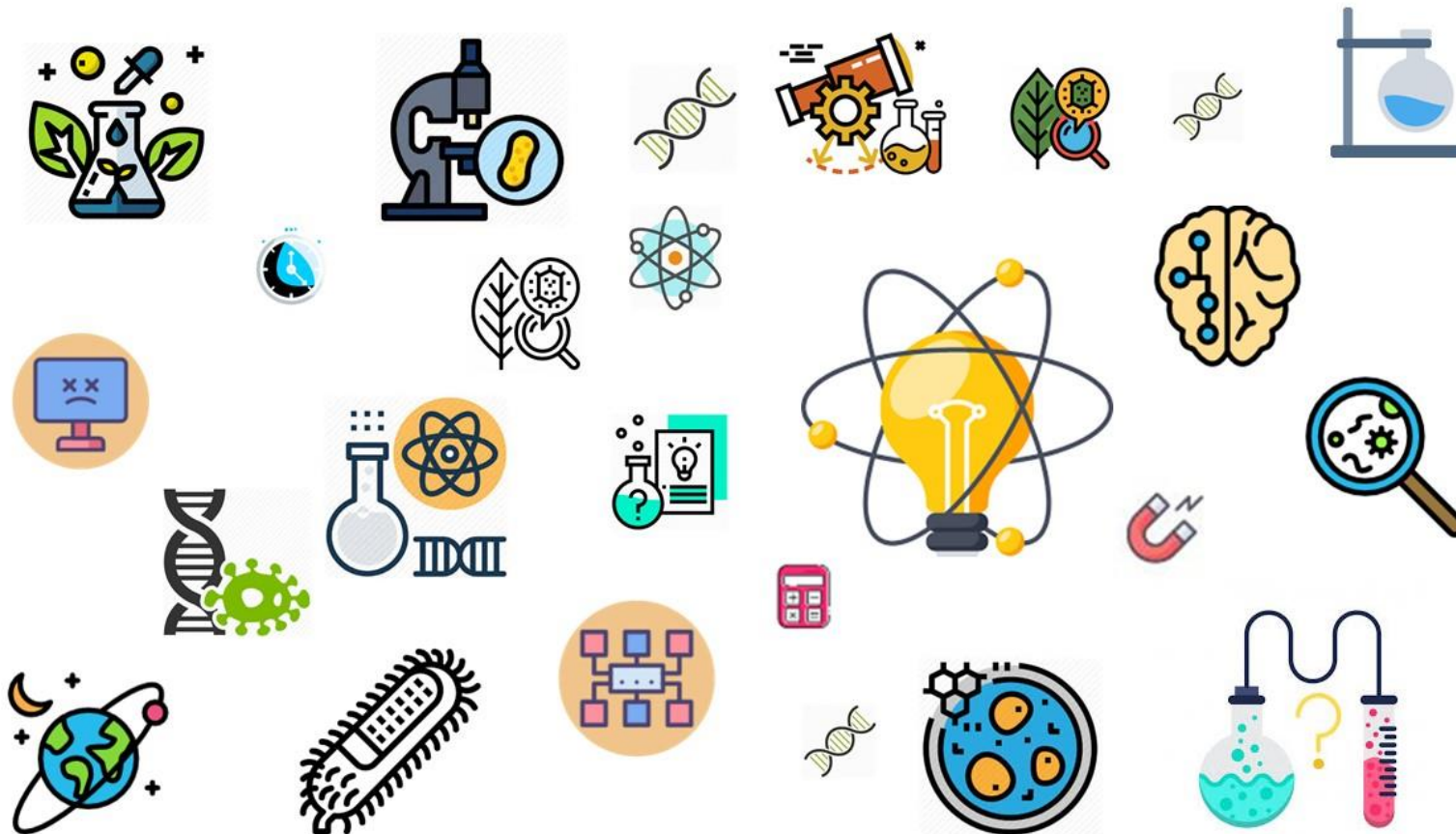




Secondary School Science E-learning Material



Introduction

The World Health Organization declared the spread of coronavirus (COVID-19) a “pandemic” on 11 March 2020, adding that this is the first "worldwide spread" of a new disease that can be controlled. The continual spread of infections and the unpredictability of conditions improving in the short-term has caused for drastic measures by governments in a variety of ways, including closure of schools at all levels.

UNESCO estimates that 1.37 billion students are home as a result of COVID-19 school closures with the figures likely to increase if the pandemic continues to spread. For continuity of learning, the Science Sector of the UNESCO Nairobi Office under the supervision of the Regional Director, has compiled a variety of educational resources to assist Secondary School students in Africa especially those from vulnerable and poor communities.

These lecture and illustrative video resources can be accessed freely online and cover many subject areas in Physics to meet the needs of the wider student population.

We shall endeavour to update these education resources from time to time.

PHYSICS

Motion		
Distance and Displacement Introduction	Velocity, Acceleration	Ticker Tape Timer (Experiment)
https://www.youtube.com/watch?v=21BwUNDOQno https://www.youtube.com/watch?v=i6G-cdrWCrU https://www.youtube.com/watch?v=V8hJhTE3bUk https://www.youtube.com/watch?v=vQCKYm3v3aA	https://www.youtube.com/watch?v=P0UYC8S4kUI https://www.youtube.com/watch?v=4dCrkp8qgLU https://www.youtube.com/watch?v=Jyiw6KkedDY https://www.youtube.com/watch?v=rZo8-ihCA9E	https://www.youtube.com/watch?v=MGLfjRTxbe8 https://www.youtube.com/watch?v=w5YZ0jWCgyA
Newton's First Law	Rectilinear Motion	Newton's Second Law
https://www.youtube.com/watch?v=LEHR8YQNm_Q https://www.youtube.com/watch?v=erghLWXDScI https://www.youtube.com/watch?v=tMN36z8Zz4U	https://www.youtube.com/watch?v=733w4Mwn5G4 https://www.youtube.com/watch?v=ZM8ECpBuQYE https://www.youtube.com/watch?v=4gbze5mbpl8	https://www.youtube.com/watch?v=ZvPrn3aBQG8 https://www.youtube.com/watch?v=xzA6IBWUEDE https://www.youtube.com/watch?v=0efXaBr_JcU

Free Fall	Newton's Third Law	Projectile Motion
https://www.youtube.com/watch?v=0ewWkfBA3vw https://www.youtube.com/watch?v=6wEEa8-RSqU https://www.youtube.com/watch?v=C6-AxMc9mig https://www.youtube.com/watch?v=XIFhOygrDoM	https://www.youtube.com/watch?v=TVAxASr0iUY https://www.youtube.com/watch?v=y61_VPKH2B4 https://www.youtube.com/watch?v=eU3ULRgS8Vk	https://www.youtube.com/watch?v=aY8z2qO44WA https://www.youtube.com/watch?v=p30tWWEElxU https://www.youtube.com/watch?v=KjQ41KfXDW0 https://www.youtube.com/watch?v=rMVbc8cE5GU
Circular Motion		
https://www.youtube.com/watch?v=bpFK2VCRHUs https://www.youtube.com/watch?v=_psIWtPBHzA https://www.youtube.com/watch?v=a2o2mzBvWbU https://www.youtube.com/watch?v=SZj6DuB0vvo		

Force		
Gravity	Elasticity	Friction
https://www.youtube.com/watch?v=U78NOo-oxOY https://www.youtube.com/watch?v=7gf6YpdvtE0	https://www.youtube.com/watch?v=FAHOI32oAns https://www.youtube.com/watch?v=ACDbJ8rsQDo	https://www.youtube.com/watch?v=fo_pmp5rtzo https://www.youtube.com/watch?v=n2gQs1mcZHA https://www.youtube.com/watch?v=C7NPD9W0kro

Composition & Resolution of Forces	Force and Motion Experiments	
https://www.youtube.com/watch?v=G8_e2JHlef0 https://www.youtube.com/watch?v=KKeXsGKpu1l https://www.youtube.com/watch?v=T8-g7stZwDs	https://www.youtube.com/watch?v=ILhckx1zGXw https://www.youtube.com/watch?v=rKQN-0rZe5s	

Energy		
Work, Energy, and Power	Conservation of Energy	Conservation of Mechanical Energy
https://www.youtube.com/watch?v=w4QFJb9a8vo https://www.youtube.com/watch?v=ca_b53EQU8w https://www.youtube.com/watch?v=zVRH9d5PW8g https://www.youtube.com/watch?v=RWPNwEIEB0Q	https://www.youtube.com/watch?v=H6D_ViW0Ch4 https://www.youtube.com/watch?v=OTK9JrKC6EY https://www.youtube.com/watch?v=BcZfRSlaw7s https://www.youtube.com/watch?v=pF0J86NTiSs	https://www.youtube.com/watch?v=hce4pncZII4 https://www.youtube.com/watch?v=AnuLW0ZX7-Q https://www.youtube.com/watch?v=pF0J86NTiSs https://www.youtube.com/watch?v=8EEnMwkmZk https://www.youtube.com/watch?v=LrRdKmjhOgw
Kinetic Energy and Potential Energy	Work-Energy Theorem	Experiment of Conservation of Energy
https://www.youtube.com/watch?v=DyaVgHGssos https://www.youtube.com/watch?v=0ImPflVhW6U https://www.youtube.com/watch?v=PkXYnY_LOHo https://www.youtube.com/watch?v=g7u6plfUVy4	https://www.youtube.com/watch?v=tsFFIYZAiNE https://www.youtube.com/watch?v=O2I73U8SMNC https://www.youtube.com/watch?v=ARSj1RzJ_VI https://www.youtube.com/watch?v=VByt7exqYUo	https://www.youtube.com/watch?v=Q_TWBWiyGcI https://www.youtube.com/watch?v=eulQktEZkjM https://www.youtube.com/watch?v=Xlf6s4QIVws

Impulse and Momentum	Conservation of Momentum	Experiment to Understand Momentum
https://www.youtube.com/watch?v=hODImGK7pl8 https://www.youtube.com/watch?v=UgcAJY1eHvY https://www.youtube.com/watch?v=E13h1E_Pc00 https://www.youtube.com/watch?v=LvsXxd3DM9w	https://www.youtube.com/watch?v=0zxTIn67q3Y https://www.youtube.com/watch?v=PiElRoeCCJw https://www.youtube.com/watch?v=w2zQJ8JMIBA https://www.youtube.com/watch?v=Kf0bBxmNec https://www.youtube.com/watch?v=F8DnNgBhUfQ	https://www.youtube.com/watch?v=CEz3cpkno3Y https://www.youtube.com/watch?v=B-w1KTxT_M8 https://www.youtube.com/watch?v=6zFkVEI6WAY
<p align="center">Perpetual Motion Machines</p>		
https://www.youtube.com/watch?v=A-QgGXbDyR0 https://www.youtube.com/watch?v=rckrnYw5sOA https://www.youtube.com/watch?v=4b8ZsFsZE8I		

Celestial Movement		
Centripetal Force	Newton's Law of Universal Gravitation	Kepler's Laws of Planetary Motion
https://www.youtube.com/watch?v=KvCezk9DJfk https://www.youtube.com/watch?v=Ajk352yc_Cs https://www.youtube.com/watch?v=vZOk8NnijLg	https://www.youtube.com/watch?v=kxkFaBG6a-A https://www.youtube.com/watch?v=c9shwPMpSq8 https://www.youtube.com/watch?v=2PSjARmmL7M	https://www.youtube.com/watch?v=kyR6EO_RMKE https://www.youtube.com/watch?v=s77LJO6USEY

Artificial Satellite	Orbital Velocity	Weightlessness
https://www.youtube.com/watch?v=bA-V2DixZBk https://www.youtube.com/watch?v=aVQXkl1tzok	https://www.youtube.com/watch?v=TMTnHdHTC4M https://www.youtube.com/watch?v=hUJb35RGpY8 https://www.youtube.com/watch?v=vbD1fNiWWfo https://www.youtube.com/watch?v=nxD7koHdQhM	https://www.youtube.com/watch?v=iQOHRKKNLQ https://www.youtube.com/watch?v=hPEx3gxtPK4 https://www.youtube.com/watch?v=F5imthMVfwY
Centrifugal Force (Experiments)		
https://www.youtube.com/watch?v=p7D9MhNjC-Y https://www.youtube.com/watch?v=yyDRI6iQ9Fw https://www.youtube.com/watch?v=20kWPQ1dmls		

Electricity		
Electrostatic/Electric Field	Coulomb's Law	Electric Potential
https://www.youtube.com/watch?v=VuptdDvjwYI https://www.youtube.com/watch?v=VFbyDCG_j18 https://www.youtube.com/watch?v=mdulzEfQXDE https://www.youtube.com/watch?v=0YOGrTNgGhE	https://www.youtube.com/watch?v=2GQTfpDE9DQ https://www.youtube.com/watch?v=a4fd2HhD7h4	https://www.youtube.com/watch?v=MnpJocNB6mc https://www.youtube.com/watch?v=QpVxj3XrLgk https://www.youtube.com/watch?v=SNIOPxZ-Ev4 https://www.youtube.com/watch?v=XWIZ9bfGloI

Closed Circuit	Closed Ohm's Law	Typical Experiments in Electricity (Experiments)
https://www.youtube.com/watch?v=oJikEfDaYpg https://www.youtube.com/watch?v=v5RJf_VOLYA https://www.youtube.com/watch?v=KdNasb1suUE	https://www.youtube.com/watch?v=l4ktT1g_6JI https://www.youtube.com/watch?v=jlL6JX1CLO8 https://www.youtube.com/watch?v=8jB6hDUqNOY	https://www.youtube.com/watch?v=c7ljY6285CE https://www.youtube.com/watch?v=-w-GoSJpvdw https://www.youtube.com/watch?v=wZho9XqXqVI https://www.youtube.com/watch?v=-w-GoSJpvdw&t=3s https://www.youtube.com/watch?v=ViZNgU-Yt-Y

Magnetic Physics

Magnetic Field	Ampère's Law	Lorentz Force
https://www.youtube.com/watch?v=lgtdttfGVw https://www.youtube.com/watch?v=bq6lhafucE https://www.youtube.com/watch?v=o0yfYTtR6go https://www.youtube.com/watch?v=Ri557hvwhcM	https://www.youtube.com/watch?v=5fqwJyt4Lus&t=15s https://www.youtube.com/watch?v=kD4b8Vdc7dM	https://www.youtube.com/watch?v=nRDVm5rn_2A https://www.youtube.com/watch?v=NPF50AaN7KU https://www.youtube.com/watch?v=8QWB8lfNols
Left and Right Hand Rule Physics	Electromagnetic Induction	Faraday's Law
https://www.youtube.com/watch?v=GmURfG3tAhg https://www.youtube.com/watch?v=nWg3B3LAVI0	https://www.youtube.com/watch?v=tC6E9J925pY https://www.youtube.com/watch?v=jeTmla00_rc https://www.youtube.com/watch?v=3HyORmBip-w	https://www.youtube.com/watch?v=Y18N-hi5P1o https://www.youtube.com/watch?v=vcStzn55MG0 https://www.youtube.com/watch?v=zRmfNvTzlhk https://www.youtube.com/watch?v=LDOa7UdfcMQ

Lenz's Law	Magnetic Physics (Experiment)	
https://www.youtube.com/watch?v=QwUq8xM_8bY https://www.youtube.com/watch?v=2_M83gNOOEg https://www.youtube.com/watch?v=xxZenoBs2Pg	https://www.youtube.com/watch?v=M1hMHylYCHw https://www.youtube.com/watch?v=KEkhu_v80yl https://www.youtube.com/watch?v=nsiAi1mFs0g https://www.youtube.com/watch?v=o8VxPNwRuxA	

Thermodynamics

Brownian Motion	Brownian Motion (Experiment)	Kinetic Molecular Theory
https://www.youtube.com/watch?v=UDj7BXA1CHU https://www.youtube.com/watch?v=4m5JnJBq2AU https://www.youtube.com/watch?v=Z-IFLBe22Rl	https://www.youtube.com/watch?v=VDOWS_JBCfw https://www.youtube.com/watch?v=hy-clLi8gHg https://www.youtube.com/watch?v=brRLL0bw30Y	https://www.youtube.com/watch?v=o3f_VJ87Df0 https://www.youtube.com/watch?v=R111Cww88XQ https://www.youtube.com/watch?v=1Jtw8g795Us https://www.youtube.com/watch?v=N9OL6AwyM5l
Avogadro's Number	First Law of Thermodynamics	
https://www.youtube.com/watch?v=H3VKLRNAQuY https://www.youtube.com/watch?v=13i3xbuaCql https://www.youtube.com/watch?v=74-X940P2XI	https://www.youtube.com/watch?v=Bz6vexpZltw https://www.youtube.com/watch?v=1OFIW80XN64 https://www.youtube.com/watch?v=Xb05CaG7TsQ	

Microphysics

Development of the Model of the Atom	Rutherford's Gold Foil (Experiment)	Bohr Model of the Hydrogen Atom
https://www.youtube.com/watch?v=NSAgLvKOPLQ https://www.youtube.com/watch?v=Qesxa71vfkM	https://www.youtube.com/watch?v=sNQsdrqsD_s https://www.youtube.com/watch?v=kHaR2rsFNhg https://www.youtube.com/watch?v=kHaR2rsFNhg	https://www.youtube.com/watch?v=uXUqWlcZrss https://www.youtube.com/watch?v=GhAn8xZQ-d8 https://www.youtube.com/watch?v=mXxsT1ut35Q
Fission and Fusion	Radiation vs Radioactive Atoms	Radioactive Decay and Half Life
https://www.youtube.com/watch?v=Cqlj4_4hcgU https://www.youtube.com/watch?v=onkW8BF5I3Q https://www.youtube.com/watch?v=FU6y1XIADdg https://www.youtube.com/watch?v=2W-GEE6YU4M	https://www.youtube.com/watch?v=sehKAccM8p0 https://www.youtube.com/watch?v=5oUagoF_vIQ https://www.youtube.com/watch?v=MYntSAIE8Uo	https://www.youtube.com/watch?v=zXw2cOSBB8E https://www.youtube.com/watch?v=F8sAkMQmOIU
Mass-Energy Equation ($E=mc^2$)		
https://www.youtube.com/watch?v=hWcACTswM9A https://www.youtube.com/watch?v=Xo232kyTs00 https://www.youtube.com/watch?v=hW7DW9NIO9M https://www.youtube.com/watch?v=Ob2bEAy0kC4		

Sustainable Development begins with Education



United Nations
Educational, Scientific and
Cultural Organization

Natural
Sciences
Sector

UNESCO Regional Office for Eastern Africa

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<https://en.unesco.org/node/315264>