

Chandra Henson-Whittaker, M.Ed.
Benjamin O. Davis High School, Aldine ISD
Architecture
Grades 10-12
24 instructional Days

The purpose of this project is to explore, evaluate and utilize the Fusion 360 program as well as integrate the curriculum taught and learned in the RET program at Texas A&M University.

TEKS: §130.42. Principles of Architecture (One Credit), Adopted 2015.

(c) Knowledge and skills.

(30) The student uses and maintains appropriate tools, machines, and equipment to accomplish project goals.

The student is expected to:

(G) explore state-of-the-art tools, equipment, materials, technologies, and methodologies.

§130.53. Architectural Design I (One Credit), Adopted 2015.

(c) Knowledge and skills.

(5) The student applies the concepts and skills of the profession to simulated or actual work situations. The student is expected to:

(H) present a final architectural product for critique;

(U) construct points, lines, and other geometric forms using accepted computer-aided design methods;

(7) The student begins expressing ideas through original architectural projects using a variety of media with appropriate skill. The student is expected to:

(A) create beginning visual solutions by elaborating on direct observation, experiences, and imagination;

(B) create beginning designs for practical applications; and

§130.54. Architectural Design II (Two Credits), Adopted 2015.

(c) Knowledge and skills.

(3) The student knows the concepts and skills that form the technical knowledge of architectural computer-aided drafting. The student is expected to:

(A) demonstrate knowledge of architectural design principles;

(4) The student knows the function and application of the tools, equipment, technologies, and materials used in architectural computer-aided design. The student is expected to:

(C) demonstrate knowledge of new and emerging technologies that may affect the field of architecture.

(5) The student applies the concepts and skills of the trade to simulated and actual work situations. The student is expected to:

(C) strive for accuracy and precision;

(D) work independently;

(6) The student applies the concepts and skills of the trade to simulated and actual work situations. The student is expected to:

(C) create two- or three-point perspectives;

(D) create three-dimensional solid models;

(E) view three-dimensional objects in several different positions;

(I) render three-dimensional objects with applied materials.

(7) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills. The student is expected to:

(H) complete work according to established criteria.

(9) The student uses advanced skills expressing ideas through original architectural projects using a variety of media with appropriate skill. The student is expected to:

(B) create, using advanced skills, designs for practical applications;

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Objective:

- Students will be able to construct projects the fusion 360 interface.
- Students will be able to implement drawings based on a predetermined format.
- Students will learn the basics of parametric modeling, freeform design, assembly creation, rendering, 3D printing and documentation.

Materials

- Worksheet 1
- Fusion 360 interface
- 3D Printer

Introduction

Students will explore the fusion 360 interface and create designs inside the platform.

Outline

- Introduction In this first lecture the student will learn how to create a project and upload data.
 - Students will independently work to become familiar with the interface.
- Product Design datasets Download these datasets to get started with the project.
 - Students will work independently and input information based on rubric
- Sketching In this section the student will create 2D sketches, define constraints, and create the first 3D part.
 - Students will work independently and input information based on rubric
- Solid modeling In this section the student will create solid models based on 2D sketches and sculpted bodies.
 - Students will work independently and input information based on rubric
- Drawing creation This week the student will learn how to, place views, and add annotations.
 - Students will collaborate in predetermined groups
- Simulation and Fabrication The student will learn how simulation can help the student validate and optimize the student design.
 - Students will collaborate in predetermined groups to evaluate the design implemented from worksheet.
- CAM This week the student will learn the basics of CAM as well as implement 2 job setups in Fusion 360.
 - Students will work together to ensure quality assurance of their individual designs.

Methods

- After the application of the worksheets students will be allowed to explore various design tools using the fusion 360 interface. Students will be able to experience learning through computerized and textile results. this ensures that students are able to see a finished product and its entirety from start to finish.

Support needed

- This curriculum needs the support of the Texas A&M Campus to ensure that students can see a quality finish product such as the pen holders we created this summer in the RET program, we do not have these facilities on our campus by.

Student Expectations

- Students are expected to master the manipulation of the Fusion 360 interface.
- Students are expected to learn how to translate drawings to Fusion 360.
- Students are expected to produce textile artifacts via the CAM commands in Fusion 360.

Pre & Post Test

- Please see attachment
- Students assessment will also be graded based on the provided rubric.

Reflection

- Students will have an opportunity to reflect on the finished products and provide a thorough investigation of the design process and what approaches they took to accomplish the design.

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In conclusion the RET program provided a brand new perspective on teaching engineering. I plan on implementing the same level of instruction in my classroom to disseminate the information I have received from the program. I plan on sharing my experiences with my fellow teachers who also work in our department as well as share with my administrators the value of RET program and how it can help change the student and the teacher.