NASA Resources for Math 1 classes

For NC Obj. - NC.M1.A-CED.1 Create equations and inequalities in one variable that represent linear, exponential, and quadratic relationships and use them to solve problems.

- **Lesson Plan: Using Mathematical Models to Investigate Planetary Habitability -** In this activity, students build a simple computer model to determine the black body surface temperature of planets in our solar system. In the first activity, students will derive a mathematical description (an equation) of the relationship between distance and the amount of energy received. In activity 2 students will make a simple mathematical model with a computer spreadsheet program. Activity 3 has students compare their model results with the actual surface temperature of the three planets.
  Student information: https://icp.giss.nasa.gov/education/modules/eccm/eccm_student_3.pdf
  Teacher Information: https://icp.giss.nasa.gov/education/modules/eccm/eccm_teacher_3.pdf

For NC Obj. - NC.M1.A-REI.6 Use tables, graphs, or algebraic methods (substitution and elimination) to find approximate or exact solutions to systems of linear equations and interpret solutions in terms of a context.

- **Lesson Plan: A Brief Mathematical Guide to Earth Science and Climate Change -** This collection of activities is intended for students looking for additional challenges in the math and physical science curriculum in grades 9 through 12. The problems were created to be authentic glimpses of modern science and engineering issues, often involving actual research data. The problems were designed to be 'one-pagers' with a Teacher's Guide and Answer Key as a second page. https://spacemath.gsfc.nasa.gov/SMBooks/SMEarthV2.pdf

For NC Obj. - NC.M1.F-IF.6 Calculate and interpret the average rate of change over a specified interval for a function presented numerically, graphically, and/or symbolically.

- **Lesson Plan: Geomagnetism I: Polar Wander (Activity 6) -** Students will recognize how the magnetic poles of Earth move in complex ways over time. Students will solve equations which demonstrate that the speed of these changes is not constant.
  http://cse.ssl.berkeley.edu/SEGwayed/lessons/exploring_magnetism/magnetism_on_earth/explore_mag_on_earth.pdf

For NC Obj. -NC.M1.F-LE.1 Identify situations that can be modeled with linear and exponential functions, and justify the most appropriate model for a situation based on the rate of change over equal intervals.

- **Lesson Plan: The Last Total Solar Eclipse…Ever! -** The moon has been steadily pulling away from earth over the span of billions of years. Calculate when we will stop seeing solar eclipses here on Earth. https://spacemath.gsfc.nasa.gov/Algebra1/4Page28.pdf

For NC Obj. -NC.M1.F-LE.3 Compare the end behavior of linear, exponential, and quadratic functions using graphs and tables to show that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.

- **Lesson Plan: Far Out Math -** Understand and compare properties of classes of functions including exponential, polynomial, rational, logarithmic, and periodic function. Lessons in the guide include activities in which students measure, compare quantities as orders of magnitude, become familiar with scientific notation, and develop an understanding of exponents and logarithms using examples from NASA's GLAST mission. http://glast.sonoma.edu/teachers/topsmod1.pdf

For NC Obj. -NC.M1.S-ID Interpreting Categorical and Quantitative Data - Summarize, represent, and interpret data on a single count or measurement variable.

- **Lesson Plan: Data Literacy Cubes (Graphs, Maps, and Data Tables)** - Use the My NASA Data Cubes to guide students' exploration of graphs, maps, and datasets to enrich their observations and inferences. https://mynasadata.larc.nasa.gov/data-literacy-cubes-graphs-maps-and-data-tables

Other Resources:

- **ARCHIVE: Real World: Shuttle Safety -** Computer modeling and simulation was used to help engineers evaluate the probability of malfunctions in everything from shuttle valves to the thermal protection system. https://nasaeclips.arc.nasa.gov/video/realworld/archive-real-world-shuttle-safety
- **Solar Math -** Teachers continue to look for ways to make math meaningful by providing students with problems and examples demonstrating its applications in everyday life. Examples appropriate for high school include: judging the reasonableness of numerical computations and their results; generalizing patterns using explicitly defined and recursively defined functions; analyzing functions of one variable by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior; understanding and comparing the properties of classes of functions, including exponential, polynomial, rational, logarithmic, and periodic functions; and drawing reasonable conclusions about a situation being modeled. https://www.nasa.gov/sites/default/files/files/Solar_Math.pdf
  This is just one of many Math Educator Guides which are all listed here: https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Solar_Math.html