

## Hands on Computer Science Activity 2

**Topic:** Building an Android Game Application

**Learning Objective:** Students will learn how to use Android Studio, a program that allows programmers to create Android Applications, to create a game similar to that of Flappy Bird. Students are exposed to the development of creating a mobile application as well as the basics of programming in Java.

### Alignment with NGSS Grades 3-5

Crosscutting Concepts and Connections to Engineering, Technology, and Applications of Science  
**Systems and System Models**

- A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot.
- A system can be described in terms of its components and their interactions.

Connections to Engineering, Technology, and Applications of Science for Grades 3-5  
**Interdependence of Science, Engineering, and Technology**

- Science and technology support each other.

Performance Expectations and Disciplinary Core Ideas for Engineering Design in Grades 3-5

- 3-ETS1-1 Define a simple design problem reflecting an need or a want that includes specified criteria for success and constraints on materials, time, or cost.

### Materials:

- Projector/TV on Wheels (For demonstration purposes)
- Blank sheets of paper and pencil/pen

### Detailed Description

- Activity
  - Get settled in the lab, review rules of the classroom and activity for the week.
    - Things to note for my class:
      - We will be typing A LOT, practice at home if needed!
      - Activities require thinking. Take your time, try not to get frustrated!
    - Review process of building an app:
      - Idea – Main purpose of the app
      - Theme – The story/art of the app
      - Art – Draw out necessary components of the app

- Pseudocode – Write out code template to determine what functions or actions are needed for the app to be successful
      - Code – Write out the code to get the app working
    - Brainstorm some pseudocode for the app and write out a template on paper.
      - Demo the Flappy Bird game and ask students to observe actions needed for the app.
        - How does the character move? Is there different speed involved?
        - Is the background/obstacle moving? If so, which direction?
        - Do we need to keep count of the score?
        - Do we need to track when the character hits the obstacle, the ground, or if it went too high up?
    - Introduce the basics of Java programming language
      - Vocabulary:
        - Syntax – spelling and grammar of a programming language
        - Debugging – action of identifying and removing errors from code
        - Function – the piece of code that you can call over and over again
        - Algorithm – a list of steps that you can follow to finish a task
        - Object - oriented language, meaning it uses objects as a way to control the flow of things in the application
      - We will use this equation a lot:
        - Object to instruct actions to + “.” + actionFunction + “()”
      - Relate equation to algorithms and functions.
      - Some examples:
        - Robot move forward one step->robot.forward(1);
        - Robot turn right->robot.turnRight();
        - Robot turn on->robot.turnOn();
      - Introduce syntax and how it is required for programming languages.
      - Ask students to help me write the code for a robot to move around in this shape:
- 
- Answer:robot.turnOn();robot.turnRight();robot.forward(3);robot.turnRight();robot.forward(2);robot.turnLeft();robot.forward(1);robot.turnRight();