**DOBBS FERRY MIDDLE SCHOOL**
Dobbs Ferry, New York 10522

# COURSE OUTLINE

**SUBJECT: Digital Design 8** **GRADE: 8**

## COURSE DESCRIPTION:

The first half of the Digital Design 8 will explore robotics using activities from LEGO MINDSTORMS EV3 system and SPHERO BOLT. Students will design and build programmable robots using high quality motors, sensors, gears, wheels, axles, and other technical components. They will create programs that intersect with the real world by using input and output devices.

The second half of the Digital Design 8 curriculum is based on activities from Code.org's Computer Science Discoveries (CS Discoveries). Activities will further enhance students' computer science education while empowering students to create authentic artifacts and engage with computer science as a medium for creativity, communication, problem solving, and fun.

## Anticipated student outcomes:

**Grade 8 – Digital Design 8** (*meets every other day for a year)*

*By the end of the first two quarters, students using hands-on robotics, will:*

- MYP Design Cycle
- Produce simple sequences and commands that link cause and effect using input/output devices
- Design robotic characters' looks,
- Use intuitive prediction tools to gain first-hand experience in forming hypotheses
- Integrate math and science using physical constraints, units of measurement, coordinate system, minimum, maximum, mean and linear relationship.

**Key Concepts Taught by this Course -**

- Learn and use engineering design process skills
- Apply knowledge of science concepts, such as speed and power, motion and stability, and forces and interactions
- Understand and apply basic math concepts such as graphing, proportions/ratios, & making predictions based on data
- Understand cross-cutting concepts, such as systems, patterns, structure and function, and logical thinking
- Understand the role of troubleshooting, invention and innovation, and experimentation in problem solving
- Plan and manage activities to develop a solution or complete a project

- Demonstrate creative thinking and construct knowledge using technology
- Use digital media and environments to communicate and work collaboratively

*By the end of the last two quarters, students will have been offered opportunities to engage in:*

- Designing and making, not just listening, observing, and using.
- Activities that are personally meaningful and relevant.
- Interactions with others as audience, coaches, and co-creators.
- Review their creative practices.

**Key Concepts Taught by this Course –**

**<u>Computational Thinking Concepts</u>**

- Sequence
- Loops
- Parallelism
- Events
- Conditionals
- Operators
- Data

**<u>Computational Thinking Practices</u>**

- Experimenting and iterating
- Testing and debugging
- Reusing and remixing
- Events

**<u>Materials required or used:</u>**

***<u>8th Grade Digital Design</u>***

- Charged Chromebook
- Two pocket folder with fasteners
- loose leaf paper
- Pencils and a manual sharpener
- Headphones/earbuds
- MicroSD or microSDHC memory card (2GB or larger up to 32GB)

**<u>Criteria for grading:</u>**

Grades will be based on the following:

- Activities and Projects
- Class Participation
- Assessments
- Homework
- Online Performance

*Outline developed by: Math Department (Mrs. Colón)* *Date: Spring 2024*