

## **Course Title: Explorations in Math**

### **Course Description**

This course is designed to provide the student with a solid mathematics foundation. The student will explore properties of rational numbers including divisibility patterns, prime factorization, greatest common factor, and least common multiple. The student will add, subtract, multiply, and divide rational numbers. Then, the student will identify and solve expressions and equations using variables. Finally, the student will use properties, including the Associative Property, Commutative Property, and Distributive Property, to solve and simplify equations. The student will be introduced to the properties of equality to solve one-step and multi-step equations. Then, the student will explore absolute value and how to compare values using absolute value. The student will examine the applications of one-step and multiple step equations. Finally, the student will be introduced to probability and statistics concepts including direct and inverse variation, mean, median, mode, counting principle, permutations, and combinations.

### **Major Concepts**

- Working with Rational Numbers
- Variables, Equations, and Properties
- Explorations of Mathematics A Final
- Integers and Solving Equations
- Probability and Statistics
- Explorations in Mathematics B Final

### **Suggested Grade Level: Grade 9-12**

### **Length of Course: Two Semesters**

### **Credit: 1.0**

## **Course Title: Game Design I**

### **Course Description**

Are you a gamer? Do you enjoy playing video games or coding? Does the idea of creating and designing your own virtual world excite you? If so, this is the course for you! When it comes to video game design, the possibilities are endless! Tap into your creative and technical skills as you learn about the many aspects involved with designing video games. With this course, you'll learn about different video game software and hardware; various gaming platforms; the technical skills necessary to design games; troubleshooting and internet safety techniques; the history of gaming; and you'll even have the opportunity to create your very own plan for a 2D video game! With the knowledge and skills you'll gain in this course, you can take your hobby and turn it into a potential career. Game Design 1 allows you to go from simply being a player in a virtual world, to actually creating one!

### **Major Concepts**

- Explain the four basic elements of games
- Describe the difference between gameplay and game mechanics
- Understand how mastery contributes to a game's success or failure
- Discuss common game mechanics found in your favorite games
- Understand the functions of the components of a game console
- Explain the way 2-D and 3-D graphics are rendered in computer games with graphing knowledge from mathematics
- Identify an example of a hardware constraint for video games and how it was overcome
- Describe the technological developments that contributed to the video game industry
- Describe the various roles on a game development team
- Explain the game design process, from concept to finished game
- List software commonly used in game development
- Analyze a game idea through the proper filters to determine whether it is a feasible idea
- Differentiate between player-centric and designer-centric game design
- Explain how point-of-view and game camera views are different, giving examples of each
- Define player immersion and show how immersion can be enhanced through different elements of game design
- Move between the four main views in Unity
- Explain how video games apply physics concepts, such as friction, drag, and collision
- Describe how video games apply the mathematical concept of a 3-dimensional space, or a 3-axis coordinate system
- Write a simple script in Unity
- Define common mathematical terms as they relate to programming languages
- Set up keyboard controls for a game object
- Write a simple conditional statement to create an action in the video game that occurs because of a related action
- Ensure that code is free of typical errors
- Explain the difference between portals and occluders
- Apply the correction cycle to your game prototype so that players have a way to practice and improve within your game
- Avoid common bugs in level design
- Design a game environment that supports the gameplay of your prototype
- Describe how a game's art might represent a particular culture or historical time period
- List the different specializations within video game art and give examples of the background knowledge needed for these specializations
- Categorize visual art software according to its function
- Create a seamless texture to use in your game prototype
- Describe the different elements that give your game good balance
- Demonstrate the ramping involved in your video game, from level to level
- Explain the steps in the game testing cycle
- Discuss how video games can be made accessible to people with different abilities
- Discuss the legal considerations that go into marketing a game
- Distinguish between the multiple agents that influence video game marketing: publishers, developers, marketers, distributors, retailers, and reviewers
- Develop a strategy for marketing your own game
- Evaluate a game in terms of government rating systems

**Suggested Grade Level: Grade 9-12**

**Length of Course: Two Semesters**

**Credit: 1.0**

### **Course Title: German II**

#### **Course Description**

German II is an intermediate level course that will introduce the student to a variety of areas of language learning. In this course, the student will continue to learn listening, speaking, reading, and writing skills through a variety of activities. Throughout the five units, or themes, of material (daily routine, animals, pastimes, the body, and descriptions), the student will learn to express himself using an ever-increasing vocabulary, past-tense verbs, demonstrative articles, and adjectives. Grammar is introduced and practiced in innovative and interesting ways with a variety of learning styles in mind. Culture is presented throughout the course to help the learner focus on the German-speaking world, people, geographical locations, and histories. In this course, the student will continue to learn listening, speaking, reading, and writing skills through a variety of activities. Throughout the five units, or themes, of material (house, shopping, leisure, travel destinations, and flying), the student will learn to express himself using an ever-increasing vocabulary, past-tense verbs, dative expressions, and adjectives. Grammar is introduced and practiced in innovative and interesting ways with a variety of learning styles in mind. Culture is presented throughout the course to help the learner focus on the German-speaking world, people, geographical locations, and histories.

**Suggested Grade Level: Grade 9-12**

**Length of Course: Two Semesters**

**Credit: 1.0**

**Pre-requisite: German I**

### **Course Title: Integrated Physics and Chemistry**

#### **Course Description**

Students explore and learn the basic concepts of chemistry and physics. The chemistry-focused lessons extend prior knowledge of the properties, states, and structure of matter; explore the dynamics of chemical bonding and reactions; and introduce students to nuclear chemistry. The physics-focused lessons enable students to explore motion, force, work, power, energy, wave mechanics, electricity, magnetism, optics, and the electromagnetic spectrum. Additional content includes Earth science units. Hands-on explorations and virtual simulations enhance students' comprehension of key science concepts.

## **Major Concepts:**

- Design an investigation
- Describe the motion of an object in terms of position, velocity, acceleration, and momentum
- Define work and simple machines
- Explain the conservation of energy within a system
- Describe the transfer of energy in systems and real-world examples
- Describe matter using properties and the kinetic theory of matter
- Utilize the periodic table of the elements
- Identify types of chemical reactions
- Describe the conservation of matter and energy in chemical reactions
- Describe the properties of household compounds
- Explain the processes of fission and fusion

**Suggested Grade Level: Grade 9-12**

**Length of Course: Two Semesters**

**Credit: 1.0**

**Pre-requisite: Pre-Algebra**

## **Course Title: Financial Literacy**

### **Course Description**

The key to a happy, successful life is to make a lot of money, right? Not really. No matter how much money you have, you still need the skills to use the money in your life responsibly and meaningfully. This one-semester course in financial literacy serves to give you an appreciation and respect for money. Too often, young adults begin their financial careers in disarray due to a lack of understanding of the short- and long-term effects of financial decisions. As these young people grow into adults, they don't have a strong foundation on which to build their financial futures. This course introduces you to the importance of money and the decisions made with regard to it. The topics in this course include defining wealth, using decision-making and goalsetting skills, the benefits and costs of employment, how to read your paycheck, how to manage and spend money, and how to save and invest money.

### **Major Concepts**

- **Describe the importance of money and its influence on your life**
- **Explain why your gross pay is not equal to your take-home pay**
- **Explain the purpose of state and federal taxes**
- **Create and manage a budget**
- **Make smart decisions on how to spend, manage, and borrow money**

- Use a variety of banking services
- Use credit cards wisely

**Suggested Grade Level: Grade 9-12**

**Length of Course: One Semester**

**Credit: .5**

## **Course Title: 2-D Animation**

### **Course Description**

Do you wonder what it would be like to create the next blockbuster animated movie or do you want to make the next big video game? Do you have an eye for drawing, technology, and timing? If so, Animation is the course for you! You will learn how to use animation tools to conceptualize and bring your creations to life. You'll learn the ins and outs of creating 2D and 3D animation, from start to finish. You'll even begin working on our own design portfolio and get hands on experience with creating your own animation projects. Learning about Animation could lead to a thriving career in the growing world of technology and animation.

### **Major Concepts**

- Trace the origins and early history of the art of animation
- Explore how the eye and brain process moving images
- Compare the differences between past animation techniques and current animation technologies
- Understand the differences between various types of animation
- Explain how drawn animation evolved from early picture viewing devices
- Understand and apply Disney's 12 Principles of Animation
- Use key terms of hand-drawn animation
- Appreciate the world of animation beyond the United States
- Include design elements in your drawings
- Understand the difference between a bitmap image and a vector image
- Trace the process of CGI production from idea to theater
- Discuss the pros and cons of different production processes
- Define and explain kinematics and animatics
- Identify the key departments in an animation studio
- Create animation sequences with layered drawings and backgrounds
- Trace videos to make rotoscoped sequences
- Use the important functions of 2D animation software
- Export your animated videos to share with the world
- Apply graphical tools to improve your digital drawings
- Draw the human body in proportion

- Identify and create the walk cycle for animation
- Discuss how poses communicate emotion
- Develop your own animated characters based on real anatomy
- Understand the Laws of Motion and Gravity
- Apply physics principles to the movement of your characters
- Create facial expressions that convey emotions
- Turn your characters into first-rate actors
- Explain the difference between motion capture and keyframe animation
- Grasp the power of modern animation techniques, including bones, muscles, and rigging
- Understand the process of simulating water, hair, and other dynamics
- Navigate the Blender interface
- Create simple animations using parenting, movement, rotation and scaling along with keyframes
- Use various modeling techniques to create a character model
- Hide background geometry
- Navigate the 3D view using shortcuts
- Switch between perspective and orthographic mode
- Understand and apply the principles of topology
- Create an armature rig to fit a bipedal character model
- Skin, or attach, a character model to a rig so that it deforms like skin with the movements of the various bones
- Develop a seamless walk cycle for a rigged character model
- Write dialogue and action in proper film script format
- Understand three-act script structure
- Identify camera shots, angles, and movement
- Create storyboards for animation
- Appreciate how sound affects emotions
- Record good voice acting for animation
- Match animated mouth shapes to the sounds of speech
- Design and edit a simple soundtrack for video
- Add titles and export an animation with sound
- Put together a portfolio of your work
- Recognize plagiarism and know how to avoid it in animation
- Pitch your animation project
- Understand the difference between jobs in animation vs. game design
- Describe how to protect your digital animation work

**Suggested Grade Level: Grade 9-12**

**Length of Course: Two Semesters**

**Credit: 1.0**

## **Course Title: Graphic Design I**

### **Course Description**

Can people communicate without using words? Do different colors invoke different emotions? Can artists use various textures to communicate a range of ideas? Absolutely! Designed to develop an understanding and appreciation for design, the Introduction to Graphic Design A course teaches the student to interpret visual representations and to communicate his or her own ideas and information graphically. By raising the student's awareness of design, this intermediate-level course establishes a strong foundation in the basic principles of graphic design. This course, the first in a two-semester series, introduces the student to scenarios that can be solved by applying creative techniques that yield innovative and effective design solutions. Though the course is structured around computer-assisted graphic design, the student will examine other types of design as well. The student will also learn to use Inkscape, an image-editing program that is provided, and will create several design compositions using this program.

### **Major Concepts**

- Image Editing Software
- What is Design?
- Art Form and Media
- The Design Process
- Elements of Design
- Principles of Design

### **Suggested Grade Level: Grade 9-12**

### **Length of Course: One Semester**

### **Credit: .5**

## **Course Title: Graphic Design II**

### **Course Description**

Understanding the history of any area of study is important to learning about and appreciating society today. In Introduction to Graphic Design B, the second course in a two-semester series, the student will be introduced to the history of design and how various design movements have contributed to the field of design. The student will get answers to questions such as “What role does design play in society?” and “How does the field of design relate to other facets of society?” Understanding where the field of design comes from will help the student to appreciate the aesthetics and purposes for design today. In addition, this course expands on foundational knowledge in the basic principles of graphic design. The student will learn to communicate visually through effective layout and interface design. The student will also be introduced to appropriate techniques for the evaluation of art and design. Though the course is structured around computer-assisted graphic design, the student will examine other types of design as well. The student will learn to use Inkscape, an image-editing program that is provided for him or her, and will create several design compositions using this program.

**Major Concepts**

- Image Editing Software
- History of Graphic Design Part 1
- History of Graphic Design Part 2
- Layout
- Designing for the Web

**Suggested Grade Level: Grade 9-12**

**Length of Course: One Semester**

**Credit: .5**

**Pre-requisite: Graphic Design I**