

**WORKSHOP/SEMINAR CONTRACT
for**

Course Title:	Makerspace Professional Development Workshop
Class Format:	Lecture / Hands-On Learning / Breakout Sessions
Sessions/Contact Hours:	5 Sessions / 8 Hours
Dates/Times:	
Location/Host:	

Scope of Work

This Scope of Work outlines the proposed 5-day activity as follows:

- 1) **IDIYA** will provide group instruction on the topic of **Digital Fabrication in the Classroom** for 5 days, typically 8 hours per day, in lecture / hands-on learning / breakout sessions.
- 2) **Cost:** (\$2,500 / 2 days) (\$5,000 / 5 days)
- 3) **IDIYA** will provide all handouts, video platforms, Discord communication tools, Google Classroom, Learn-Dash classroom, Canvas (or whatever LMS desired) for both the 5-day presentation as well as follow-up throughout the semester.
- 4) **IDIYA** is working on approval for a course through the University of Alaska for participants to receive credit for the training.
- 5) **IDIYA** will provide information and assistance for advertising purposes. The seminar host may advertise through the use of flyers, website, internet lists/posts and other publications.
- 6) **IDIYA** reserves the right to use images captured during training for other marketing and evaluation reports.
- 7) **School district / site** will provide space for hosting the training, tables for participants and A/V equipment needed.

Training Schedule

Day 1, Part 1: Intro to Digital Fabrication

Participants will be introduced to design thinking and how it can help build interest in science and math through project-based learning. This segment looks at the history of advanced manufacturing and how laser cutters, 3D printers and CNC machines are changing job demands in the 21st century.

Day 1, Part 2: 3D Printing in the Classroom

Participants will print and troubleshoot a previously designed 3D model. In this class, we will discuss the different types of 3D printers, the advantages and disadvantages of each, and how to apply 3D printing within different curricula.

Day 1, Part 3: Intro to Digital Design (CAD Basics) — TinkerCAD Integration

Participants will learn how to create digital 3D models using TinkerCAD. We will discuss file types, CAD programs and file manipulations. The skills learned during this session will be applied to future sessions to support the production and use of advanced manufacturing equipment.

Day 2, Part 1: Laser Cutting in the Classroom — Vector Image

Participants will be introduced to vector graphic design software and prepare a design for prototyping and testing on the laser cutter. The design will include dimensioning parameters that can be modified for various materials. Participants will demonstrate proper laser cutter safety for the classroom as well as operation and troubleshooting.

Day 2, Part 2: Laser Cutting in the Classroom — Raster Engraving

In this session, we will look at engraving images and text into materials. We will explore file types and discuss ways to create photographic images on objects. During this session, we will discuss the proper speed and power settings to achieve desired results in materials such as wood, plastic, leather and acrylics.

Day 3, Part 1: CNC Milling — Basic

This session will focus on the basic safety and use of a CNC milling machine in the classroom. Participants will utilize CAD models to demonstrate the safe and proper operation of a CNC milling machine. During this segment of the training, we will evaluate the advantage of CNC milling over other equipment found in the makerspace. Each participant will troubleshoot CNC-milled products and create a functional prototype for their individual curriculum needs.

Day 3, Part 2: CNC Milling — Advanced

This session will focus on the advanced use of a CNC milling machine in the classroom. We will go in depth discussing machining bit types, software settings and best practices for CNC operation. In addition to CAD software, we will look at CAM (computer-aided manufacturing) software and how it creates G-code, the numeric code that all CNC machines run on.

Day 4, Part 1: Computer-Aided Design (CAD)

Participants will learn how to manipulate design files and dive deeper into CAD utilizing Fusion 360, a full-service design suite. In this lesson, participants will learn how to create dimensionally accurate components and be able to pair CAD software with the equipment in the innovation lab to create real working parts. By the end of this lesson, members will be comfortable creating parts by sketching, extruding and editing design files.

Day 4, Part 2: Intro to Circuits and Basic Logic/Coding

Participants will be able to identify and describe the different parts of a circuit and learn how a microprocessor can be programmed to interact with the components found within. Using Scratch, they will program a Microbit to interact with LEDs in order to create different light patterns, sounds and displays. In addition, participants will modify the circuit based upon different input information, and have the Microbit automate a variety of outputs including servos, LEDs and speakers.

Day 5, Part 1: LMS & Makerspace Pedagogy (Alternative)

Using an LMS platform chosen by the district, participants will be able to set up, organize and utilize a makerspace classroom lesson for school students of all age groups. They will demonstrate best practices for classroom success through proper planning and classroom management techniques. We will design and review a makerspace curriculum appropriate for the goals of the individual teacher.

Day 5, Part 2: Team Project Build (Start)

Participants will be broken into groups and will choose a challenge that faces them in everyday life in their community. Using the knowledge built throughout the week, each team will be tasked to create a prototype to solve the challenge faced. Each team will be given time to work on a solution, create design files, and build a prototype that will be shared and presented to the class on Day 5.

Day 5, Part 3: Project Demonstrations

Participants will break into their groups and present to the class the solution for the challenge chosen by the team. Each team member will provide a brief explanation of how they will use their prototype throughout the new school year as well as ways they plan to collect data and make improvements. Participants are encouraged to design files and make digital duplicates for others at the school with the advanced manufacturing equipment now found within the innovation lab.