

Physics Resource List

TROP ICSU
Feb, 2023

Lesson Plans

#	Lesson Plan Title	Disciplines	Key Topics	Link
1	Power, Energy, Dynamics- Wind Turbines	Physics	Power, Energy, Work, Conservation of Energy	https://tropicsu.org/power-energy-dynamics-wind-turbines/
2	Waves and Oscillations	Physics, Earth Sciences	Waves, Oscillations, Simple Harmonic Motion	https://tropicsu.org/waves-and-oscillations-2/
3	Thermodynamic Processes in the Atmosphere	Physics	Thermodynamics, Thermodynamic Systems, Thermodynamic Processes- Isothermic	https://tropicsu.org/thermodynamic-processes-in-the-atmosphere/
4	Simple Harmonic Motion and Simple Harmonic Oscillators	Physics	Simple Harmonic Motion (SHM), Simple Harmonic Oscillators	https://tropicsu.org/simple-harmonic-motion-and-simple-harmonic-oscillators/
5	Phase Diagrams and Phase Equilibria	Chemistry, Physics, Earth Sciences	Phase Equilibria, Phase Diagrams Feedback Mechanisms, Runaway Greenhouse Effect	https://tropicsu.org/phase-diagrams-and-phase-equilibria/
6	Heat Transport in the Atmosphere, Hadley Circulation and Climate (Global Precipitation Patterns and Distribution of Deserts)	Geography, Earth Sciences, Physics	Hadley Cell, Hadley Circulation, Heat Transport, Atmospheric Circulation	https://tropicsu.org/heat-transport-in-the-atmosphere-hadley-circulation-and-climate-global-precipitation-patterns-and-distribution-of-deserts/
7	Coriolis Force, Coriolis Effect, and the Impact of Coriolis Effect on Climate	Physics, Earth Sciences	Coriolis Force and Coriolis Effect,	https://tropicsu.org/coriolis-force-coriolis-effect-and-the-impact-of-coriolis-effect-on-climate/
8	Teaching Planck's Law and Blackbody Radiation through Climate-related Examples	Physics	Planck's Law, Blackbody Radiation, Stefan-Boltzmann Law	https://tropicsu.org/teaching-plancks-law-and-blackbody-radiation-through-climate-relatedexamples/

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9	Create Your Climate Model- Earth's Energy Balance using Python	Mathematics, Earth Sciences, Physics	Thermodynamics, Blackbody Radiation	https://tropicsu.org/create-your-climate-model-earths-energy-balance-using-python/

Teaching Tools

#	Teaching Tool Title	Disciplines	Key Topics	Link
1	Video: Climate Change in the Physics Classroom	Physics	Climate Physics, Climate Change Overview	https://tropicsu.org/climate-change-in-the-physics-classroom/
2	Reading: The Physics of Climate Change	Physics	Climate Physics, Climate Change Overview	https://tropicsu.org/the-physics-of-climate-change/
3	Video: Climate Change: The Physics Connection	Physics	Climate Physics, Climate Change Overview	https://tropicsu.org/climate-change-the-physics-connection/
4	Reading: A History of Climate Models	Physics, Earth Sciences	Climate Physics, Climate Models	https://tropicsu.org/a-history-of-climate-models-2/
5	Video: An Introduction to Atmospheric Thermodynamics	Physics, Earth Sciences	Thermodynamics, Atmospheric Physics	https://tropicsu.org/an-introduction-to-atmospheric-thermodynamics/
6	Video: Quantum Physics	Physics, Earth Sciences	Quantum Physics, Electromagnetic Radiation, The Greenhouse Effect	https://tropicsu.org/quantum-physics-2/
7	Video: Quantum Mechanics and Climate Change	Physics, Earth Sciences	Quantum Mechanics, Quantum Physics, Planck's Law	https://tropicsu.org/quantum-mechanics-and-climate-change/
8	Visualization: Blackbody Spectrum	Physics	Blackbody Radiation, Electromagnetic Radiation, Planck's Law	https://tropicsu.org/blackbody-spectrum/

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9	Reading: Chaos Theory and Global Warming	Physics, Earth Sciences	Chaos Theory, Climate Models, Atmospheric Physics	https://tropicsu.org/chaos-theory-and-global-warming/
10	Teaching Module: The Physics of Climate Change Prediction	Physics	Climate Physics, Atmospheric Physics, Climate Models	https://tropicsu.org/the-physics-of-climate-change-prediction/
11	Classroom/Laboratory Activity: The Coriolis Effect	Physics, Earth Sciences	Coriolis Force, Coriolis Effect, Atmosphere	https://tropicsu.org/the-coriolis-effect/
12	Video: First Law of Thermodynamics	Physics, Earth Sciences	Thermodynamics, Atmospheric Physics, Planetary Energy Balance, First Law of Thermodynamics, Earth's Climate, Atmosphere	https://tropicsu.org/first-law-of-thermodynamics/
13	Video: Clausius Clayperon and the Second Law of Thermodynamics	Physics, Earth Sciences	Climate Physics, Atmospheric Sciences, Atmospheric Physics, Second Law of Thermodynamics, Thermodynamics	https://tropicsu.org/claussius-clayperon-and-the-second-law-of-thermodynamics/
14	Video: Thermodynamics and the Hydrostatic Equation	Physics, Earth Sciences	Atmospheric Physics,, Thermodynamics	https://tropicsu.org/thermodynamics-and-the-hydrostatic-equation/
15	Reading: Introduction to Planetary Energy Balance	Physics, Earth Sciences	Planetary Energy Balance, The Greenhouse Effect, Electromagnetic Radiation	https://tropicsu.org/introduction-to-planetary-energy-balance/
16	Teaching Module: Planetary Energy Balance	Physics, Earth Sciences	Planetary Energy Balance, The Greenhouse Effect, Electromagnetic Radiation	https://tropicsu.org/planetary-energy-balance-3/

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17	Video: Radiative Transfer	Physics, Earth Sciences	Planetary Energy Balance, The Greenhouse Effect, Electromagnetic Radiation	https://tropicsu.org/radiative-transfer/
18	Model/Simulator: Modeling Planetary Energy Balance	Earth Sciences; Physics; Computer Science	Planetary Energy Balance, The Greenhouse Effect, Climate Models	https://tropicsu.org/modeling-planetary-energy-balance/
19	Model/Simulator: Milankovitch Orbital Parameters	Earth Sciences; Physics; Mathematics and Statistics; Computer Science	Milankovitch Cycles, Earth's Orbital Parameters, Earth's Climate, Cyrosphere	https://tropicsu.org/milankovitch-orbital-parameters/
20	Reading: General Circulation Models of Climate	Physics, Earth Sciences	Climate Models, Climate Physics	https://tropicsu.org/general-circulation-models-of-climate/
21	Reading: The Carbon Dioxide Greenhouse Effect	Physics, Earth Sciences	The Greenhouse Effect, Atmospheric Physics	https://tropicsu.org/the-carbon-dioxide-greenhouse-effect/
22	E-learning Course/Reading: 'The Discovery of Global Warming'	Physics, Earth Sciences, Environmental Sciences, Geography	Climate Change Overview, Greenhouse Effect, Global Warming, Climate Physics, Earth System, Earth's Climate System, Earth's Climate	https://tropicsu.org/the-discovery-of-global-warming/
23	Video: Planck's Law and Earth's Climate	Physics, Earth Sciences	Planck's Law, Atmospheric Physics, Stefan Boltzmann Law, Climate Physics	https://tropicsu.org/plancks-law-and-earths-climate/
24	Video: Physics of Scattering and Greenhouse Gases	Physics, Earth Sciences	Climate Physics, Atmospheric Physics, Stefan Boltzmann Law	https://tropicsu.org/physics-of-scattering-and-greenhouse-gases/

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25	E-Learning Course: Atmospheric Science	Physics, Earth Sciences	Earth system, Atmosphere, Atmospheric Physics, Thermodynamics, Second Law of Thermodynamics, Planck's law, Planetary Climate, Earth's Climate, Climate Physics	https://tropicsu.org/atmospheric-science/
26	Reading: Water Vapour Feedback and Earth's Climate	Chemistry, Physics, Earth Sciences	Water Cycle, Hydrosphere, Planetary Climate, Earth's Climate, Phase Equilibria	https://tropicsu.org/water-vapour-feedback-and-earths-climate/
27	Video: Phase Diagrams and Earth's Climate	Chemistry, Physics, Earth Sciences	Phase Diagrams, The Greenhouse Effect	https://tropicsu.org/phase-diagrams-and-earths-climate/
28	Reading: Earth's Equable Climate	Physics, Earth Sciences	Hadley Circulation, Convection, Atmospheric Physics	https://tropicsu.org/earths-equable-climate/
29	Reading: Planetary Temperatures	Physics, Earth Sciences	Planetary Energy Balance, Electromagnetic Radiation, Stefan Boltzmann Law, Planck's Law	https://tropicsu.org/planetary-temperatures/
30	Classroom/Laboratory Activity: Hadley Circulation-Heat Transport in the Atmosphere	Physics, Earth Sciences	Hadley Circulation, Convection, Heat Transport	https://tropicsu.org/hadley-circulation-heat-transport-in-the-atmosphere/
31	Reading: Atmospheric Dynamics and Hadley Cells	Physics, Earth Sciences	Hadley Circulation, Heat Transport	https://tropicsu.org/atmospheric-dynamics-and-hadley-cells/
32	Laboratory Activity: Urban Heat Island	Physics	Heat Transport, Conservation of Energy, Electromagnetic Radiation	https://tropicsu.org/urban-heat-island/

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33	Reading: Simple Atmospheric Model	Physics, Earth Sciences	Blackbody Radiation, Climate Model, Atmospheric Physics	https://tropicsu.org/simple-atmospheric-model/
34	Visualization: Blackbody Radiation and Planetary Temperatures	Physics	Planetary Energy Balance, Blackbody Radiation, Electromagnetic Radiation, Conservation of Energy	https://tropicsu.org/blackbody-radiation-and-planetary-temperatures/
35	Video: Rising Sea Surface Temperature and Hurricane Intensity	Physics, Earth Sciences	Heat Transport, Conservation of Energy	https://tropicsu.org/rising-sea-surface-temperature-and-hurricane-intensity/
36	Visualization: Infrared Spectra of Greenhouse Gases	Physics	Electromagnetic Radiation, The Greenhouse Effect	https://tropicsu.org/infrared-spectra-of-greenhouse-gases/
37	Video: The Greenhouse Effect of the Atmosphere	Physics, Earth Sciences	Blackbody Radiation, Stefan Boltzmann Law	https://tropicsu.org/the-greenhouse-effect-of-the-atmosphere/
38	Reading: Hadley Circulation	Geography, Earth Sciences, Physics	Atmosphere, Atmospheric Physics, Hadley Cell, Hadley Circulation, Heat Transport, Convection, Atmospheric Circulation	https://tropicsu.org/hadley-circulation-5/
39	Video: Upwelling	Physics, Earth Sciences, Geography	Coriolis Force, Climate Physics, Atmospheric Physics	https://tropicsu.org/upwelling/
40	Radiation Laws	Physics, Earth Sciences	Radiation, Blackbody, Atmospheric Radiation, Stefan-Boltzmann Law	https://tropicsu.org/radiation-laws/