

Chemistry Resource List

TROP ICSU
Feb, 2023

Lesson Plans

#	Lesson Plan Title	Disciplines	Key Topics	Link
1	Lesson Plan: Carbon Cycle Regulation by Carbon Sequestration	Environmental Sciences, Chemistry, Earth Sciences	Carbon Chemistry, Biogeochemical Cycles, Environmental Chemistry, Climate Change Overview, Geologic Carbon Cycle, Adaptation and Mitigation, Carbon Cycle, Carbon Sequestration	https://tropicsu.org/carbon-cycle-regulation-by-carbon-sequestration/
2	Lesson Plan: Electrolysis: Application in Fuel Cell Technology	Chemistry, Environmental Sciences	Electrochemistry, Environmental Chemistry, Fossil Fuels, Carbon Emissions, Pollution	https://tropicsu.org/electrolysis-application-in-fuel-cell-technology/
3	Lesson Plan: Electrochemistry: Use of Electrolysis to Reduce Global Carbon Emissions	Chemistry, Environmental Sciences	Electrochemistry, Environmental Chemistry, Fossil Fuels, Carbon Emissions, Pollution	https://tropicsu.org/electrochemistry-use-of-electrolysis-to-reduce-global-carbon-emissions/
4	Lesson Plan: The Water Cycle in a Sustainable World	Chemistry, Geography, Earth Sciences	Environmental Chemistry, Water Cycle, Biogeochemical Cycles, Hydrosphere, Atmosphere, Water Resources and Climate Change, Hydrological Cycle, Condensation, Evaporation	https://tropicsu.org/the-water-cycle-in-a-sustainable-world/
5	Lesson Plan: The Greenhouse Effect	Earth Sciences, Geography, Environmental Sciences, Chemistry	Climate Change Overview, Greenhouse Effect, Greenhouse Gases, Fossil Fuels, Atmosphere, Carbon Chemistry, Atmosphere, Greenhouse Effect, The Electromagnetic Spectrum	https://tropicsu.org/the-greenhouse-effect-1p/
6	Lesson Plan: Beer-Lambert Law and Earth's Atmosphere	Chemistry	Greenhouse Gases, The Electromagnetic Spectrum, Beer-Lambert Law	https://tropicsu.org/beer-lambert-law-and-earths-atmosphere/
7	Lesson Plan: Black Carbon and its Impact on Earth's Climate	Chemistry, Environmental Sciences	Carbon Chemistry, Molecular Structure of Compounds, Environmental Chemistry, Pollution, Human Health, Carbon Emissions, Fossil Fuels, Atmosphere	https://tropicsu.org/black-carbon-and-its-impact-on-earths-climate/

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8	Lesson Plan: Aerosols and Climate	Chemistry, Environmental Sciences	Environmental Chemistry, Greenhouse Gases, Greenhouse Effect, Atmosphere, Pollution, Aerosols	https://tropicsu.org/aerosols-and-climate/
9	Lesson Plan: Buffers, Buffer Action and Ocean Acidification	Chemistry	Acids and Bases, pH Scale, Ocean Acidification, Buffers, Buffer Action, pH Level	https://tropicsu.org/buffers-buffer-action-and-ocean-acidification/
10	Lesson Plan: Phase Diagrams and Phase Equilibria	Chemistry, Physics, Earth Sciences	Phase Diagrams, Water Cycle, Biogeochemical Cycles, Greenhouse Gases, Hydrosphere, Atmosphere, Atmospheric Physics, Greenhouse Effect	https://tropicsu.org/phase-diagrams-and-phase-equilibria/
11	Lesson Plan: Infrared Spectroscopy and the Greenhouse Gas Effect	Chemistry	Molecular Structure of Compounds, Carbon Chemistry, Greenhouse Gases	https://tropicsu.org/infrared-spectroscopy-and-the-greenhouse-gas-effect/
12	Lesson Plan: Fertilizers and Climate	Chemistry	Biogeochemical Cycles, Greenhouse Gases, Fertilizers	https://tropicsu.org/fertilizers-and-climate/
13	Lesson Plan: Hydrocarbons and Climate Change	Chemistry, Environmental Sciences	Environmental Chemistry, Carbon Chemistry, Greenhouse Gases, Fossil Fuels, Hydrocarbon, Carbon Emissions, Pollution, Greenhouse Effect, Atmosphere	https://tropicsu.org/hydrocarbons-and-climate-change/
14	Lesson Plan: Teaching Carbon Cycle through Climate-related Examples	Chemistry, Earth Sciences, Environmental Sciences, Geography	Environmental Chemistry, Carbon Cycle, Biogeochemical Cycles, Chemical Weathering, The Urey Reaction, Atmosphere, Lithosphere, Biosphere, The Silicate Thermostat, Carbon Emissions, Fossil Fuels, Earth's Climate System	https://tropicsu.org/teaching-the-carbon-cycle-through-climate-related-examples/
15	Lesson Plan: Atomic Number, Mass Number, Isotopes and Isotopic Ratios, and Isotopic Compositions as Climate Proxies	Chemistry, Earth Sciences	Atomic Number, Atomic Mass, Environmental Chemistry, Isotopes, Earth's Climate, Climate History, Recent Climate Change, Milankovitch Cycles, Cryosphere	https://tropicsu.org/atomic-number-mass-number-isotopes-and-isotopic-ratios-and-isotopic-compositions-as-climate-proxies/

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16	Lesson Plan: Teaching the pH Scale, and Acids and Bases through Climate-related Examples	Chemistry	pH Scale, Acids and Bases, Ocean Acidification	https://tropicsu.org/teaching-the-ph-scale-and-acids-and-bases-through-climate-relatedexamples/
17	Lesson Plan: Chemistry of Carbon Compounds	Chemistry	Carbon Chemistry, Environmental Chemistry, The Electromagnetic Spectrum, Molecular Structure of Compounds, Greenhouse Gases	https://tropicsu.org/chemistry-of-carbon-compounds/
18	Breathless Oceans: Impact of Climate Change on Dissolved Oxygen	Chemistry, Environmental Sciences	Environmental Chemistry, Hydrosphere	https://tropicsu.org/breathless-oceans-impact-of-climate-change-on-dissolved-oxygen/
19	Carbon Sequestration in Trees	Environmental Sciences, Biological Sciences, Earth Sciences, Chemistry	Carbon Sequestration, Carbon Cycle, Biogeochemical Cycles, Ecology, Botany, Biosphere	https://tropicsu.org/carbon-sequestration-in-trees/

Teaching Tools

#	Teaching Tool Title	Disciplines	Key Topics	Link
1	Video/Microlecture: Climate Change in the Chemistry Classroom	Chemistry	Climate Change Overview, Environmental Chemistry	https://tropicsu.org/climate-change-in-the-chemistry-classroom/
2	Reading: Chemistry and Climate Change	Chemistry	Climate Change Overview, Environmental Chemistry	https://tropicsu.org/chemistry-and-climate-change/
3	Reading: Climate Change: The Chemistry Connection	Chemistry, Earth Sciences	Climate Change Overview, Environmental Chemistry	https://tropicsu.org/the-chemistry-connection/
4	Classroom/Laboratory Activity: Quiz on Carbon Cycle	Chemistry, Environmental Sciences, Earth Sciences	Carbon Cycle, Biogeochemical Cycles	https://tropicsu.org/quiz-on-carbon-cycle/
5	Reading: Introduction to the Carbon Cycle	Chemistry, Environmental Sciences, Earth Sciences	Carbon Cycle, Biogeochemical Cycles	https://tropicsu.org/introduction-to-the-carbon-cycle/
6	Reading: Carbon Sequestration in Soil	Chemistry, Environmental Sciences	Carbon Cycle, Lithosphere, Carbon Sequestration	https://tropicsu.org/carbon-sequestration-in-soil/
7	Reading: Carbon Sequestration and Climate Change	Chemistry, Environmental Sciences	Carbon Cycle, Biosphere, Lithosphere, Carbon Sequestration	https://tropicsu.org/carbon-sequestration-and-climate-change/
8	Teaching Module: Biogeochemical Cycles and Climate Change	Chemistry, Earth Sciences, Environmental Sciences	Carbon Cycle, Biogeochemical Cycles, The Geologic Carbon Cycle	https://tropicsu.org/biogeochemical-cycles-and-climate-change/

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9	Classroom/Laboratory Activity: Interactive Quiz on the Water Cycle	Chemistry	Water Cycle, Biogeochemical Cycles, Hydrosphere	https://tropicsu.org/interactive-quiz-on-the-water-cycle/
10	Reading: The Concrete Problem	Chemistry, Environmental Sciences	Hydrocarbon, Carbon Emissions, Fossil Fuels, Environmental Chemistry, Pollution	https://tropicsu.org/the-concrete-problem/
11	Video/Microlecture: Precipitation Patterns and Climate Change	Chemistry, Environmental Sciences	Environmental Chemistry, Water Cycle, Biogeochemical Cycles	https://tropicsu.org/precipitation-patterns-and-climate-change/
12	Reading: The Water Cycle	Chemistry, Earth Sciences, Environmental Sciences, Geography	Hydrosphere, Environmental Chemistry, Water Cycle, Biogeochemical Cycles, Hydrological Cycle, Condensation, Evaporation	https://tropicsu.org/the-water-cycle/
13	Model/Simulator: The Greenhouse Effect	Chemistry	Carbon Chemistry, Atmosphere, Greenhouse Effect, Greenhouse Gases, Carbon Emissions, Fossil Fuels	https://tropicsu.org/the-greenhouse-effect-5/
14	Teaching Module: The Greenhouse Effect	Chemistry, Geography	Greenhouse Gases, Greenhouse Effect	https://tropicsu.org/the-greenhouse-effect-4/
15	Reading: Beer-Lambert Law	Chemistry, Environmental Sciences	Carbon Chemistry, The Electromagnetic Spectrum, Greenhouse Effect, Beer-Lambert Law, Greenhouse Gases	https://tropicsu.org/beer-lambert-law/
16	Reading: Black Carbon- An Introduction	Chemistry	Carbon Chemistry, Environmental Chemistry, Greenhouse Gases	https://tropicsu.org/black-carbon-an-introduction/

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17	Classroom/Laboratory Activity: Black Carbon and Human Health	Chemistry	Carbon Chemistry, Greenhouse Gases, Environmental Chemistry, Human Health	https://tropicsu.org/black-carbon-and-human-health/
18	Reading: Black Carbon in the Atmosphere	Chemistry, Environmental Sciences	Carbon Chemistry, Greenhouse Gases, Greenhouse Effect	https://tropicsu.org/black-carbon-in-the-atmosphere/
19	Classroom/Laboratory Activity: Black Carbon and Earth's Albedo	Chemistry	Carbon Chemistry, Greenhouse Gases	https://tropicsu.org/black-carbon-and-earths-albedo/
20	Classroom/Laboratory Activity: What are Aerosols?	Chemistry, Environmental Sciences	Environmental Chemistry, Pollution	https://tropicsu.org/what-are-aerosols/
21	Reading: Water Vapour Feedback and Earth's Climate	Chemistry, Physics, Earth Sciences	Water Cycle, Hydrosphere, Planetary Climate, Earth's Climate	https://tropicsu.org/water-vapour-feedback-and-earths-climate/
22	Classroom/Laboratory Activity: Volcanoes and Climate	Chemistry, Environmental Sciences	Environmental Chemistry, Pollution, Greenhouse Gases, Atmosphere	https://tropicsu.org/volcanoes-and-climate/
23	Classroom/Laboratory Activity: Thermal Potential of Carbon dioxide	Chemistry, Environmental Sciences	Carbon Chemistry, Greenhouse Gases, Carbon Emissions, Fossil Fuels	https://tropicsu.org/thermal-potential-of-carbon-dioxide/
24	Video micro-lecture: Phase Diagrams and Earth's Climate	Chemistry, Physics, Earth Sciences	Phase Diagrams, Water Cycle, Biogeochemical Cycles	https://tropicsu.org/phase-diagrams-and-earths-climate/

#	Teaching Tool Title	Disciplines	Key Topics	Link
25	Visualization: pH Levels of Oceans and Atmospheric CO ₂	Chemistry, Environmental Sciences	pH Scale, Acids and Bases, Ocean Acidification, Environmental Chemistry, Hydrosphere, Pollution	https://tropicsu.org/ph-levels-of-oceans-and-atmospheric-co2-2/
26	Video Micro-lecture: Ocean Buffer Chemistry	Chemistry, Environmental Sciences, Earth Sciences	pH Scale, Acids and Bases, Hydrosphere, Carbon Chemistry, Ocean Acidification	https://tropicsu.org/ocean-buffer-chemistry/
27	Reading: Molecular Vibration Modes and Greenhouse Effect	Chemistry	Greenhouse Gases, Molecular Structure of Compounds, Carbon Chemistry, The Electromagnetic Spectrum	https://tropicsu.org/molecular-vibration-modes-and-greenhouse-effect/
28	Reading: Hydrocarbon Combustion	Chemistry, Environmental Sciences	Hydrocarbons, Greenhouse Gases, Fossil Fuels, Carbon Emissions	https://tropicsu.org/hydrocarbon-combustion/
29	Reading: Isotopic Compositions and Ice Cores	Chemistry, Earth Sciences	Isotopes, Atomic Number, Atomic Mass, Cryosphere	https://tropicsu.org/isotopic-compositions-and-ice-cores/
30	Teaching Module: pH Scale, Ocean Chemistry and Impact of Ocean Acidification on Marine Life	Chemistry	pH Scale, Acids and Bases, Ocean Acidification	https://tropicsu.org/ph-scale-ocean-chemistry-and-impact-of-ocean-acidification-on-marine-life/
31	Classroom/Laboratory Activity: Reconstruction of Paleoclimate by Using Isotopic Composition Data	Chemistry, Earth Sciences	Atomic Number, Atomic Mass, Isotopes	https://tropicsu.org/reconstruction-of-paleoclimate-by-using-isotopiccomposition-data/

#	Teaching Tool Title	Disciplines	Key Topics	Link
32	Classroom/Laboratory Activity: Ocean Chemistry, Ocean Acidification, and Oyster Growth	Chemistry	Ocean Acidification, pH Scale, Acids and Bases	https://tropicsu.org/ocean-chemistry-ocean-acidification-and-oyster-growth/
33	Visualization: The Changing of pH of Ocean Water and Its Impact on Marine Life	Chemistry	Ocean Acidification, pH Scale, Acids and Bases	https://tropicsu.org/the-changing-of-ph-of-ocean-water-and-its-impact-on-marine-life/
34	Classroom/Laboratory Activity: The Impact of Human Activities on the Natural Carbon Cycle	Chemistry, Earth Sciences, Environmental Sciences	Carbon Cycle, Biogeochemical Cycles, Environmental Chemistry	https://tropicsu.org/the-impact-of-human-activities-on-the-natural-carbon-cycle/
35	Video: What is Ocean Acidification?	Chemistry	Ocean Acidification, pH Scale, Acids and Bases	https://tropicsu.org/what-is-ocean-acidification/
36	Using Isotopes to Measure Temperatures	Chemistry, Earth Sciences	Atomic Number, Atomic Mass, Isotopes, Hydrosphere	https://tropicsu.org/using-isotopes-to-measure-temperatures/
37	Modes of Vibration in Greenhouse Gas Molecules	Chemistry	Carbon Chemistry, Environmental Chemistry, Molecular Structure of Compounds, The Electromagnetic Spectrum	https://tropicsu.org/ph-levels-of-oceans-and-atmospheric-co2/
38	The Carbon Dioxide Greenhouse Effect	Physics, Earth Sciences, Chemistry	Climate Change Overview, The Greenhouse Effect, Greenhouse Gases	https://tropicsu.org/the-carbon-dioxide-greenhouse-effect/
39	Climate Solutions for the Infrastructure Development Sector	Economics, Chemistry, Environmental Sciences	Carbon Emissions, Climate Change Economics, Greenhouse Gases, Molecular Structure of Compounds, Carbon Chemistry	https://tropicsu.org/climate-solutions-for-the-infrastructure-development-sector/

#	Teaching Tool Title	Disciplines	Key Topics	Link
40	Climate Solutions for the future	Environmental Sciences, Economics, Chemistry, Biological Sciences	Climate Solutions, Carbon Emissions, Climate Change Economics, Food Security, Carbon Sequestration, Ecosystems, Conservation	https://tropicsu.org/climate-solutions-for-the-infrastructure-development-sector-2/