

# The Innovation Hub

## Executive Summary

### The Innovation Hub

The Innovation Hub resides at the center of the Spectrum Innovates Pathway Program. The IH informs and drives the program and methodology. Physically composed of Maker Space, Composite Prototyping Center, and Robotics Lab, with access to Flight Simulators and Air Traffic Control Simulators, the IH provides the space and tools for immersive and experiential learning that reinforce and build upon knowledge acquired and generates new knowledge. In addition to its physical assets the IH is imbued with a professional, collaborative, safe, affirming atmosphere that improves self-regulation and workplace behaviors, and increases productivity (Scott et al., 2019). Soft Skills Deficits in executive functioning and social communication, referred to as “soft skills,” are identified as major challenges to employment success for adults with ASD (Baker-Ericzen et al., 2017).

SIPP addresses soft skills both directly and indirectly. The skills of problem solving, goal oriented thinking, asking for help and self-advocacy are infused, explicitly practiced and applied as part of the work in the Innovation Hub and classroom. Skills such as self-regulation, context awareness, perspective taking, collaboration and communication emerge and are utilized as a natural consequence of engaging in work in the IH environment (Martin, Vidiksis, & Koenig, 2019) (Waters, 2016). Preparation and delivery of oral presentations are incorporated throughout the program.

The Innovation hosts three main learning pathways. Through the Innovation Challenges & Maker Laboratory curriculum, students will engage in rich project-based learning designed to give students practice in the design, development and Maker processes. These challenges are paced and structured in such a way to give deeper context and connection to the student’s academic and SEL coursework.

Through the Certification Pathway, students engage in carefully curated professional development to prepare for independent certification tests in industry standard software. In its first year, students will prepare for the Solidworks Associate certifications in Mechanical Design, Additive Manufacturing and Mechanical Design Academic.

Throughout the SEL Integration Pathway, students will develop their Self-Awareness, Self-Management, Social Awareness, Relationship and Responsible Decision-Making skills in structured lessons, private consultations, self-reflection and in context during academic and Innovation Hub pathways.

## Structure of Innovation Hub Pathways

Students in the SIPP program will attend Vaughn College courses Monday through Thursday during the morning. Students take two courses per semester. Pre-Calculus is offered in Fall, English Literature offered in the Spring. The Canvas course is a year long course.

Students are expected to work in the Innovation Hub Monday - Thursday from 12:30 to 4:pm. Students will use their time to do supplemental work on their Vaughn courses, and engage in maker challenges that give students an opportunity to practice skills in new ways and be creative. SEL skills will be embedded in these activities. Attendance is required during these hours to achieve the SIPP Program Certificate and the accompanying micro-badges. Students will Time spent in the The Innovation Hub will run from 9pm to 3pm on Fridays.

A sample schedule is provided below - note that the blocks of time are suggestions, and are fluid.

Time	M	T	W	TH	F
9	VAUGHN CLASSWORK	VAUGHN CLASSWORK	VAUGHN CLASSWORK	VAUGHN CLASSWORK	SEL
10					Certification Coursework
11	Maker Break/SEL	Maker Break/SEL	Maker Break/SEL	Maker Break/SEL	
12	Lunch	Lunch	Lunch	Lunch	Lunch
12:30	Supplemental Time	Supplemental Time	Supplemental Time	Supplemental Time	Supplemental Time
2	Innovation Challenges	Innovation Challenges	Innovation Challenges	Innovation Challenges	Innovation Challenges
3					
4	Independent Time	Independent Time	Independent Time	Independent Time	
5					
6					

During the week, students will receive 2.5 hours of explicit SEL instruction, as mini-lessons, which will be practiced and necessitated in their project based learning activities. There will be 10 hours of Innovation time, 5 hrs of coursework supplemental time, and 3 hrs allotted for Certification Coursework.

## Innovation Challenges & Maker Laboratory

The Innovation Challenge Pathway focuses on providing avenues for developing a young person's executive functioning skills. These challenges are meant to provide opportunities for initiation, project planning, creative problem solving and application of engineering principles.

### Weekly Challenges

Students will work in teams, chosen in a variety of ways to foster teamwork, resilience, and a broad experience base. Some strategies for choosing teams may include:

- Random pairings and groupings
- Based on affinity for project
- Based on affinity for team role
- Opportunity to develop a skill set
- Individual Choice/Team Application

The weekly challenges begin work in rotating pairs for about 4-5 weeks, then make groups bigger - and extend prompts to a 2 week time frame.

The first 8 weeks:

- Arduino challenge // connect to C++ concepts
- Solidworks - (intro was in summer - so now what to design with new knowledge)
- focus on design challenges to reinforce the C++ & Solidworks Units in survey course.

The second 8 weeks prototype challenges (Robotics & Drones survey course)

Each week, students will Ideate, plan, prototype an answer to their challenge. All groups present a project update on Friday. Instructors will structure these presentations as opportunities for feedback. Students will build capacity to give each other constructive feedback while instructors model the type of feedback to give. Example feedback forms are attached in the appendix.

### SEL Skills Integration

[SEL Learning Process Executive Summary](#)

### Structure of SEL Integration to Innovation Hub:

1. Begin SEL Instructional block with a few minutes of [self-regulation](#) practice
2. Introduce SEL concepts and skills with mini lessons (~10 minutes)
  - a. See "[SEL Activity Plans](#)" for lesson plans and supporting documents/resources
  - b. Complete any SEL activities
3. Provide time for any discussions or individual reflections
  - a. see [fall](#) and [spring](#) weekly activity plans documents for suggested prompts → these serve as a guide but can be adapted to instructor and student needs
4. Encourage students to practice the SEL skill or integrate the SEL concept (this will differ depending on the topic) into their Innovation Hub challenges and Academic work
  - a. See "Innovation Hub Integration" suggestions under some weekly activity plans in fall and spring documents
5. Provide time (~2-5 minutes; this will vary depending on skill) for student reflection and instructor/peer/self feedback on SEL skill that is *practiced in real time in the Innovation Hub*
  - a. Example of instructor feedback:
    - i. Student is practicing showing a growth mindset and asking for help
    - ii. Student approaches instructor and asks for help in \_\_\_\_\_
    - iii. Instructor provides the help
    - iv. Instructor explicitly highlights to the student that they notice they asked for help
    - v. Instructor records behavior in the [competency-based evaluation tool](#)
  - b. Example of student reflection:
    - i. Students have learned about organization and planning within executive functioning during an SEL mini lesson
    - ii. Students transition to work on their academics in the Innovation Hub
    - iii. Student "A" notices that they do not have an organization and planning tool in place for completing their academic work
    - iv. Student "A" begins to comb through the organization and planning suggested tools and considers which tool will work best for them
6. [SEL + Innovation Hub Integration Example](#)

Rethinking "THE design process" more as navigating eight core design abilities..

<https://medium.com/stanford-d-school/lets-stop-talking-about-the-design-process-7446e52c13e>

## Prompts / Topics:

Build a device to keep your social distance during a pandemic

Retro Games → Modern Language

CNC Machines to Paint, Draw,

Bottle Flipping Robot

Environmental Challenges

Social Justice → community benefitting

Autism Apps/Aids

First Responder

Multitool

Robot

Disability/Animal

Build a Fidget/STIMMING Toy Lego

Design Build Fly

Multiple Challenges (Round Robin Format) -

Build a machine that will be part of an assembly line that makes something. Each group will work on a machine that will add a certain part to the final product

Reverse Challenge → here is a product, tool, etc. what are the problems this can solve (define problem) & “outside the box” uses

Mini challenges of this

Promote goofiness, curiosity, playfulness in makerspace

[Build tallest tower](#)

[Engineer Helicopter for Mars](#)

[Rubber Band Helicopter NASA challenge](#)

[Hacksmith](#) (fictional ideas from comics, movies, video games to make real prototypes - doesn't look like our students will have access to the technology to make these, but this idea might be good)

Mark Rober Challenges

DARPA Prompts

[HeroX challenges](#) (monetary rewards - very comprehensive challenges which need lots of time )

Invention Competitions

[Aeronautics for Introductory Physics](#) NASA curriculum

## SEL Integration Topics:

Theme SEL topics (within each competency area) related to innovation hub challenges:

### Self-Awareness

- identifying/engaging in special interests (helpful strategy to prevent burnout/meltdowns) → **special interest challenge?**

### Self-Management

- Showing adaptability, self-motivation, & initiative → how does this translate into challenges? More likely these skills will show up in every challenge, not just one

### Social awareness

- Supporting others' (that you work with) strengths and weaknesses
- Advocating for the rights of others to contribute to the common good of all
- Identifies a range of *social norms* in various settings, stereotypes, and biases, including strategies for opposing unjust ones → **social justice challenge?**
- Understands systems thinking and how organizations/systems affect the behavior of others → **challenge about an organization/large system?**

### Relationship skills

- Using different communication styles and methods

### Responsible decision-making

- Curiosity, open-mindedness, creativity → **“reverse” challenges?**
- Pattern recognition (!! big in autism + larger findings of grant)
- Identifies problems & solutions to problems → **“reverse” challenges?**
- Makes decisions that align with *values, needs, wants, and goals of self, group, and/or community* and behaves with ethical responsibility → **community values/helping community challenge**

\*other SEL topics not listed will be incorporated into all challenges and are not specific to just one challenge

## Feedback Form

Presentation/Project (Work Student Accomplished)

Process

Workforce/SEL Skills Feedback

Team/Peer Assessment

Self

Peer

Mentor

## Team/Peer Assessment

### ***Innovation Hub***

**Project:**

**Team Members:**

**Student Role:**

<b>SEL Skill</b>	<b>Description</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Equitable Distribution of Workload	Teammate completed their assigned work				
Active Listening	Teammate respectfully heard all ideas				
Positive Language					
Contribute Ideas					
Compromise					
On-Task					

## Project / Presentation Assessment - Instructor

### Assessment of Sample Project

Project: Smart Car

Team: Self-Directed/Pairing

Evaluator: Innovation Hub Mentor

Note: All rubrics are adaptable as necessary. Utilizing this format would allow the instructor the ability to generate specialized rubrics for individuals, individual teams and individual projects.

	Skill	Demonstration	1	2	3	4
<b>Maker-Designer Skillset</b>	Program Servos	Smart car servos programmed and work with strenuous testing				
	CAD Design	Complete CAD model created				
	Material Choice	Appropriate material chosen for chassis				
<b>Executive Function</b>	Time Management	Use budgeted time wisely				
	Resources	Minimized material waste via planning				
	Documentation	Created detailed task list before project began				
<b>Interpersonal</b>	Feedback	Did you accept feedback and act on it?				
	Culture	Positive impact on workplace				
	Adaptability	Utilize strategies during stressful situations as they arise.				
<b>Self-Management</b>	Motivation	Effort every day				
	Openness	Brainstorm 9 ideas				
	Resilience	Utilize strategies to get unstuck				
<b>General Comments</b>						
<b>Student Response</b>						
<b>Overall Progress:</b>						



## Project / Presentation Assessment - Self



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Spectrum Innovates  
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