Flipped Internship Guide - Working with Career Connect SW

A. WHAT IS A FLIPPED INTERNSHIP?

A Flipped Internship is a career exploration approach designed to provide both 21st century job skills training as well as industry-specific problems from which students can further understand the fit of the career to their interests and ambitions. Flipped internships provide students an opportunity to work with mentors. The intent of a Flipped Internship is to bring authentic problems into the classroom in a short and focused problem or project-based format that allows for open-ended solution design. Flipped Internships can be designed for any class and in any industry sector, and therefore provide endless possibilities for student and community engagement. Flipped Internships can be done in any educational setting, but are designed to increase access to authentic problems and community partners for those students furthest from opportunity such as rural schools and alternative learning settings.

This general outline is provided to guide the creation of a Flipped Internship and does not seek to convey any industry specific content. For more information on how to work with the Career Connect SW team at ESD112 on setting up a Flipped Internship, you can contact Scott Culbertson (scott.culbertson@esd112.org).

B. METHOD OF INSTRUCTION

Flipped Internships rely on many of the facets in project-based learning. Should teachers wish to have support in implementing this instructional practice, there are courses, coaching

and resources available to you through ESD112's Teaching & Learning Department. Please contact vickei.hrdina@esd112.org if you'd like more information.

This outline provides a brief snapshot into developing an authentic problem that professionals tackle into an appropriate student-facing project. The intent is to focus student outcomes on 21st Century Skills.

The format of the course instruction should contain the following instructional categories:

1. **Overview of industry standard practices and 21st Century skills.** Although certain elements are common to all industries (showing up on time, communicating honestly, taking ownership for your work), portions may be industry specific such as expected dress code. Sample 21st century skills:
   - Professionalism - body language, dress, eye contact
   - Resume construction and interview preparation and practice
   - Team work - conflict resolution, communication

2. **Industry-Specific Content.** Depending upon the level of difficulty of the project, some introduction to the material may be required. For example, if the project is significantly technical, students may not have the ability to form a solution. On the other hand, most project-oriented instruction calls for the problem to be introduced before the learning of the content and the subject matter is uncovered as the project unfolds. If the material requires some preparatory instruction, it is best to have an industry practitioner introduce the material. This section of the Flipped Internship, if required, should be kept brief. The goal is to have the student's understanding of the material uncovered by the work itself.

3. **Project/Problem Based Activities** – In this part of a Flipped Internship, a series of industry-specific projects are prepared for the students. Ideally these projects are designed to have the students work together in teams. The projects should increase in difficulty as the students progress from one to the next. This portion of the curriculum is introduced by the industry professional if at all possible. Each project should be designed such that it is not open to a quick solution. It should push the students to make trade-offs, discuss complexities, and manage the interactions on the team to ensure all students on the team are contributing. During these PBL assignments, the industry partner should be available via email to address questions posed by the students with an expected 'one business day' response time. We have found that setting up the project teams such that the students are "reporting" directly to the mentor works best. The mentor is then asking his/her direct reports for help with a particular project.

Students must learn to deal with team-work and attendance dynamics much as they would in a work environment. The project lead is responsible for communicating progress with the volunteer mentor during the course of the project work. At the conclusion of the project, the lead is also responsible for reporting the performance of each team member to the mentor upon completion of the project. The role of project lead should be rotated with each PBL so that all students have the opportunity to lead the team where it is practical to do so.

4. **Presentations** - Work in-progress should be presented to the industry mentor at the mid-way point in group work. This allows for students to integrate and adapt to real feedback. There should be an expectation that teams address feedback and make modifications to their solutions. Then, at the conclusion of the individual PBL working time, the student groups will report out to the industry mentor. This report out should include comment on the approach, team-dynamics, and the group's solution accompanied by supporting rationale and evidence. These presentations should be made to the mentor at the conclusion of each project. If at all possible, it is best to have these reviews in person with the mentor.

5. **Rigorous Assessment** - Flipped Internships should begin with appropriate content standards in mind and student performance should be evaluated against mastery of the standards as in any other learning experience. The 21st century skills that are explicitly taught should also be assessed formatively, allowing for students to self-evaluate their own understanding and growth in developing competence. It is highly advised that educators develop integrated rubrics with the students for identifying key content, skills and success criteria. If you would like support in developing these rubrics, please contact pranjali.upadhyay@esd112.org

C. Example of a Flipped Internship

In 2018, the Camas School District developed a Flipped Internship with WaferTech LLC. The course was developed using the method outlined in section "C" above. The WaferTech mentors were involved in the development of the course content and guided the educator on material that they deemed necessary and useful for incoming employees to understand and practice. Following in class sessions on 21st century skills, the mentors worked with the students on five consecutive project based challenges. For this industry, they were:

- Clean Room Calculations - math based challenge of whether air quality can be maintained during a local field fire.
- Six Sigma or “6S” - Practical application of the principles to a school facility (both a warehouse and the woodshop were used in different years for this exercise).
- Layout and efficiency - students were tasked with changing the layout of the facility to reduce the time to transport products between workstations.
- Technical Writing - a team project in creating a technical document that can be followed with precision.
- Statistical Process Control, or “SPC” - students were tasked with ascertaining if a production process to pack raisins into small boxes was in or out of control based on SPC math introduced in class.

The material to introduce each section was a collaboration between the educator and the mentors from WaferTech. As often as possible, the mentors were present in the classroom to discuss the material and add more detail as to its relevance.

This detail is provided as an example only. The development of PBL content is industry and in some cases industry-partner specific. The rich development of PBL content is generated from a close working relationship with the mentor organization. Finally, this approach is applicable to all industries.

Career Connect SW has developed a template to assist you with organizing the problem into a meaningful project designed around content and skills. The template is provided at the end of this guide and is available digitally by contacting pranjali.upadhyay@esd112.org

D. Partnering with Career Connect SW

The Career Connect SW team at ESD112 will help to facilitate developing a Flipped Internship for you. The following table presents a development timeline as an example.

Suggested Duration: 2-3 weeks

Task or Step	Timeline	Responsibility
Teacher requests support on Flipped Internship design	When ready	Teacher contacts CCL Coordinator
Initiate industry partnership & develop initial ideas for problems	After contact with teacher and debrief from CCL Coordinator	Community Partnership Manager

Draft sample problems and align to best fit courses	Within a week of business contact	Curriculum Coordinator
Consult with teacher on industry partners and problems suggested to ensure fit	Within 2-3 weeks of teacher contact	CCL Coordinator
Meet with educator to review PBL design; discuss timelines and make modifications to the project as required	Ongoing	CCL Coordinator
*Optional: meet to support PBL implementation or rubric design	Teacher requests support	Curriculum Coordinator
Liaise with the business partner to determine staff; timeline and revise problem	Ongoing	Community Partnership Manager
Launch PBL with class	Once industry visit or field trip is scheduled	Teacher
Remain in contact with Career Connect SW team for support, problem solving and to collect data and evaluations	Throughout Flipped Internship	Teacher & Industry partner

Note that working with the Career Connect SW team is at no cost to districts or industry partners. We do request that teachers and partners complete an evaluation and provide data on students engaged in these experiences and the learning outcomes for all stakeholders.

Flipped Internship

Industry - Based Problem Template

Part 1. The Industry & Problem

[Insert the industry partner, contact information and website]

Technical Background for the Teacher

Problem Statement

The problem is jointly developed by the partner and the teacher, with support from the CCL team. This problem statement should be written in student-friendly language.

A client has produced 3,500 integrated plastic and cardboard containers used to hold printer cartridges and display them in stores. The plastic clamshell that protects the cartridge does not fit inside the cardboard base, making the entire display unusable. However, the client has invested significant time and staff in developing the product and they don't want the already produced packages to go to waste. They've brought the problem to your team to design a solution and present to the client within 3 days. Solutions must be drafted in 2D and 3D prototypes are required. In addition to your final model, you will also need to present to the client your design process, any additional substrates that may be required, estimated costs and a timeline for production.

Part 2. Planning for Classroom Application

Student Engagement Protocol

1. Invite the mentor to join the class for a brief presentation of the problem (in-person/video). Refer to the problem without presenting the solution. Include references to materials, time, tools and resources as criteria or constraints.
2. (*If required*) Problem Solving Toolkit
    A. Problem Analysis – Identifying what is known, what needs to be learned, and any problem constraints

B. Self-Directed Learning – Setting specific learning goals, identifying necessary resources, and developing a timeline for achieving those goals
C. Brainstorming – Productively engaging in collaborative learning to identify the best course of action for solving the task at hand
D. Solution Testing – Developing a plan to validate the solution based on specific performance criteria

3. Clarification of the specifications and constraints. Students have the opportunity to ask questions during the presentation.
4. Collaborative learning groups. Teacher structures small groups to design solutions and complete the problem collaboratively.
5. Structured brainstorming session. Norms are established and followed (co-design norms with class if this is the first internship PBL).
6. Initial model development.
7. Presentations to Company for feedback and input
8. Modification and revisions based on Company feedback
9. Final presentations to Company
10. Students compare/contrast their solutions to Ralph's Solution using a Pugh matrix.
11. Students self-reflect
12. Final Assessment

Standards Alignment & CTE Frameworks

[*Insert course-specific content standards that the problem addresses and relevant skills that will be taught and assessed at the end of the problem.]*

CAD/CADD/ Drafting and Design Technology (CIP 151302) - Unit/Standard: Multi-view and Orthographic Projections

Math/Science
Practice 1: Make sense of problems and persevere in solving them. Practice 6: Attend to precision.

HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

21st Century Skills and STEM Competencies
Collaboration Communication

Multifaceted Assessment of Content, Concepts and Application

A. Content - Traditional set of assessments: portfolio, quiz, reflection, etc.
B. Concepts - Students design a concept map that demonstrates their design process
C. Application - Technical report, providing an evidence-based decision of which solution is optimum, based on prioritized criteria, analysis of the strengths and weaknesses (costs and benefits) of each solution, and barriers to be overcome.
D. STEM Skills and Competencies self-reflection and coaching session

Rubric for Student Self-Assessment

STEM Industry-Based Problem:

_____

Strong aspects of your work	Criteria	*How you can improve the result*
	TD 9.0 — Apply general and geometric dimensions and tolerances to 2-D part views.	

	ETS-1-3 - Generate a list of three or more realistic criteria and two or more constraints, including such relevant factors as cost, safety, reliability, and aesthetics that specifies an acceptable solution to the problem	
	Collaborate and cooperate effectively with team; Respect and appreciate team diversity; Be accountable for results	

Student Reflection on STEM Careers

What career paths did you learn about during this Internship that would interest you?
