

Promoting materials that engage students in meaningful activities, promote the effective use of technology to support the mathematics, further equip students with stronger problems solving and critical thinking skills, as well as enhance numeracy.



Table of Contents

Activity	Title	Subject Matter / Description / Resources
0	The Right Stuff Way	This worksheet is for faculty who are considering reforming courses below calculus. The Table Of Contents is included. 0.0 Table of Contents 0.2 Teacher Notes
1	Ma and Pa Talk Mathematics	Students will model data obtained from MPG vs MPH with a cubic function. They investigate the rate of change of MPG to MPH. Reading graphs; modeling 1.1 Student Worksheet 1.2 Teacher Worksheet 1.3 Excel 1.4 TI-Nspire™ Student 1.4 TI-Nspire™ Teacher
2	Generator Math	Students will find a model that will enable them to predict the number of hours a generator will run on gallons of fuel based on data obtained experimentally. Linear modeling 2.1 Student Worksheet 2.2 Teacher Worksheet 2.3 Excel 2.4 TI-Nspire™ Student 2.4 TI-Nspire™ Teacher
3	Super Snacks	Students will investigate the number of super snacks sold as the price is changed in order to find the price that gives the maximum revenue. Quadratic modeling 3.1 Student Worksheet 3.2 Teacher Worksheet 3.3 Excel 3.4 TI-Nspire™ Student 3.4 TI-Nspire™ Teacher

4	Data Mining Math	<p>Students will learn the terminology of data mining and be able to calculate support and confidence.</p> <p>4.1 Student Worksheet</p> <p>4.2 Teacher Worksheet</p> <p>4.3 Excel</p>
5	Soap Bubbles, Cheesecake Factories Cell Phone Towers	<p>Students will investigate the shape of Voronoi diagrams; specifically, finding the edges and nodes using linear equations.</p> <p>Linear Functions</p> <p>5.1 Student Worksheet</p> <p>5.2 Teacher Worksheet</p> <p>5.3 Excel</p> <p>5.4 TI-Nspire™ Student</p> <p>5.4 TI-Nspire™ Teacher</p> <p>5.5 Voronoi Figure1</p> <p>5.5 Voronoi Figure2</p>
6	Hurricanes – This Will Blow You Away	<p>Students will investigate the quadratic relationship between wind speed and wind pressure. Quadratic Functions</p> <p>6.1 Student Worksheet</p> <p>6.2 Teacher Worksheet</p> <p>6.3 Excel</p> <p>6.4 TI-Nspire™ Student</p> <p>6.4 TI-Nspire™ Teacher</p> <p>6.5 USA Today Snapshot</p> <p>6.5 Wind & Pressure</p>
7	A Slice of Liver	<p>Students will investigate the signal intensity ratio found from MRI graphics in order to predict the amount of iron in the liver. Linear Functions.</p> <p>7.1 Student Worksheet</p> <p>7.2 Teacher Worksheet</p> <p>7.3 Excel</p> <p>7.4 TI-Nspire™ Student</p> <p>7.4 TI-Nspire™ Teacher</p> <p>7.5 Screen Capture: MRI of Livers</p>

8	Bioequivalence	<p>Students will calculate the constants that are used to judge the bioequivalence of two drugs. Logarithms, exponents</p> <p>8.1 Student Worksheet</p> <p>8.2 Teacher Worksheet</p> <p>8.3 Excel</p> <p>8.4 TI-Nspire™</p> <p>8.5 Video Model</p> <p>8.5 Bioequivalence Picture 1</p>
9	Mathematics of Crop Circles	<p>Students investigate the area of geometric regions in order to find optimal values. Optimization, Modeling, Geometry</p> <p>9.1 Student Worksheet</p> <p>9.2 Teacher Notes</p> <p>9.3 Excel</p> <p>9.4 TI-Nspire™ Student</p> <p>9.4 TI-Nspire™ Teacher</p> <p>9.5 Pictures</p>
10	Minimizing Distance	<p>Students investigate the distance from a moving point on a line to another point in order to find a model and the minimum distance. Geometry, Quadratics, Roots, and Asymptotes</p> <p>10.1 Student Worksheet</p> <p>10.2 Teacher Notes</p> <p>10.3 Excel</p> <p>10.4 TI-Nspire™ Student</p> <p>10.4 TI-Nspire™ Teacher</p>
11	What Happens If...	<p>This collection of real world functions requires students to investigate what happens when parameters of a function change. Students will explain how the graph changes as the parameters change. Functions include quadratic, rational, logistic, and exponential.</p> <p>11.1 Student Worksheet</p> <p>11.2 Teacher Notes</p> <p>11.3 Excel</p> <p>11.4 TI-Nspire™ Student</p> <p>11.4 TI-Nspire™ Teacher</p>

12	Looking Into The Future ... Value	<p>Students will investigate the change in the future value of a single deposit as one of the variables (PV, i or n) is increased while the others remain constant.</p> <p>Linear and Exponential Functions</p> <p>10.1 Student Worksheet</p> <p>10.2 Teacher Worksheet</p> <p>10.31 Excel (student)</p> <p>10.32 Excel (teacher)</p> <p>10.4 TI-Nspire™ Student</p> <p>10.4 TI-Nspire™ Teacher</p> <p>10.5 Pictures</p>
13	Reading and Interpreting Graphs	<p>Students will examine graphs and pictographs and answer questions based on the data within them. Graphs and Pictographs, Statistics</p> <p>13.1 Student Worksheet</p> <p>13.2 Teacher Worksheet</p> <p>13.3 Excel</p> <p>13.5 Figures</p>
14	Limitations of Models	<p>Students investigate data from the Internet on the length of a day, sunrise to sunset. There are several models that might work for data over only 30 to 45 days but what happens after that? This includes an introduction to the sine function. Modeling, Introduction to the Sine Function</p> <p>14.1 Student Worksheet</p> <p>14.2 Teacher Worksheet</p> <p>14.3 Excel</p> <p>14.4 TI-Nspire™ Student</p> <p>14.4 TI-Nspire™ Teacher</p>
15	Piecewise-Defined Functions	<p>Students investigate scenarios that require piecewise functions.</p> <p>Linear Functions</p> <p>15.1 Student Worksheet</p> <p>15.2 Teacher Worksheet</p> <p>15.3 Excel</p> <p>15.4 TI-Nspire™ Student</p> <p>15.4 TI-Nspire™ Teacher</p>

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| 16 | Compound Interest –
Linear Functions | <p>Students will investigate the linear relationship between the initial deposit and the future value. Linear Equations</p> <p>16.1 Student Worksheet</p> <p>16.2 Teacher Notes</p> <p>16.3 Excel</p> <p>16.4 TI-Nspire™ Student</p> <p>16.4 TI-Nspire™ Teacher</p> |
| 17 | Math of Finance –
Power Functions | <p>Students will investigate the relationship between the term of an investment and the future value. Power Functions</p> <p>17.1 Student Worksheet</p> <p>17.2 Teacher Notes</p> <p>17.3 Excel</p> |
| 18 | Archimedes' Law | <p>Students may use data provided (see video) or collect their own data on the apparent change in the weight of an object submerged in water. The line of best fit provides the density of water in grams per cm³. The concept may be further explored in a problem that requires the student to find the depth to which a wooden ball will be submerged. Linear Functions – Algebra – Table of Values</p> <p>18.1 Student Worksheet</p> <p>18.2 Teacher Notes</p> <p>18.3 Excel</p> <p>18.4 TI-Nspire™ Student</p> <p>18.4 TI-Nspire™ Teacher</p> <p>18.5 Pictures</p> <p>18.5 Video- Data Collection</p> |
| 19 | Standard Deviation | <p>This short classroom activity will help students to understand the concept of standard deviation as they manipulate data to make the mean and standard deviation some given value. Standard Deviation, Mean</p> <p>19.1 Student Worksheet</p> <p>19.2 Teacher Notes</p> <p>19.3 Excel</p> |
| 20 | Boxes and Cylinders | <p>This hands-on activity helps students grasp the concepts of area and volume as they construct a box with a top with a given volume and a given dimension. The ideas are then used to explore the dimensions of a tin can with a minimum amount of surface area and a given volume.</p> <p>20.1 Student Worksheet</p> <p>20.2 Teacher Notes</p> <p>20.3 Excel</p> <p>20.4 TI-Nspire™</p> |