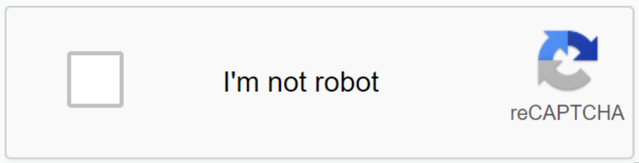

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Ap physics 1 circular motion and gravitation review

#frameofreference-acceleration-velocity-circularmotion-vectors⏱ 2 min read by an observer in a reference frame can describe the movement of an object using quantities such as position, movement, distance, speed, speed and acceleration. Key Concept: Frame Of Reference A system of contact information for which judgments can be rendered, usually from an observer's point of view, is known as a frame of reference. A reference frame moving with constant speed is known as an inertial frame of reference. 💪♀️💪♂️Rotational Velocity and Acceleration:Image courtesy of Giphy.🎥Watch: Khan Academy - Angular Velocity and SpeedEssential Knowledge 3.A.2 □ □Forces are described by vectors. Key Vocabular: VectorQuantities which are described by a size (magnitude) and a direction (e.g. East, High, Right, etc.) Example: The gas station is located five miles west of the carForce, Movement, speed and acceleration are vector amountsA force can simply be described as thrust or traction. We know that a thrust or pull has both the magnitude and direction (therefore, it is a vector quantity) and can vary greatly in both respects. Essential Knowledge 3.A.3 🔊 A force exerted on an object is always due to the interaction of that object with another object. Strength is always the result of an interaction of two or more objects. No object has the strength in itself. Therefore, no object can exert force on itself. When you clap your hands, one hand exerts a force of the other. When you throw a ball, it exerts a force on your hand and your hand exerts a force on it. Essential Knowledge 3.A.4 ↔If an object exerts force on a second object, the second always exerts a force of equal magnitude on the first object in the opposite direction. Newton's third law states, For every action, there is an equal and opposite reaction. In other words, in each interaction, there is a pair of forces acting on the two interacting objects. The magnitude of the force on the first object is equal to the magnitude of the force on the second object. The direction of the force on the first object is opposed to the direction of force on the second object. Forces always come in pairs - equal and opposite forces action-reaction.🎥Watch: AP Physics 1 - Unit 3 Streams #gravitationalforce-newtons-angularmotionvariables-mass-acceleration⏱ 1 min read by the engraving force describes the interaction of an object with the mass with another object with the mass. Image courtesy of Giphy.Key Concept: Gravitational Force - a model used to explain the influence that an object extends into space around producing force on another object. This force is always attractive. Equation: Fg-mg, where Fgis the Force of Gravity in Newtons, m is the mass in kilograms, and g is the acceleration due to gravity in m/s/sKey Concept: Newton's Universal Law of - each particle attracts all the other particles of the universe with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers. Equation: Fg - Gm1m2/r-2, where Fg is the Force of Gravity in Newtons, G is the gravitational constant 6.7 x 10-11 N-m-2/kg-2, m is the mass in kilograms, and r is the radius in meters⟶ still feeling a little confused about Newton's universal law of gravitation? Do not worry! Check out this video from Khan Academy for more practice!🎥Watch: Khan Academy - Angulal Motion Variables🎥Watch: AP Physics 1 - Unit 3 Streams A field combines a value of a certain physical amount with each point in space. Field models are useful for describing interactions that occur at a distance (long-range forces) as well as a variety of other physical phenomena. Boundary Statement: Physics 1 treats gravitational fields; Physics 2 treats electric and magnetic fields. Essential Knowledge 2.A.1: A vector field gives, depending on the position (and perhaps the time), the value of a physical quantity described by a vector. Vector fields are represented by field vectors indicating direction and magnitude. When several source objects with mass or electrical charge are present, the value of the field can be determined by the addition of vectors. Conversely, a known vector field can be used to make inferences about the number, relative size and location of sources. Gravitational field Understanding 2.B: A gravitational field is caused by a mass object. Essential Knowledge 2.B.1: A g gravitational field at the location of an object with mass causes me a gravitational force of magnitude mg to exert on the object in the direction of the field. On Earth, this gravitational force is called weight. The gravitational field at one point in space is measured by dividing the gravitational force exerted by the field on a test object at this point by the mass of the test object and has the same direction as the force. If gravitational force is the only force exerted on the object, the acceleration observed in free fall of the object (in meters per second squared) is numerically equal to the magnitude of the gravitational field (in newtons/kilogram) at that location. Learning Goal (2.B.1.1): The student is able to apply F-mg to calculate gravitational force on an object with m mass in a g-force gravitational field in the context of the effects of a clear force on objects and systems. [See Scientific Practices 2.2 and 7.2] Essential Knowledge 2.B.2: The gravitational field caused by a symmetrical spherical object with a mass is radial and, outside the object, varies as the reverse square of the radial distance from the center of this object. The gravitational field caused by a spherically symmetrical object is a vector outside the object is equal to GM/r2. Only spherically symmetrical objects will be considered sources of the gravitational field. Learning Goal (2.B.2.1): The student is able to apply g-GM/r2 to calculate the gravitational field due to an M-mass object, where the field is a vector directed towards the center of the mass object M.[See scientific practice 2.2]Learning objective (2.B.2.2): The student is able to approach a numerical value of the gravitational field (g) near the surface of an object of its radius and its mass in relation to those of the Earth or other reference objects. [See scientific practice 2.2] Universal GravitationDparly 3.C: At the macroscopic level, forces can be classified as either long-range forces (remote action) or as contact forces. Essential Knowledge 3.C.1: Gravitational force describes the interaction of an object that has a mass with another object that has a mass. Gravitational force is always attractive. The magnitude of the force between two symmetrical objects spherical mass m1 and m2 is G m1 m2 /r2 where is the center-center distance between objects. In a narrow range of heights above the Earth's surface, the local gravitational field, g, is approximately constant. Learning Goal (3.C.1.1): The student is able to use Newton's law of gravitation to calculate the gravitational force that the two objects exert on each other and use this force in contexts other than orbital motion. [See scientific practice 2.2] Learning Goal (3.C.1.2): The student is able to use Newton's law of gravitation to calculate the gravitational force between two objects and use this force in contexts involving orbital motion (for circular orbital motion only in physics 1). [See scientific practice 2.2] Why is the Earth spinning? Examples of circular motion include: an artificial satellite orbiting the Earth at a constant height, a stone that is attached to a rope and rotates in circles, a car rotating through a curve in a race track, an electron moving perpendicular to a uniform magnetic field, and a rotating gear within a mechanism. As the object's velocity vector constantly changes direction, the moving object undergoes an acceleration of a centripetal force in the direction of the rotation center. Without this acceleration, the object would move in a straight line, according to Newton's laws of motion. Page 2 Newton's law of universal gravitation states that two bodies in the universe attract each other with a force that is directly proportional to the product of their masses and vice versa squared the distance between them. (Separately, it has been shown that large spherically symmetrical masses attract and are attracted as if all their mass is concentrated at their centers.) G - 6.67 x 10-11 N m2/kg2Demo: subjectWebsite topicWebsite topicPhysics clips - Gravity (UNSW)Video (SixtySymbols): Cavendish experimentVideo (BockPhysics): Cavendish experimentVideo (Elegant universe): Newton's Picture of gravityTutorial (Khan Academy): GravitationHandout/Practice skills: topicActivity: topicLaboratory/Virtual lab (PhET): Video (Wonders of the Universe): Falling to Zero-G If you see this message, it means we're having trouble loading external resources onto our website. If you're behind a web filter, make sure the kastatic.org and .kasandbox.org domains are unlocked. Unlocked.