Course Syllabus

8th Grade Design Makerspace

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**Malesus STEM (Science, Technology, Engineering, Math) Innovation Center’s Mission Statement:**

The Malesus STEM Innovation Center mission is to reimagine learning within the context of the 21st Century to meet emerging industry workforce needs.

**Design Makerspace Institute:**

Design MakerSpace offers students a dedicated space equipped with various tools, materials, and technology, where they can bring their ideas to life. Students have access to tools such as 3D printers, laser cutters, electronics, woodworking equipment, and more.

Students learn about the fabrication process and explore topics in market research, product development, and identifying problems to develop innovative product solutions. Students have the freedom to experiment, take risks, and learn from their failures, receiving guidance and mentorship from teachers, industry professionals, and local entrepreneurs. The Design MakerSpace Institute nurtures creativity and innovation through problem-solving, critical thinking, collaboration, and resilience.

**Additional Required Course – 8th Grade Mathematics:**

Students will explore the following mathematical concepts and skills:

1. **The Number System -** This is the culminating area for the number system from 6th and 7th grade with the introduction of irrational numbers. Students learn that there are numbers that are not rational, called irrational numbers, and they approximate irrational numbers by rational numbers, locating them on a number line. Students estimate the value of irrational expressions.
2. **Expressions and Equations -** Students work with radicals and integer exponents. Students understand the connections between proportional relationships, lines, and linear equations. Students advance their knowledge developed in 7th grade about equations to analyze and solve linear equations and pairs of simultaneous linear equations. Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize equations for proportions (y/x = m or y = mx) as special linear equations (y = mx + b), understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin. They understand that the slope, m, of a line is a constant rate of change. They understand that if the input or x-coordinate changes then the output or y-coordinate changes as well with respect to the slope. Students will solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane. They learn that these lines will either intersect, be parallel, or are actually the same line, corresponding to a single solution, no solution, or infinite solutions. Students use linear equation, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve real-world and mathematical problems.
3. **Geometry -** Students informally explore translations, rotations, reflections, and dilations, laying groundwork for a deeper study of these in high school mathematics. Students use informal arguments to establish facts about the angle sum and exterior angle of triangles. Students explain and model the Pythagorean Theorem and its converse. They apply the Pythagorean Theorem to find distances between points on the coordinate plane and to find side lengths in right triangles. Students work with volume by solving problems involving cones, cylinders, and spheres.
4. **Statistics and Probability -** Students extend their knowledge from 7th grade by working with scatter plots for bivariate measurement data and understand linear associations and the use of linear models to solve problems interpreting the slope and intercept. Students will assess models by informally fitting a straight line and judging the closeness of the data points to the line. Students continue their work with probability from 6th and 7th grade by finding probability of compound events and represent the data using organized lists, tables, and tree diagrams.
5. **Functions -** 8th grade begins the formal study of functions, a mathematical concept that for the student will continue throughout high school. Students grasp the concept of a function as a rule that assigns to each input exactly one output. They understand that functions describe situations where one quantity determines another. They can translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations), and they describe how aspects of the function are reflected in the different representations. They do not have to learn function notation at this point but they do know and interpret the equation y = mx + b as defining a linear function.

**Additional Required Course: 8th Grade Science**

The themes for science in eighth grade are how forces and motion drive objects in our solar systems (ESS1), move lithospheric plates (ESS2), and how nature’s driving forces of geology (ESS2) impact ecosystems via environmental selection for a species (LS4). This content utilizes core ideas from sixth and seventh grade; for example, using a hereditary approach in seventh grade to examine natural selection in eighth grade. Tennessee's state mathematics standards are integrated into the science standards, specifically forces and motion (8.PS2). Special attention is given to science literacy through the use of the science and engineering practices. Students are often required to gather information from reliable sources to construct evidenced-based arguments (e.g., 8.ESS2). By the end of eighth grade, it is expected that students should be able to demonstrate the skills and content knowledge emphasized in the following standards in preparation for future learning in science and its practice.

**Student Expectations:**

1. Be Respectful

2. Be Responsible

3. Be Ready

4. Be Safe

**Course Materials:**

1. Pencils
2. 2 Black Dry Erase Markers
3. 2 Pocket Folders-1 for Science, 1 for Math
4. 3 Spiral Notebooks- 1 for Science, 1 for Math, 1 for Lab
5. Pack of Page protectors

**Grading Policy:**

**A =** 90 – 100

**B =** 80 – 89

**C =** 70 –79

**D =** 60 – 69

**F =** Below 59