

# Chino Valley Unified School District

## High School Course Description

CONTACTS	
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A. COVER PAGE - COURSE ID	
<b>1. Course Title:</b>	Innovation to Commercialization: English and Product Development (UCCI)
<b>2. Transcript Title/Abbreviation</b>	IC English
<b>3. Transcript Course Code/Number</b>	5U42
<b>4. Seeking Honors Distinction</b>	No
<b>5. Subject Area/Category</b>	English
<b>6. Grade level(s)</b>	12
<b>7. Unit Value</b>	5 credits per semester/ 10 total credits – English
<b>8. Length of Course</b>	Two (2) semesters / one (1) year
<b>9. Was this course previously approved by UC?</b>	Yes
<b>10. Is this course classified as a Career Technical Education course?</b>	Yes
<b>11. Is this course modeled after an UC approved course?</b>	Yes
<b>12. Repeatable for credit?</b>	No
<b>13. Date of Board Approval</b>	May 5, 2016
<b>14. Brief Course Description:</b> <p>Innovation to Commercialization combines English Language Arts Common Core State Standards with the Advanced Manufacturing Career Technical Education (CTE) Standards. This course will introduce and then lead each student through the design process of an original product that meets a need that has been identified by each student in his or her surrounding community. Students will be expected to read a variety of short stories, expository pieces, technical documents, novels, analyze information provided in multimedia formats, all of which provides the vehicle for developing and refining listening, speaking, reading and writing skills in the context of product design. Specific writing in this course includes the composition of user manuals, proposals, literary analysis, research responses/essays, persuasive texts, and marketing materials. As students approach the creation of their own product, they will examine case studies of inventions and their impact on history, society and the environment; conduct a needs assessment of their surrounding community; consider the ethics involved in the creation and manufacturing of a product; perform a cost analysis; explore the laws of intellectual property and how they apply to the student's product; analyze marketing and advertising techniques of products; and ultimately create a comprehensive portfolio of their work throughout the design process of their original product.</p>	

# Chino Valley Unified School District

## High School Course Description

<b>15. Prerequisites:</b>	One year as a LEAD academy student.
<b>16. Context for Course:</b>	This course will be taught to LEAD academy seniors. It will be team taught with the senior capstone course Engineering Design and Development. Students will be enrolled in both Engineering Design and Development and Innovation to Commercialization.
<b>17. History of Course Development:</b>	This course was developed at a 2015 UCCI institute to integrate manufacturing and product development with ERWC. This course was written for students in Linked Learning Academies with the focus of Engineering and Manufacturing.
<b>18. Textbooks:</b>	Brown, Ryan A., Brown, Joshua W., and Berkeihiser, Michael. Engineering Fundamentals: Design, Principles, and Careers. Tinley Park, IL: Goodheart-Willcox Publisher, 2014. ISBN: 978-1-61960-220-5
<b>19. Supplemental Instructional Materials:</b>	<p>Alred, Gerald J., Charles T. Brusaw, and Walter E. Oliu. Handbook of Technical Writing. Boston, MA: Bedford/St. Martins, 2006. Print.</p> <p><a href="http://www.wipo.int/freepublications/en/youth.html">http://www.wipo.int/freepublications/en/youth.html</a> download Your Own World of IP (designed for 12-19 year olds)</p> <p><a href="http://www.uspto.gov/learningandresources/outreachandeducation-information">http://www.uspto.gov/learningandresources/outreachandeducation-information</a> on patents designed for educators</p> <p><a href="https://edpuzzle.com/EdPuzzle">https://edpuzzle.com/EdPuzzle</a></p> <p><a href="http://www.thisamericanlife.org/radioarchives/episode/441/whenpatentsattack">http://www.thisamericanlife.org/radioarchives/episode/441/whenpatentsattack</a> WBEZ Radio This American Life “When Patents Attack!” (episode 441, July 22, 2011).</p> <p><a href="http://www.thisamericanlife.org/radioarchives/episode/496/whenpatentsattack">http://www.thisamericanlife.org/radioarchives/episode/496/whenpatentsattack</a> Parttwo WBEZ Radio This American Life “When Patents Attack... Part Two!” (Episode 496, May 31, 2013).</p> <p>Lego Documentary “Inside Lego”</p> <p>YouTube: “How to” videos</p> <p>The Jungle, 1984 (5), Frankenstein, Jurassic Park (3), Brave New World (5), Sound of Thunder (3) , Feed (5)</p>

# Chino Valley Unified School District

## High School Course Description

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	<p>Poynter <a href="http://www.poynter.org/">http://www.poynter.org/</a></p> <p>Truth in Marketing Standards, Federal Trade Commission  <a href="http://www.ftc.gov/tipsadvice/businesscenter/advertisingandmarketing">http://www.ftc.gov/tipsadvice/businesscenter/advertisingandmarketing</a></p> <p>Federal Trade Commission <a href="http://www.ftc.gov/">http://www.ftc.gov/</a>  Cautions/Warnings and Safety  (including the use of standard symbols), if applicable</p> <p><a href="http://www.youtube.com/watch?v=xiiUQsyiDnk">http://www.youtube.com/watch?v=xiiUQsyiDnk</a> HOME  Documentary on Backpack Beds by Swags for Homeless,  directed by Phoebe Hartley</p> <p><a href="http://www.youtube.com/watch?v=zsU27zTm908">http://www.youtube.com/watch?v=zsU27zTm908</a> Forbes 400  Members Set The Bar In Business And Philanthropy</p> <p>The Art of Doing Good: Where Passion Meets Action by  Charles Bronfman</p> <p>BusinessDictionary.com</p> <p><a href="http://www.businessdictionary.com/definition/consumeranalysis.html">http://www.businessdictionary.com/definition/consumeranalysis.html</a></p> <p>Shark Tank: <a href="http://abc.go.com/shows/sharktank">http://abc.go.com/shows/sharktank</a></p> <p>KickStarter: <a href="https://www.kickstarter.com/">https://www.kickstarter.com/</a></p> <p>Quirky: <a href="https://www.quirky.com/shop">https://www.quirky.com/shop</a></p> <p>Stanford d. school: <a href="http://dschool.stanford.edu/">http://dschool.stanford.edu/</a></p>
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# Chino Valley Unified School District

## High School Course Description

### B. COURSE CONTENT

#### **Course Outline:**

##### Unit 1: Introduction to the Design Process

Unit 1 Overview: In this unit, students will be introduced to the design process through various resources, such as videos and articles. These teacher selected articles and videos will demonstrate the design process from start to finish and thereby provide concrete examples of engineers/inventors responding to needs. Once they have gone through the design process, the teacher will help students identify a need, problem or opportunity for a new product (keeping in consideration the confines of the materials). Students will then apply ideation techniques to develop a prototype using materials provided by the teacher (i.e. building blocks, toothpicks/marshmallows, newspaper, cardboard, etc.). As they create the prototype, students will create a user manual. Once the user manual is created, students will trade with others to do a user trial. The observing students will be responsible for silently taking observation notes as they witness areas that are unclear in their manuals. After doing their observations, students will revise their user manuals, do another user trial, and then complete a final revision of their manuals. The final version of this manual will become part of each student's portfolio. This unit overall provides students with a basic foundation of the design process while giving them an opportunity to explore the components and relevance of technical writing.

##### Key Assignments

Thinking About Design Decisions: In this assignment, students are introduced to the design process and complete a design process template, including an attached prototype sketch. The instructor will design or choose a design process template (such as "Introduction to Design Thinking" or other resources from "Stanford d. School") that details the design process. Criteria for the template includes: recording interview responses, determining their users' needs based on the interview, defining the specific need, recording their ideation ideas, and drafting a sketch of their prototype. Students will be assigned a need scenario, such as: "More people need to take the stairs" and will follow the abovementioned design process, using the template to guide their process. In the testing phase, students should share their sketch and receive feedback. Finally, students will watch a video that demonstrates how other designers solved the assigned or a similar need. For the above example of "More people need to take the stairs," an instructor may use the video "Piano Stairs The Fun Theory." After the video, students will write a reflective piece in which they explain how the designers in the video met the need and reflect on changes they would make to their own prototype based on this video.

Creating a Prototype with User Manual: Students will read online articles (such as those from IAM consultants that demonstrate the importance and function of user manuals. These articles will help students to understand the importance of and serve as models for consistency (grammar, format, etc.), audience, clarity, etc. in technical documentation. Using knowledge from the design process, students will create their own prototype and a user manual for the prototype. To direct the creation of prototypes and their manuals, the instructor will provide students with an expository text, such as NY Times' "California Imposes First Ever Mandatory Water Restrictions to Deal with Drought," that will be used to determine a need, problem, or opportunity for a new product (keeping in consideration the confines of the materials they will be given i.e. building blocks, toothpicks/marshmallows, newspaper, or cardboard). Students' created user manuals must be formatted according to a style guide that will be used throughout the whole course for writing a manual. The user manual will convey the assembly process clearly and accurately through the effective selection and organization of necessary information. Students must consider audience and determine the information that is relevant for inclusion.

# Chino Valley Unified School District

## High School Course Description

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### Key “User Manual” Requirements

- Suggested material and tool list
- The adherence to a style guide
- Organization of content: Major Sections, subheadings, etc.
- Inclusion of Goals of Actions (consistent use of infinitive verb form or gerund)
  - *Building the frame*
  - *To build the frame*
- Inclusion of Response of Actions, if applicable (consistent verb choice)
- Imperative verb forms for Actions
  - *Secure the axle*
- Cautions/Warnings and Safety (including the use of standard symbols), if applicable
- Use of graphics/diagrams/visuals
- Formatting via a style guide (This includes indentations for Actions/Response, placement of warning/caution icons and information, placement of notes, etc.)
- Industry standard, consistent grammar usage (imperative or gerund forms for actions) (Simple and direct verb forms *try* vs. *attempt*; *do* vs. *execute* ; *show* vs. *display*)
- Use of transition words/phrases, if necessary

### User Trial and Manual Revision:

Student prototypes and user manuals must now go through a user trial process. Students must note/record their own observations notes during user trial process. Students will strengthen their manuals by editing, rewriting, and revising them based on user trial observations with the goal of producing a more accurate, organized and precisely worded user manual. The observation notes should record the actions of the people testing their manual as well as reflections as to what needs to be improved based on the observation (unexpected issues). The final version of this manual and images of its prototype will become part of each student’s Unit 8 portfolio.

### Unit 2: Case Study: Learning from History

Case Study: Learning from History At the Drawing (or Writing Board) Students will use the information and their practice pertaining to the design process (from Unit 1) to look at historical case studies of innovations, their inventors, and impact. Students can either start with an invention they want to research or a specific inventor they want to learn more about. First students will read biographical information about their inventor and complete a biographical analysis. Next students will complete a contextual analysis of the historical and societal influences leading to the invention. Students will combine both the biographical and contextual analyses into a detailed timeline of the inventor’s life and historical time period. The design analysis will have students look at the original invention’s design, materials, and means of production and possibly how those elements have evolved over time. Next students will analyze the environmental impact and safety concerns of this invention. Finally, based on their analysis of their case study, students will complete a need analysis for their proposed product. All final versions of the Unit 2 assignments will become part of each student’s Unit 8 portfolio.

# Chino Valley Unified School District

## High School Course Description

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### Key Assignments

**Biographical Synthesis Paper:** Students will apply research methodologies to evaluate multiple sources of information presented in different media or formats on an inventor of their choosing. The research should focus on how the inventor applied various ideation techniques to develop his or her ideas and concepts as well as how the inventor identified a need, problem, or opportunity for a new product, product line, system design, or service. Then in a short synthesis paper, students will integrate their research by citing strong and thorough textual evidence to support an analysis of the biographical influences that led that individual to create his or her invention.

**Contextual Analysis:** Students will evaluate multiple sources of information (35) in order to examine the historical and societal influences that led to the invention that they chose in the biographical synthesis paper. Citing strong and thorough textual evidence, students will write an analytical paper in which they identify which historical and societal influences they believe most significantly influenced the invention and explain their reasoning.

**Timeline:** The biographical synthesis paper and contextual analysis will be simplified and combined in the visual format of a timeline in which the major events in the inventor's life are documented along with the historical and social influences that influenced the invention. The timeline allows students to synthesis the two prior assignments in a visual format.

**Design Analysis:** After analyzing the biographical and historical influences of the inventor, students will look more closely at the design of the invention itself. Students will conduct additional research investigating the design elements that went in to the original invention, the materials used for that design, and the means of production. Additionally, students will research how these elements have changed or evolved over time. These findings will be presented in an analytical paper.

**Environmental Impact/Safety Analysis:** Building upon their learning in the design analysis, students will research environmental sustainability and assess the specific environmental impact(s) of the invention in terms of choice of materials and means of production. Secondly, students will look at the relative safety concerns of the invention: both its production and its use. Students will present their findings in a visual graphic.

**Inventor/Invention Multimedia presentation:** Compiling their learnings from the previous key assignments in this unit, students will produce a multimedia presentation that is 3-5 minutes in length and educates their classmates about their inventor and her/his invention, the societal influences that created a need for that invention, an explanation of the design of that invention and the environmental and/or safety issues associated with that invention. After each presentation the audience will evaluate to what extent this invention meets the social needs, wants or benefits of a society (the essential question for the course).

**Need Analysis:** As the culminating project of this unit, students will begin to apply their understanding of product design to come up with their own product solution. Following the design process students will identify a general need they see, interview at least 25 potential users that represent a cross section of stakeholders and will then define a specific need based upon their findings. Students will defend the specific need they identified, and the rationale and methodology they used, in an individual interview with their instructor. During this interview, students are expected to provide their instructor with data that supports their findings.

# Chino Valley Unified School District

## High School Course Description

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### Unit 3: The Ethics of Invention

Once students have identified a need, they will continue through the design process (ideating, prototyping, testing, and redesigning) but now factoring in the possible impacts (intended and unintended consequences) and environmental sustainability of their product. Students will first ideate and create a prototype based upon their defined need and justify their design choices in a written reflection. Next, students will learn about the positive and negative effects that an invention can have by reading a fictional text that provides an example of how an invention/innovation can have an extreme impact (possible examples: *Jurassic Park*, *Brave New World*, *I, Robot*). Using a dialectical journal, students will identify inventions in the text, track the impact those inventions have, and evaluate to what extent the impact(s) was/were intended or not. Students will then participate in a class debate on the moral issue of who is ethically responsible for an invention and its use/impact. Finally, students will synthesize their understanding of societal impacts in this unit with their investigation of environmental sustainability from Unit 2 to make redesign choices on their prototype based on their assessment.

### Key Assignments

**Ideate and Prototype:** Based on the Need Analysis completed in Unit 2, students will apply ideation techniques to brainstorm and sketch multiple concepts of realistic solutions to their defined need. Students will then edit their concepts and identify a key product that solves the problem, fulfills the need, or addresses an opportunity. Next, students will create a preliminary design of their product concept utilizing drawing, computer software (graphic or CAD), and/or conceptual model fabrication techniques. Finally, students will write a one page explanation on the choice of their design and justify how this choice best solves the defined need. The final version of this assignment will become part of each student's Unit 8 portfolio.

**Dialectical Journal:** After developing a prototype, students will learn how product design can have an intended or unintended societal impact. To foster this understanding, students will start with analyzing the interplay of inventions and societal factors in a work of fiction. Through a novel, such as *Jurassic Park*, *Brave New World*, *I, Robot* or a similarly themed text, students will analyze the development over the course of the text of the societal impact of an invention. While reading, students will identify innovations and inventions in the text and maintain a dialectical journal citing strong and thorough textual evidence evaluating:

1. the need(s) to which the invention responds,
2. the impact of that invention, positive and negative, on an individual, society, and/or the environment, and
3. how the impact(s) change or develop over the course of the text.

Students will utilize this evaluation in evaluating and redesigning their own prototype.

**Moral Dilemma Debate:** Students will synthesize their literature analysis and their case study from Unit 2 to debate to what extent an inventor is responsible for the societal impact of his or her invention. The class will work in teams to construct an argument on this topic using prior knowledge gained from previous assignments and any additional research needed. Ultimately student teams will defend their position with cited research in a formal class debate. Students will use the conclusions they draw from the debate to take another look at their prototype in the next assignment.

# Chino Valley Unified School District

## High School Course Description

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Prototype Testing and Redesign: Based on their findings in the debate and drawing from their understandings from their Environmental Impact/Safety Analysis from Unit 2, students will evaluate/"test" their own prototype through the lens of possible societal impacts as well as environmental sustainability. Through this assessment of the outcome of their prototype, students will identify any issues that need redesigning or refining related to function, construction, or other factors. Students will then create a new redesigned prototype and write a 23 page reflection justifying their redesign choices and how they address possible societal and environmental impacts. The final version of this assignment will become part of each student's Unit 8 portfolio.

### Unit 4: Cost Analysis

Overview: Based on their redesigned prototype from Unit 3 and with a more thorough historical and ethical framework in place to evaluate their own work, students are ready to examine more practical matters in regards to design and assess various factors that contribute to the cost of a product. First, students will research and present a cost analysis looking at one element of their design and how it influences the cost. This data will then be used to write a product proposal and video presentation where they will need to market their design to a group of possible investors. All final versions of Unit 4 assignments will become part of each student's Unit 8 portfolio.

### Key Assignments

Cost Analysis: Students identify one element of their design that affects the cost of manufacturing or cost of getting the product to market (e.g. for a molded plastic handle that is part of the design, the student may examine any or all of the following: material, manufacturing process, labor, transportation, or other aspect) and research variables that affect the cost of that element. Students then make strategic use of textual and graphical media (i.e. charts or graphs) to create a presentation of findings. Based on findings in the cost analysis, students either justify their design as cost effective, or document a modification to their design. Students will also apply these findings to the Written Product Proposal. Through this assignment, students expand their ability to assess the feasibility of design.

Written Product Proposal: After creating a cost analysis for a portion of their prototype, students will write an additional 23 page product proposal to attract possible investors. Students will need to include a summary of their need analysis, an explanation of the design solution (e.g., product, product line, system design, or service) that effectively communicates its features and benefits, an evaluation of possible business competition, and a justification of their cost analysis or redesign solution. The technical writing component of this unit demonstrates that students can write persuasively and justify their intentions using domain specific technical language and evidence from research.

Video Pitch: Students will use the information from the product proposal to create an "elevator pitch" video of no more than 90 seconds that is designed to convince a manufacturer or investor to commercialize the product. Students synthesize the information from the product proposal, produce a written draft of their pitch and ultimately revise it to convey a clear, concise, and distinctive argument that is appropriate to the audience. Videos will be given to industry experts or other potential stakeholders for feedback on their effectiveness.



# Chino Valley Unified School District

## High School Course Description

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### Unit 5: Intellectual Property

The Other Tenth-How to Own Something that you Don't Possess.

Moving beyond the idea of production possibility, practicality, and responsibility explored in Unit Three, students now explore the economic feasibility, legal benefits, and pitfalls of intellectual property ownership. First, students research the nature and history of intellectual property and the process of obtaining ownership. Second, using real world situations, students will analyze legal and ethical issues related to intellectual property. Third, students examine case studies of legal decisions regarding intellectual property. Finally, students amend their product proposal from the previous unit to include justification of the legal uniqueness of their product. In order to demonstrate knowledge and skills gained in this unit, students will create and build upon a multimedia presentation that enhances understanding of findings, reasoning, and interest, using appropriate citations and research methodology.

Suggested resources:

<http://www.streetlaw.org/en/home>

<http://www.wipo.int/about-ip/en/iprm/> World Intellectual Property Organization Handbook

<http://www.educateip.org/index.php/multimediacasestudies>

<http://www.thisamericanlife.org/radio-archives/episode/441/whenpatentsattack>

WBEZ Radio *This American Life* "When Patents Attack!" (episode 441, July 22, 2011).

<http://www.thisamericanlife.org/radioarchives/episode/496/when-patents-attackparttwo>

WBEZ Radio *This American Life* "When Patents Attack... Part Two!" (episode 496, May 31, 2013).

<http://www.pubpat.org/>

[http://www.supremecourt.gov/opinions/12pdf/11796\\_c07d.pdf](http://www.supremecourt.gov/opinions/12pdf/11796_c07d.pdf)

### Key Assignments

**Owning Intellectual Property:** Students are grouped and assigned to research the nature and history of intellectual property and the process of obtaining ownership in the following areas (one area per group): copyright, patent, trademark, industrial design, and geographical indications. For their type, student groups create a 34 minute multimedia presentation (Power point, Prezi, Google Slides, etc.) that includes examples of protected property, the reasoning behind developed systems for intellectual ownership, a brief history of intellectual ownership law and policy, and a description of the process in obtaining intellectual property. Groups present findings to the class, demonstrating the ability to synthesize information from multiple sources and showing evidence of planning and organization.

**The Benefits and Detriments of Intellectual Property:** Students research cases of legal battles over intellectual property to understand the various legal and ethical issues related to intellectual property. Students choose two or three legal issues and create a written summary of each legal battle, including an evaluation of the effectiveness of each side of the argument. Students post this writing onto a shared blog, website, or other shared source. All students are to read posts and show engagement through comments or other means of demonstrating reading.

# Chino Valley Unified School District

## High School Course Description

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Case Study: Students research a specific legal case more in depth, and create a 3-5 minute multimedia presentation (Power point, Prezi, Google Slides, etc.) that includes:

- A brief overview of the case or lawsuit.
- An analysis of the main points used on either side of the issue.
- An analysis of the intent and purpose of wording and rhetoric on both sides of the issue, and an evaluation of the effectiveness of this language.
- An objective argument that agrees or disagrees with the final decision of the case.

Note: there is enough easily available information in the given sources as well as others to avoid having several students research the same case. The final version of this assignment will become part of each student's Unit 8 portfolio.

Amendment to Written Product Proposal: In an amendment to the proposal from Unit 4 and using what they have learned from the prior assignments, students defend their design as legally unique or explain possible legal conflicts with the design. Students conduct a thorough search for existing patents that may have preceded their design. This amendment will include:

- A description of patent search attempts, thoroughness of searches, and found results.
- A description of an existing patented product that the student believes is closest in design to their own design.
- A justification with analysis of why their design is different enough from the closest existing patent to receive a patent OR a justification with analysis of why the closest existing patent may cause a legal issue for obtaining a patent.

\*The amendment to the product proposal will be added to the Unit Four product proposal within each student's Unit 8 portfolio.

### Optional Extension Assignment:

Students defend as original their design from Unit 3. In this activity, students complete a mock application for a patent with a peer group as a review panel, or defend their design against a mock infringement lawsuit in which the peer group serves as jury. This activity serves as preparation and practice for the "shark tank" activity in Unit 6.

Option: Replace peer groups with a panel of industry partners, teachers, or other group that provides a more authentic audience.

### Unit 6: Marketing and Advertisements

#### Marketing and Advertisements

In this unit, students write a correctly formatted mid-length page analytical essay, including works cited that address the complexities of developing and promoting ideas to guide the formation of their own criteria based on information obtained from several literature sources like "1984," the Federal Trade Commission's "Truth in Marketing Standards," and "Shark Tank." Students examine commercials and print advertisements and participate in a product point of sale analysis to make logical inferences about the author's intent to write, present and defend a marketing plan. The culminating project is to develop a commercial for their product to anchor the importance of basic advertising and marketing complexities. All final Unit 6 assignments will become part of each student's Unit 8 portfolio.

# Chino Valley Unified School District

## High School Course Description

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### Key Assignments

**Advertising and Marketing Analysis Essay:** Initially, students explore and examine several resources available through the Federal Trade Commission's "Teacher and Parent-Advertising and Marketing" site including the "Fact Sheets" and interactive games to write a basic guide delineating how to advertise and market products. Students examine several literature excerpts from varying texts like "1984" (government), "Brave New World" (society), and "Feed" (technology) and chart how each text addresses advertising and marketing objectives, obstacles, and outcomes. Students then research and summarize the advice from current practitioners like: Shark Tank, Kick Starter, or Quirky. Additionally, students research to examine the ethics of product development and marketing as a consumer and as a producer and present their findings. Finally, students write a correctly formatted analytical essay, including works cited that address the complexities of developing and promoting ideas.

**Packaging and Promoting:** Students distinguish the nuances between advertising and marketing as well as the perceived impact of marketing and advertising. As a launch, students examine products at their point of sale to help them understand package design concepts for a product or line of products as well as product placement. Students use a graphic organizer to compare two similar products that employ differing design elements (e.g., font, color, symbols, product proposition) to assess their effectiveness to communicate and influence consumer behavior. Students then draft a product label to advertise their intended product, mindful of their target consumer, integrating advertising principles and include a written justification of their design integrating specific design principles.

**Marketing Plan:** Students research key elements of a marketing plan from credible sources like Forbes and draft a template for their use. Students then draft two different marketing plans for their product that includes a different target consumer for each campaign to include: price, product name, brand, logo or label, and product positioning in their target retail market and present their marketing strategies, which include ethical practices through a peer review process similar to Shark Tank. The presentations must demonstrate organization, planning, and effective use of technical language when speaking. Finally, students integrate the feedback from the peer review and revise/finalize one marketing plan specific to only one target audience with a clearly articulated written explanation for their marketing plan.

**Commercialization:** Students produce one print advertisement and one commercial to align with their marketing plan. First, students examine several print advertisements promoting similar products to compare varying techniques and then develop a print advertisement and an accompanying 21st Century medium like a tweet. Next students analyze several commercials, and then critically annotate one commercial using a Voiceover tool like EDpuzzle modeled after the work of the Poynter Institute to prepare them to craft their own commercial. Students will create their own performance criteria and quality standard to measure and evaluate their commercial. Next students craft a story board for their commercial as a draft for peer feedback. Finally, students convert their storyboard to a 30 second commercial specific to their target audience and orally present key elements of their marketing plan and rationalization for their commercial design.

### Optional Assignments:

**How-to guide:** Students develop a "how to advertise and market guide" for high school entrepreneurs explaining the basic tenants of advertising and marketing after synthesizing the information gained from diverse sources. Students revisit their draft and integrate the information gained from their literature reviews, their summaries, and analysis.

# Chino Valley Unified School District

## High School Course Description

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### Unit 7: Catastrophe or Opportunity?

In Unit 7 students will focus on predicting, identifying, and solving problems, which could potentially affect a product. Through two different assignments, students will examine intrinsic and external factors that may affect the product. Some examples of intrinsic or external factors include change in demand, the availability of resources related to, and/or legal guidelines that may affect the product or service. In order to develop and propose solutions, students will gather relevant information from multiple sources to address different criteria requirements for product adaptation and consumer concerns.

### Key Assignments

**Prototype Testing Creating a Performance Evaluation Test:** In order to emulate the later stages in advanced manufacturing, students will utilize a test group as part of the design process. Test groups will evaluate product performance of the prototypes that were designed in Unit 3. Each student will construct a document that contains their own performance criteria and quality standards to measure and evaluate their prototype.

- **Student Created performance criteria and quality example:** What is my product supposed to do or accomplish? Does it? How Well? This will be extremely specific to the product (i.e. A student designs a left handed mouse. It needs to make selections on the computer screen interface. The left hand mouse should feel comfortable in your hand, it should be easy to reach the buttons, etc.).

**Prototype Testing Memo Performance Evaluation Test Observation and Feedback:** Test groups will test the functionality and features and evaluate the results of the prototype against the student created performance criteria and quality standard. When applicable students will also predict unintended uses and possible dangers or health concerns related to their prototype. Using their own findings and the feedback from test groups, students will write a bullet pointed memo to a lead engineer (teacher, business partner, or other student) that describes their findings. This memo needs to follow an established format that uses parallel structure, concise diction, and an informed idea of audience/purpose.

An example of a product evaluation: manufacturers of a park bench which is intended for sitting or lying on, but some users will do skateboarding tricks on it. Students will identify any redesigning or additional corrections required to improve the overall quality, look, or performance of the product.

**Overcoming Product Challenges:** Students will prepare a multimedia presentation for a board of directors which suggests a strategy their company should adopt to confront and overcome a potentially catastrophic problem. Each student will act as a team lead for their product development. Students will be assigned a potentially catastrophic problem that is external (not intrinsic) to each product. Students will use a problem solving model to create a solution to the catastrophic problem, which must include: identifying root cause of the problem, exploring options and alternatives, selecting a solution among alternatives, and implementing a plan of action. Students do not need to implement the change, but instead must document an informative implementation plan proposal articulating how they would address the hypothetical problem, solution and plan of action. The following are examples of catastrophes that can be assigned or used as models for generating other ideas:

- Product is offensive to a particular demographic.
- Production country is now illegal to do business with.
- Prominent personality fuels negative publicity.
- Extremist groups targeting product. e.g. Environmentalists targeting SUV's.
- Negative publicity regarding environmental issues. e.g. Plastic water bottles clogging the ocean or coal power plants filling the air with smoke.

# Chino Valley Unified School District

## High School Course Description

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- Labor goes on strike and your product can't be made.
- Minimum wage increases, government mandated benefits.

The final version of this assignment will become part of each student's Unit 8 portfolio.

### Unit 8: Student Portfolio Defending a product and/or position

Unit 8 Overview: This final unit represents a culmination of student learning throughout the year that will be presented as a portfolio (such as a binder, website, etc.). Their portfolio will demonstrate knowledge of the design process, technical writing, advertising/marketing, intellectual property as well as ethical considerations and sustainability as they apply to design. Students will also present (via Prezi or Power point presentation) their completed portfolio to a panel justifying the comprehensive preparedness of their product to move forward to the manufacturing stage.

### Key Assignments

Portfolio: (Compilation of Multiple Assignment from Unit 1 to Unit 7) In preparation for the panel presentation, students will create a portfolio which complies the benchmark assignments of this course. The portfolio is a final compilation of student work throughout the course. The portfolio should minimally include:

1. Prototype manual and sketch (Unit 1)
2. All final versions of Unit 2 assignments
3. Ideate and prototype assignment (Unit 3)
4. Prototype Testing and Redesign reflection (Unit 3)
5. Cost Analysis Presentation and Video Pitch (Unit 4)
6. Product Proposal (Unit 4), including the Amendment (Unit 5)
7. Case Study (Unit 5)
8. Marketing Plan, Print Advertisement and Commercial (Unit 6)
9. Product performance evaluation test (Unit 7)
10. Prototype testing memo (Unit 7)
11. Video of the multimedia presentation to the Board of Directors (Unit 7)

### Panel Presentation Proposal to Investors

At this point students have completed their product through a needs assessment, product design, prototype testing, and revisions, and their product is effectively completed and ready to be introduced to the market. Students draft and present a promotional pitch to a group of Venture Capitalists (teacher, administrator, other students, or business partners) for their investment consideration. This pitch will effectively communicate using written and oral communication skills developed over the year their products features and benefits. It should also include: a target consumer, brand, and product name.

### **Assessment Including Methods and/or Tools:**

Assessment opportunities that allow continuous evaluation of student progress will be embedded throughout the course and will be a part of the learning experience. All students will be expected to achieve mastery of all topics, often with demonstration of mastery occurring during a public forum. The following strategies, which include both formal and informal assessment techniques, may include but are not limited to:

- Written tests with a variety of short answer, essay questions, and problems;

## Chino Valley Unified School District

### High School Course Description

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- Performance-based assessments such as experiments, demonstrations, discussions, debates, simulations, and projects;
- Presentations, both team and individual;
- A cumulative portfolio; and
- Written assignments (such as justification, investigations, primary and secondary research, evaluative, or technical).