Middle School Lessons

Each of our activities is designed to be flexible and self-contained. Please feel free to use any of the activities as the basis of your teaching or as supplementary materials.

You do not need to do more than one of the activities in order for them to be useful. However, we have listed them here in the approximate order that we have used them with students. This may be helpful for teachers looking for a series of activities.

Please explore our categorizations by activity type, process, and math concept if you are looking for something specific!

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1. **Who Shares My Function? - Linear with All Representations** - Students will work in groups after finding other students who have the same linear function represented by a story, a table, a graph, or an equation. They will attempt to explain and discuss why the different representations refer to the same function.
2. **It Depends** - Students will think about how we can show a dependent relationship between two quantities, using a variety of representations.
3. **Who Shares My Function? - Linear with Graphs and Stories** - Students will make groups by finding other students who have the same quadratic or linear function in different representations.
4. **Contrasting Equations** - Students write equations for three graphs and examine their slopes by comparing and contrasting the graphs. Students also look at the same functions graphed on differently scaled coordinate planes.
5. **Who Shares My Function? - Linear with Graphs, Tables, and Equations** - Students will make groups by finding other students who have the same linear function, as shown in representations of graphs, tables, or equations. They will then generate a story to go with the function.
6. **Jason's Tree House** - Students will extract data from a story and use tables and graphs to answers questions about proposed scenarios.
7. **Candy Experiment** - Students will create their own data to construct a graph and equation of negative and fractional slope.
8. **Graphing Equations** - Students will practice moving between graphs and equations of functions, as well as identifying the y-intercept and slope.
9. **Wind-Up Car** - Students will produce an equation from a graph, based on an engineering-context.
10. **Who Shares My Function? - Linear with Negative and Fractional Slope** - Students will find other functions that are the same as theirs, starting from a table, a graph, or an equation. Once they have identified the same function represented in a different way, they will create a story that describes all of the different representations of the same function.
11. **Guess My Rule - Linear** - Students will try to determine the equation to match their partner's created graph and work together to correct their own mistakes.
12. **Compare and Contrast** - Students will identify the y-intercept and slope using equations and then use that data to create corresponding tables and graphs.
13. **Coupon Activity** - Students will create graphs, tables and equations to explain their stories and look at how a graph changes depending on the y-intercept.
14. **Race Car Activity** - Students will look at four different graphs to determine which two describe the scenario proposed by the teacher displaying parallel lines and the correct y-intercepts.
15. **Same and Different** - Students will compare graphs of linear functions, looking for similarities and differences, and will produce algebraic expressions, again identifying what is the same and what is different about each one.
16. **Can We Predict Differences?** - Students will predict, produce, and compare linear and non-linear function graphs used to represent the number of punches on a balloon.
17. **Lotto Winnings** - Students will generate a graph for a nonlinear function, point by point, in order to realize that there are different types of functions that they might not know about yet.
18. **Area of a Square as a Function** - Students will develop a quadratic equation to represent the area of a square.
19. **Relating Graphs and Equations - Linear and Quadratic Functions** - Students will generate graphs from given equations and equations from given graphs.
20. **Playground Construction** - Students will create a quadratic equation based on the context of building a playground referring to surface, fencing, and equipment needed, to create an equation of $y = ax^2 + bx + c$ form.
21. **Who Shares My Function? - Quadratics** - Students will make groups by finding other students who have the same quadratic or linear function in different representations.
22. **What Will Happen** - Students will work with equations of functions (both linear and non-linear) to find the y-intercept without graphing.
23. **x2 and x** - Students will look at x squared and x as functions, and for which values of x one function value is greater than the other.
24. **Biggest Output** - Students will decide on what linear and quadratic functions will result in the greatest output, starting from an algebraic expression, and using tables and graphs to help them make these decisions.
25. **Sound Loudness** - Students will examine a non-linear function depicted in a graph and generate the corresponding function table and equation.
26. **Guess My Rule - Non-Linear** - Students will produce algebraic expressions starting from non-linear graphs produced by other students in the class.
27. **Box of Clay Activity** - Students will compare two cubic functions based on the context of the volumes of a box of clay.
28. **Graphing Equations - Nonlinear Functions** - Students write equations for three graphs and examine their slopes by comparing and contrasting the graphs. Students also look at the same functions graphed on differently scaled coordinate planes.
29. **Curves in a Cubic** - Students will explore different kinds of cubic functions through graphs and tables.
30. **Function Challenges - 20 Questions** - Students will compete in a game to generate equations for functions that meet certain criteria, as given by the instructor.
31. **Box Extremum** - Students will start by finding average rates of change for a non-linear function over increments of the independent variable. The size of the increments will decrease to introduce the idea of using tangent lines to find instantaneous rates of change of linear and non-linear functions. Students will see what a tangent looks like at the extrema of a graph. Students will then create a box that maximizes the volume and see how determining the extrema of a graph can help to find the maximum volume.