Unit 4: Physical Computing

Content Area: **Business**
Course(s):
Time Period: **Semester 1 & 2**
Length: **3 weeks**
Status: **Published**

Standards

CS.9-12.8.1.12.AP.1	Design algorithms to solve computational problems using a combination of original and existing algorithms.
CS.9-12.8.1.12.AP.3	Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
CS.9-12.8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
CS.9-12.8.1.12.CS.2	Model interactions between application software, system software, and hardware.
CS.9-12.8.1.12.CS.3	Compare the functions of application software, system software, and hardware.
CS.9-12.AP	Algorithms & Programming
	A computing system involves interaction among the user, hardware, application software, and system software.
	Individuals evaluate and select algorithms based on performance, reusability, and ease of implementation.
	Complex programs are designed as systems of interacting modules, each with a specific role, coordinating for a common overall purpose. Modules allow for better management of complex tasks.

Essential Questions

Chapter 1: Inputs and Outputs

- What inputs and outputs are available on a physical device?
- What inputs and outputs are available on an app?
- How can we create apps that use a physical device to control a digital app?

Chapter 2: Building Physical Prototypes

- How can a physical device use sensors to react to a physical environment?
- How can simple hardware be used to develop innovative new products?

Enduring Understandings

- Design and build a physical computing device that integrates physical inputs and outputs with digital

apps.

- Create app prototypes that use a physical device to solve real-world problems
- Use physical computing to solve problems in fun and innovative ways

Knowledge and Skills

- Students use Code.org's App Lab environment, in conjunction with the Adafruit Circuit Playground, to explore the relationship between hardware and software.
- Throughout the unit, students develop prototypes that mirror existing innovative computing platforms, before ultimately designing and prototyping one of their own.

Transfer Goals

- Students explore the role of physical devices in computing.
- Using App Lab and Adafruit's Circuit Playground, students develop programs that utilize the same hardware inputs and outputs that you see in the smart devices, looking at how a simple rough prototype can lead to a finished product.
- Students explore how physical devices can be used to react to the world around them using a "maker" mindset to create prototypes with everyday materials.

Resources

- Web Lab - Programming Environment
- Code.org Videos
- Code.org Demonstration Apps
- Code.org Activity Guide