Planned Course: Imagineering Workshop	Course Number: AH843T	Department: Fine & Digital Arts
Unit: 3: Research & Self-Directed Learning Estimated Time: 10 weeks Integrated	Grade Level: 9-12 Level/Track: Elective	Date Approved: August 27, 2018

PA Academic Standards	Core Concepts (in question format) • Skills/Knowledge	Activities/Strategies/Study Skills (identify some activities as remedial or enrichment activities)	Assessments (include types and topics)
3.1.12. A: Apply concepts of systems, subsystems, feedback and control to solve complex technological problems. • Apply systems analysis to predict results. • Compare and contrast several systems that could be applied to solve a single problem. • Evaluate the cause of a system's inefficiency. **3.1.12. D: Analyze scale as a way of relating concepts and ideas to one another by some measure.** • Assess the use of several units of measurement to the same problem. • Analyze and apply appropriate measurement scales when collecting data. **3.1.12. E: Evaluate change in nature, physical systems and man-made systems.** • Evaluate the patterns of change within a technology (e.g., changes in engineering. **3.2.12. A: Evaluate the nature of scientific and technological knowledge.** • Know and use the ongoing scientific processes to continually improve and better understand how things work. • Critically evaluate the status of	▶ What is Self-Directed Learning & why is it important? ▶ What is research and why is it necessary in ALL instances? • How does one go about starting to research an idea? • What kinds of research are valid? ▶ Why is it always important to know where something will end up (the end use(s)) before you start a project? • How does one output the items? Requirements for output? • Is it a physical item or an idea/concept? • How does one package the idea/project? • What is the terminology necessary for this particular project?	• Students will refine the sketch/idea into one specific sketch/idea for a project or to solve a problem that requires a solution. • Students will research methods and processes necessary to complete their project/find their solution. • Students will undergo independent learning in the methods and processes that their research deems necessary to complete their project/find their solution. • Students will import, explain/caption and organize all notes and all digital files in their digital Learning Journal allowing them to keep a digital trail of their journey. • Ongoing independent consultations with the instructor throughout this entire unit will allow students to illustrate and explain their	• This unit will be assessed formally by observing the progress in student Learning Journals. • The instructor will also informally observe and mentor students while they are working in the classroom in order to provide on the spot feedback and motivation or direction. • Informal assessment will also be observed and directed by the instructor upon seeing the demonstration of skills students are employing during their self-directed learning process and practice. • Peer mentoring (as appropriate) will also be highly encouraged (and informally assessed) to foster a family atmosphere and aid both parties in retaining their knowledge on a higher level.

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existing theories (e.g., germ theory of disease, wave theory of light, classification of subatomic particles, theory of evolution, epidemiology of aids). **3.2.12. C: Apply the elements of scientific inquiry to solve multi-step problems.** • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Evaluate the appropriateness of questions. • Design an investigation with adequate control and limited variables to investigate a question. • Organize experimental information using analytic and descriptive techniques. **3.2.12. D: Analyze and use the technological design process to solve problems.** • Assess all aspects of the problem, prioritize the necessary information and formulate questions that must be answered. • Propose, develop and appraise the best solution and develop alternative solutions. **3.6.12. B: Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and	▶ Why is accuracy important in every endeavor in life – not just math?	solutions and examine and predict the level of success of each outcome (remedial, new learning and/or enrichment depending upon the level of project they choose).	

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decoding. • Analyze and evaluate a message designed and produced using still, motion and animated communication techniques. **3.6.12.C: Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.** • Apply knowledge of construction technology by designing, planning and applying all the necessary resources to successfully solve a construction problem. • Compare resource options in solving a specific manufacturing problem. • Analyze and apply complex skills needed to process materials in complex manufacturing enterprises. • Apply advanced information collection and communication techniques to successfully convey solutions to specific construction problems. • Analyze the positive and negative qualities of several different types of materials as they would relate to specific construction applications. **3.7.12. A: Apply advanced tools, materials and techniques to answer complex questions.**			

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• Demonstrate the safe use of complex tools and machines within their specifications. • Select and safely apply appropriate tools, materials and processes necessary to solve complex problems that could result in more than one solution. • Evaluate and use technological resources to solve complex multistep problems. **3.7.12. D: Evaluate the effectiveness of computer software to solve specific problems.** • Evaluate the effectiveness of software to produce an output and demonstrate the process. • Analyze, select and apply the appropriate software to solve complex problems. • Analyze the legal responsibilities of computer users. **3.8.12. A: Synthesize and evaluate the interactions and constraints of science and technology on society.** • Compare and contrast how scientific and technological knowledge is both shared and protected. • Evaluate technological developments that have changed the way humans do work and discuss their impacts (e.g., genetically engineered crops).			

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• Evaluate socially proposed limitations of scientific research and technological application. **3.8.12. B: Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.** • Apply appropriate tools, materials and processes to solve complex problems. • Use knowledge of human abilities to design or modify technologies that extend and enhance human abilities. **3.8.12. C: Evaluate the consequences and impacts of scientific and technological solutions.** • Propose solutions to specific scientific and technological applications, identifying possible financial considerations. • Analyze scientific and technological solutions through the use of risk/benefit analysis. • Evaluate and describe potential impacts from emerging technologies and the consequences of not keeping abreast of technological advancements (e.g., assessment alternatives, risks, benefits, costs, economic impacts, constraints).			