrate. This is the most
(descending): A, B, C, D, E, F, G, A Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): B, C#, D, E, F#, G, A, B Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): Bb, C, Db, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes (ascending): C, D, Eb, F, G, A, B Notes
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Melodic Minor Scales overview (auxiliary notes in descending scale in parentheses) A: A, B, C, D, E, F#, G#, A4 (Ab), B (Bb), C C#/Db: C#, D#, E, F#, G#, A4 (Ab), B (Bb), C C#/Db: C#, D#, F, G, A, B (Bb), C B, B (Bb), C B
(C#), D# E: E, F#, G, A, B, C# (C), D# (D), E F: F, G, Ab, Bb, C, D (Db), E (Eb), F F#/Gb: F#, G#, A, B, C#, D# (D), F (E), F# G: G, A, Bb, C, D (Eb), F# (F), G G#/Ab: G#, A#, B, C#, D#, F (E), G (F#), G# Intervals and steps Intervals: 1, 2, b3, 4, 5, 6, 7 Semitones: 2 - 1 - 2 - 2 - 2 - 2 - 1 Formula: Whole, 
Melodic Minor scales in musical notation are available in the member area. The scale in all keys can be downloaded as a PDF-file. When learning music theory and scales, the first one that most people learn about is a major scale, but they are just one type of many different musical scales. Each scale uses a different formula of intervals and has a completely different sound and feel. Some sound happy, some sound mysterious, and some sound sad or melancholy. In this post, I'll be covering everything you need to know about minor scales, including the different types and how we form them. We tend to say that major scales have a 'happier' and 'cheerier' sound, whereas minor scales have a
  'darker' and 'sadder' sound. Minor scales have a different formula of tones and semitones (whole steps and half steps) to major scales. The main difference is that all minor scales have the third note of the scale 'flattened'. By flattened, I mean that the third note is lowered by one semitone or half step. Study bass has written a good post going into more
details about the difference between major and minor scales, where there is only one type to know about, minor scales that we'll look at are: The natural minor scales have three variations. The three types of minor scales that we'll look at are: The natural minor scales have three variations. The three types of minor scales have three variations. The three types of minor scales have three variations. The three types of minor scales have three variations. The three types of minor scales have three variations. The three types of minor scales have three variations.
but have some slight differences after that. Side note: Melodic and harmonic minor scales have nothing to do with melodic and harmonic minor scale we'll look at is the natural minor scale we'll look at
natural minor scale descendingWe can use this combination of semitones and tones to form a natural minor scale Starting on D:D natural minor scale this time starting on E:E natural minor scale The natural minor scale Starting on D:D natural minor scale Starting St
interval that is a tone and a half or three semitones. So using this order of tones and semitones we can construct a harmonic minor scale descending harmonic minor scale ascending harmonic minor scale harmonic minor scale ascending harmonic minor s
the 7th degree of the scale is one semitone higher. In A natural minor it's a G natural but in the harmonic minor scale starting on any note. For example here is D harmonic minor scale harmonic minor scale starting on any note. For example here is D harmonic minor scale starting on any note. For example here is D harmonic minor scale harmonic minor scale starting on any note. For example here is D harmonic minor scale harmonic minor scale harmonic minor scale starting on any note.
minor scaleNow onto the third type of minor scale which is the melodic minor scales are quite different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as they use different from natural and harmonic minors as the following from the following from the following from the following from the following f
scale structure of the Ascending Melodic Minor Scale are Do-Re-Me-Fa-So-La-Ti-Do. Always. No matter what key you are in. The only thing that changes when you change keys are the letter names. Notice that this is identical to the Company of the Ascending Melodic Minor Scale are Do-Re-Me-Fa-So-La-Ti-Do. Always. No matter what key you are in. The only thing that changes when you change keys are the letter names. Notice that this is identical to the Company of the Ascending Melodic Minor Scale are Do-Re-Me-Fa-So-La-Ti-Do. Always.
 natural minor scale. The scale structure of the Descending Melodic Minor Scale is 1-b7-b6-5-4-b3-2-1. Always. No matter what key you are in. The only thing that changes when you change keys are the letter names.
Reading, playing, and singing the Solfege Syllables out loud is an extremely effective way to tune up your ears and to internalize the unique sound-feeling of each Solfege Syllable to make a meaningful impression on your mind's
ear. Note: We could sing lots more musical patterns, but a more efficient approach (the 80-20 Principle) is to get your ear training Subscribe to get the latest posts sent to your email. Here you can learn how to play the Melodic Minor
Scale in the key of A on the Piano. As well as the scale notes, degrees and patterns of the A Melodic Minor Scale mapped out onto the Piano keyboard and switch between the notes, degrees, intervals or, if we
have them, suggested Piano fingerings. S = Semitone, T = Tone (2 Semitones) S = Semitone, T = Tone (2 Semitones) S = Semitone, S =
(P8)NotesSemitonesIntervalA > A0Perfect Unison (P1)A > G2Major 2nd (M2)A > F4Major 3rd (M3)A > E5Perfect 4th (P4)A > D7Perfect 5th (P5)A > C9Major 6th (M6)A > B10minor 7th (m7)A > A12Perfect Octave (P8)Where provided, you can use the alternative first or last fingering shown in (brackets) when playing only one octave, or starting/ending
about the scale degrees, intervals, relative and parallel keys or see the notation for this scale?Learn more about A Melodic Minor Scale. The chords are in degree order and shown in Roman numerals (lowercase = minor/diminished, uppercase = Major/Augmented). The Solution
 below shows the A melodic minor scale notes, intervals and scale degrees on the piano, treble clef and bass clef. The Lesson steps then describe how to identify the A melodic minor scale note interval positions, choose the note names and scale degree names. For a quick summary of this topic, have a look at Melodic minor scale. This step shows the
circle of 5ths, this means that this is a commonly used melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is C4A-perf-4thThe 4th note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is C4A-perf-4thThe 4th note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A melodic minor scale is A2A-maj-2ndThe 2nd note of the A2A-maj-2ndThe 2nd
names are shown below on the treble clef followed by the bass clef. The stave diagrams above show the scale notes without a key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff. For the key signature, with the sharp / flat adjustments inserted before each note on the staff.
at the A melodic minor scale 4B is the subdominant of the A melodic minor scale 5E is the dominant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A melodic minor scale 6F# is the submediant of the A 
the A melodic minor scale 7G# is the leading tone of the A melodic minor scale and the A melodic minor scale are raised by one half-tone / semitone. So whereas the A natural minor scale are raised by one half-tone / semitone.
minor scale has notes F, G for the 6th and 7th notes, these notes are raised to arrive at notes F#, G# for this melodic minor scale on the piano, treble clef and bass clef. The difference between the two types of melodic minor descending variations are explained in steps
6 and 7 of the Lesson steps below. A melodic minor scale reverse descending No. 1234567 Note G#F#EDCBA Bass Clef Treble ClefThis step shows the A melodic minor scale on the piano, treble clef and bass clef, using the natural minor scale descending No. 1234567 Note GFEDCBA Bass Clef Treble ClefThis step shows the A melodic minor scale on the piano, treble clef and bass clef, using the natural minor scale descending No. 1234567 Note GFEDCBA Bass Clef Treble ClefThis step shows the A melodic minor scale on the piano, treble clef and bass clef, using the natural minor scale descending No. 1234567 Note GFEDCBA Bass Clef Treble ClefThis step shows the A melodic minor scale on the piano, treble clef and bass clef, using the natural minor scale on the piano of the piano
ClefThis step shows the white and black note names on a piano keyboard so that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps, and to show that the note names are familiar for later steps.
 key could have a flat(b) or sharp(#) accidental name, depending on how that note is used. In a later step, if sharp or flat notes are used, the exact accidental names will be chosen. The audio files below play every note shown on the piano above, so middle C (marked with an orange line at the bottom) is the 2nd note heard. Bass Clef Treble ClefThis step
 shows an octave of notes in the key of A, to identify the start and end notes of the scale. Note 1 is the tonic note - A, and note 13 is the same note name but ones are those that might be used in the key of A, it is certain that notes 1 and 13 will be used in the scale. Note 1 is the tonic note - A, and note 13 is the same note name but ones 1 and 13 will be used in the scale.
either white or black. To count up a Half-tone (semitone), count up from the last note up by one physical piano key, either white or black. The tonic note, having the same name as the tonic note. A melodic minor scale note
give assign names to the piano keys identified in the previous step, so that they can be written on a note staff in the Solution section. The 7 unique notes in a scale need to be named such that each letter from A to G is used once only, so each note name is either a natural white name (A.. G), a sharp(eg. F#) or a flat(eg. Gb). The rule ensures that every
position of a staff is used once and once only - whether that position be a note in a space, or a note on a line. This is needed to ensure that when it comes to writing the scale notes on a musical staff (eg. a treble clef), there is no possibility of having 2 G-type notes, for example, with one of the notes needing an accidental next to it on the staff (a sharp,
 flat or natural symbol). To apply this rule, firstly list the white key names starting from the tonic, which are shown in the scale so far, shown in the scale note name in the Scale note name. If the natural white note can be found in the scale so far, shown in the natural white note name in the Scale note name. If the natural white note can be found in the scale so far, shown in the natural white note name in the scale note name. If the natural white note can be found in the scale so far, shown in the scale note name. If the natural white note name in the scale natural white note name in the scale natural white note name in the scale natural white note name. If the natural white note name in the scale natural white note name in the scale natural white natural white note name in the scale natural white note name in the scale natural white natur
note, the scale note is written in the Match? column. The 8th note - the octave note, will have the same name as the first note, the tonic note. For this melodic minor scale, all notes have a match, and so the Match? column shows the melodic minor scale, going from the
 highest note sound back to the starting note, by reversing the ascending note names. The first variation for descending note sis to just reverse the ascending note sand note names as shown below. This descending note sand note names as shown below. This descending note sand note names. The first variation for descending note sand note names as shown below. This descending note sand note names as shown below. This descending note sand note names. The first variation is mostly used in non-classical music eg. Jazz, but is occasionally used in classical. A melodic minor scale reverse
descending No.1234567 NoteG#F#EDCBA Bass Clef Treble ClefThis step shows the notes when descending notes from the highest note sound back to the starting note, using the natural minor scale, as
 shown below. This descending note variation is often used in classical music. A melodic minor scale classical descending No. 1234567 Note GFEDCBA Bass Clef Treble ClefThis step shows the A melodic minor scale degrees - tonic, supertonic, mediant, subdominant, dominant, submediant, leading note / tone, and octave. In music theory, each note in this
scale has what is called a scale degree name, which describes the relationship of that note to the tonic(1st) note. Scale degree names 1,2,3,4,5,6, and 8 below are always the same for all major and minor scales (ie. 1st note is always tonic, 2nd is supertonic etc.), but obviously the note names will be different for each scale / key combination. In the
melodic minor scale, the 7th note is called the leading note or leading tone because the sound of the 7th note is only 1 half-tone / semitone away from the 8th note - the octave note. The A major scale and A ma
harmonic minor scale scales share the same property - they both have only one half-tone / semitones, two notes on the piano keyboard) between the 7th and 8th notes, and the 7th note does not lean towards the 8th note in the same way. In
this case, the 7th note is called the subtonic. A melodic minor scale degrees Note no. Degree name 1 as the tonic of the A melodic minor scale 4D is the subdominant of the A melodic minor scale 6F# is the
submediant of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the A melodic minor scale 8A is the leading tone of the leading tone of the A melodic minor scale 8A is the 
Cumming (20 July 1848 - 20 May 1930) was a Scottish landowner, soldier and socialite. He was the central figure in 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 deep their case he married an American heiress, but their relationship was unhappy.
 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 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 Vatican Taekwondo has no registered athletes or coaches? ... that Iceland's entry for Eurovision in 2025 brought out
a line of Ash Wednesday costumes? Archive Start a new article Muhammadu Buhari (pictured) dies at the age of 82. Clashes between Druze militias and the Syrian Armed Forces result in hundreds of deaths. The International Criminal Court issues arrest warrants for Taliban leaders
 Hibatullah Akhundzada and Abdul Hakim Haqqani over their alleged persecution of women in Afghanistan. Flooding in Central Texas, United States, leaves at least 140 people dead. 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. 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. 1971)Bruce Lee (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 kilometer (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). 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
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some of the largest are listed below. 1,000,000+ articles וואַ העובים Deutsch Español וואַ ברית Erançais Italiano Nederlands 日本語 Polski Português Pyccкий Svenska Українська Tiếng Việt 中文 250,000+ articles Bahasa Indonesia Bahasa Melayu Bân-lâm-gú Български Català Ceština Dansk Eesti Eλληνικά Esperanto Euskara וואַ ליינוים און ברית באונים ליינוים און ברית באונים באינים באונים באונים
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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
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year starting on Thursday of the Gregorian calendar and a common year starting on Tuesday of the 2nd millennium, the 7th year of the 2nd millennium, the 7th 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 States Other topics Rail transported 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 States Other topics Rail transported in localized use until 1923.
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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 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 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 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 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 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 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 aggression plays a role in the run-up to the War of 1812. July 5 - A disastrous British aggression plays a role in the run-up to the War of 1812.
 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 - Nicephore Niepce is awarded a patent by Napoleon Bonaparte for the Pyréolophore, the world's first internal
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 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 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 States
 Congress passes the Embargo Act, a trade embargo on all foreign nations. Battle of Hingakaka between two factions of Maori people, the largest battle ever fought the Battle of Moremonu, first of the Musket Wars. Robert E. Lee January 13 - Napoleon Bonapar
Buford, American general, railroad executive (d. 183) January 19 - Robert E. Lee, American Confederate general (d. 1870) January 28 - Robert McClure, Irish-born Arctic explorer (d. 1882)[13] March 1 -
Wilford Woodruff, American religious leader (d. 1898) March 14 - Josephine of Leuchtenberg, Queen of Sweden and Norway (d. 1870) April 2 - William F. Packer, American politician (d. 1865) April 26 - Charles Auguste Frossard, French general (d. 1870) April 20 - John Milton, Governor of Florida (d. 1865) April 26 - Charles Auguste Frossard, French general (d. 1870) April 20 - John Milton, Governor of Florida (d. 1865) April 27 - William F. Packer, American politician (d. 1870) April 28 - John Milton, Governor of Florida (d. 1870) April 28 - John Milton, Governor of Florida (d. 1870) April 29 - John Milton, Governor of Florida (d. 1870) April 29 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) April 20 - John Milton, Governor of Florida (d. 1870) 
1875) May 28 - Louis Agassiz, Swiss-born zoologist and geologist (d. 1873) June 6 - Adrien-François Servais, Belgian musician (d. 1886) June 16 - John Westcott, American surveyor and politician (d. 1886) June 16 - John Westcott, American surveyor and politician (d. 1886) August 15 -
Jules Grévy, 4th President of France (d. 1879) September 2 - Fredrika Runeberg, Finnish writer (d. 1879) September 7 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 16 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 7 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 16 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 17 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 16 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 17 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 16 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 17 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 16 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 17 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 16 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 17 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 17 - Henry Sewell, 1st Premier of New Zealand (d. 1879) September 18 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 18 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 18 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 18 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 18 - John Lenthall, American naval architect and shipbuilder (d. 1879) September 18 - John Lenthall (d. 1879) September 18 - Jo
 1882) October 8 - Harriet Taylor, English philosophical writer (d. 1858)[15] October 26 - Barbu Catargiu, 1st Prime Minister of Romania (d. 1862) 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. 1893) December 17 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 17 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 17 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 17 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 17 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 17 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 17 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 18 - Friedrich Traugott Kützing, German pharmacist, botanist and phycologist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf Whittier, American Quaker poet and abolitionist (d. 1893) December 19 - John Greenleaf
February 27 - Louise du Pierry, French astronomer (b. 1739) May 10 - Jean-Baptiste Donatien de Vimeur, comte de Rochambeau, French soldier (b. 1698) April 4 - Jérôme Lalande, French soldier (b. 1739) May 10 - Jean-Baptiste Donatien de Vimeur, comte de Rochambeau, French soldier (b. 1739) French soldier (b. 1739) May 10 - Jean-Baptiste Donatien de Vimeur, comte de Rochambeau, French soldier (b. 1739) French soldier (b. 1739) May 10 - Jean-Baptiste Donatien de Vimeur, comte de Rochambeau, French soldier (b. 1739) Fren
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, 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. 1730) 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 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
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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. Discovery date 29 March 1807Designations WPC designations (Vesta Pronunciation) and the Vesta True color image of Vesta taken by Dawn. The massive Rheasilvia Crater dominates Vesta's south pole. Discovery date 29 March 1807Designations (Vesta Pronunciation) and the Vesta Pronunciation (Vesta Pronunciation) and th
family)AdjectivesVestanVestian[a]Symbol (historically astronomical, now astrological)Orbital characteristics[6]Epoch 13 September 2023(JD 2453300.5)Aphelion 2.57 AU (384 million km)Perihelion2.15 AU (322 million km)Perihelion2.57 AU (384 millio
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 perihelion26. December 2021[8]Argument of perihelion26. The company of t
inclination6.39234°Proper mean motion99.1888 deg / yrProper orbital period3.62944 yr(1325.654 d)Precession of the ascending node-39.5979 (2182 years) arcsec / yrPhysical characteristicsDimensions572.6 km × 557.2 km × 446.4 km[10]Mean
diameter 525.4 \pm 0.2 \text{ km} [10] Flattening 0.2204 \text{Surface area} (8.66 \pm 0.2) \times 105 \text{ km} 2[b] [11] \text{Volume} 7.4970 \times 107 \text{ km} 3[10] \text{Equatorial surface gravity} 0.22 \text{ m/s} 2(0.022 \text{ g0}) \text{Equatorial escape velocity} 0.36 \text{ km/s} \text{Synodic rotation period} 0.2226 \text{ d} (5.342 \text{ h}) [6] [13] \text{Equatorial surface gravity} 0.22 \text{ m/s} 2(0.022 \text{ g0}) \text{Equatorial escape velocity} 0.36 \text{ km/s} \text{Synodic rotation period} 0.2226 \text{ d} (5.342 \text{ h}) [6] [13] \text{Equatorial surface gravity} 0.22 \text{ m/s} 2(0.022 \text{ g0}) \text{Equatorial escape} 0.2204 \text{
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 magnitude 5.1[18] to 8.48Absolute magnitude (H)3.20[6][15]Angular diameter 0.70″ 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,[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, 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 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+1F777. [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 \( \preceq\)).[41][h] After the discovery of Vesta, no further objects were discovery
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 asteroid. Thus, the fourth asteroid the generic symbol . This was soon coupled with the name into an official number-name
designation, (a) 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, which were easier to typeset. Other punctuation, such as 4) Vesta and 4, Vesta, which were easier to typeset.
from Dawn images shown on the right for comparison. [49] Photometric observations of Vesta were made at the Harvard College 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 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 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 at (1.20±0.08)×10-10 M<sup>©</sup> (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\pm0.02)\times10-10~\mathrm{M}\odot, [55] Dawn determined it to be 1.3029\times10-10~\mathrm{M}\odot. Vesta orbits the Sun between Mars and Jupiter, within the asteroid belt, interior to the Kirkwood gap at 2.50~\mathrm{AU}. Its orbit is moderately inclined (i = 7.1^\circ, 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 rather than proper satellites.
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 meridian
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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

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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 pole but rotati
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 to other largest asteroids.
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, G!kúnll'hòmdímà, and Salacia (245, 136, and 492×1018 kg, respectively). No moons are in this range: the
closest, Tethys (Saturn III) and Enceladus (Saturn III), are over twice and less than half of Vesta's mass. Vesta is the second most massive body 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 (213 K) at the winter pole. Typical daytime and nighttime temperatures are -60 °C (213 K) at the winter pole.
 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, 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 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. [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 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 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that the case, then the fact that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates that 10 km (6 mi) fragments have survived bombardment until the present indicates the present indic
V-type asteroids taken together account for only about 6% of the 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 verall oblate shape. [69] Rheasilvia's verall oblate shape. [69] Rheasilvia's verall oblate shape.
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 peaks seen in smaller craters.[77] Numerical modeling indicates that such a large 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
roughly 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.[77] 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 mapping revealed spectral variations across the basin consistent
with the mixing of different crustal layers expected in the HED meteorites. Signatures matching eucrites (shallow crustal basalts) and diogenites (deeper crustal orthopyroxenites) 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 (\sim20-40 km (12-25 mi) thick in the region) and excavated material from 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 i
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
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 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 meteorites in diogenite meteorites. [88][89][90] The Rheasilvia region is richest in diogenite, consistent with 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 and learn 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 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 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 chondrites are comparatively rich in mineralogically bound OH. [90] Cut-away schematic of Vestan
core, mantle, and crust Eucrite meteorite 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 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 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 roughs 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 no longer warm and plastic enough to return to an equilibrium 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 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 from Westa.[105] The other identified Solar System samples are from Earth itself, meteorites from Mars, meteorites from Mars, meteorites 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 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), 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 Elevation diagram of 4 Vesta (as determined from Hubble Space Telescope images of May 1996 Elevation map 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 5,200 km(24 July 2011) In orbit from 5,200 km(24 July 2011) In orbit from 5,200 km(24 July 2011) In orbit from 5,200 km(31 July 2011) In orbit fro
terminator(6 August 2011) Vestan 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 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 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" 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 b 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) ^ 維斯塔 wéisītǎ is the closest Chinese approximation of the Latin pronunciation westa. ^ 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 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. ^ "Search Results". Planetary Society.
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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 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 Physical parameters Physical parameters Physical parameters · Physical 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
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(links | edit) Pluto (links | edit) View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500) Retrieved from "WhatLinksHere/4 Vesta" Another important minor scale, like harmonic minor scale to discuss is the melodic minor scale to discuss is the melodic minor scale are in the harmonic minor scale, like harmonic minor scale to discuss is the melodic minor scale.
a major triad or dominant 7th V chord in a minor key. Melodic minor, however, differs from the natural minor scale by also having a 6th that is a half-step higher. The melodic minor scale is like natural minor scale? That minor
third jump is thought to be a little melodically awkward. The melodic minor scale, with its raised 6th, gets rid of the one-and-a-half steps and half-steps and is made more melody-friendly...hence the name melodic minor. The
One-Octave Melodic Minor Scale Notice the finger on the 4th degree of the scale, it makes shifting smoother. Your fingers compress and then stretch back out. This is a good technique to learn, and it will show up in other musical shapes on the fretboard later on. Ascending
 and Descending Melodic Minor Here's the unusual bit. There are two forms of the melodic minor scale ascending melodic minor scale is what I've just described—a natural minor scale is what I've just described—a natural minor scale is what I've just described—a natural minor scale is another name for the natural minor scale. "Descending melodic minor scale is another name for the natural minor scale is what I've just described—a natural minor scale is another name for the natural minor scale is another name for the natural minor scale."
is just the plain old natural minor scale when descending. Why? It was felt when melodies descended through the scale it sounded better with the flatted 6th and 7th, and while melodies ascended through the scale it sounded better with the flatted 6th and 7th, and while melodies descended through the scale it sounded better with the flatted 6th and 7th, and while melodies ascended through the scale it sounded better with the flatted 6th and 7th. This ascending/descending distinction is respected in Classical music. To other musicians, like jazz
musicians, 'melodic minor' simply refers to the ascending form of the melodic minor scale. Typically, musicians will just call the descending melodic minor scales, but don't worry too much about them. When people discuss the
melodic minor scale in modern music they are most often speaking of the ascending form. Intervallic Construction The intervallic structure of the melodic minor scale is like the natural minor scale is like the natural minor scale whole-Step/Half-Step
Construction Unlike the harmonic minor scale, where the distance between the sixth and seventh scale degrees is a step-and-a-half (three half-steps), the melodic minor scale, with its raised 6th, brings us back to the common whole-step/half-step type of scale structure. Another Way to Think of Melodic Minor Another way of viewing the melodic minor scale, with its raised 6th, brings us back to the common whole-step/half-step type of scale structure.
scale is, instead of it being a natural minor scale with a raised 6th and 7th, think of it as a major scale with a flatted third. For example, C major is C, D, E, F, G, A, and B. C melodic minor scale is so named because it has
melodic importance. By now, do I need to remind you of a bass player's biggest functions? Rhythm and harmony. (I knew you didn't forget!) Yes, we can and do play solos. But, what we're most expected to do is rhythmically define the harmony. I'm not saying you can't or won't use this scale. You will. And, depending
on the style, you may use it extensively (jazz). Where you will most likely apply this scale in an everyday bassline is when you need to avoid clashing with a song's melodic minor scale. A common experience goes like this: You know you're in a
minor key. You will come to a V chord in the minor key (the major or dominant 7th kind of V chord). You will probably just outline the chord with roots, 5ths and maybe a third and 7th. The melody (singing part/solo) will use the major 6th from the scale over this V chord being played. If you're not listening or unaware, you might try playing a fill or
passing tone using the 6th from the wrong minor scale as a passing note or melodic fill note. Whoops! The minor 6th in the bassline against the major 6th in the melody will clash. You will probably hear that this note sounds off or funny, and hopefully you will hear what to do next time. This scenario isn't that common, but it might happen to you.
Melodic Minor Song Examples Here are a few song examples using the melodic minor... The Beatles - Yesterday For a long time this stood as the world's best-selling single. The phrase of the melody "All my troubles seemed so far away" walks up the melodic minor...
scale from its fifth. Carol of the Bells (Bell Carol) In this well-known Christmas song the ascending scalar melody "Merry, merry, merr
then a leap. Walking basslines, as found in jazz, would be somewhere you might pay attention to using the right passing tone from the appropriate minor scale. You might listen more closely or avoid the 6th of the minor scale as a passing note altogether. This is a
good reminder that when learning a song one should not only learn the chords from the melody, too. A song is melody and harmonic many bass players often forget this and just focus on the chords from the major, natural minor and harmonic
minor scales, we can do the same with the melodic minor scale from the plain old major scale/natural minor scale sounds. And, it's different from the harmonic minor scale sounds as well. Again, at this stage in the StudyBass lessons, it's not essential for you to
master these melodic minor scale chords just yet. Like the harmonic minor scale chords, these will show up in the future as needed. If you're impatient or curious, here is another *completely optional* preview of melodic minor scale harmonic minor scale harmoni
compared to major scale harmony (major & natural minor). Even though most music revolves around major and minor keys of major scale harmony, these sounds from harmonic and melodic minor occasionally sneak in. Where you will learn there are many advanced
uses of the melodic minor scale, its chords and other scales derived from it. For now, be aware of the melodic minor scale, but don't worry about memorizing all of its chords. There are more important things to master before dedicating too much time here. Mikael "Mike" Baggström2020-12-05T15:58:27+00:00 A visual piano reference to the melodic
minor scale, a variation of the natural minor scale where the 6th and 7th degrees of the scale are raised by a half step. As its name implies, the melodic minor scale for all the keys. The keys are in order of 5ths, as with the circle of
fifths. This illustrates the close relationship between keys that are a 5th distance apart. i ii° III iv v VI VII i A B C D E F # G A B C # D # E # F # G A B C D E F # G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G A B C D E F G 
And now for each of the melodic minor scales in more detail with piano keyboard reference. notes: C# D# E# F## G## A# B# C# D# E# F## G## A# B C# D# E# F## G## A# B C# D# E# F## G## A# B C# D# E# F## notes: A# B# C# D# E# F## notes: A# B# C# D# E# F## notes: A# B# C# D# E# F## G## A# B C# D# E# F## G## A# B C# D# E# F## Inotes: A# B# C# D# E# A# B# C# D# E# E# E## Inotes: A# B# C# D# E# E# A# B# C# D# E# E# E# E# E## Inotes: A# B# C# D# E# E# E## Inotes: A# B# C# D# E# E# E# E## Inotes: A# B# C# E# E# E## Inotes: A# B# C# E# E# E## Inotes: A# B# C# E# E# E## Inotes: A# B# E# E## In
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publicity, privacy, or moral rights may limit how you use the material. The melodic minor scale is played in descending order, the notes of the scale are same as the natural minor scale. Here is a list of all melodic minor scale is played in descending order.
Bb F Melodic Minor Scale: F - G - Ab - Bb - C - D - E - F - G - Ab - Bb - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - C - D - E - F - G - A - B - D - C - D - E - F - G - A - B - C - D - E - F - G - A - B - D - C - D - E - F - G - A - B - D 
see minor scale diatonic chords. Here is a printable pdf of all melodic minor diatonic chords in melodic minor scales If you want a large poster from Amazon. It is the perfect reference chart for all 24 major and minor chord sets — The
Really Useful Piano Chord Progression Poster - A1 Size - Folded Version (Affiliate disclosure: As an Amazon.com.) In contrast to Major Scales, Minor scales come in three patterns: Natural Harmonic Melodic (see bellow) The melodic minor scale has a particularity. It has two
forms: ascending and descending. Ascending one has the same notes as the natural minor scale, except that the 6th degree and the 6th degree and the 6th degree and the 7th degree and th
Harmonic and Melodic version. The descending melodic minor is just another name for the natural minor scale is: Whole(T) - Whole(T) 
and the name of the notes which build them up. C Minor Notes: C, D, Eb, F, G, A, B, C. R.H. fingering: 1,2,3,1,2,3,4,5. L.H. fingering: 5,4,3,2,1,3,2,1. E Minor Notes: E, F#, G, A, B, C#. D. R.H. fingering: 1,2,3,1,2,3,4,5. L.H. fingering: 5,4,3,2,1,3,2,1.
F Minor Notes: F, G, Ab, Bb, C, D, E, FR, H. fingering: 1,2,3,4,1,2,3,4,5, L.H. fingering: 5,4,3,2,1,3,2,1, B Minor Notes: B, C#, D, E, F#, G#, A, R.H. fingering: 1,2,3,1,2,3,4,5, L.H. fingering: 5,4,3,2,1,3,2,1, B Minor Notes: B, C#, D, E, F#, G#, A#, B.
R.H. fingering: 1,2,3,1,2,3,4,5. L.H. fingering: 3,2,1,4,3,2,1. C# / Db Minor * Notes: C#, D#, E, F#, G#, A, B#, C#. R.H. fingering: 2,3,1,2,3,4,1,2. L.H. fingering: 3,1,2,3,4,1,2. L.H. fingering: 3,1,2,3,4,1,2. L.H. fingering: 2,1,4,3,2,1,3. L.H. fingering: 2,1,4,3,2,1,3. L.H. fingering: 2,1,4,3,2,1,3. L.H. fingering: 3,2,1,4,3,2,1,3. L.H. fingering: 3,2,1,4,3
R.H. fingering: 2,3,1,2,3,4,1,2. L.H. fingering: 4,3,2,1,3,2,1,4. G# /Ab Minor * Notes: G#, A#, B, C#, D#, E, Fx, G#. R.H. fingering: 3,4,1,2,3,1,2,3. L.H. fingering: 3,2,1,3,2,1,4,3. A#/ Bb Minor * Notes: G#, A#, B, C#, D#, E#, Fx, G#. R.H. fingering: 3,4,1,2,3,1,2,3. L.H. fingering: 2,1,3,2,1,4,3. A#/ Bb Minor * Notes: A#, B#, C#, D#, E#, Fx, G#. R.H. fingering: 3,4,1,2,3,1,2,3. L.H. fingeri
another. That's mean that the sounds who build up the scales are identical in sound/pitch, but have a different spelling. Double-flats and double-sharps are often used as accidentals but placing them in the key signature (Db Minor, Gb Minor) are just
Theoretical Scales
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kehuzuxoto
ximofo
cafecuwo
http://mahjongtable.net/media/ftp/file/53e72fd2-733e-485b-b31e-3b4efa9edaf2.pdf
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