

SPEED: if constant speed, use $v = \frac{d}{t}$

$$v = u + at$$

$$v^2 = u^2 + 2ax$$

$$x = \frac{uv}{a}$$

$$x = ut + \frac{1}{2}at^2$$

WHERE:

u = initial speed (ms^{-1})

v = final speed (ms^{-1})

a = acceleration (ms^{-2})

t = time (seconds)

x = displacement (m)

a = acceleration (ms^{-2})

CIRCULAR MOTION

SPEED: $v = \frac{d}{t}$ OR $v = \frac{2\pi r}{T}$ OR $v = \sqrt{ar}$

ACCELERATION: $a = \frac{v^2}{r}$ OR $\frac{4\pi^2}{T^2}$

FORCE: $F = \frac{mv^2}{r}$ OR $\frac{4\pi^2 mr}{T^2}$



VERTICAL CIRCULAR MOTION:

Forces at top: if at minimum speed, no normal force, so feel weightless! if above minimum speed, total force (centripetal force) is made of a downward gravity and a downward normal:

$$2F = N + mg = \frac{mv^2}{r}$$

Forces at bottom: Centripetal force (towards center/upwards) is made of a downwards gravity force and a BIGGER upwards normal force. You feel heavier! $2F = N - mg = \frac{mv^2}{r}$

Minimum Speed at top: $v = \sqrt{rg}$

BALL ON A STRING

Radius of path $r = 1.5 \times \text{string}$

Circumference of path = $2\pi r$

Forces are the towards the center, except tension instead of reaction/normal force.

Tension: $F = mg/\cos\theta$

Vertical force = $3\cos\theta$

Speed = $\sqrt{rg \tan\theta}$

Speed if given length = $\sqrt{Lg \sin\theta \tan\theta}$

Angle = $\tan^{-1}(\frac{v^2}{rg})$

INCLINED PLANES

TO FIND R (NORMAL FORCE): $R = mg \cos\theta$

TO FIND IF (FORCE DOWN PLANE) (WITH GRAVITY): $IF = mg \sin\theta$

TO FIND ACCELERATION WITH NO FRICTION: $a = g \sin\theta$

BANKED TRACKS

$\tan\theta = \frac{v^2}{rg}$

$F_{\text{NET}} = \frac{mv^2}{r}$

Force $\dots = \frac{mv^2}{r}$

ENERGY

KINETIC ENERGY: $EK = \frac{1}{2}mv^2$

GRAVITATIONAL POTENTIAL ENERGY: $GPE = mgh$

TOTAL MECHANICAL ENERGY = GPE + KE + EPE

DETERMINING INELASTIC/ELASTIC COLLISIONS:

1: Calculate EK initial by adding the EK of object one with object two. 2: Calculate EK final by using the combined mass of the system & combined speed (found using $v = u/a$) 3: if the same = elastic, different = inelastic

Average force if momentum is known: $F = \frac{\Delta p}{\Delta t}$

SPRINGS

HOOKE'S LAW: $F = k\Delta x$

SPRING ENERGY: $\frac{1}{2}k\Delta x^2$

k = gradient of a force vs distance graph.

Example: Show that the spring constant is 5 Nm^{-1}

Use $F = k\Delta x$ & rearrange to find k .

Example: Find the extension of the spring at the lowest point of oscillation.

Use GPE ($1/2kx^2$) and find x .

Speed: $\frac{kx^2}{m}$

Greater k value = stiffer spring

WORK

The product of the applied force & the displacement in the direction of the force. $W = F \cos\theta \Delta x$ OR $W = Q \cdot V$



POWER

The rate at which work is done. $P = \frac{\text{work done}}{\text{time taken}} = \frac{W}{\Delta t}$

if 27 km^2 constant, can't use $F = k\Delta x$, must use area under force-distance graph

NEWTON'S LAWS

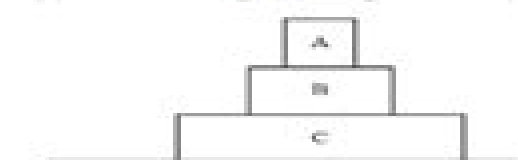
1st LAW: if an object has 0 net force acting on it, it will either remain at rest or continue going with a constant velocity

2nd LAW: $F = ma$

3rd LAW: For every action, there is an equal and opposite reaction

FORCES

toy blocks, A (0.050 kg), B (0.10 kg) and C (0.20 kg)



Force of A on B = 0.5N

Force of B on C = 1.5N (A and B together)

Force of C on ground = 3.5N (A, B and C together)



RADIUS & ORBITS

RADIUS: Height + radius of Earth

SPEED: $V = \frac{2\pi r}{T}$

TIME PERIOD (seconds): $T = \sqrt{\frac{4\pi^2 r^3}{GM}}$ IF GEOSTATIONARY

SATELLITE TIME = 86400s

RADIUS OF ORBIT (metres): $r = \sqrt[3]{\left(\frac{GMT^2}{4\pi^2}\right)}$

STRENGTH OF GRAVITY: $g = \frac{GM}{r^2}$

GRAVITATIONAL FORCE: $F = \frac{GMm}{r^2}$

ACCELERATION: $a = \frac{v^2}{r}$ OR $a = \frac{4\pi^2}{T^2}$

APPARENT WEIGHTLESSNESS

Apparent weightlessness is achieved when an object falls with an acceleration equal to the gravitational field strength, as no normal reaction force is experienced. For example, astronauts in a satellite in stable orbit will feel weightless as the satellite is in constant free-fall. True weightlessness when $g=0 \text{ N/kg}$ usually in deep space.

Eq > g, heavier. Eq < g, lighter.

APPARENT WEIGHT (NORMAL FORCE)

Going up: $F = m(a+g)$, Going down: $F = m(g-a)$

PROJECTILE MOTION

HORIZONTAL COMPONENT: Usually no acceleration, so use $a = \frac{v}{t}$

To find initial speed, use $u_x = v \sin(\theta)$

VERTICAL COMPONENT: Has acceleration, so use equation of motion

To find initial speed, use $u_y = v \cos(\theta)$

$\tan(\theta) = \frac{\text{vertical speed}}{\text{horizontal speed}}$

EXAMPLE: A batsman hits a cricket ball (from ground level) at a speed of 30.0 ms^{-1} and at an angle of 36.9° to the horizontal. An advertising board is placed on the boundary of the cricket ground at a distance 72.0 m from the batsman. Air resistance can be ignored. At what height above the ground will the ball strike the advertising board?

Remember that it will take the same time to go up as to come down (if air resistance can be ignored).

Horizontal motion:

$u_x = v \cos(\theta)$

$u_x = 30 \cos(36.9) = 24 \text{ ms}^{-1}$

Using $x = ut$, $t = \frac{72}{24} = 3\text{s}$

Vertical motion:

$u_y = v \sin(\theta)$

$u_y = 30 \sin(36.9) = 18 \text{ ms}^{-1}$

Using $x = ut + \frac{1}{2}at^2$

$x = 18 \times 3 + \frac{1}{2} \times -10 \times 3^2$

$x = 54 - 45 = 9\text{m}$

EXAMPLE: A car is discovered at the bottom of a 72 m cliff. How fast was the car going if it landed 22 m horizontally from the cliff's edge? (Note that the cliff is flat, i.e. the car came off the cliff horizontally).

First find the time it takes for the car to reach the bottom of the cliff (vertical motion)

$x = ut + \frac{1}{2}at^2$

$72 = 0 + \frac{1}{2} \times 10t^2$

$72 = 5t^2, t^2 = \frac{72}{5}$

$t = \pm 3.79\text{s}$

Since time cannot be negative the answer is 3.79s .

FOR SYMMETRICAL FLIGHT:

$RANGE = \frac{v^2 \sin 2\theta}{g}$

Physics Pgrade 1final Exam

Pei-Luen Patrick Rau

A red circular graphic with a gradient, appearing as a stylized arrow or a partial circle, located to the right of the author's name.

Physics Pgrade 1final Exam:

God's Perfect Plan Mark Paul Bishop,2011-06 While working in the ER one evening the nurse called to tell me that Pastor Steve would like to talk with me As I shared my thoughts with Pastor Steve the simplicity of his responses almost left me speechless It was from this life changing conversation that Dr Mark Paul Bishop began a life devoted to Christ exhausting his human potential in service to his fellow man God s Perfect Plan is Dr Mark s spiritual autobiography and details his faith journey as he wrestles with issues directly pointing to the deficiency of our lives a deficiency that he learned can only be filled through a relationship with Christ Readers will be inspired as they seek their own answers to questions regarding God s perfect plan in their own lives Woven into the fabric of God s perfect plan for you you will discover the role of our social institutions of the family church school community and government You will be further amazed by the manner in which God incubates His plan for your life through His divine guidance and protection See how this family physician despite skepticism and wavering faith demonstrates how God s purpose and plan is clear in our lives if we only look for it The practical application of Christianity is not a myth it really does work See for yourself as you discover God s perfect plan **Girep**

2009 Cheryl Hurkett,Laurence Rogers,2010 **United States Air Force Academy** United States Air Force Academy,

Teach Yourself How to Learn Saundra Yancy McGuire,2023-07-03 Following up on her acclaimed Teach Students How to Learn that describes teaching strategies to facilitate dramatic improvements in student learning and success Saundra McGuire here presents these secrets direct to students Her message is that Any student can use simple straightforward strategies to start making A s in their courses and enjoy a lifetime of deep effective learning Beginning with explaining how expectations about learning and the study efforts required differ between college and secondary school the author introduces her readers through the concept of metacognition to the importance and powerful consequences of understanding themselves as learners This framework and the recommended strategies that support it are useful for anyone moving on to a more advanced stage of education so this book also has an intended audience of students preparing to go to high school graduate school or professional school In a conversational tone and liberally illustrated by anecdotes of past students the author combines introducing readers to concepts like Bloom s Taxonomy to illuminate the difference between studying and learning fixed and growth mindsets as well as to what brain science has to tell us about rest nutrition and exercise together with such highly specific learning strategies as how to read a textbook manage their time and take tests With engaging exercises and thought provoking reflections this book is an ideal motivational and practical text for study skills and first year experience courses **Research in Education** ,1973 Curriculum Handbook with General Information Concerning ... for

the United States Air Force Academy United States Air Force Academy,2004 **Resources in Education** ,1996-04

2007 Physics Education Research Conference Leon Hsu,Charles Henderson,Laura McCullough,2007-11-26 This text brings together peer reviewed papers from the 2007 Physics Education Research Conference whose theme was Cognitive

Science and Physics Education Research The conference brought together researchers studying a wide variety of topics in physics education including transfer of knowledge learning in physics courses at all levels teacher education and cross disciplinary learning This up to date text will be essential reading for anyone in physics education research **Annual Catalogue** United States Air Force Academy,1985 The Navy List ,1899 *OECD Reviews of Evaluation and Assessment in Education: Serbia* Maghnouj Soumaya,Salinas Daniel,Kitchen Hannah,Guthrie Caitlyn,Bethell George,Fordham Elizabeth,2020-03-20 This review developed in cooperation with UNICEF provides Serbia with recommendations to help strengthen its evaluation and assessment system to focus on support for student learning It will be of interest to Serbia as well as other countries looking to make more effective use of their evaluation and assessment system to improve quality and equity and result in better outcomes for all students **Grading for Growth** David Clark,Robert Talbert,2023-07-03 Are you satisfied with your current and traditional grading system Does it accurately reflect your students learning and progress Can it be gamed Does it lead to grade grubbing and friction with your students The authors of this book two professors of mathematics with input from colleagues across disciplines and institutions offer readers a fundamentally more effective and authentic approach to grading that they have implemented for over a decade Recognizing that traditional grading penalizes students in the learning process by depriving them of the formative feedback that is fundamental to improvement the authors offer alternative strategies that encourage revision and growth Alternative grading is concerned with students eventual level of understanding This leads to big changes Students take time to review past failures and learn from them Conversations shift from why did I lose a point for this to productive discussions of content and process Alternative grading can be used successfully at any level in any situation and any discipline in classes that range from seminars to large multi section lectures This book offers a comprehensive introduction to alternative grading beginning with a framework and rationale for implementation and evidence of its effectiveness The heart of the book includes detailed examples including variations on Standards Based Grading Specifications Grading and ungrading of how alternative grading practices are used in all kinds of classroom environments disciplines and institutions with a focus on first hand accounts by faculty who share their practices and experience The book includes a workbook chapter that takes readers through a step by step process for building a prototype of their own alternatively graded class and ends with concrete practical time tested advice for new practitioners The underlying principles of alternative grading involve Evaluating student work using clearly defined and context appropriate content standards Giving students helpful actionable feedback Summarizing the feedback with marks that indicate progress rather than arbitrary numbers Allowing students to revise without penalty using the feedback they receive until the standards are met or exceeded This book is intended for faculty interested in exploring alternative forms of learning assessment as well as those currently using alternative grading systems who are looking for ideas and options to refine practice *British Medical Journal* ,1898 *Cross-Cultural Design* Pei-Luen Patrick Rau,2017-06-28 This book constitutes

the proceedings of the 9th International Conference on Cross Cultural Design CCD 2017 held as part of the 19th International Conference on Human Computer Interaction HCII 2017 held in Vancouver Canada in July 2017 HCII 2017 received a total of 4340 submissions of which 1228 papers were accepted for publication after a careful reviewing process The papers thoroughly cover the entire field of Human Computer Interaction addressing major advances in knowledge and effective use of computers in a variety of application areas The 60 papers presented in the CCD 2017 proceedings are organized in topical sections cultural foundations of design cross cultural product and service design cross cultural communication design for social development cross cultural design for learning *Advances in Intelligent Tutoring Systems* Roger Nkambou, Riichiro Mizoguchi, Jacqueline Bourdeau, 2010-08-27 May the Forcing Functions be with You The Stimulating World of AIED and ITS Research It is my pleasure to write the foreword for *Advances in Intelligent Tutoring Systems* This collection with contributions from leading researchers in the field of artificial intelligence in education AIED constitutes an overview of the many challenging research problems that must be solved in order to build a truly intelligent tutoring system ITS The book not only describes some of the approaches and techniques that have been explored to meet these challenges but also some of the systems that have actually been built and deployed in this effort As discussed in the Introduction Chapter 1 the terms AIED and ITS are often used interchangeably and there is a large overlap in the researchers devoted to exploring this common field In this foreword I will use the term AIED to refer to the search area and the term ITS to refer to the particular kind of system that AIED researchers build It has often been said that AIED is AI complete in that to produce a tutoring system as sophisticated and effective as a human tutor requires solving the entire gamut of artificial intelligence research AI problems *Audio-visual Technology and Learning* Educational Technology Publications, Incorporated, 1973

Engineering Education American Society for Engineering Education, 1961 **Bulletin** United States. Office of Education, 1959 **Graduate Programs in Engineering & Applied Sciences 2011 (Grad 5)** Peterson's, 2011-05-01 Peterson's Graduate Programs in Engineering Agricultural Engineering Architectural Engineering Biomedical Engineering Chemical Engineering Civil Computer Science Electrical Energy Engineering Design Engineering Physics Geological Mineral Mining and Petroleum Engineering Industrial Engineering Management of Engineering Materials Sciences Mechanical Engineering Ocean Engineering Paper and Telecommunications Up to date data collected through Peterson's Annual Survey of Graduate and Professional Institutions provides valuable information on degree offerings professional accreditation jointly offered degrees part time and evening weekend programs postbaccalaureate distance degrees faculty students degree requirements entrance requirements expenses financial support faculty research and unit head and application contact information As an added bonus readers will find a helpful See Close Up link to in depth program descriptions written by some of these institutions These Close Ups offer detailed information about the specific program or department faculty members and their research and links to the program Web site In addition there are valuable articles on financial assistance and

support at the graduate level and the graduate admissions process with special advice for international and minority students Another article discusses important facts about accreditation and provides a current list of accrediting agencies

How to Enhance Learning Efficiency When Online Learning is Popular and Indispensable: Theory, Research and Practice Rong Lian, Chang Liu, Juzhe Xi, 2024-07-17

Online learning has become more and more common globally whether for comfort adapting to work hours or just having the freedom to study from anywhere And now under the coronavirus pandemic as people are having to stay at home it has become more important than ever Although the popularity of wireless network and portable smart device makes it possible for people to acquire and learn knowledge anytime and anywhere it does not necessarily mean an increased learning performance Relevant research in cognitive science has revealed possible limitations in online learning For example the knowledge acquired through online learning tends to be fragmented and lacks guidance for integrated thinking among different subjects which makes it difficult for learners to form a systematic knowledge structure Learners may experience cognitive overload metacognitive illusion and low learning efficiency in self regulated learning It follows that in the post COVID 19 era online learning puts forward new requirements and challenges to the contemporary students not only to their learning strategies but positive character traits in learning Most of the current learning theories were developed in the early 20th century and may not fit in well with the current situation then possibly leading to inefficient learning and increased learning burden Therefore it is necessary and important to reexplore the influencing factors and mechanisms that affect the learning efficiency of students at all levels nowadays based on which we could construct a theoretical model of efficient learning model

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russian roulette russian roulette was published in 2013 it is told from the point of view of the infamous contract killer yassen

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