Mathematics and Statistics Resource List

TROP ICSU

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Lesson Plans

#	Lesson Plan Title	Disciplines	Key Topics	Link
1	Lesson Plan: Data Science: Linear and Polynomial Regression	Mathematics, Data Science	Linear Regression, Introduction To Statistics, Data Science, Computer Programming	https://tropicsu.org/data-science-linear-and-polynomial-regression/
2	Lesson Plan: Data Science: Linear Regression with Global Average CO2 Concentrations	Mathematics, Data Science	Linear Regression, Introduction To Statistics, Data Science, Computer Programming	https://tropicsu.org/data-science-linear-regression-with-global-average-co2-concentrations/
3	Lesson Plan: Data Science: Predictive Analysis using Mumbai Temperature Data	Mathematics, Data Science	Linear Regression, Introduction To Statistics, Data Science, Trend Analysis, Computer Programming, Recent Climate Change	https://tropicsu.org/data-science-predictive-analysis-using-mumbai-temperature-data/
4	Lesson Plan: Coding with Python: Modeling the Ice Albedo Feedback	Earth Sciences, Mathematics, Computer Sciences	Mathematical Modeling, Numerical Modeling, Computer Programming, Cryosphere, Earth's Climate, Milankovitch Cycles	https://tropicsu.org/coding-with-python-modeling-the-ice-albedo-feedback/
5	Lesson Plan: Algebra: Formula Substitution using the Wind Energy Equation	Mathematics	Algebra	https://tropicsu.org/algebra-formula-substitution-using-the-wind-energy-equation/
6	Lesson Plan: Teaching Linear Regression using Arctic Sea Ice Data	Mathematics	Introduction to Statistics, Linear Regression	https://tropicsu.org/teaching-linear-regression-using-arctic-sea-ice-data/
7	Lesson Plan: Teaching Integration using World Petroleum Consumption Data	Mathematics, Earth Sciences	Calculus, Integration, Functions	https://tropicsu.org/teaching-integration-using-world-petroleum-consumption-data/
8	Lesson Plan: Logistic and Exponential Differentiation using Solar Energy Data	Mathematics	Calculus, Differentiation, Functions	https://tropicsu.org/logistic-and-exponential-differentiation-using-solar-energy-data/

#	Lesson Plan Title	Disciplines	Key Topics	Link
9	Lesson Plan: Polynomial and Logistic Differentiation using Global Wind Energy Production Data	Mathematics	Calculus, Differentiation, Polynomial Differentiation, Functions	https://tropicsu.org/polynomial-and-logistic-differentiation-using-global-wind-energy-production-data/
10	Lesson Plan: Teaching Application of Derivatives using Arctic Sea Ice Data	Mathematics	Calculus, Differentiation, Polynomial Differentiation, Functions	https://tropicsu.org/teaching-application-of-derivatives-using-arctic-sea-ice-data/
12	Lesson Plan: Create Your Climate Model-Earth's Energy Balance using Python	Mathematics, Earth Sciences, Physics	Mathematical Modeling, Numerical Modeling, Computer Programming, Earth's Climate, Planetary Climate, Thermodynamics, Blackbody Radiation, Planetary Energy Balance, Stefan Boltzmann Law	https://tropicsu.org/create-your-climate-model-earths-energy-balance-using-python/
13	Lesson Plan: Teaching Linear Regression using Global Temperature Anomalies Data	Mathematics	Introduction to Statistics, Linear Regression, Confidence Interval	https://tropicsu.org/teaching-linear-regression-using-global-temperature-anomalies-data/
14	Lesson Plan: Teaching Polynomial Differentiation using Global Average Temperature Data	Mathematics	Calculus, Differentiation, Polynomial Differentiation, Functions	https://tropicsu.org/teaching-polynomial-differentiation-using-global-average-temperature-data/
15	Lesson Plan: Basic Data Handling Using Climate Data	Mathematics	Trend Analysis, Data Science, Introduction to Statistics	https://tropicsu.org/basic-data-handling-using-climate-data/
16	Lesson Plan: Trigonometry and Sea Level Rise	Mathematics	Trigonometry, Functionsx	https://tropicsu.org/trigonometry-and-sea-level-rise/

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17	Lesson Plan: Teaching Introductory Calculus (Integration) by using CO2 Emissions Data	Mathematics	Calculus, Integration, Riemann Sums	https://tropicsu.org/teaching-introductory-calculus-integration-by-using-co2-emissions-data/
18	Lesson Plan: Analyzing Trends and Calculating Uncertainty using Hurricane Data Records	Statistics, Geography, Earth Sciences	Introduction to Statistics, Trend Analysis, Confidence Interval, Standard Deviation, Disasters and Hazards, Hydrosphere, Atmosphere, Recent Climate Change	https://tropicsu.org/analyzing-trends-and-calculating-uncertainty-using-hurricane-data-records-2/
19	Lesson Plan: Teaching Introductory Calculus (Differentiation) using Atmospheric CO2 Data	Mathematics	Calculus, Differentiation, Polynomial Differentiation	https://tropicsu.org/teaching-introductory-calculus-differentiation-using-atmospheric-co2-data/

Teaching Tools

#	Teaching Tool Title	Disciplines	Key Topics	Link
1	Reading: Climate Change Mathematics	Mathematics and Statistics	Mathematical Modelling, Probability, Climate Change Overview, Introduction to Statistics	https://tropicsu.org/climate-change-mathematics/
2	Video: Climate Change: The Math Connection	Mathematics and Statistics	Mathematical Modelling, Climate Change Overview	https://tropicsu.org/climate-change-the-math-connection/
3	Reading: Algebra and Climate	Mathematics	Algebra, Introduction to Statistics, Climate Change Overview	https://tropicsu.org/algebra-and-climate/
4	Teaching Module: Climate Change Mathematics by NASA	Earth Sciences, Mathematics and Statistics, Environmental Sciences	Algebra, Trigonometry, Introduction to Statistics, Climate Change Overview (EVS), Climate Change Overview (Maths), Earth's Climate	https://tropicsu.org/climate-change-mathematics-by-nasa/
5	E-learning Course: Build Climate Models using Python	Mathematics and Statistics	Mathematical Modeling, Numerical Modeling, Computer Programming	https://tropicsu.org/build-climate-models-using-python/
6	Teaching Module: Analyzing Climate Science Data through Simple Statistical Techniques	Mathematics and Statistics	Introduction to Statistics, Linear Regression, Quadratic Regression	https://tropicsu.org/analyzing-climate-science-data-through-simple-statistical-techniques/
7	Classroom/Laboratory Activity: Using Introductory Calculus (Integration) to Analyze CO_2 Emission Data	Mathematics	Calculus, Integration, Riemann Sums	https://tropicsu.org/using-introductory-calculus-integration-to-analyze-co2-emission-data/
8	Classroom/Laboratory Activity: Using Polynomial Differentiation to Analyze Global Atmospheric CO_2	Mathematics	Calculus, Differentiation, Polynomial Differentiation, Functions	https://tropicsu.org/using-polynomial-differentiation-to-analyze-global-atmospheric-co2/

#	Teaching Tool Title	Disciplines	Key Topics	Link
9	Video: Climate Change in the Maths and Statistics Classroom	Mathematics and Statistics	Mathematical Modelling	https://tropicsu.org/climate-change-in-the-maths-and-statistics-classroom/
10	Teaching Module: Predict the Climate by throwing a dice	Mathematics and Statistics	Introduction to Statistics, Probability, Trend Analysis	https://tropicsu.org/predict-the-climate-by-throwing-a-dice/
11	Classroom/Laboratory Activity: Meteorologist for a day	Mathematics and Statistics	Introduction to Statistics, Mean-Median-Mode, Trend Analysis	https://tropicsu.org/meteorologist-for-a-day/
12	Differential Calculus using Methane Data	Mathematics and Statistics	Calculus, Differentiation, Polynomial Differentiation	https://tropicsu.org/differential-calculus-using-methane-data/
13	Classroom/Laboratory Activity: Teaching Differentiating Functions through Solar Energy Data	Mathematics and Statistics	Calculus, Differentiation, Functions	https://tropicsu.org/teaching-differentiating-functions-through-solar-energy-data/
14	Classroom/Laboratory Activity: Differentiation and Wind Energy	Mathematics and Statistics	Calculus, Differentiation, Polynomial Differentiation, Functions	https://tropicsu.org/differentiation-and-wind-energy/
15	Classroom/Laboratory Activity: World Petroleum Consumption	Mathematics and Statistics	Calculus, Integration, Functions	https://tropicsu.org/world-petroleum-consumption/
16	Model/Simulator: Daisyworld- A Model to Explore the Gaia Hypothesis	Earth Sciences, Mathematics and Statistics, Biological Sciences	Mathematical Modeling, Numerical Modeling, Computer Programming	https://tropicsu.org/a-model-to-explore-the-gaia-hypothesis/

#	Teaching Tool Title	Disciplines	Key Topics	Link
17	Model/Simulator: Milankovitch Orbital Parameters	Earth Sciences; Physics; Mathematics and Statistics; Computer Science	Mathematical Modeling, Numerical Modeling, Computer Programming, Milankovitch Cycles, Climate Models, Earth's Climate	https://tropicsu.org/milankovitch-orbital-parameters/
18	Laboratory Activity: Modelling the Earth's Zonal Energy Balance	Mathematics and Computer Science	Mathematical Modeling, Numerical Modeling, Computer Programming	https://tropicsu.org/modelling-the-earths-zonal-energy-balance/
19	Model/Simulator: Modeling Earth's Carbon	Earth Sciences, Mathematic and Statistics	Mathematical Modeling, Numerical Modeling, Computer Programming, Carbon Cycle, Earth's Climate	https://tropicsu.org/modeling-earths-carbon/
20	Classroom/Laboratory Activity: Linear Regression using Global Temperatures	Mathematics and Statistics	Introduction to Statistics, Linear Regression, Confidence Interval	https://tropicsu.org/linear-regression-using-global-temperatures/
21	Teaching Module: T-tests and Climate Data	Mathematics and Statistics	Introduction to Statistics, Probability, Standard Deviation, Mean Median Mode	https://tropicsu.org/t-tests-and-climate-data/
22	Classroom/Laboratory Activity: Regression Analysis of Global Temperature Data	Mathematics and Statistics	Introduction to Statistics, Linear Regression, Confidence Interval	https://tropicsu.org/regression-analysis-of-global-temperature-data/
23	Classroom/Laboratory Activity: Modelling Temperature Data by using Trigonometric Functions	Mathematics and Statistics, Earth Sciences	Trigonometry, Functions, Mathematical Modeling, Earth's Climate	https://tropicsu.org/modelling-temperature-data-by-using-trigonometric-functions/
24	Classroom/Laboratory Activity: Linear Regression on Arctic Ice Data	Mathematics and Statistics	Introduction to Statistics, Linear Regression, Confidence Interval	https://tropicsu.org/linear-regression-on-arctic-ice-data/

#	Teaching Tool Title	Disciplines	Key Topics	Link
25	Classroom/Laboratory Activity: Statistical Methods to Determine Trends in Hurricane Intensity	Mathematics and Statistics	Introduction to Statistics, Linear Regression, Standard Deviation, Confidence Interval, Trend Analysis	https://tropicsu.org/statistical-methods-to-determine-trends-in-hurricane-intensity/
26	Classroom/Laboratory Activity: Statistical Methods to Determine Historical Temperature Trends	Mathematics and Statistics	Introduction to Statistics, Linear Regression	https://tropicsu.org/statistical-methods-to-determine-historical-temperature-trends/
27	Teaching Module: Introduction to Statistics through Weather Forecasting	Mathematics and Statistics, Earth Sciences	Introduction to Statistics, Mean-Median-Mode, Standard Deviation, Future Projections	https://tropicsu.org/introduction-to-statistics-through-weather-forecasting/
28	Classroom/Laboratory Activity: Modelling the Effect of Changes in Radiation on Planetary Temperature	Mathematics and Statistics	Functions, Mathematical Modeling, Data Science,	https://tropicsu.org/modelling-the-effect-of-changes-in-radiation-on-planetary-temperature/
29	Classroom/Laboratory Activity: Polynomial Differentiation Using Temperature Data	Mathematics and Statistics	Calculus, Differentiation, Polynomial Differentiation, Functions	https://tropicsu.org/polynomial-differentiation-using-temperature-data/
30	Classroom/Laboratory Activity: Teaching Polynomial Differentiation with Arctic Sea Ice Data	Mathematics and Statistics	Calculus, Differentiation, Polynomial Differentiation, Functions	https://tropicsu.org/teaching-polynomial-differentiation-with-arctic-sea-ice-data/
31	E-learning Course: Visual Storytelling using Climate Change Data	Mathematics and Statistics, Humanities	Communication, Storytelling	https://tropicsu.org/e-learning-course-visual-storytelling-using-climate-change-data/