



Kodu Curriculum: Appendix

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Appendix A: 3 Day Camp with Performance Standards

This 3-day curriculum framework was designed for a Microsoft DigiGirlz Technology camp. The female high school students were exposed to Kodu for the first time and were given a project to make a tennis-based game for the Washington Kastles, a local World Team Tennis franchise. This version represents an unedited, rough draft and should be used as an example and template for future endeavors.

Day 1: 4 hours

Day 2: 4 hours

Day 3: 4 hours

Standards References

MTLSS – Maryland Technology Literacy Standards for Students (MTLSS Grade level. Standard. Topic. Objective. Sub-Objective)

ITEA – International Technology Education Association (ITEA STL - Standard. Objective)

CSTA – Computer Science Teachers Association Level III National Standards Draft - October 2006 (CSTA Level. Topic. Objective)

Part 1: Introduction, Exploration, Practice

Assumptions

- Learners want to do, not watch.
- Learners want to start with success and feel insecure about risky or difficult situations.
- Learners have the curiosity and drive to explore with minimal instructions.
- Learners want to have fun, collaborate, socialize, and share.

Essential Question(s)

- What is a computer program?
- What are the roles of objects in an object-oriented game?
- How can you learn how to do things by editing already created work?

Enduring Understandings

- A computer program is a sequence of instructions written in a programming language designed to perform a task.
- Objects in a game are like actors in a play; they are both programmed to act based on input. (When... Do...)
- Analyzing and editing a pre-existing product can teach you how the product was created.

Time	Results	Standards
20-30 min	<p>1. Learners will choose five partners and practice the rules of pair programming by working on Tangram puzzles.</p> <p>Activity: Pair programming with Tangrams.</p> <p>Formative Assessment: They reflect with their partner on the usefulness of this approach and how to make it work better.</p>	
30 min	<p>2. Learners will work in pairs. One will be the robot, the other will be the programmer. The programmer will be given three different situations. Their partners playing the robot will play/act out the part of the Robot. These program commands are based on When... Do... statement will be the only thing “robot” understands</p> <p>Activity: Students will pick from 3 different behaviors and will have to program a student to perform the action, but only using Kodu command manipulatives.</p> <p>a. Person 1 gets Kodu command list and a behavior statement</p>	

	<p>b. Person 1 uses the Kodu command list to program her partner</p> <p>c. The partner playing the robot will act it out in front</p> <p>d. They two will switch roles.</p> <p>Supplemental: The programmed girls get all together and we see what their actions are. Have them program girls to interact with one another or do funny things... give examples of funny things... (<i>When see a girl wearing a red shirt, turn in a circle</i>)</p> <p>Formative Assessment: The programmed students will get into groups of 10 and act out their behaviors among one another.</p>	
1 hr. 30 min	<p>3. When given a demonstration of Kodu environment characteristics, the learner will be able to access the different menus in the editor and identify the commands required for performing an action.</p> <p>Demo: Creating and editing terrain, picking and placing objects, simple program statements. Do one “When...Do...” at a time and show the effect after each statement. Then start compounding the statements.</p> <p>Exploration Activity: Students will be introduced to a scenario and will pick from 2 different endings to implement in their own way and complete the scene. (<i>Need to play with Kodu to come up with possibly better scenarios – teach basic concepts, show Kodu potential, and are attainable for novices</i>)</p> <p>Scenario 1: A Kodu rancher, in hill country, is corralling her herd of animals together, but they all avoid her, so she...</p> <p>Scenario 2: A Kodu farmer is walking around her farm and every time she gets an apple...</p> <p>Formative Assessment: Students will display their work through a gallery walk and reflect on the different ways students approached similar situations.</p>	Make two-dimensional and three-dimensional representations of the designed solution. (ITEA STL-11.J)

Part 2: Instructions, Testing for Errors

Essential Question(s)

- How do you sequence instructions in order to perform a task?
- How do you test for errors?

Enduring Understanding

- Instructions are ordered chronologically by their execution and can be performed simultaneously.
- Knowledge of the intended outcome is necessary when testing for errors.

Time	Results	Standards
1 hr. 30 min (on Day 1)	<p>4. When given a Kodu, “When...Do...” instruction that is out of order, students will put it in the correct order to perform the correct task. (Done as a warm-up/review activity)</p> <p>Activity</p> <p>Part 1: Each student given a sign that has a word like when, do, see, hear, bump, Kodu.. etc. They get into groups of 10 and have to program a behavior using each person. They arrange themselves in order.</p> <p>Supplemental: Put it on the computer afterwards and see the effect.</p> <p>Part 2 (optional)(Presenter note: Give real-life example of competing directives that are prioritized) Arrange multiple “When...Do...” statements in order of priority. Example: Statements governing seeing and moving towards an apple is of higher priority, than moving towards the apple tree.</p>	
(Day 2 after storyboarding #6)	<p>5. (Optional) When given a program with logic errors and a description of the intended outcome, the student will be able to debug the errors to perform the intended result.</p> <p>Activity: Students get a buggy Kodu game that they must fix. The game they get has some tennis-like aspects to it to acquaint them with some of the code they might need for their final game.</p>	<p>Modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions. (ITEA STL-9.H)</p> <p>Malfunctions of any part of a system may affect the function and quality of the system. (ITEA STL-2.Q)</p> <p>Test a solution to ensure that it meets its stated requirements. (CSTA 3.1.5)</p> <p>Systems thinking involves considering how every part relates to others. (ITEA STL-2.N)</p>

Part 3: Game Design using Storyboards

Enduring Understanding

- Games are designed using a combination of storyboards with text.

Essential Question(s)

- How do you design a game?

Time	Results	Standards
2 hours	<p>6. When given a description of a scenario, the student will design an accurate, graphical storyboard that visually represents the sequence of scenes in the scenario.</p> <p>Activity: Create a multi-panel storyboard depicting a tennis video game. The different panels should show different screenshots from the entire game from beginning (title screen) to end (victory screen).</p> <p>Situation: The Washington Kastles want to introduce the game of tennis to elementary school kids in the DC area. They have hired you to design a game based loosely on the rules of tennis to excite kids about tennis and promote the Kastles team. They have provided you with information and a tour of their facility to inspire you. They have a few requirements though:</p> <ul style="list-style-type: none"> • Two player • Colorful • Must have some object bouncing and the two players must hit the ball back and forth • Go over judgment criteria 	<p>Given a problem statement, write a natural language procedure for solving the problem. (CSTA 3.1.1)</p> <p>The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas. (ITEA STL-17.K)</p> <p>Use design tools (such as flowcharts or UML diagrams) to express a solution to a problem. (CSTA 3.1.2)</p>

Part 4: Conditions, Complex Behaviors

Enduring Understandings

- Programs respond differently depending on the situation.
- Methods are used to group related code for repetition.

Essential Question(s)

- How do you write a program so that it can make decisions?
- How do you repeat instructions efficiently?

Time	Results	Standards
	7. When given a task requiring a decision with alternative results, the student will implement a conditional control structure to decide what action will be executed. (Kodu: Switch to a different page of code)	Write programs that use simple and complex logic statements (relational operators and Boolean operators). (CSTA 3.3.1)

Part 5: User Input, Creating a Tennis Game

Enduring Understanding

- User input controls how a program executes.
- Educational gaming is used to teach ideas in engaging and interactive ways.

Essential Question(s)

- How can a program interact with a user?
- How can a game teach a concept?

Time	Results	Standards
	8. When given the description of an interactive video game, the student will pick appropriate user input events (controller buttons) to represent and trigger tasks to be performed in the video game.	Technological systems include input, processes, output, at times, feedback. (ITEA STL-2.M)
	9. (Done as demo) When given an existing project, the student will be able to innovate it with interaction by adding at least two user input events. Activity: The students are given a pre-made Kodu project that does not contain user input event-handling. They must identify two behaviors in the code that can be initiated by	Invention is a process of turning ideas and imagination into devices and systems. Innovation is the process of modifying an existing product or system to improve it. (ITEA

	<p>button presses. For example, a Kodu might have a jumping behavior that can be activated by pressing the A button.</p>	<p>STL-10.G)</p>
	<p>10. When given the program requirements for an interactive tennis game, the student will “build” a game that uses various control structures, methods, and user input events.</p> <p>Situation: The Washington Kastles want to introduce the game of tennis to elementary school kids in the DC area. They have hired you to “build” a game based loosely on the rules of tennis to excite kids about tennis and promote the Kastles team. They have provided you with information and a tour of their facility to inspire you. They have a few requirements though:</p> <ul style="list-style-type: none"> • Two player • Colorful • Must have some object bouncing and the two players must hit the ball back and forth • Go over judgment criteria 	<p>Solve a problem by applying a problem-solving process and translate the solution into a program that uses appropriate data types and control structures. (CSTA 3.1.3)</p> <p>The development of technology is a human activity and is the result of individual and collective needs and the ability to be creative. (ITEA STL-1.G)</p> <p>Requirements are the parameters placed on the development of a product or system. (ITEA STL-2.R)</p> <p>Brainstorming is a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. (ITEA STL-9.G)</p>

Appendix B: Educator and Student Surveys

Educator Instructions

As a part of our larger goal to understand how Kodu impacts attitudes towards computer science, we provide each academic partner with our multi-part questionnaire. These surveys track attitudes toward computer programming as well as towards Kodu itself. By tracking attitudes at multiple time points, we enable you to assess change over time. In addition to accomplishing assessment goals, we hope that this survey also benefits educators by providing a standardized measurement tool for tracking the impact of Kodu in the classroom.

Assessing Usage

We suggest that these surveys are administered at two time points:

Before Usage: This survey is intended to be administered immediately before students use Kodu. Students should not be informed about Kodu or about the goals of the program prior to this survey.

After Usage: This survey is meant to be administered at the end of your program. We realize that programs vary in length. If your program is particularly long (e.g., one year) we suggest that students complete the “after” survey at multiple intervals.

Unique Identifiers

We cannot collect personally identifying information about the children taking part in the study, however, we would like to link children’s responses. Please give each child a unique identifier (e.g., an 8 digit number or a text alias) that they can use for each survey. It is important that they use the same identifier on each survey.

Contact Us

If you need help with assessment you can send this survey along with anonymous student surveys to:

Kodu Team
Redwest-C/ 1225
One Microsoft Way
Redmond WA 98052

Or just email Bokud@microsoft.com with electronic results. We welcome any additional feedback. We look forward to working with you to help make Kodu an effective educational tool.



Student Pre-Survey

ID number (teachers will assign these numbers) _____

Instructions: This survey is designed to help us understand your attitudes towards computers and programming. There are no correct answers. We are interested in what you are thinking right now. If you have questions or are not sure if an option is correct please select the best possible response provided even though it might not perfectly describe your attitudes or behaviors. Also, we will ask you to complete some free response questions. Here we don't expect you to "know the answers", we are just wondering what you are thinking. Again, just do your best and keep in mind that it is OK to skip any questions that you do not feel comfortable answering.

1. How old are you? _____
2. What is your grade in school? _____
3. What is your gender? (*check one*)
 - Male
 - Female
4. How many hours each day do you spend playing video games (on your computer or on your game console)? (*check one*)
 - None, I don't play video games.
 - Less than one hour
 - 1-2 hours
 - 3-4 hours
 - More than 5 hours
5. Have you ever taken a computer programming class before? (*check one*)
 - Yes
 - No
6. Why did you decide to try out Kodu? (*check one*)
 - It was part of a class.
 - My parents wanted me to.
 - I wanted to check out a new game.
 - I wanted to learn programming.
 - I wanted to create my own games.
 - I was trying it for someone else who I thought might like it.

Other (please explain) _____

The next questions use scales. For each question rate how much you agree by circling a number from 1-7.

7. I know a lot about computer programming. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

8. I know a lot about history. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

Do you think computer programming is: (*For each question rate how much you agree by circling a number from 1-7.*)

	Strongly disagree			Neutral			Strongly agree
9. Creative	1	2	3	4	5	6	7
10. Difficult	1	2	3	4	5	6	7
11. Easy	1	2	3	4	5	6	7
12. Fun	1	2	3	4	5	6	7
13. Interesting	1	2	3	4	5	6	7
14. Nerdy	1	2	3	4	5	6	7
15. Boring	1	2	3	4	5	6	7
16. Frustrating	1	2	3	4	5	6	7
17. Cool	1	2	3	4	5	6	7
18. Something I'd be good at	1	2	3	4	5	6	7



Student Post-Survey

ID number (teachers will assign these numbers) _____

Instructions: You are about to complete the follow-up survey. We will ask you about your use of Kodu and again about your attitudes towards computer programming. You may see some questions that you already answered in Survey I. Again, if you are not sure about a response, just do your best to answer with what you are thinking right now. There are no correct responses. Keep in mind that it is OK to skip any questions that you do not feel comfortable answering. Thank you for using Kodu.

1. Does Kodu remind you of any subjects at school? (*check one*)
 - Math
 - Science
 - History
 - English
 - Art
 - Other (please explain)_____

2. How much of your time was spent creating versus playing games in Kodu? (*check one*)
 - All of my time was spent creating games; I didn't play games at all.
 - Most of my time was spent creating games rather than playing games.
 - I spent equal amounts of time creating and playing games.
 - Most of my time was spent playing games rather than creating games.
 - All of my time was spent playing games; I didn't create games at all.

3. How did you learn to create games in Kodu? (*check all that apply*)
 - I taught myself.
 - I learned from my group.
 - I learned from the student teachers.
 - My parents taught me at home.
 - I learned from the instructor.
 - Other_____.

The next questions use scales. Please circle the number on the scale from 1-7 that is closest to how you feel.

4. Creating games in Kodu was **fun**. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

5. Creating games in Kodu was **easy**. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

6. Playing games in Kodu was **fun**. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

7. Playing games in Kodu was **easy**. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

8. My team worked well as a group. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

9. I know a lot about computer programming. (*circle a number*)

1	2	3	4	5	6	7
Not much			Some			A lot

10. I know a lot about History. (*circle a number*)

1	2	3	4	5	6	7
Not much			Some			A lot

Educator Pre-Survey

In order to make Kodu a better educational tool, we provide educators involved with the Kodu program a multi-part survey. The goal of this survey is to allow you to provide feedback about your experience with Kodu. These surveys ask about your use of technology in the classroom, the benefits of Kodu and any difficulties you experiences.

We suggest that you take these surveys at two time points:

Before usage: This survey is intended to be taken before you start the Kodu program. We are interested in your expectations.

After usage: This survey is meant to be taken three months after the Kodu program. These questions are focused on your experience with Kodu and its educational impact in your classroom.

Instructions: This survey is designed to assess your past use of technology and your goals for the Kodu program. We will use your responses to improve the Kodu program in the future. Select the best possible response.

1. Outside of this program, what is your role? (*check one*)

- Math teacher
- Computer teacher
- Teacher, other _____.
- Administrator
- Volunteer
- Parent
- Other _____.

2. What subjects are you using Kodu to teach? (*check one*)

- Math
- Science
- History
- English
- Art
- Other (please explain) _____.

3. Is participation in the Kodu program: (check one)
- Voluntary
 - Required
4. Is performance: (*check one*)
- Graded
 - Not graded
5. Have you introduced computer programming concepts to students before? (*check one*)
- Yes
 - No
 - No, but other educators have
 - No, I am unsure if the student's primary educators have
6. Which of the following do you anticipate will be most difficult for you: (*check as many as apply*)
- Learning programming concepts
 - Pacing the program appropriately
 - Reaching students of all ability levels
 - Using the Xbox controller
 - Assessing student learning
 - Keeping students engaged
 - Other_____.

The next questions use scales. For each question rate how much you agree by circling a number from 1-

7. Typically I enjoy using technology in the classroom. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

8. I am comfortable introducing computer gaming concepts. (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

9. I am comfortable introducing computer programming concepts? (*circle a number*)

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

10. In general, the students in this program are interested in computer programming. (*circle a number*)

1 2 3 4 5 6 7
 Strongly disagree Neutral Strongly agree

11. On average, the students in this program have access to technology. (*circle a number*)

1 2 3 4 5 6 7
 Strongly disagree Neutral Strongly agree

12. There was more interest in the Kodu program than in other similar programs at this school. (*circle a number*)

1 2 3 4 5 6 7
 Strongly disagree Neutral Strongly agree

Do you anticipate Kodu will help your students improve the following skills: (*For each question rate how much you agree by circling a number from 1-7. If unsure, circle the question mark.*)

	Strongly disagree			Neutral			Strongly agree	Unsure
13. Computer Programming	1	2	3	4	5	6	7	?
14. Math	1	2	3	4	5	6	7	?
15. Problem Solving	1	2	3	4	5	6	7	?
16. Computer Skills (general)	1	2	3	4	5	6	7	?
17. Writing	1	2	3	4	5	6	7	?
18. Art	1	2	3	4	5	6	7	?
19. Empathy	1	2	3	4	5	6	7	?
20. Group work	1	2	3	4	5	6	7	?
21. Modeling simulations	1	2	3	4	5	6	7	?

22. Which of the following do you anticipate will be the biggest benefit of Kodu for your students: (*check as many as apply*)

- Creating positive attitudes towards computer programming.
- Preparing students for technical jobs.
- Improving problem solving skills.
- Improving writing skills.
- Improving collaboration skills.
- Improving attitudes towards computer programming.
- Other_____.

23. What is your goal for the Kodu program?

24. What was the most difficult part about setting up the Kodu program?

Did the following students benefit from using Kodu: (For each question rate how much you agree by circling a number from 1-7. If unsure, circle the question mark.)

	Strongly disagree		Neutral			Strongly agree		Unsure
	1	2	3	4	5	6	7	?
7. Top ¼ of academic performers.	1	2	3	4	5	6	7	?
8. Middle half of academic performers.	1	2	3	4	5	6	7	?
9. Bottom ¼ of academic performers	1	2	3	4	5	6	7	?
10. Students less behavior problems.	1	2	3	4	5	6	7	?
11. Students with more behavior problems.	1	2	3	4	5	6	7	?
12. Students who have more difficulty focusing in class.	1	2	3	4	5	6	7	?
13. Students who have less difficulty focusing in class.	1	2	3	4	5	6	7	?
14. Other_____.	1	2	3	4	5	6	7	?

Did Kodu help your students improve the following skills: (For each question rate how much you agree by circling a number from 1-7. If unsure, circle the question mark.)

	Strongly disagree		Neutral			Strongly agree		Unsure
	1	2	3	4	5	6	7	?
15. Computer Programming	1	2	3	4	5	6	7	?
16. Math	1	2	3	4	5	6	7	?
17. Problem Solving	1	2	3	4	5	6	7	?
18. Computer Skills (general)	1	2	3	4	5	6	7	?
19. Writing	1	2	3	4	5	6	7	?
20. Art	1	2	3	4	5	6	7	?
21. Empathy	1	2	3	4	5	6	7	?
22. Group work	1	2	3	4	5	6	7	?
23. Modeling simulations	1	2	3	4	5	6	7	?

24. If you were to offer this program again, what would you do differently?

25. If you were to offer this program again, what would you do similarly?

26. Do you have any feedback or advice for other programs?

Appendix C: Overview of the Controller

Introduce the Xbox Controller and Kodu Main Page

When running a session with younger students or those who are not as familiar with the Xbox, it may be helpful to introduce the Xbox controller in the first session. The survey and discussion will allow you to know to what degree your students are familiar with it. The illustration below, along with having students see what you are doing on the controller as you navigate the menu, will give them an understanding of how the controller works before they are let loose on the program. Depending on the number of students you have, consider sitting in a chair facing your overhead projection or screen with the students in a circle around you (perhaps even with their own unplugged controllers in their hands). As you navigate the screens, show them what you are doing with the controller and point out its anatomy.

Parts of the Xbox Controller

