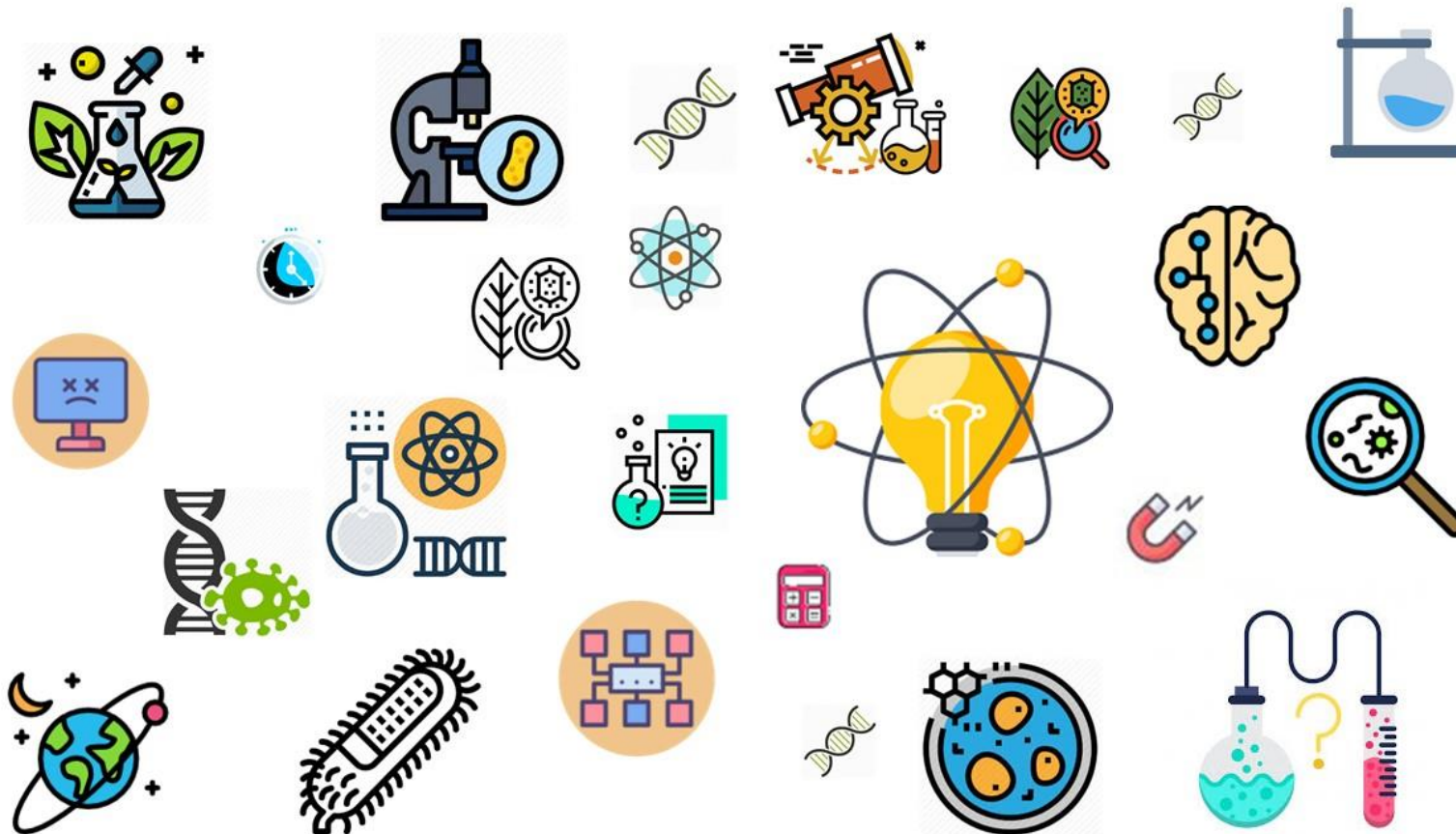




# Secondary School Science E-learning Material



# 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 Chemistry to meet the needs of the wider student population.

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

# CHEMISTRY

| Introduction   | Types of Matter: Elements, Compounds, and Mixtures  |
|--|---|
| <a href="https://www.youtube.com/watch?v=Rd4a1X3B61w">https://www.youtube.com/watch?v=Rd4a1X3B61w</a><br><a href="https://www.youtube.com/watch?v=bka20Q9TN6M">https://www.youtube.com/watch?v=bka20Q9TN6M</a><br><a href="https://www.youtube.com/watch?v=MYuh5yErdFA">https://www.youtube.com/watch?v=MYuh5yErdFA</a><br><a href="https://www.youtube.com/watch?v=k3rRrl9J2F4">https://www.youtube.com/watch?v=k3rRrl9J2F4</a> | <a href="https://www.youtube.com/watch?v=dggHWvFJ8Xs">https://www.youtube.com/watch?v=dggHWvFJ8Xs</a><br><a href="https://www.youtube.com/watch?v=pSJeMJJaCkVU">https://www.youtube.com/watch?v=pSJeMJJaCkVU</a><br><a href="https://www.youtube.com/watch?v=IFKnq9QM6_A">https://www.youtube.com/watch?v=IFKnq9QM6_A</a><br><a href="https://www.youtube.com/watch?v=olNaHLbd8zg">https://www.youtube.com/watch?v=olNaHLbd8zg</a><br><a href="https://www.youtube.com/watch?v=bJvZOITWzVo">https://www.youtube.com/watch?v=bJvZOITWzVo</a> |

| Gas  |  |  |
|--|--|--|
| Composition of Air   | Oxygen Properties  | Hydrogen Properties  |
| <a href="https://www.youtube.com/watch?v=zSnHv1nQ-xA">https://www.youtube.com/watch?v=zSnHv1nQ-xA</a><br><a href="https://www.youtube.com/watch?v=ltPXu-o3tNo">https://www.youtube.com/watch?v=ltPXu-o3tNo</a><br><a href="https://www.youtube.com/watch?v=PMenuLJmV0I">https://www.youtube.com/watch?v=PMenuLJmV0I</a><br><a href="https://www.youtube.com/watch?v=CUCyCtth9xw">https://www.youtube.com/watch?v=CUCyCtth9xw</a><br><a href="https://www.youtube.com/watch?v=byoKHAvaj98">https://www.youtube.com/watch?v=byoKHAvaj98</a><br><a href="https://www.youtube.com/watch?v=gSAI_uRb79M">https://www.youtube.com/watch?v=gSAI_uRb79M</a> | <a href="https://www.youtube.com/watch?v=om4U1k2mfKc">https://www.youtube.com/watch?v=om4U1k2mfKc</a><br><a href="https://www.youtube.com/watch?v=13u73PCz_to">https://www.youtube.com/watch?v=13u73PCz_to</a><br><a href="https://www.youtube.com/watch?v=ERvLRHfRitY">https://www.youtube.com/watch?v=ERvLRHfRitY</a><br><a href="https://www.youtube.com/watch?v=xAQ3ACUICcY">https://www.youtube.com/watch?v=xAQ3ACUICcY</a> | <a href="https://www.youtube.com/watch?v=U-MNKK20Z_g">https://www.youtube.com/watch?v=U-MNKK20Z_g</a><br><a href="https://www.youtube.com/watch?v=DP05fxR4oUk">https://www.youtube.com/watch?v=DP05fxR4oUk</a><br><a href="https://www.youtube.com/watch?v=wBnNG3tpaJo">https://www.youtube.com/watch?v=wBnNG3tpaJo</a><br><a href="https://www.youtube.com/watch?v=wBnNG3tpaJo">https://www.youtube.com/watch?v=wBnNG3tpaJo</a> |

| Nitrogen Properties   | Gas Experiment  |  |
|---|---|--|
| <a href="https://www.youtube.com/watch?v=qwQEO54oczY">https://www.youtube.com/watch?v=qwQEO54oczY</a><br><a href="https://www.youtube.com/watch?v=IHfqVe8eq4E">https://www.youtube.com/watch?v=IHfqVe8eq4E</a><br><a href="https://www.youtube.com/watch?v=bQM8B2uLnV0">https://www.youtube.com/watch?v=bQM8B2uLnV0</a> | <a href="https://www.youtube.com/watch?v=qN1fUM9vSA4">https://www.youtube.com/watch?v=qN1fUM9vSA4</a><br><a href="https://www.youtube.com/watch?v=GqBI83Koig">https://www.youtube.com/watch?v=GqBI83Koig</a><br><a href="https://www.youtube.com/watch?v=En_vKeLwi7o">https://www.youtube.com/watch?v=En_vKeLwi7o</a><br><a href="https://www.youtube.com/watch?v=Fe7cTbwwrTQ">https://www.youtube.com/watch?v=Fe7cTbwwrTQ</a><br><a href="https://www.youtube.com/watch?v=LiAvDpl5aJA">https://www.youtube.com/watch?v=LiAvDpl5aJA</a><br><a href="https://www.youtube.com/watch?v=tyhWF1EYtok">https://www.youtube.com/watch?v=tyhWF1EYtok</a><br><a href="https://www.youtube.com/watch?v=mwwBeDBh_ik">https://www.youtube.com/watch?v=mwwBeDBh_ik</a> |  |
| Nitrogen Properties   | Gas Experiment  |  |
| <a href="https://www.youtube.com/watch?v=qwQEO54oczY">https://www.youtube.com/watch?v=qwQEO54oczY</a><br><a href="https://www.youtube.com/watch?v=IHfqVe8eq4E">https://www.youtube.com/watch?v=IHfqVe8eq4E</a><br><a href="https://www.youtube.com/watch?v=bQM8B2uLnV0">https://www.youtube.com/watch?v=bQM8B2uLnV0</a> | <a href="https://www.youtube.com/watch?v=qN1fUM9vSA4">https://www.youtube.com/watch?v=qN1fUM9vSA4</a><br><a href="https://www.youtube.com/watch?v=GqBI83Koig">https://www.youtube.com/watch?v=GqBI83Koig</a><br><a href="https://www.youtube.com/watch?v=En_vKeLwi7o">https://www.youtube.com/watch?v=En_vKeLwi7o</a><br><a href="https://www.youtube.com/watch?v=Fe7cTbwwrTQ">https://www.youtube.com/watch?v=Fe7cTbwwrTQ</a><br><a href="https://www.youtube.com/watch?v=LiAvDpl5aJA">https://www.youtube.com/watch?v=LiAvDpl5aJA</a><br><a href="https://www.youtube.com/watch?v=tyhWF1EYtok">https://www.youtube.com/watch?v=tyhWF1EYtok</a><br><a href="https://www.youtube.com/watch?v=mwwBeDBh_ik">https://www.youtube.com/watch?v=mwwBeDBh_ik</a> |  |

## Carbon and Its Compounds

| Balance Chemical Equations  | Carbon Introduction   | Carbon Dioxide   |
|---|---|--|
| <a href="https://www.youtube.com/watch?v=vTq4sgGd2QU">https://www.youtube.com/watch?v=vTq4sgGd2QU</a><br><a href="https://www.youtube.com/watch?v=npyvZSBqyc0">https://www.youtube.com/watch?v=npyvZSBqyc0</a><br><a href="https://www.youtube.com/watch?v=e_C-V5vJv80">https://www.youtube.com/watch?v=e_C-V5vJv80</a><br><a href="https://www.youtube.com/watch?v=zmdxMlb88Fs">https://www.youtube.com/watch?v=zmdxMlb88Fs</a><br><a href="https://www.youtube.com/watch?v=uYY_baOiKms">https://www.youtube.com/watch?v=uYY_baOiKms</a> | <a href="https://www.youtube.com/watch?v=ULiLt2rtpAg">https://www.youtube.com/watch?v=ULiLt2rtpAg</a><br><a href="https://www.youtube.com/watch?v=QuW4_bRHbUk">https://www.youtube.com/watch?v=QuW4_bRHbUk</a><br><a href="https://www.youtube.com/watch?v=ceCwRWf79zw">https://www.youtube.com/watch?v=ceCwRWf79zw</a> | <a href="https://www.youtube.com/watch?v=VTbxS9evIkQ">https://www.youtube.com/watch?v=VTbxS9evIkQ</a><br><a href="https://www.youtube.com/watch?v=ICl56YDnj4A">https://www.youtube.com/watch?v=ICl56YDnj4A</a><br><a href="https://www.youtube.com/watch?v=koBqP57AACc">https://www.youtube.com/watch?v=koBqP57AACc</a><br><a href="https://www.youtube.com/watch?v=0J4HpjwKwsg">https://www.youtube.com/watch?v=0J4HpjwKwsg</a> |
| Carbon Compounds  |   |  |
| <a href="https://www.youtube.com/watch?v=yAGevUynzW4">https://www.youtube.com/watch?v=yAGevUynzW4</a><br><a href="https://www.youtube.com/watch?v=gipyujuKMf4">https://www.youtube.com/watch?v=gipyujuKMf4</a><br><a href="https://www.youtube.com/watch?v=MhZSx0-VDi8">https://www.youtube.com/watch?v=MhZSx0-VDi8</a><br><a href="https://www.youtube.com/watch?v=qox3ntVY_5M">https://www.youtube.com/watch?v=qox3ntVY_5M</a><br><a href="https://www.youtube.com/watch?v=m5ffJpyg_PM">https://www.youtube.com/watch?v=m5ffJpyg_PM</a> |   |  |

## Non-Metal

| Non-Metal Properties  | Non-Metal Oxides  |  |
|---|---|--|
| <a href="https://www.youtube.com/watch?v=1O5Dz_t3F0U">https://www.youtube.com/watch?v=1O5Dz_t3F0U</a><br><a href="https://www.youtube.com/watch?v=SYvrOpOaaWo">https://www.youtube.com/watch?v=SYvrOpOaaWo</a><br><a href="https://www.youtube.com/watch?v=Z-tt-pAxMRA">https://www.youtube.com/watch?v=Z-tt-pAxMRA</a> | <a href="https://www.youtube.com/watch?v=lme3cNG9Oc8">https://www.youtube.com/watch?v=lme3cNG9Oc8</a><br><a href="https://www.youtube.com/watch?v=bOA_8SG4iQw">https://www.youtube.com/watch?v=bOA_8SG4iQw</a><br><a href="https://www.youtube.com/watch?v=J904M8YUdSQ">https://www.youtube.com/watch?v=J904M8YUdSQ</a> |  |

## Metal

| Property of Metals  | Sodium (Na)  | Magnesium (Mg)  |
|---|--|---|
| <a href="https://www.youtube.com/watch?v=vOuFTuvf4qk">https://www.youtube.com/watch?v=vOuFTuvf4qk</a><br><a href="https://www.youtube.com/watch?v=Oh0nv3ErjqU">https://www.youtube.com/watch?v=Oh0nv3ErjqU</a><br><a href="https://www.youtube.com/watch?v=YxnN5vLW9F4">https://www.youtube.com/watch?v=YxnN5vLW9F4</a><br><a href="https://www.youtube.com/watch?v=Rc2JBp91V7o">https://www.youtube.com/watch?v=Rc2JBp91V7o</a><br><a href="https://www.youtube.com/watch?v=QsbRgTYvthg">https://www.youtube.com/watch?v=QsbRgTYvthg</a><br><a href="https://www.youtube.com/watch?v=0Q8ZhzuT3Y0">https://www.youtube.com/watch?v=0Q8ZhzuT3Y0</a><br><a href="https://www.youtube.com/watch?v=-qInXrhrhY">https://www.youtube.com/watch?v=-qInXrhrhY</a> | <a href="https://www.youtube.com/watch?v=WsrdE5g4z1I">https://www.youtube.com/watch?v=WsrdE5g4z1I</a><br><a href="https://www.youtube.com/watch?v=7IT2I3LtINE">https://www.youtube.com/watch?v=7IT2I3LtINE</a><br><a href="https://www.youtube.com/watch?v=UsSnFEUDKtw">https://www.youtube.com/watch?v=UsSnFEUDKtw</a><br><a href="https://www.youtube.com/watch?v=NinmIYKaj2w">https://www.youtube.com/watch?v=NinmIYKaj2w</a> | <a href="https://www.youtube.com/watch?v=FKkWdizutxl">https://www.youtube.com/watch?v=FKkWdizutxl</a><br><a href="https://www.youtube.com/watch?v=ushi-G0Qs5Y">https://www.youtube.com/watch?v=ushi-G0Qs5Y</a><br><a href="https://www.youtube.com/watch?v=g2A5o_MJ1-k">https://www.youtube.com/watch?v=g2A5o_MJ1-k</a> |

| Aluminum (Al)   | Iron (Fe)   | Galvanic/Voltaic Cells  |
|---|---|---|
| <a href="https://www.youtube.com/watch?v=ILWBE6w_oR4">https://www.youtube.com/watch?v=ILWBE6w_oR4</a><br><a href="https://www.youtube.com/watch?v=4AhZ8503WPs">https://www.youtube.com/watch?v=4AhZ8503WPs</a><br><a href="https://www.youtube.com/watch?v=iq_Sqemu6VI">https://www.youtube.com/watch?v=iq_Sqemu6VI</a>   | <a href="https://www.youtube.com/watch?v=euQUgp5AY-Y">https://www.youtube.com/watch?v=euQUgp5AY-Y</a><br><a href="https://www.youtube.com/watch?v=uAMMQv0rKFI">https://www.youtube.com/watch?v=uAMMQv0rKFI</a><br><a href="https://www.youtube.com/watch?v=omGKUKwJPB8">https://www.youtube.com/watch?v=omGKUKwJPB8</a><br><a href="https://www.youtube.com/watch?v=LM4VOW6xZ5Y">https://www.youtube.com/watch?v=LM4VOW6xZ5Y</a><br><a href="https://www.youtube.com/watch?v=HcXj60cSUX4">https://www.youtube.com/watch?v=HcXj60cSUX4</a> | <a href="https://www.youtube.com/watch?v=9bIB-uMTIAM">https://www.youtube.com/watch?v=9bIB-uMTIAM</a><br><a href="https://www.youtube.com/watch?v=7b34XYgADIM">https://www.youtube.com/watch?v=7b34XYgADIM</a><br><a href="https://www.youtube.com/watch?v=9Xncz_mMc5g">https://www.youtube.com/watch?v=9Xncz_mMc5g</a><br><a href="https://www.youtube.com/watch?v=2_r5tK4Mkg8">https://www.youtube.com/watch?v=2_r5tK4Mkg8</a><br><a href="https://www.youtube.com/watch?v=C26pH8kC_Wk">https://www.youtube.com/watch?v=C26pH8kC_Wk</a> |
| Electrolytic Cells  | Experiments   |   |
| <a href="https://www.youtube.com/watch?v=2_r5tK4Mkg8">https://www.youtube.com/watch?v=2_r5tK4Mkg8</a><br><a href="https://www.youtube.com/watch?v=o8auXrCo_BM">https://www.youtube.com/watch?v=o8auXrCo_BM</a><br><a href="https://www.youtube.com/watch?v=uzYVK7aa5oU">https://www.youtube.com/watch?v=uzYVK7aa5oU</a><br><a href="https://www.youtube.com/watch?v=l1GLa7gxTdg">https://www.youtube.com/watch?v=l1GLa7gxTdg</a><br><a href="https://www.youtube.com/watch?v=1xKeFiyOemA">https://www.youtube.com/watch?v=1xKeFiyOemA</a> | <a href="https://www.youtube.com/watch?v=tbPxwDiX1NU">https://www.youtube.com/watch?v=tbPxwDiX1NU</a><br><a href="https://www.youtube.com/watch?v=BRX40XLBiak">https://www.youtube.com/watch?v=BRX40XLBiak</a><br><a href="https://www.youtube.com/watch?v=qtJx9UIwhIE">https://www.youtube.com/watch?v=qtJx9UIwhIE</a><br><a href="https://www.youtube.com/watch?v=TGPPPFczOj0">https://www.youtube.com/watch?v=TGPPPFczOj0</a><br><a href="https://www.youtube.com/watch?v=fCZztwJmAlO">https://www.youtube.com/watch?v=fCZztwJmAlO</a> |   |

## Solution

| Solution Formation  | Solubility   | Concentration of Solutions  |
|---|--|---|
| <a href="https://www.youtube.com/watch?v=R5iuT7jsUd4">https://www.youtube.com/watch?v=R5iuT7jsUd4</a><br><a href="https://www.youtube.com/watch?v=Lc-P_nNSLHA">https://www.youtube.com/watch?v=Lc-P_nNSLHA</a><br><a href="https://www.youtube.com/watch?v=zePYWZ2Ajl">https://www.youtube.com/watch?v=zePYWZ2Ajl</a>   | <a href="https://www.youtube.com/watch?v=MDHlaTHbEgM">https://www.youtube.com/watch?v=MDHlaTHbEgM</a><br><a href="https://www.youtube.com/watch?v=AsCLuLS-yZY">https://www.youtube.com/watch?v=AsCLuLS-yZY</a><br><a href="https://www.youtube.com/watch?v=Z8f-rVdnEBs">https://www.youtube.com/watch?v=Z8f-rVdnEBs</a><br><a href="https://www.youtube.com/watch?v=WjiXbemBXkE">https://www.youtube.com/watch?v=WjiXbemBXkE</a> | <a href="https://www.youtube.com/watch?v=3G3KQIyoZDI">https://www.youtube.com/watch?v=3G3KQIyoZDI</a><br><a href="https://www.youtube.com/watch?v=UMPyExRPsuw">https://www.youtube.com/watch?v=UMPyExRPsuw</a><br><a href="https://www.youtube.com/watch?v=HgtoTsmcOHo">https://www.youtube.com/watch?v=HgtoTsmcOHo</a><br><a href="https://www.youtube.com/watch?v=HQIE64P_N7s">https://www.youtube.com/watch?v=HQIE64P_N7s</a><br><a href="https://www.youtube.com/watch?v=F2BRpFihX3M">https://www.youtube.com/watch?v=F2BRpFihX3M</a> |
| Experiment - Solution Preparation   |  |   |
| <a href="https://www.youtube.com/watch?v=A2Yylo8vSCA">https://www.youtube.com/watch?v=A2Yylo8vSCA</a><br><a href="https://www.youtube.com/watch?v=iPYyRNjXkgY">https://www.youtube.com/watch?v=iPYyRNjXkgY</a><br><a href="https://www.youtube.com/watch?v=0_CsM6br4PI">https://www.youtube.com/watch?v=0_CsM6br4PI</a><br><a href="https://www.youtube.com/watch?v=HV6DggGVNck">https://www.youtube.com/watch?v=HV6DggGVNck</a><br><a href="https://www.youtube.com/watch?v=cmXXdPxEafE">https://www.youtube.com/watch?v=cmXXdPxEafE</a> |  |   |



## Reactions

| Types of Chemical Reactions   | Endothermic and Exothermic Reactions  | Oxidation-Reduction (Redox) Reactions  |
|---|---|--|
| <a href="https://www.youtube.com/watch?v=aMU1RaRuSo">https://www.youtube.com/watch?v=aMU1RaRuSo</a><br><a href="https://www.youtube.com/watch?v=iJD8RNLpS0">https://www.youtube.com/watch?v=iJD8RNLpS0</a><br><a href="https://www.youtube.com/watch?v=iUdU3I0zZGk">https://www.youtube.com/watch?v=iUdU3I0zZGk</a><br><a href="https://www.youtube.com/watch?v=TStjgUmL1RQ">https://www.youtube.com/watch?v=TStjgUmL1RQ</a><br><a href="https://www.youtube.com/watch?v=TX6BYceUSL0">https://www.youtube.com/watch?v=TX6BYceUSL0</a> | <a href="https://www.youtube.com/watch?v=4HS6D0hTzdg">https://www.youtube.com/watch?v=4HS6D0hTzdg</a><br><a href="https://www.youtube.com/watch?v=CVIG2P1sxHQ">https://www.youtube.com/watch?v=CVIG2P1sxHQ</a><br><a href="https://www.youtube.com/watch?v=JRIm_a2LDPM">https://www.youtube.com/watch?v=JRIm_a2LDPM</a><br><a href="https://www.youtube.com/watch?v=eJXL0IrbtqE">https://www.youtube.com/watch?v=eJXL0IrbtqE</a><br><a href="https://www.youtube.com/watch?v=8k_csPv9pDo">https://www.youtube.com/watch?v=8k_csPv9pDo</a> | <a href="https://www.youtube.com/watch?v=5rtJdjas-mY">https://www.youtube.com/watch?v=5rtJdjas-mY</a><br><a href="https://www.youtube.com/watch?v=dF5IB7gRtcA">https://www.youtube.com/watch?v=dF5IB7gRtcA</a><br><a href="https://www.youtube.com/watch?v=dF5IB7gRtcA">https://www.youtube.com/watch?v=dF5IB7gRtcA</a><br><a href="https://www.youtube.com/watch?v=VXvtkwubQQg">https://www.youtube.com/watch?v=VXvtkwubQQg</a><br><a href="https://www.youtube.com/watch?v=6gtcvqLmPo8">https://www.youtube.com/watch?v=6gtcvqLmPo8</a><br><a href="https://www.youtube.com/watch?v=jyvcVjrZnJA">https://www.youtube.com/watch?v=jyvcVjrZnJA</a> |

## Acid, Bases and Salt

| Acid and Bases  | Neutralization Reaction  | Acid-bases Experiment   |
|---|--|---|
| <a href="https://www.youtube.com/watch?v=wmhOttrolrw">https://www.youtube.com/watch?v=wmhOttrolrw</a><br><a href="https://www.youtube.com/watch?v=mnbS56HQbaU">https://www.youtube.com/watch?v=mnbS56HQbaU</a><br><a href="https://www.youtube.com/watch?v=dXCwJUNaqSo">https://www.youtube.com/watch?v=dXCwJUNaqSo</a> | <a href="https://www.youtube.com/watch?v=ANi709MYnWg">https://www.youtube.com/watch?v=ANi709MYnWg</a><br><a href="https://www.youtube.com/watch?v=LFQdD0e3L9l">https://www.youtube.com/watch?v=LFQdD0e3L9l</a><br><a href="https://www.youtube.com/watch?v=UfTJrAPjeys">https://www.youtube.com/watch?v=UfTJrAPjeys</a><br><a href="https://www.youtube.com/watch?v=n9wUdgxCLMQ">https://www.youtube.com/watch?v=n9wUdgxCLMQ</a><br><a href="https://www.youtube.com/watch?v=gtcE8TosEq4">https://www.youtube.com/watch?v=gtcE8TosEq4</a><br><a href="https://www.youtube.com/watch?v=8NBbKHwTTPw">https://www.youtube.com/watch?v=8NBbKHwTTPw</a> | <a href="https://www.youtube.com/watch?v=Ko5iDMYzwWE">https://www.youtube.com/watch?v=Ko5iDMYzwWE</a><br><a href="https://www.youtube.com/watch?v=vOZe3fnoX0">https://www.youtube.com/watch?v=vOZe3fnoX0</a><br><a href="https://www.youtube.com/watch?v=l18K2upEHLc">https://www.youtube.com/watch?v=l18K2upEHLc</a><br><a href="https://www.youtube.com/watch?v=B96REFFF084">https://www.youtube.com/watch?v=B96REFFF084</a><br><a href="https://www.youtube.com/watch?v=2PKzBeKwPrg">https://www.youtube.com/watch?v=2PKzBeKwPrg</a> |

| Salt Introduction  | Salt Experiment  |
|--|--|
| <a href="https://www.youtube.com/watch?v=WnAKhtnJjz0">https://www.youtube.com/watch?v=WnAKhtnJjz0</a><br><a href="https://www.youtube.com/watch?v=kbhOeZ8sWBA">https://www.youtube.com/watch?v=kbhOeZ8sWBA</a><br><a href="https://www.youtube.com/watch?v=rn9Xlwl_YHo">https://www.youtube.com/watch?v=rn9Xlwl_YHo</a><br><a href="https://www.youtube.com/watch?v=0le7m5Zpy5A">https://www.youtube.com/watch?v=0le7m5Zpy5A</a> | <a href="https://www.youtube.com/watch?v=qlOMlwBoe_4">https://www.youtube.com/watch?v=qlOMlwBoe_4</a><br><a href="https://www.youtube.com/watch?v=lpM_VCMPFug">https://www.youtube.com/watch?v=lpM_VCMPFug</a><br><a href="https://www.youtube.com/watch?v=E1ODnGe9LnM">https://www.youtube.com/watch?v=E1ODnGe9LnM</a><br><a href="https://www.youtube.com/watch?v=lzKjoja6l34">https://www.youtube.com/watch?v=lzKjoja6l34</a> |

| Organic Matter   |   |   |
|--|---|---|
| Organic Chemistry Introduction   | Hydrocarbons  | Alkanes   |
| <a href="https://www.youtube.com/watch?v=HRz-jH4CAy8">https://www.youtube.com/watch?v=HRz-jH4CAy8</a><br><a href="https://www.youtube.com/watch?v=PmvLB5dIEp8">https://www.youtube.com/watch?v=PmvLB5dIEp8</a><br><a href="https://www.youtube.com/watch?v=YAjpntbbQ2w">https://www.youtube.com/watch?v=YAjpntbbQ2w</a><br><a href="https://www.youtube.com/watch?v=DTKKSyooqyM">https://www.youtube.com/watch?v=DTKKSyooqyM</a> | <a href="https://www.youtube.com/watch?v=Ulolw7dhnlQ">https://www.youtube.com/watch?v=Ulolw7dhnlQ</a><br><a href="https://www.youtube.com/watch?v=ykIFTtTjoso">https://www.youtube.com/watch?v=ykIFTtTjoso</a><br><a href="https://www.youtube.com/watch?v=o3Db15Gw_mU">https://www.youtube.com/watch?v=o3Db15Gw_mU</a><br><a href="https://www.youtube.com/watch?v=1LV-_vqu6cQ">https://www.youtube.com/watch?v=1LV-_vqu6cQ</a><br><a href="https://www.youtube.com/watch?v=Xx9fxChPEH8">https://www.youtube.com/watch?v=Xx9fxChPEH8</a> | <a href="https://www.youtube.com/watch?v=anrfDiEA1AA">https://www.youtube.com/watch?v=anrfDiEA1AA</a><br><a href="https://www.youtube.com/watch?v=F8J2Firblxg">https://www.youtube.com/watch?v=F8J2Firblxg</a><br><a href="https://www.youtube.com/watch?v=WI1IXNQnKao">https://www.youtube.com/watch?v=WI1IXNQnKao</a><br><a href="https://www.youtube.com/watch?v=EK5c3_MEf34">https://www.youtube.com/watch?v=EK5c3_MEf34</a><br><a href="https://www.youtube.com/watch?v=ykIFTtTjoso">https://www.youtube.com/watch?v=ykIFTtTjoso</a> |
| Alkenes  | Alkynes   | Comparison of Alkanes, Alkenes and Alkynes  |
| <a href="https://www.youtube.com/watch?v=8tQweTAzjBk">https://www.youtube.com/watch?v=8tQweTAzjBk</a><br><a href="https://www.youtube.com/watch?v=3QGSShSKYeQ">https://www.youtube.com/watch?v=3QGSShSKYeQ</a><br><a href="https://www.youtube.com/watch?v=dygC-Frvphs">https://www.youtube.com/watch?v=dygC-Frvphs</a><br><a href="https://www.youtube.com/watch?v=yZqaP7E_tzo">https://www.youtube.com/watch?v=yZqaP7E_tzo</a> | <a href="https://www.youtube.com/watch?v=VkCRNwx5dbs">https://www.youtube.com/watch?v=VkCRNwx5dbs</a><br><a href="https://www.youtube.com/watch?v=C4b-23l1Cs4">https://www.youtube.com/watch?v=C4b-23l1Cs4</a><br><a href="https://www.youtube.com/watch?v=adNW-WRXMHc">https://www.youtube.com/watch?v=adNW-WRXMHc</a><br><a href="https://www.youtube.com/watch?v=DQWekDBCCdQ">https://www.youtube.com/watch?v=DQWekDBCCdQ</a>  | <a href="https://www.youtube.com/watch?v=uNZ_gJmIbIM">https://www.youtube.com/watch?v=uNZ_gJmIbIM</a><br><a href="https://www.youtube.com/watch?v=Sfm3eHe57PU">https://www.youtube.com/watch?v=Sfm3eHe57PU</a><br><a href="https://www.youtube.com/watch?v=VjzhirlJmGk">https://www.youtube.com/watch?v=VjzhirlJmGk</a><br><a href="https://www.youtube.com/watch?v=EyDYaEROPWM">https://www.youtube.com/watch?v=EyDYaEROPWM</a>  |

| Benzene  | Aromatics  |  |
|--|--|--|
| <a href="https://www.youtube.com/watch?v=xD7Z7SHix-w">https://www.youtube.com/watch?v=xD7Z7SHix-w</a><br><a href="https://www.youtube.com/watch?v=nNRfzwktHFY">https://www.youtube.com/watch?v=nNRfzwktHFY</a><br><a href="https://www.youtube.com/watch?v=EJZYbYxYYG0">https://www.youtube.com/watch?v=EJZYbYxYYG0</a><br><a href="https://www.youtube.com/watch?v=3bZ7bpS6ksw">https://www.youtube.com/watch?v=3bZ7bpS6ksw</a> | <a href="https://www.youtube.com/watch?v=2_1PYcdUWy0">https://www.youtube.com/watch?v=2_1PYcdUWy0</a><br><a href="https://www.youtube.com/watch?v=kXFEex-dABU">https://www.youtube.com/watch?v=kXFEex-dABU</a><br><a href="https://www.youtube.com/watch?v=RaBI3IAACKg">https://www.youtube.com/watch?v=RaBI3IAACKg</a><br><a href="https://www.youtube.com/watch?v=7-BguH4_WBQ">https://www.youtube.com/watch?v=7-BguH4_WBQ</a> |  |

| Hydrocarbon Derivatives   |  |   |
|---|--|---|
| Introduction  | Ethanol  | Ethanal/Acetaldehyde  |
| <a href="https://www.youtube.com/watch?v=hIXc_eEtBHA">https://www.youtube.com/watch?v=hIXc_eEtBHA</a><br><a href="https://www.youtube.com/watch?v=TOfQBQKkrPA">https://www.youtube.com/watch?v=TOfQBQKkrPA</a><br><a href="https://www.youtube.com/watch?v=RTyJOk9oYW0">https://www.youtube.com/watch?v=RTyJOk9oYW0</a><br><a href="https://www.youtube.com/watch?v=x_VhNu8xi6U">https://www.youtube.com/watch?v=x_VhNu8xi6U</a><br><a href="https://www.youtube.com/watch?v=FHZSeh2eUw4">https://www.youtube.com/watch?v=FHZSeh2eUw4</a> | <a href="https://www.youtube.com/watch?v=MX2IWFBO5fM">https://www.youtube.com/watch?v=MX2IWFBO5fM</a><br><a href="https://www.youtube.com/watch?v=M2ydl8BDTHU">https://www.youtube.com/watch?v=M2ydl8BDTHU</a><br><a href="https://www.youtube.com/watch?v=uFZasZ-hs_A">https://www.youtube.com/watch?v=uFZasZ-hs_A</a><br><a href="https://www.youtube.com/watch?v=TXJ0ffXyLq0">https://www.youtube.com/watch?v=TXJ0ffXyLq0</a> | <a href="https://www.youtube.com/watch?v=rjpf11TJT3E">https://www.youtube.com/watch?v=rjpf11TJT3E</a><br><a href="https://www.youtube.com/watch?v=tS3kXKr2ZcM">https://www.youtube.com/watch?v=tS3kXKr2ZcM</a><br><a href="https://www.youtube.com/watch?v=BNaz2p4Xgdk">https://www.youtube.com/watch?v=BNaz2p4Xgdk</a> |

| Acetic/Ethanoic Acid   | Carbohydrates   | Fatty Acids   |
|--|---|---|
| <a href="https://www.youtube.com/watch?v=roCnpyzpsCw">https://www.youtube.com/watch?v=roCnpyzpsCw</a><br><a href="https://www.youtube.com/watch?v=Bc5ulX4BmBY">https://www.youtube.com/watch?v=Bc5ulX4BmBY</a><br><a href="https://www.youtube.com/watch?v=0qu--d5qWrs">https://www.youtube.com/watch?v=0qu--d5qWrs</a><br><a href="https://www.youtube.com/watch?v=8iG_qnkF08Y">https://www.youtube.com/watch?v=8iG_qnkF08Y</a><br><a href="https://www.youtube.com/watch?v=2vOBTq73iyk">https://www.youtube.com/watch?v=2vOBTq73iyk</a><br><a href="https://www.youtube.com/watch?v=Nce1xOlvrQc">https://www.youtube.com/watch?v=Nce1xOlvrQc</a> | <a href="https://www.youtube.com/watch?v=doe_zZdJU5c">https://www.youtube.com/watch?v=doe_zZdJU5c</a><br><a href="https://www.youtube.com/watch?v=wFYsufJ9XMM">https://www.youtube.com/watch?v=wFYsufJ9XMM</a><br><a href="https://www.youtube.com/watch?v=kIIS59cjzl">https://www.youtube.com/watch?v=kIIS59cjzl</a><br><a href="https://www.youtube.com/watch?v=mUo4c2f9rpI">https://www.youtube.com/watch?v=mUo4c2f9rpI</a><br><a href="https://www.youtube.com/watch?v=_zm_DyD6FJO">https://www.youtube.com/watch?v=_zm_DyD6FJO</a> | <a href="https://www.youtube.com/watch?v=kNDh1Ba0U9k">https://www.youtube.com/watch?v=kNDh1Ba0U9k</a><br><a href="https://www.youtube.com/watch?v=7dmoH5dAvpY">https://www.youtube.com/watch?v=7dmoH5dAvpY</a><br><a href="https://www.youtube.com/watch?v=Ezp8F7XJHWE">https://www.youtube.com/watch?v=Ezp8F7XJHWE</a><br><a href="https://www.youtube.com/watch?v=5BBYBRWzsLA">https://www.youtube.com/watch?v=5BBYBRWzsLA</a><br><a href="https://www.youtube.com/watch?v=VGHD9e3yRIU">https://www.youtube.com/watch?v=VGHD9e3yRIU</a> |
| <b>Polymers</b>  |   |   |
| <a href="https://www.youtube.com/watch?v=rHxxLYzJ8Sw">https://www.youtube.com/watch?v=rHxxLYzJ8Sw</a><br><a href="https://www.youtube.com/watch?v=LWxoDV-LI8k">https://www.youtube.com/watch?v=LWxoDV-LI8k</a><br><a href="https://www.youtube.com/watch?v=VKmdYYPexbs">https://www.youtube.com/watch?v=VKmdYYPexbs</a><br><a href="https://www.youtube.com/watch?v=Yol-Nn5r6IE">https://www.youtube.com/watch?v=Yol-Nn5r6IE</a><br><a href="https://www.youtube.com/watch?v=VigpwmH7E3M">https://www.youtube.com/watch?v=VigpwmH7E3M</a>  |   |   |

## Nitrogen Family

| Introduction   | Nitrogen and Its Compounds   | Ammonia  |
|--|--|--|
| <a href="https://www.youtube.com/watch?v=-z1mKwi8r4w">https://www.youtube.com/watch?v=-z1mKwi8r4w</a><br><a href="https://www.youtube.com/watch?v=bT2OIFHai8U">https://www.youtube.com/watch?v=bT2OIFHai8U</a><br><a href="https://www.youtube.com/watch?v=aLo_TmnpQik">https://www.youtube.com/watch?v=aLo_TmnpQik</a><br><a href="https://www.youtube.com/watch?v=tjuwwXTSrU">https://www.youtube.com/watch?v=tjuwwXTSrU</a>   | <a href="https://www.youtube.com/watch?v=bQM8B2uLnV0">https://www.youtube.com/watch?v=bQM8B2uLnV0</a><br><a href="https://www.youtube.com/watch?v=kh4twsEDy_k">https://www.youtube.com/watch?v=kh4twsEDy_k</a><br><a href="https://www.youtube.com/watch?v=8M6KkCVOwuM">https://www.youtube.com/watch?v=8M6KkCVOwuM</a>  | <a href="https://www.youtube.com/watch?v=3edKxUyqHQc">https://www.youtube.com/watch?v=3edKxUyqHQc</a><br><a href="https://www.youtube.com/watch?v=wiwl4eoHbig">https://www.youtube.com/watch?v=wiwl4eoHbig</a><br><a href="https://www.youtube.com/watch?v=Anh2Nwk7JfE">https://www.youtube.com/watch?v=Anh2Nwk7JfE</a>  |
| Oxides of Nitrogen   | Phosphorus & Phosphorus Pentoxide  | Experiment   |
| <a href="https://www.youtube.com/watch?v=R4Leb9YDhxU">https://www.youtube.com/watch?v=R4Leb9YDhxU</a><br><a href="https://www.youtube.com/watch?v=UcsX2e_Q_Wa">https://www.youtube.com/watch?v=UcsX2e_Q_Wa</a><br><a href="https://www.youtube.com/watch?v=zr5gUHapRCI">https://www.youtube.com/watch?v=zr5gUHapRCI</a><br><a href="https://www.youtube.com/watch?v=0NRBd7iVdhQ">https://www.youtube.com/watch?v=0NRBd7iVdhQ</a> | <a href="https://www.youtube.com/watch?v=v_xoZUuor3Y">https://www.youtube.com/watch?v=v_xoZUuor3Y</a><br><a href="https://www.youtube.com/watch?v=U6_-EUcswSc">https://www.youtube.com/watch?v=U6_-EUcswSc</a><br><a href="https://www.youtube.com/watch?v=GEURYjuomrw">https://www.youtube.com/watch?v=GEURYjuomrw</a><br><a href="https://www.youtube.com/watch?v=hsKAaYBmxqs">https://www.youtube.com/watch?v=hsKAaYBmxqs</a> | <a href="https://www.youtube.com/watch?v=vpbYWLE9I_Q">https://www.youtube.com/watch?v=vpbYWLE9I_Q</a><br><a href="https://www.youtube.com/watch?v=ApW_M8sSCDg">https://www.youtube.com/watch?v=ApW_M8sSCDg</a><br><a href="https://www.youtube.com/watch?v=X1BktOPsc7g">https://www.youtube.com/watch?v=X1BktOPsc7g</a><br><a href="https://www.youtube.com/watch?v=-z4liRirdv0">https://www.youtube.com/watch?v=-z4liRirdv0</a> |

## Chalcogens / Oxygen Family

| Introduction  | Sulphur and its Compounds  | Experiment   |
|---|--|--|
| <a href="https://www.youtube.com/watch?v=odU8N_8VVgQ">https://www.youtube.com/watch?v=odU8N_8VVgQ</a><br><a href="https://www.youtube.com/watch?v=K1dnXhMtgg">https://www.youtube.com/watch?v=K1dnXhMtgg</a><br><a href="https://www.youtube.com/watch?v=oWqCAdSm8DI">https://www.youtube.com/watch?v=oWqCAdSm8DI</a><br><a href="https://www.youtube.com/watch?v=HmxT0snCBfE">https://www.youtube.com/watch?v=HmxT0snCBfE</a><br><a href="https://www.youtube.com/watch?v=A-bzmVMRNEs">https://www.youtube.com/watch?v=A-bzmVMRNEs</a> | <a href="https://www.youtube.com/watch?v=1ve8cuAq56I">https://www.youtube.com/watch?v=1ve8cuAq56I</a><br><a href="https://www.youtube.com/watch?v=mddfu3TXaRw">https://www.youtube.com/watch?v=mddfu3TXaRw</a><br><a href="https://www.youtube.com/watch?v=FJCKFS6B9rU">https://www.youtube.com/watch?v=FJCKFS6B9rU</a><br><a href="https://www.youtube.com/watch?v=LWhjvVdSIBQ">https://www.youtube.com/watch?v=LWhjvVdSIBQ</a> | <a href="https://www.youtube.com/watch?v=ACo7mgawxZs">https://www.youtube.com/watch?v=ACo7mgawxZs</a><br><a href="https://www.youtube.com/watch?v=-YVH0DXbqmo">https://www.youtube.com/watch?v=-YVH0DXbqmo</a> |

## Halogens

| Introduction  | Chlorine  |  |
|---|---|--|
| <a href="https://www.youtube.com/watch?v=yW_C10cEzMk">https://www.youtube.com/watch?v=yW_C10cEzMk</a><br><a href="https://www.youtube.com/watch?v=AXdjNfxpuHo">https://www.youtube.com/watch?v=AXdjNfxpuHo</a><br><a href="https://www.youtube.com/watch?v=XqAZgH6APcM">https://www.youtube.com/watch?v=XqAZgH6APcM</a><br><a href="https://www.youtube.com/watch?v=kNPthLiM8T4">https://www.youtube.com/watch?v=kNPthLiM8T4</a><br><a href="https://www.youtube.com/watch?v=oDvQvu_xfAw">https://www.youtube.com/watch?v=oDvQvu_xfAw</a> | <a href="https://www.youtube.com/watch?v=TriWA7vc1Zk">https://www.youtube.com/watch?v=TriWA7vc1Zk</a><br><a href="https://www.youtube.com/watch?v=0vggU8Kw9jY">https://www.youtube.com/watch?v=0vggU8Kw9jY</a><br><a href="https://www.youtube.com/watch?v=O_PY7yU-QC8">https://www.youtube.com/watch?v=O_PY7yU-QC8</a> |  |

| <b>Crystalloids and Colloids</b>   | <b>Some Amazing Experiments</b>  |
|--|--|
| <p><a href="https://www.youtube.com/watch?v=ItN3UtVVb5U">https://www.youtube.com/watch?v=ItN3UtVVb5U</a><br/><a href="https://www.youtube.com/watch?v=7w3F-U6j1yU">https://www.youtube.com/watch?v=7w3F-U6j1yU</a><br/><a href="https://www.youtube.com/watch?v=AJ9BWZK_nfA">https://www.youtube.com/watch?v=AJ9BWZK_nfA</a><br/><a href="https://www.youtube.com/watch?v=0duj050JP1E">https://www.youtube.com/watch?v=0duj050JP1E</a><br/><a href="https://www.youtube.com/watch?v=YkehtZ6OM5o">https://www.youtube.com/watch?v=YkehtZ6OM5o</a></p> | <p><a href="https://www.youtube.com/watch?v=kK9RXIrc5Vk">https://www.youtube.com/watch?v=kK9RXIrc5Vk</a><br/><a href="https://www.youtube.com/watch?v=bOueJf8Dr_4">https://www.youtube.com/watch?v=bOueJf8Dr_4</a><br/><a href="https://www.youtube.com/watch?v=RGnG-S6naUw">https://www.youtube.com/watch?v=RGnG-S6naUw</a><br/><a href="https://www.youtube.com/watch?v=0Bt6RPP2ANI">https://www.youtube.com/watch?v=0Bt6RPP2ANI</a><br/><a href="https://www.youtube.com/watch?v=AO67MnZaAvQ">https://www.youtube.com/watch?v=AO67MnZaAvQ</a><br/><a href="https://www.youtube.com/watch?v=sJuJH_GT36k">https://www.youtube.com/watch?v=sJuJH_GT36k</a></p> |

# Sustainable Development begins with Education



United Nations  
Educational, Scientific and  
Cultural Organization

Natural  
Sciences  
Sector

## **UNESCO Regional Office for Eastern Africa**

UN Gigiri Complex, P.O. Box 30592 – 00100,  
Nairobi, Kenya

Tel: +254-(0)20-7622356; Email: [NAIROBI@UNESCO.ORG](mailto:NAIROBI@UNESCO.ORG)

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