

**MT. DIABLO UNIFIED SCHOOL DISTRICT
COURSE OF STUDY**

COURSE TITLE: 3D Modeling
COURSE NUMBER: 4201
CBEDS NUMBER: 5711
DEPARTMENT: Visual and Performing Arts
LENGTH OF COURSE: Year long
CREDITS PER SEMESTER: 5 credits
GRADE LEVEL(S): 10-12
REQUIRED OR ELECTIVE: Elective

PREREQUISITES: Art I (middle or high school), Introduction to Animation, Design A/B, or consent of instructor, and/or Animation 1 4435

Required -
Recommended - X

BOARD OF EDUCATION ADOPTION:

COURSE DESCRIPTION: This course is a technical, aesthetic and historical exploration of three-dimensional design through the creation of digital modeling and animation artworks. By using 3d modeling tools, the course emphasizes artistic perception and creative expression through 2-dimensional image making, digital animation, and 3d printed sculpture.

This process-focused course will build the students' perceptual skills and visual arts vocabulary in 2-dimensional design principles to their application in 3-dimensional space. Two-dimensional works will focus on the application of artistic processes and skills to communicate meaning in original works of art; Developing and applying drawing and design skills through sketchbook activities, design and composition concepts, and digital manipulation skills using a variety of traditional and digital tools. Three-dimensional artworks will focus on analyzing the sculptural nature of 3D modeling, explore the elements of contemporary 3d digital design, and analyze the role and development of 3D design in past and present cultures throughout the world. Students will create their own interpretations of traditional and contemporary 3-dimensional artwork which may serve as functional pieces and/or works of fine art.

3D Modeling for Design is a 3rd year class in a sequence of animation and design courses. Students enter this class having taken a sequence of animation courses (Introduction to 2D Animation and Intermediate 2D Animation) or the students have completed a sequence of design courses (Design A/B and Art Design Advanced). Many students have also completed Introduction to Engineering, a Project Lead the Way course. 3D Modeling for Design is for students who are interested in the fields of animation, illustration, character modeling, design for video games, motion graphics, industrial design, and architecture.

COURSE PURPOSE: The purpose of 3D Modeling for Design is to expand the students' knowledge of the elements of art, principles of design, and principles of animation as they relate to 3D digital art. Although computers are used as the primary media to create expressive works, the emphasis in this class is building core knowledge about the language of visual arts, developing the students' historical knowledge and cultural context, aesthetic awareness as it applies to traditional and digital 3-dimensional art forms. This course also connects and applies art knowledge, skills, and processes within and across other

disciplines and careers such as three dimensional medical imaging.

The students' individual voice or style is developed throughout the year by completing design challenges of increasing complexity and skill that reflect their point of view. A central theme in this class is the role and development of the visual arts; exploring how technological developments have impacted and influenced the making of art throughout time. Students research, identify and analyze how these technological developments have shaped the making of art, the evolution of concepts, and how viewers experience art. Students also report on how new technology might affect the visual arts and speculate on how advances in technology might change the definition and function of the visual arts and. Additionally, students build a broad understanding of careers in the arts and related fields that focus on digital art and animation.

COURSE OUTLINE: Unit One: 3D Totems- An Introduction to the Elements of Art and Principles of Design

This lesson focuses on developing artistic perceptual skills and visual arts vocabulary. The teacher introduces student to traditional artwork made in the form a totem found in various cultures and also analyze artwork from the exhibition titled "Tall Tales: A Modern Totem Pole." The focus of the conversation is analyzing how the elements and principles have been used to create expressive content. They discuss how totems from various cultures have similar and dissimilar themes. Students then demonstrate the understanding of vocabulary through drawing a series of small 2" X 2" compositions that illustrate the elements of art and principles of design. These sketches are then transformed into a stacked totem-like sculpture using the software Cinema 4D and printed using a 3d printer. At the end of this unit, students will know how to:

The Visual Arts ("f") topics

- Discuss a series of their original works of art, using the appropriate vocabulary of art.
- Describe the use of the elements of art to express mood found in works of art.
- Create original works of art of increasing complexity and skill that reflect complex ideas, such as distortion, color theory, arbitrary color, scale, and expressive content.
- Investigate and discuss universal concepts expressed in works of art from diverse cultures.
- Identify the intentions of artists creating contemporary works of art and explore the implications of those intentions.

CTE Topics

- Articulate the characteristics of various art forms from past and present cultures and analyze similar themes used by various cultures.
- Know the appropriate skills and vocabulary of the art form.
- Understand and analyze the elements of the art form.
- Students analyze how change happens at different rates at different times; understand that some aspects can change while others remain the same; and understand that change is complicated and affects not only technology and politics but also values and beliefs.
- Know policies, procedures, and regulations regarding health and safety regarding the 3D printing equipment.
- Understand critical elements of health and safety of practices related to storing, cleaning, and maintaining tools, equipment, and supplies related to the 3D printer and wash tank.

Unit Two: Blobatar Unit

This lesson focuses on how shape symbolism can create the emotional impact and personality characteristics of an animated character. Students discuss familiar characters from movies and those from the early 20th century. They analyzing and breaking down the basic shapes found in these works. Artwork discusses includes: Otto Messmer's *Felix the Cat*, Walt Disney Studios, UPA, Studio Ghibli, and Pixar. Stop motion animations like; *Wallace and Gromit* and *The Nightmare Before Christmas*, will also be discussed. They will discuss how the important developments of early animation studies have impacted work made today. Students complete sketchbook assignments that focus on color theory and shape symbolism. Students practice drawing shapes to express emotion, draw concept sketches, complete preliminary art in Photoshop, build clay models of the characters, and finally model a simple character

made of “blobs” that embody a particular emotion. Cinema 4D is used to model the 3d character. At the end of this unit, students will know how to:

The Visual Art (“f”) Topics

- Analyze and discuss complex ideas, such as distortion, color theory, arbitrary color, scale, expressive content in works of art.
- Analyze their own work of art as to personal direction and style.
- Describe the use of the elements of art to express mood.
- Identify contemporary artists worldwide who have achieved regional, national, or international recognition and discuss ways in which their work reflects, plays a role in, and influences present-day.

CTE Topics

- Know universal cultural concepts and identify cultural similarities and differences found in artwork from various animation studios.
- Use technical applications in the creative process of building an original expressive character.

Unit Three: The Production Pipeline - Character Development, Design, and Modeling

The focus of this unit is for students to understand industry standard production processes for product creation. Students research a number of visual arts careers that use 3D modeling and research artists working in these fields. They explore the process of developing a work of art from ideation to final product (the Project Pipeline). To accomplish this, a story synopsis is provided to the class that outlines a setting, a story synopsis, and a specific cast of characters. Students select a character to visually and conceptually develop, sketch, pitch to the class, and critique. A clay model is sculpted as a visual prototype and the final character is modeled in Cinema 4d and zBrush. The topic of copyright is discussed in this unit. At the end of this unit, students will know how to:

The Visual Art (“f”) Topics

- Create original works of art of increasing complexity and skill that reflect their points of view.
- Demonstrate in their own works of art a personal style and an advanced proficiency in communicating an idea.

CTE Topics

- Know the personal qualifications, aptitudes, knowledge, and skills necessary to succeed in careers.
- Understand the scope of career opportunities and know the requirements for education, and licensure.
- Understand the concept and application of ethical and legal behavior consistent with workplace standards, including the adherence to the copyright and intellectual guidelines.
- Identify contemporary artists worldwide who have achieved regional, national, or international recognition and discuss ways in which their work reflects, plays a role in, and influences present-day culture.

Unit Four: Sculpting the Human Figure

This unit’s focus is on understanding the human figure. Students analyze how artists across time have represented it using a variety of media. The discussion focuses on how technology has influenced the ways artists have represented the human figure throughout time. Contemporary 3D modelers that focus on the human figure are contrasted with artwork from Greek and Roman antiquities, the Renaissance, and modernist sculpture. Artists discussed include Scott Eaton, Marc Quinn, and Sophie Robinson. The students create multimedia presentations about their research, present it to the class, and post it on a website. They will complete a portfolio of life drawings and finally use zBrush to sculpt a posed human figure in a personal style. At the end of this unit, students will know how to:

The Visual Art (“f”) Topics

- Analyze the works of a well-known artist as to the art media selected and the effect of that selection on the artist's style.
- Identify contemporary artists worldwide who have achieved regional, national, or international

recognition and discuss ways in which their work reflects and influences present-day culture.

CTE Topics

- Deliver multimedia presentations that include images, text, and video.
- Understand the application of research and analysis skills to the create of content.

Unit Five: The Human Figure in Motion - Walk Cycle

The unit focuses is on understanding the movement of the human figure. Students study early forms of animation including the Egyptian tomb of Khnumhoptep and Niankhkhnum, the Thaumatrope, Zoetrope and Kineograph (flipbook). Students practice drawing a walk cycle and build simple Thaumatrope animation. Students are introduced to the work of Eadweard Muybridge and early stop frame animation in films like *King Kong*, *Jason and the Argonauts*, and *The Making of ParaNorman*. Students discuss the evolution of stop frame animation. They analyze and discuss how 3D printing technology in the movie, *ParaNorman*, was used to create the models and how it improved the expressive qualities of the animation. Students then study the human figure in motion and produce a portfolio of figure drawings from life. The students storyboard a 15 second movie that involves the movement of a human figure. They produce a series of reference photos using high speed photography. These photos are used as reference for keyframing a mannequin in a 15 second animation made in Cinema 4D. Students learn the 12 Principles of Animation. Using these principles, students then animate the character developed for Unit 3. At the end of this unit, students will know how to:

The Visual Art ("f") Topics

- Analyze the artworks as to the art media selected and the effect of that selection on the style.
- Describe the relationship involving the art maker (artist), the making (process), the artwork (product), and the viewer.
- Speculate on how advances in technology might change the definition and function of the visual arts.

CTE Topics

- Understand how technology can reinforce, enhance, or alter products and performances.
- Use a variety of strategies (e.g., personal experience, discussion, research) to comprehend, interpret, evaluate, and appreciate source and technical documents and materials.

Unit Six: Virtual Kinetic Sculpture - A Response to Technology

The focus of this unit is to learn about kinetic sculpture and use advanced animation tools to create a virtual sculpture. Students study the history of kinetic sculpture. Historical artists like Alexander Calder and Jean Tinguely, and contemporaries like Li Mee Young, Theo Jansen, Paul Grundbacher, and David C. Roy are introduced as examples of sculptures that move through 3-dimensional space. Students also examine public installations about the environment like: *Field* by Richard Box, the work of Janet Echelman, Gabriel Dawe, and Ron Arad's *Curtain Call*. Using the 12 basic principles of animation learned in Unit 5, students will work in teams to create a proposal for a public artwork that moves. They research a local, site location and develop a large-scale kinetic sculpture for that location. Students employ the principles of Animation to create their 3D models in Cinema 4d. The content of the sculpture must address the student's ideas about how technology is shaping the environment. The students present their ideas to a panel of professionals in the community. At the end of this unit, students will know how to:

The Visual Art ("f") Topics

- Investigate and report on the essential features of modern or emerging technologies that affect or will affect visual artists and the definition of the visual arts.
- Construct a rationale for the validity of a specific work of artwork that falls outside their own conceptions of art.
- Understanding the cultural dimensions of the visual arts.

CTE Topics

- Understand the historical contributions and cultural dimensions of the visual arts.
- Participate in interactive teamwork to solve design challenges.
- Understand the characteristics and benefits of teamwork, leadership, and citizenship in the community.

Unit Seven: Toy Design and Product Design Unit

The focus of this unit is to develop a product design and work with a group of student engineers to manufacture the design. Students write their own synopsis of a toy they would like to build. The ideas are pitched to the class, students then create orthographic sketches and final orthographic illustrations in Illustrator. Student draft illustrations (blueprints) to scale and share them with a team of student engineers. They build a model in Cinema 4d or zBrush. Google Drive is used as a planning and sharing tool. The design/engineering team problem solve how to assemble to toys, move parts, and rotate components. They work together to determine the material usage and cost of the final product. Students design packaging for the toy and a final 2-dimensional poster with original 3d fonts is created and printed. Students present the process portfolio of their work at a public exhibition. At the end of this unit, students will know how to:

The Visual Art (“f”) Topics

- Create original works of art of increasing complexity and prepare portfolios of their original works of art.
- Assemble and display objects or works of art as a part of a public exhibition at the local library.
- Demonstrate a personal style and an advanced proficiency in communicating an idea.

CTE Topics

- Use models, simulations, and other tests to determine optimal design solutions from a variety of options. Prototyping construction methods with the engineer to determine what methods will work best for their toy design.
- Construct and read drawings and models made to scale.
- Understand the use of contracts in the arts industry and the principles and responsibilities of working as an independent contractor, including budgeting, project planning, advertising, and marketing strategies.
- Understand past, present, and future technological advances as they relate to a chosen pathway.
- Understand the characteristics of teamwork and leadership in the workplace.
- Understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others.
- Compare and contrast the roles of creators, performers, and others involved in the production and presentation of the arts.

Unit Eight: Industrial Design-Functional Forms inspired by Forms in Nature

The focus of his industrial design unit is developing ideas for functional objects. Students examine a range of objects including: vehicle design, furniture design, sculptural jewelry, and shoe design. Students select an area of interest and identify a problem with a product they would like to redesign. Students learn how to draw objects using 2 and 3-point perspective and spend several days in the maker studio prototyping solutions using wood, foam, paper, tape, glue, and other quick prototyping materials. They finalize their designs based on the prototypes and then create a 3D model in Cinema 4D. The students work closely with a panel of industrial designers from the area throughout the project. Prototypes are printed using the 3D printer. The panel judges student presentations and final product. At the end of the unit, students will know how to:

The Visual Art (“f”) Topics

- Plan and create works of art that reflect complex ideas.
- Assemble and display objects or works of art as a part of a public exhibition.
- Demonstrate in their own works of art a personal style and an advanced proficiency in communicating an idea.

CTE Topics

- Collaborate with industry experts for specific technical knowledge and skills.
- Know the skills required to design, edit, and produce a production for printed presentation.
- Use a variety of strategies interpret, evaluate, and appreciate source and technical materials.

Unit Nine: Wunderkammer Unit - A Contemporary Collection

The focus of this unit is for students to explore the history of collecting objects and develop visual metaphors of their own. This class project expands the students' understanding of the museum as a place of spectacle, wonder, and repository of unusual objects. Students begin by researching the history of the Wunderkammer, or Cabinet of Curiosity. They explore how this cultural phenomenon, in fashion during the colonial period, developed into the contemporary museum. They will read articles about how artists still work with this curatorial strategy. The students visit 2 local museums and a local store that sells unusual objects (a kind of cabinet of curiosity). Students then create an unusual object that acts as a visual metaphor for a social problem or current event. Students curate these objects into a class WunderKammer. At the end of this unit, students will know how to:

The Visual Art ("f") Topics

- Research the methods art historians use to determine the time, place, context, value, and culture that produced a given work of art.
- Describe the relationship involving the art maker (artist), the making (process), the artwork (product), and the viewer in the context of a museum.
- Compare and contrast works of art, probing beyond the obvious and identifying psychological content found in the symbols and images.
- Use innovative visual metaphors that represent a social issue, current event, or idea about today's world.

CTE Topics

- Understand digital applications appropriate to specific media and projects.

Unit Ten: Virtual Museum Project

Students study the 4 aesthetic theories; Imitationalism, Instrumentalism, Emotionalism, and Formalism. They research various artworks made using 3D modeling software. Building on what they have learned throughout the year, the students work in design teams to create a virtual museum of artworks curated into a 4 distinctive galleries that represent the aesthetic theories. Each student curate their research, include their own work made this year, and create a new work for one of the galleries in the museum.

The Visual Art ("f") Topics

- Assemble and display objects or works of art as a part of a public exhibition.
- Demonstrate in their own works of art a personal style and an advanced proficiency in communicating an idea, theme, or emotion.
- Identify contemporary artists worldwide who have achieved regional, national, or international recognition and discuss ways in which their work reflects, plays a role in, and influences present-day culture.
- Research the methods art historians use to determine the time, place, context, value, and culture that produced a given work of art.
- Apply various art-related theoretical perspectives to their own works of art.

CTE Topics

- Know how technology and the arts are interrelated in the development of presentations and productions.
- Articulate the characteristics of various art forms from past and present cultures and analyze similar themes used by various cultures in a variety of arts settings.
- Understand the historic impact of the arts and technology on society.

Unit Eleven: Surrealistic Illustration, Animation, and the 3D scanner

The unit focuses on exploring visual metaphors through surrealistic image making. Students learn how to use the 3D scanner of their faces. Students plan and create a fine arts piece that will be placed in the Virtual Museum created in Unit 10. They print for an exhibition as in a public space. Student may work independently or in teams to create the work. Students use Cinema 4d or zBrush to build the images. At the end of this unit, students will know how to:

The Visual Art (“f”) Topics

- Compare how distortion is used in photography or video with how the artist uses distortion in painting or sculpture.
- Identify the intentions of artists creating contemporary works of art and explore the implications of those intentions.
- Use innovative visual metaphors in creating works of art.
- Plan and create works of art that reflect complex ideas, such as distortion, color theory, arbitrary color, scale, expressive content, and real versus virtual.
- Assemble and display objects or works of art as a part of a public exhibition.

CTE Topics

- Analyze the way in which technical design (e.g. color theory, lighting, graphics, typography, posters, sound, costumes, makeup) contributes to a performance or presentation.
- Understand the influence of current and emerging technology on selected segments of the economy.

Unit Twelve: The Reel and Print Portfolio

The unit focuses on gathering work for public sharing. As a final assessment, students assemble a reel (an animated digital portfolio) and a print portfolio of their year’s work. Students create storyboards to outline the order in which footage is presented. Students use iMovie to assemble the portfolio and print 2-dimensional examples of their work. Students write criteria for successful works, define how their work has grown over time, write an artist statement, and complete a résumé. Students build portfolio websites of their work, include the reel, and present their work at an exhibition event.

The Visual Art (“f”) Topics

- Develop written criteria for the selection of a body of work from their portfolios that represents significant achievements.
- Select three works of art from their art portfolio and discuss the intent of the work and the use of the media.
- Prepare portfolios of their original works of art for a variety of purposes (e.g., review for post - secondary application, exhibition, job application, and personal collection).

CTE Topics

- Know important strategies for self-promotion in the hiring process, such as job applications, résumé writing, interviewing skills, and preparation of a portfolio.

KEY ASSIGNMENTS: The following is a list of the Key Assignments that outline how the Visual Art and CTE standards are met throughout the year. The first 7 assignments listed are general activities complete over the course of the entire year and may or may not be connected to an individual unit. This is followed by a list of sequential instructional units that outline the process, product, and outcome of each unit of study.

Weekly Sketchbook Assignments (each week)

Students complete weekly homework sketchbook assignments that build drawing skills, visual arts vocabulary, build knowledge of color theory, artistic perception, and help them develop concepts for class projects. Weekly assignments might also include visual research of a topic, and/or written investigations of an aesthetic theory or movement, and reflection about an artist’s work or concept. Investigations into careers in the field of 3D design will be explored. These assignments are integrated into a particular unit of study and build on the concepts taught during that unit of instruction. The outcome of the weekly sketchbook assignments are for students to develop the habit of drawing to explore ideas, develop observational drawing skills, use drawing as a means of research/information gathering, and as a form of communication.

Digital Tutorials (Units 1, 2, 4, 5, 6, 9, 10, and 11)

Students complete simple digital tutorials for each of the units that teach them how to use the software. Similar to classroom demonstrations of art materials, these tutorials are most often 1-2 class period long and primarily focus on specific software tools to create a product, not the unit content itself. Students complete 8 digital tutorials throughout the year. The outcome of the tutorials is for students to gain the technical skills to successfully complete a subsequent design challenge.

Google Drive Notes (used for lecture notes and peer feedback)

Students keep class notes using the online program, Google Drive. A Cornell Notes template is provided to the class for in class note taking. These notes are used to keep information about a given software, class lectures, or research they have completed. Information gained from Sustained Silent Reading materials is gathered in Google Drive. Group work is also developed and shared using Google Drive. These notes are shared with the teacher for review and editing. The outcome of this activity is for students to learn how technology tools can be used for productive study habits and a collaborative form of communication.

ThingLink and Prezi Activities (Units 1, 4, 9, 10, and 11)

Students use the website, ThingLink.com, as a research and information-sharing tool throughout the year on several units. Students conduct research individually and with design teams, create slide shows, short video clips, and upload original artwork to teach the class and others about aesthetic theory, the history of sculpture, technology, and their own artwork. These activities act as the primary means to share visual and information research. The outcome of these assignments is to develop interactive presentation skills that go beyond a simple PowerPoint presentation. Links to the presentations are posted on a class website.

Oral presentations (Units 3, 6, 7, 9, 10, and 11)

A central feature of college and career readiness is the ability for student to communicate orally. Students present preliminary sketches, process work and final projects to the teacher, to each other's, and to industry professionals. Students present in both formal and informal ways to large and small groups including: sharing sketchbooks, concept sketches, historical research, and career investigations. The outcome of these tasks is to help students become comfortable in front of others, receive criticism from others, develop brainstorming strategies, and develop organizational strategies for successful communication.

Peer critiques and peer evaluations (all units involve a peer feedback activity) Students learn to objectively critique the work of others using several strategies from the book, *Art Critiques: A Guide*, by James Elkins. These critiques happen at the beginning of a unit, during the progress and end of the unit of study. The outcome of the process and final critiques is for students to develop critical thinking skills necessary for successful employment in the design industry.

Cooperative learning and team organization (Unit 3, 9, and 10)

Students learn the social skills necessary to work effectively with others to produce a product or achieve a common goal. Students produce Gantt workflow charts, create documents shared via Google Drive, define Project Pipeline roles, and develop respectful behaviors.

INSTRUCTIONS METHODS and/or STRATEGIES: The following list of Instructional Methods are designed to give the student a broad range of experiences that meet the Visual Art Standards and provide the college and career readiness experiences outlined by the Career Technical Education Standards. The methods balance the rigorous investigation into the artistic, creative, historical and aesthetic awareness of the visual arts and provide authentic challenges the student might experience in the fields of animation, illustration, character modeling, and design for video games, motion graphics, industrial design, and architecture.

1. Cornell note taking strategies for class discussions and lecture: A Cornell Notes Template is provided to the students at the beginning of the year in the Google Drive. Students use the template to take

notes about the design process, technical information, take notes from video presentations and lectures. These notes are used to study and as a reference for software questions.

2. Direct instruction: The teacher works 1-on-1 with students as they solve design problems.

3. Guided practice using teacher lead digital and traditional art making tutorials: The teacher uses a projector and document camera to teach drawing techniques, share student work and teach technical skills related to the software. In the drawing studio, the teacher demonstrates to the students how to complete

4. Collaborative group work: Several assignments ask students to solve design challenges in teams. The teams develop workflow charts, assign responsibilities or jobs, critique each other's work and present in groups. The 3D Modeling students collaborate with engineering students to develop 3d printed models of their artwork.

5. Small group demonstrations/instruction: The teacher will often demonstrate techniques to small groups to determine their ability to retain the techniques.

6. Investigative/inquiry activities: Students are challenged with research components to the Design Challenges. They activities are designed to build the students' awareness of content prior to solving a challenge. This is completed both individually and in groups throughout the year.

7. Authentic Experiential learning: Student learn the product process and then embody these roles in several authentic design challenges. Student learn the value in

8. Independent study: Students develop their own solutions to design challenges. They also develop reels or portfolio of works for summative assessments.

9. Collaborative team teaching: The 3D Modeling and Engineering teachers collaborate on the Toy Design Unit. Teachers collaborate on the launch of the project, critique the works of each group throughout the unit, and evaluate the final products.

10. Internet Research: Students conduct research for a wide variety of projects. Image research and information research is gathered and present in a variety of ways.

11. Guest Speakers: Toy designers, industrial designers, and animators visit classes when available and appropriate. Alumni of the course who are studying 3D Modeling, animation, or industrial design visit the course to discuss their programs of study. College representatives visit the class to discuss careers in the field of 3D modeling.

13. Self and peer critiques: Students critique their work and the work of others to improve their work. Several critiquing strategies are used to develop the students technical, communication, and artistic skills.

ASSESSMENTS INCLUDING METHODS and/or TOOLS: The following is a list of formative and summative assessments for each unit of the course. The assessments evaluate a range of skills including: the students' aesthetic awareness, creative expression of a particular design challenge, the students' technical abilities in traditional and digital media, the student's knowledge of history and cultural influence, and the students' ability to communicate visually and orally. Assignments listed in the Unit descriptions should be considered formative assessments. The following is a general list of assessment methods followed by a detailed explanation of individual units. The College and Career Readiness Anchor Standards have also been listed.

Evaluation breakdown: Design Challenges and presentations 65%, Test and Quizzes 10%, Weekly Sketchbook Assignments 25%

1. In-class Tinker Challenges: The intent of the Tinker Challenge is for students to develop technical knowledge, artist skill, and brainstorming skills needed to begin a larger design project. Habits of Mind: The Tinker Challenges provide an opportunity for students to "chew" on complex ideas before they apply them to final designs.

2. Weekly Sketchbook Assignments: Weekly assignment are given to develop drawing and observation skills, as well as a means for students to collect research. The teacher shares example of successfully completed assignments and uses a Sketchbook Rubric to assess their products. Habits of Mind: Weekly Sketchbook Assignments develop the habit of drawing regularly and allow students to practice technical drawing skills.

3. Written composition, reports, and reflections: Students experience a wide range of written assessments that ask them to reflect, explain, develop ideas, and communicate to others. A Common Core

Writing Rubric is provided for each assignment prior to the task. Habits of Mind: Writing about art, techniques, aesthetic theory, and careers in the arts helps student verbalize conceptual ideas and to improve communication to others.

4. Partner and individual quizzes: The teacher assigns quizzes to individual students and to teams of students. These quizzes are designed to test the students technical skills/awareness, as well as, their aesthetic and historical knowledge of the visual arts. Habits of Mind: Partner quizzes build partnerships with others in the classroom, a valuable skill in the art field; while individual quizzes help build personal responsibility.

5. Design Challenge critiques: Student participate in individual, large group, and small group critiques. Progress critiques aid the student in addressing artistic and technical skills, while summative critiques help student is presentation skills. Habits of Mind: Design Critiques help students share and listen to critical questions and feedback. It offers students an opportunity to elicit feedback about form and concepts and provides a forum for students to share their technical/artist knowledge with one another.

6. Unit quizzes: Unit quizzes focus on assessing the students' technical skills using the software. Habits of Mind: They also assess their artistic, aesthetic and historical awareness. They encourage the students to continue their study of artistic vocabulary and technical terminology.

7. Unit projects presentations: Throughout the year, students make formal presentations to the class and are evaluated using a presentation rubric. Habits of Mind: Either individually or in design teams, design presentations using technology such as; Google Drive, ThingLinks, Prezi, and also present from traditional 2d printed images, preliminary sketches, and technical drawings provide an opportunity for students to practice real world presentation skills needed in today's workplace.

8. Continual analysis through self and peer critiques: Students critique their work and the work of others to improve their work. Several critiquing strategies are used to develop the students technical, communication, and artistic skills. Grades are determined by participation in critique. Habits of Mind: Peer critiques provide opportunities for students to elicit feedback about form and concepts on a 1-1 basis. This can be a safer place to get help from peers than in large-group Design Critiques.

9. Mid-term performance exam: This semester final is designed to the students' artistic and technical development. The exam includes a wide range of questioning strategies including: standardized test methods, performance tasks, and written responses. Habits of Mind: The mid-term examine is a combination of aesthetic awareness through written reflection, artist creative solution to a design challenge, and technical skills assessment.

10. Mastery of Technical Skills Checklists: The teacher provides a Skills Checklist for each unit of study. As the students develops their traditional and digital technical skills, the student and teacher meet to discuss their mastery of the skills. This might be a drawing portfolio, collection of sketchbook assignments, or a list of tools used in the software program. Habits of Mind: Checklists provide a guidepost for students, an easy measuring still to determine what they should know at the end of a unit.

11. Final Reel and Print Portfolio Presentation: For the final assessment, students develop a movie reel of the concept art, drawings, 3D models, and animations created throughout the year. The reel demonstrates the breadth of accomplishments and/or highlights the students' artistic voice. The reel is posted on the class website and other digital media outlets. Habits of Mind: The reel and portfolio are a professional means to share work with others.

12. Common Core Anchor Standards

Students participate in a number of assessments aligned with the College and Career Readiness anchor standards. 3D modeling for design incorporates both Visual Arts and CTE content to build content knowledge alongside career readiness skills. Below is an overview of the CCR standards covered in 3D modeling for Design.

Reading

Students read a variety of non-fiction texts such as technical documents, analysis of artistic works found in professional journals, essays, film criticisms, articles about new technologies, websites, and new art practices, and digital media. The Reading Anchor Standards specifically addressed in 3D Modeling for design include R.1, R.7, R.9, and R.10.

Writing

3D Modeling incorporates writing in a variety of contexts for the Design, Media, and Visual Arts

industry. Students write several project proposals, character synopsis overviews, critiques, blog posts, and web pages. Students write in both sketchbooks and using online resources like Google Drive, ThingLink, and Evernote. They also write many analytical descriptions of artworks made throughout time. Longer and more formal writing tasks include informative, compare-contrast, and an in-depth research paper (Unit 11). Writing that is specific to the design industry includes a mock journalism article, resumes, and a career investigation are written in units 3, 4, 6, and 11. Students must demonstrate appropriate formatting, command of written and verbal language, and knowledge of audience and purpose. The Writing Anchor Standards specifically addressed in 3D Modeling for design include W.1, W.6, W.7, and W.8.

Listen and Speaking

3D Modeling for Design emphasizes the need to excel in speaking and listening, in addition to writing in order to compete in a media oriented job market. Students develop speaking and presentations skills by addressing a variety of audiences from small groups to community forums. In each unit, students develop listening skills by critiquing peer and professional presentations. Students apply these skills to determine valid arguments in a variety of contexts including classmates' pitches and podcasts, professional videos, and web based sources. The Listen and Speaking Anchor Standards specifically addressed in 3D Modeling for design include SL.2 and SL.5.

For VAPA Courses Only:

ARTISTIC PERCEPTION: Artistic perception in 2-dimensional work is developed throughout the year with activities that challenge the students to apply the elements of art and principles of design. For instance, students process, analyze and respond to shape symbolism in character development by analyzing sensory information presented in the visual language unique to art in characters found in contemporary and historical animated movies (Unit 3). Students process, analyze, and respond to the visual aspects of their work through experimenting with manipulating the value and colors of various models impacts emphasis, unity, and balance. Students process and analyze how various painters and sculptors have distorted the human figure throughout time and then sculpt a classical figure, as well as a figure with distorted proportion using zBrush (Unit 4). Later, these works are printed using a 3d printer. Students analyze through writing the formal and emotional aspects of works made by Dali, Rene Magritte, and contemporary surrealist painters (Unit 12). Students learn how to grow and paint virtual textures on models of mythological creatures that mimic textures found in the natural world. Then, they simulate various lighting conditions in their virtual environments to affect the overall mood of an artwork (Unit 12). Students analyze how the expressive qualities in a works of art are affected by compositional strategies. Compositional strategies such as rule of 3rds, triangular composition, and symmetry are all discussed when composing a 2-dimensional work (Units 4, 6, 8, and 12). 2-dimensional images are printed, analyzed, and critiqued by classmates and displayed for exhibition.

Artistic perception in 3-dimensional work is developed through extensive exploration of various 3D art forms in both traditional and digital media, the students build a broad understanding of what it means to create works of art that exist in 3-dimensions. The elements of art and principles of design are discussed in relation to 3-dimensional works of art (Units 1, 3, and 10). Additional concepts about sculpture are discussed, like: sculpture in the round, functional art (instrumentalism) vs. fine art, and interior and exterior space. Artistic perception in animated work is developed through the study of the 12 principles of animation to animate scenes in several short movies and apply these concept to their own works of art.

CREATIVE EXPRESSION: Students demonstrate a personal style and point of view by completing several design challenges that focus on creative expression. For instance, students will explore a number of methods for developing ideas, including weekly sketchbook assignments that focus on observational drawing of objects, architecture, vehicles and observations of nature. In Unit 1 students

create a stacked, 3-dimensional sculpture using their knowledge of the elements and principles of design. Using their knowledge of shape symbolism, they create a simple blob-like character that expresses a mood (Unit 2) and in Unit 3 create an original cartoon character using zBrush. Students spend several days creating a portfolio of figure drawings (Unit 4) and use these drawings as reference in a 3d model of a human. Student apply their knowledge of the principles of animation to create a human figure (Unit 5) and again to create a virtual kinetic sculpture (Units 7). Sketchbook drawings focused on Linear perspective (Unit 10), isometric perspective (Unit 10), and orthographic drawing (Unit 2 and 3) are created to visually communicate their ideas. Create build a virtual art museum and curate artists' work and their own into distinctive galleries (Unit 10). Students participate in the production process, or Project Pipeline, used in the entertainment industry, create ideation sketches, and conduct written and visual research for projects (Unit 9 and 11). Additionally, students deconstruct the work of traditional and contemporary artist that use visual metaphor, and the Post-modern Principles. Students then create their own visual metaphors that combines a 3d scan, abstract forms and images to illustrate a point of view about a social issue of our time applying one or more of the Post-modern Principle (Unit 11).

HISTORICAL and CULTURAL CONTEXT: The historical and cultural importance of art making is explored in a number of ways. Traditional and contemporary artworks made in the form a totem found in various cultures is introduced to learn how the elements of art have been employed throughout many cultures (Unit 1). They analyze how artists across time have represented the human figure focusing the discussion on how technology has influenced the ways artists have represented the human figure in various cultures. They compare contemporary 3D modelers that focus on the human figure with artwork from Greek and Roman antiquities, the Renaissance, and modernist sculpture. Artists like Scott Eaton, Marc Quinn, and Sophie Robinson are discussed in the context of how they use current technology to produce artwork (Unit 4).

Students explore the development of early forms of animation including the Egyptian tomb of Khnumhoptep and Niankhkhnum, the Thaumatrope, Zoetrope and Kineograph (flipbook) to gain an understanding of the evolution of art. They study the work of Eadweard Muybridge and early stop frame animation in films like *King Kong*, *Jason and the Argonauts*, and *The Making of ParaNorman* to see how animation has evolved with technological developments (Unit 5). In Unit 3 students analyze the artworks of Otto Messmer's *Felix the Cat*, Walt Disney Studios, UPA, Studio Ghibli, Pixar, and stop motion animations like, *Wallace and Gromit* and *The Nightmare Before Christmas*. They explore how every new animation has been influenced by the past and one can trace a film's "ancestry" back to previous works of art (Unit 3).

The history of kinetic sculpture is explored, focusing on historical artists like Alexander Calder and Jean Tinguely, and contemporaries like Li Mee Young, Theo Jansen, Paul Grundbacher, and David C. Roy, Richard Box, Janet Echelman, Gabriel Dawe, and Ron Arad (Unit 6). Students explore the history of collecting objects and the development of the Wunderkammer, or Cabinet of Curiosity (Unit 9). During Unit 11, students explore the Surrealists, Salvador Dali and Magritte, and compare these works to contemporary artists working with 3D modeling and Surrealism (Aram Vardazaryan, Fran Camos, Gediminas Pranckevicius, Petar Petrov, Steve Barrett, Tomasz Strzalkowski, and Kosmur). Students study the 4 aesthetic theories; Imitationalism, Instrumentalism, Emotionalism, and Formalism. They research various artworks made throughout time and explore how to create works that can be frames within the discussion of an aesthetic theory (Unit 10).

ASTHETIC VALUING: To develop aesthetic valuing students study a wide variety of artwork, analyze works of art as they relate to aesthetic theory, make judgments about works of art in relation to the elements of art and principles of design, and apply these theoretical perspectives to discuss their own work. During Unit 1, students learn the elements of art and principles of design, create several studies of these concepts, and create a 3d model representing the elements of art and principles of design. The principles of design are reinforced through teacher-led and student-led critiques throughout the course in each unit.

Students apply these concepts to various projects using appropriate vocabulary and terminology to describe and analyze their own work.

Students analyze, assess, and derive meaning from art historic and contemporary Surrealist works of art. The discussion focuses on what the Breton called “a poetic vision of the real mind.” (Unit 11). In Units 4, 6, 8, and 9 students identify intentions of artist in contemporary and discuss the implications of these intentions for the viewer. In these units, they discuss the relationship between form and content, the importance of the art process and product. Students apply the theories of Emotionalism, Imitationalism, Instrumentalism and Formalism to analyze both traditional and digital works of art and use these theories to construct a rationale for a work they don't like.

To help the student understand the relationship between the artist, the art process, and the viewer, students embody the various stages of the Production Process (pre-production, production, and post-production) in an Industrial Design unit (Unit 7) and a Toy Design project (Unit 8). They collaborate with professional mentors to guide and critique their products and present their work to a panel of experts for final critique. These design challenges model for the student how to collaborate in various fields like, industrial design, product and toy design, and concept design from the animation industry.

They write about artwork that use traditional media and those that use digital media, then create a virtual museum to curate their own works of art (Unit 10). As a final activity, students develop criteria of successful work for the making of an artist's final reel and portfolio website (Unit 12).

CONNECTIONS, RELATIONSHIPS, and APPLICATIONS: Students make connections and relations to other visual art forms and careers in the arts. To develop a wide range of competencies and creative problem solving skills, the instructional unit in this course are centered on design challenges. The design challenges build a broad foundation of knowledge visual literacy, the act of making, and presenting information to a variety of forums. Student compare and contrast works of historical and contemporary artwork in several units of study. In Unit 1 we explore totem around the world, in Unit 2 and 4 we examine symbolism and the human figure, and in Unit 11 we compare several Surrealist works of art.

They speculate on the impact computer technologies will have on the visual arts by researching emerging technologies used by contemporary artists. They will examine augmented reality, the use of video games outside the field of entertainment, 3d scanning, and how 3d printers have impacted contemporary fine art and industrial design (Units 1, 4, 6, 8 and 11).

The students further their lifelong learning and career skills while working with a wide range of outside support. Industry professionals act as advisors to aid students in creating an original industrial design product and toy design (Units 7 and 8). Students work with professional artist and art teachers to complete a portfolio of their original artwork for exhibition, college admittance, and online public viewing.

INSTRUCTIONAL MATERIALS:

Cinema 4D Resources

Alley, Tony. *Exploring 3D Modeling with Cinema 4D R9*. Clifton Park, NY: Delmar Learning, 2006.

Call, Anson. *Cinema 4D R10 Handbook*. Boston, MA: Charles River Media, 2007.

Koenigsmarck, Arndt Von. *Cinema 4D 10 Workshop*. Amsterdam: Elsevier Focal, 2007.

Koenigsmarck, Arndt Von. *Cinema 4D 11 Workshop*. Amsterdam: Focal, 2008.

McQuilkin, Kent, and Anne Powers. *Cinema 4D: The Artist's Project Sourcebook*. Waltham, MA: Focal, 2011.

Osipa, Jason. *Stop Staring: Facial Modeling and Animation Done Right*. Indianapolis, IN: Wiley/Sybex, 2007.

Sondermann, Horst. *Light Shadow Space: Architectural Rendering with Cinema 4d*. Vienne: Springer, 2008.

Tickoo, Sham. *Maxon Cinema 4D R14 Studio: A Tutorial Approach*. CADCIM Technologies. 2013.

Zbrush Resources

- Keller, Eric. *Introducing ZBrush 4*. Indianapolis, IN: Wiley, 2011.
- Kingslien, Ryan. *ZBrush Studio Projects: Realistic Game Characters*. Indianapolis, IN: Wiley Pub., 2011.
- Robson, Wayne. *Essential ZBrush*. Plano, TX: Wordware Pub., 2008.
- Scherer, Manuel. *ZBrush 4 Sculpting for Games: Beginner's Guide: Sculpt Machines, Environments, and Creatures for Your 5 Game Development Projects*. Birmingham, [UK: Packt Pub., 2011.
- Spencer, Scott, Eric Keller, and Paul Gaboury. *ZBrush Digital Sculpting Human Anatomy*. Indianapolis, IN: Wiley Pub., 2010.
- Spencer, Scott. *ZBrush Character Creation: Advanced Digital Sculpting*. Indianapolis: Wiley, 2011.
- Wise, Daryl. *Secrets Of Zbrush Experts*. Clifton Park, NY: Delmar, 2011.

DVD Resources

- Sims, Aaron. *Creature Design with Aaron Sims*. Prod. The Gnomon Workshop, 2007. DVD.
- Welsh, Jason. *Pixologic Zbrush 3.1*. Virtual Training Company, 2008. DVD.
- Brown, John. *Sculpture with John Brown: Vol 1. The Character Armature*. The Gnomon Workshop, 2007. DVD.
- Brown, John. *Sculpture with John Brown: Vol 2. Character Maquettes*. The Gnomon Workshop, 2007. DVD.
- Infiniteskills. *Learning Cinema 4D Special Effects Techniques - Training DVD*. 2012. DVD.

Drawing and Design Resources

- Bancroft, Thomas. *Creating Characters with Personality*. Watson-Guptill Publications. 2006.
- Curedale, Rob. *Design Thinking: Process and Methods Manual*. Design Community College Inc. 2013.
- Davenne, Christine. *Cabinet of Curiosity*. Abrams Publishing. 2011.
- Ehrenberg, Rachel. "The 3D Printing Revolution: Dreams Made Real, One Layer at a Time." *Science News*. 2013: 20-25. Print.
- Elkins, James. *Art Critiques: A Guide*, 2nd ed. New Academia Publishing. 2009.
- Greenberg, Saul, and Marquardt, Nicolai. *Sketching User Experiences: The Workbook*. Morgan Kaufmann. 2011
- Hart, John. *The Art of the Storyboard: A Filmmaker's Introduction 2nd ed*. Focal Press. 2008.
- Hallgrímsson, Bjarki. *Prototyping and Model making for Product Design (Portfolio skills)*. Laurence King Publishing. 2012.
- Hatch, Mark. *The Maker Movement Manifesto: Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers*. McGraw-Hill. 2013
- Henry, Kevin. *Drawing for Product Designer/Portfolio Skills Product Design*. 2012.
- Hudson, Jennifer. *Process: 50 Product Designs from Concept to Manufacture*. London: Laurence King Pub., 2011.
- Martin, Bella. *Universal Methods of Design: 100 Ways to Research Complex Problems Develop Innovative Ideas, and Design Effective Solutions*. Rockport Publisher. 2012.
- Robertson, Scott. *How to Draw: Drawing and Sketching Objects and Environments from your Imagination*. Design Studio Press. 2013.
- Roselien, Steur. *Sketching: The Basics*. BIS Publishers. 2011.
- Parada, Andres. *Product Sketches: From Rough to Refined*. BIS Publishers. 2013.
- Whitlatch, Terry, and Gilbert Banducci. *Animals Real and Imagined: The Fantasy of What Is and What Might Be*. Culver City, CA: Design Studio, 2010.
- Wilkinson, Karen. *The Art of Tinkering*. Weldon Owen Publications. 2013
- Van Wulfen, Gijs. *The Innovation Expedition: A Visual Toolkit to Start Innovation*. BIS Publishing. 2013.
- Various authors. *The Big Book of Character Design: A Compilation of Contemporary Character Culture*. 2012.

Web Resources

- The Artist Classroom: Feldman Model of Analyzing Artwork
<http://artistclassroom.weebly.com/feldman-approach.html>

Drawing & Composition for visual storytelling.

<http://www.floobynooby.com/IPUB/comp1.html>

The Future Channel for information about math concepts

<http://thefutureschannel.com>

The Guardian Article about Cabinet of Curiosities

<http://www.theguardian.com/artanddesign/2014/jan/13/cabinet-curiosities-taxidermy-retro-museums>

Greyscale Gorilla for digital tutorials

www.greyscalegorilla.com

Institute of Design at Stanford for information about Design Thinking strategies

www.dschool.stanford.edu

Lynda.com for digital tutorials

www.lynda.com

Museum of Modern Art for information about surrealism

https://www.moma.org/learn/moma_learning/themes/surrealism/surrealist-landscapes

MOMA exhibition about the Wunderkammer for information about the history of the Wunderkammer

<http://www.moma.org/interactives/exhibitions/2008/wunderkammer/>

School of Visual Arts, *Tall Tales: A Modern Totem Pole*. for information about contemporary totems

<http://design.sva.edu/talltales>

The Surrealist Manifesto for information about surrealists

http://www.ubu.com/papers/breton_surrealism_manifesto.html

ThingLink for display of student research

www.thinglink.com

When Reality Fades Away: Surrealism Invades 3d Art for information about surrealists

<http://www.cgtrader.com/blog/when-reality-fades-away-surrealism-invades-3d-art>

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2. Rachel Hallquist, Teacher/Art Dept. Chair
3. Lynda Hayes, Vice Principal
4. Erin Parsons, Teacher
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