

A Guide for Computer Science Educators

Texas Instruments coding content aligned to Computer Science Teacher Association's grade 6–12 computer science standards

OVERVIEW

This document is provided as a resource to help computer science educators align coding content from Texas Instruments to the Computer Science Teacher's Association (CSTA) computer science standards which are published here:

<https://csteachers.org/k12standards/interactive/>

This resource was developed by a computer science educator and national T³™ instructor.

TI Technology

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<https://education.ti.com/en/purchase/sales-contact>

Variables and Data Types

6–8 CSTA Standards (2-CS-02, 2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13)	9–12 CSTA Standards
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Note: If the following outcomes are being taught to high school students, for the first time, it is appropriate to refer to the grade 6-8 CSTA standards outlined above.

Sample list of outcomes:

Students will:

- » Distinguish between Integer, Float and String variables.
- » Use the Input command to request information.
- » Use Order of Operations to calculate quantities.
- » Use the Print command to display strings and variables.
- » Use functions to modularize code.
- » Use functions to return values.
- » Use parameters to pass values into a function.
- » Use the Math Library.

TI-Innovator™ Hub

- » Use the TI-Innovator™ Hub library.
- » Use the Time library.

TI-Innovator™ Rover

- » Use the TI Rover library.

Dash Robot from Wonder Workshop

- » Use the Dash library to control the robot.

Tello Drone

- » Use the Tello Drone library to control the drone.

Variables and Data Types (continued)

Introduce topic with guided directions with 10 Minutes of Code activities:

<u>TI-Nspire™ CX II graphing calculator</u> <u>10 Minutes of Code</u> (2-CS-03, 2-AP-11, 2-AP-13)	<u>TI-84 Plus CE Python graphing calculator</u> <u>10 Minutes of Code</u> (2-CS-03, 2-AP-11, 2-AP-13)
Unit 1: Getting Started With Python Skill Builder 1 Skill Builder 2 Skill Builder 3 Application	Unit 1: Getting Started With Python Skill Builder 1 Skill Builder 2 Skill Builder 3 Application
Unit 2: Input, Output Functions Skill Builder 1 Skill Builder 2 Skill Builder 3 Application	Unit 2: Input, Output Functions Skill Builder 1 Skill Builder 2 Skill Builder 3 Application
Unit 5: The TI Modules Skill Builder 2	Unit 5: The TI Modules Skill Builder 2

<u>TI-Nspire™ CX II graphing calculator,</u> <u>TI-Innovator™ Hub</u> <u>10 Minutes of Code</u> (2-CS-02, 2-CS-03, 2-AP-11)	<u>TI-84 Plus CE Python graphing calculator,</u> <u>TI-Innovator™ Hub</u> <u>10 Minutes of Code</u> (2-CS-02, 2-CS-03, 2-AP-11)
Unit 1: Getting Started With Python and TI-Innovator™ Hub Skill Builder 1 Skill Builder 2 Skill Builder 3 Application	Unit 1: Getting Started With Python and TI-Innovator™ Hub Skill Builder 1 Skill Builder 2 Skill Builder 3 Application

Variables and Data Types (continued)

Continue learning and exploring using:

(2-AP-11, 2-AP-13)

[Lessons Using Python – TI-Nspire™ CX II graphing calculator](#)

- » Introduction to Computer Science (with TI-Innovator™ Rover) (Activity 1).
- » Introduction to Computer Science (with TI-Innovator™ Hub) (Activities 1–2).
- » Functions (Activities 1–5).

TI-BulleTIn Board Posts:

(2-AP-11)

[I <3 Math, and Math Is Fun :-\)](#)

[Math In Motion Plus Activities \(TI-Innovator Rover\)](#)

(2-CS-03, 2-AP-11, 2-AP-12)

- » Move the Cone.
- » Navigate “Math-hatten” Challenge.
- » Drive the Line Challenge.

[Meet the Dash Robot](#)

(2-AP-11)

[Tello Drone](#)

(2-AP-11)

Getting Your Wings

Conditions, If Statements and While Loops

6–8 CSTA Standards

(2-CS-01, 2-CS-02, 2-CS-03, 2-AP-10, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-15, 2-AP-16, 2-AP-17, 2-AP-18, 2-AP-19, 2-DA-07)

9–12 CSTA Standards

(3B-AP-14, 2-AP-15, 3B-AP-21, 3A-AP-22)

Sample list of outcomes:

Students will:

- » Perform modular arithmetic using the % symbol.
- » Perform integer division using //.
- » Use if statements to make decisions.
- » Use if..else statements to make decisions.
- » Use if..elif..else statements to make decisions.
- » Use while conditions to repeat code until a condition is met.
- » Use the TI-System library and functions to get keypad events.
Use Time library and the sleep() function.

TI-Innovator™ Hub

- » Use the brightness.range() function to change the brightness of an LED.
- » Use the brightness.measurement() function to measure light brightness.
- » Use the sound.tone(frequency,time) function to play a tone given frequency and time.
- » Use color.rgb(r,g,b) to set the color of an LED.
- » Use the light.on() and light.off() functions to control an LED.

TI-Innovator™ Rover

- » Use if statements to make decisions.
- » Use if..else statements to make decisions.
- » Use if..elif..else statements to make decisions.
- » Use while conditions to repeat code until a condition is met.

Conditions, If Statements and While Loops (continued)

Introduce topic with guided directions with 10 Minutes of Code activities:

<p>TI-Nspire™ CX II graphing calculator 10 Minutes of Code (2-CS-03, 2-AP-11)</p>	<p>TI-84 Plus CE Python graphing calculator 10 Minutes of Code (2-CS-03, 2-AP-11)</p>
<p>Unit 3: Conditions, If and While Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>	<p>Unit 3: Brightness, If and While With the TI-Innovator™ Hub Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>
<p>Unit 5: The TI Modules Skill Builder 3 Application Various End of Course Projects</p>	<p>Unit 5: The TI Modules Skill Builder 3 Application Various End of Course Projects</p>

<p>TI-Nspire™ CX II graphing calculator, TI-Innovator™ Hub 10 Minutes of Code (2-CS-02, 2-CS-03, 2-AP-11)</p>	<p>TI-84 Plus CE Python graphing calculator, TI-Innovator™ Hub 10 Minutes of Code (2-CS-02, 2-CS-03, 2-AP-11)</p>
<p>Unit 3: Brightness, If and While With the TI-Innovator™ Hub Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>	<p>Unit 3: Brightness, If and While With the TI-Innovator™ Hub Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>

Continue learning and exploring using:

(2-CS-03, 2-AP-11, 2-AP-12)

[Lessons Using Python – TI-Nspire™ CX II graphing calculator](#)

- » Conditional Statements (Activities 1–6).
- » Loops – While Loops.
- » Introduction to Computer Science (with TI-Innovator™ Hub) (Activities 1–2).
- » Introduction to Computer Science (with TI-Innovator™ Rover) (Activities 1–3).

Conditions, If Statements and While Loops (continued)

Guided STEM Projects:

(*2-CS-01, 2-CS-02, 2-CS-03, 2-AP-10, 2-AP-11, 2-AP-12, 2-AP-13, *2-AP-15, *2-AP-16, 2-AP-17, *2-AP-18, 2-AP-19, *3A-AP-22)

[Digital Mood Ring](#)

TI-BulleTIn Board

(2-CS-03, 2-DA-07, 2-AP-11, *2-AP-16)

[Choose Your Own Adventure: 5 Projects to Get Students Coding With Python!](#)

Explorations With Coding- Coding with Python:

(2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, *2-AP-16, 2-AP-17, 3A-AP-18, 3B-AP-14, 3B-AP-21)

TI-Nspire™ CX II graphing calculator	TI-84 Plus CE Python graphing calculator
Fraction Tic-Tac-Toe	Fraction Tic-Tac-Toe
Shuffleboard Slide	Shuffleboard Slide
Putt Putt with Python	Putt Putt with Python

*The standard can be addressed with the listed resources but requires the teacher to ensure alignment.

For Loops, Intro to Lists, and While Loops

6–8 CSTA Standards

(2-CS-01, 2-CS-02, 2-CS-03, 2-AP-10, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-15, 2-AP-16, 2-AP-17, 2-AP-18, 2-AP-19, 2-DA-08)

9–12 CSTA Standards

(3A-AP-14, 3A-AP-17, 3A-AP-18, 3A-AP-22, 3B-AP-14, 3A-AP-15, 3B-AP-21, 3B-AP-22, 3A-DA-09)

Sample List of outcomes:

Students will:

- » Use a for loop to repeat code.
- » Use a While True loop to repeat code.
- » Use a list to store a collection of numbers.
- » Use the `.append()` function to add to a list of items.
- » Use `randint()` from the Random library to generate a random integer.

Optional TI-Innovator™ Hub:

- » Use the `light.on()` and `light.off()` functions to control an LED.
- » Use the `sleep()` function from the Time Library.
- » Use the `color.rgb(r,g,b)` function to change the color of an LED.
- » Use the `sound.tone(frequency,time)` function to play a tone given frequency and time.
- » Use the `sound.note(note)` function to play a given note.

Optional TI-Innovator™ Rover:

- » Use the `rv.forward()` and `rv.left()` functions to drive the TI-Innovator™ Rover.
- » Use the `rv.color_rgb(r,g,b)` to set the LED light on the TI-Innovator™ Rover.
- » Use the `rv.ranger_measurement()` function to collect distance data.
- » Use the `rv.color_measurement()` function to measure color.
- » Use the `rv.to_angle(0, "degrees")` function to turn to a given angle.
- » Use the `rv.to_xy(x,y)` function to go to a given (x,y) value.
- » Use the random integer function to generate random integers.
- » Use loops to repeat code.
- » Use the `eval()` function to evaluate mathematical expressions from input.
- » Use the `fabs()` function to trouble shoot roundoff errors.
- » Fix a runtime errors.
- » Use the TI-System library to import lists.

For Loops, Intro to Lists, and While Loops (continued)

Introduce topic with guided directions with 10 Minutes of Code activities:

<u>TI-Nspire™ CX II graphing calculator 10 Minutes of Code</u> (2-CS-03, 2-AP-11, 2-AP-12, 3A-AP-14)	<u>TI-84 Plus CE Python graphing calculator, 10 Minutes of Code</u> (2-CS-03, 2-AP-11, 2-AP-12, 3A-AP-14)
Unit 4: For Loops and Lists Skill Builder 1 Skill Builder 2 Skill Builder 3 Application	Unit 4: For Loops and Lists Skill Builder 1 Skill Builder 2 Skill Builder 3 Application
Unit 5: The TI Modules Skill Builder 1 Various End of Course Projects	Various End of Course Projects

<u>TI-Nspire™ CX II graphing calculator, 10 Minutes of Code + Modules</u> (2-CS-03, 2-AP-11, 2-AP-12)	<u>TI-84 Plus CE Python graphing calculator, 10 Minutes of Code + Modules</u> (2-CS-03, 2-AP-11, 2-AP-12)
Turtle TI Draw TI Image Tello Drone	Turtle TI Draw TI Image Tello Drone

<u>TI-Nspire™ CX II and TI-Innovator™ Hub 10 Minutes of code</u> (2-CS-02, 2-CS-03, 2-AP-11, 2-AP-12, 3A-AP-14)	<u>TI-84 Plus CE Python and TI-Innovator™ Hub 10 Minutes of code</u> (2-CS-02, 2-CS-03, 2-AP-11, 2-AP-12, 3A-3-AP-14)
Unit 2: For Loops With the TI-Innovator™ Hub Skill Builder 1 Skill Builder 2 Skill Builder 3 Application	Unit 2: For Loops With the TI-Innovator™ Hub Skill Builder 1 Skill Builder 2 Skill Builder 3 Application
Unit 4: Rover's Driving Features Skill Builder 1 Skill Builder 2 Skill Builder 3 Application	Unit 4: Rover's Driving Features Skill Builder 1 Skill Builder 2 Skill Builder 3 Application

For Loops, Intro to Lists, and While Loops (continued)

Introduce topic with guided directions with 10 Minutes of Code activities
(continued):

<p>Unit 5: Rover's Sensors</p> <p>Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>	<p>Unit 5: Rover's Sensors</p> <p>Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>
<p>Unit 6: Coordinates with the Rover</p> <p>Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>	<p>Unit 6: Coordinates with the Rover</p> <p>Skill Builder 1 Skill Builder 2 Skill Builder 3 Application</p>

Continue learning and exploring using:

(2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13)

[Lessons Using Python – TI-Nspire™ CX II graphing calculator](#)

- » Loops – Do While Loops.
- » Loops – For Loops.
- » Introduction to Computer Science (with TI-Innovator™ Hub) (Activities 3–5).
- » Introduction to Computer Science (with TI-Innovator™ Rover) (Activities 4–8).

Guided STEM Projects:

(*2-CS-01, 2-CS-03, 2-DA-08, *2-AP-10, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, *2-AP-15, *2-AP-16, *2-AP-17, *2-AP-18, 2-AP-19, 3A-AP-14, 3A-AP-17, 3A-AP-18, *3A-AP-22, 3B-AP-14, *3B-AP-21)

<p>TI-Nspire™ CX II graphing calculator</p>	<p>TI-84 Plus CE Python graphing calculator</p>
<p>Pet Car Alarm Smart Water Irrigation The Heart Project</p>	<p>Pet Car Alarm Smart Water Irrigation</p>

[Math In Motion Plus Activities \(TI-Innovator™ Rover\)](#)

(2-CS-03, 2-AP-11, 2-AP-12)

Driving Inequalities

*The standard can be addressed with the listed resources but requires the teacher to ensure alignment.

For Loops, Intro to Lists, and While Loops (continued)

TI-BulleTIn Board

(2-CS-03, 2-AP-11, 2-AP-12, *2-AP-16, *2-AP-17, 3A-DA-09, 3A-AP-14)

[Fireworks, Flags and the 4th of July](#)

[Math and Python: A Great Valentine's Day Couple](#)

[Choose Your Own Adventure: 5 Projects to Get Students Coding With Python!](#)

[You Can Teach an Old Snake New Tricks: Computer Science on the TI-84 Plus CE Python](#)

[Graphing Calculator](#)

[Using Python to Squeeze the Fun Back Into Math](#)

Tello Drone

(2-CS-03, 2-AP-11, *3A-AP-15)

[Four Square](#)

Explorations With Coding – Coding with Python

TI-Nspire™ CX II graphing calculator (2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, *2-AP-16, 2-AP-19, 3A-AP-14, *3A-AP-15, 3B-AP-14, *3B-AP-21, *3B-AP-22)	TI-84 Plus CE Python graphing calculator 2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, *2-AP-16, 2-AP-19, 3A-AP-14, *3A-AP-15, 3B-AP-14, *3B-AP-21,*3B-AP-22
Integer Darts	Integer Darts
Frisbee Golf	Frisbee Golf
Putting the Fun in Functions	Putting the Fun in Functions
Integer Quadratic Functions	Integer Quadratic Functions
Parabolic Hoops	Parabolic Hoops
Factor Darts	Factor Darts
Ready, Set ... Solve!	Ready, Set ... Solve!

*The standard can be addressed with the listed resources but requires the teacher to ensure alignment.

Lists

6–8 CSTA Standards (2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-16, 2-AP-17)	9–12 CSTA Standards (3A-DA-11, 3A-DA-12, 3A-AP-14, 3A-AP-17, 3A-AP-18, 3B-DA-07, 3B-AP-21, 3B-AP-11, 3B-AP-22)
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Sample list of outcomes:

Students will:

- » Use lists to organize and store data.
- » Use the plot library and lists to graphically display data.
- » Use loops to traverse a list.
- » Use loops to sort a list.

Introduce topic with guided directions with 10 Minutes of Code activities:

<u>TI-Nspire™ CX II graphing calculator</u> <u>10 Minutes of Code</u>	<u>TI-84 Plus CE Python graphing calculator</u> <u>10 Minutes of Code</u> (2-CS-03, 2-AP-11)
	Unit 5: The TI Modules Skill Builder 1 Skill Builder 2 Skill Builder 3 Application

<u>TI-Nspire™ CX II graphing calculator</u> <u>10 Minutes of Code +Modules</u> (2-CS-03, 2-AP-11, 3A-DA-11, 3A-DA-12, 3A-AP-14)	<u>TI-84 Plus CE Python graphing calculator</u> <u>10 Minutes of Code +Modules</u> (2-CS-03, 2-AP-11, 3A-DA-11, 3A-DA-12, 3A-AP-14)
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TI Image TI PlotLib Micro:bit Micro:bit with Expansion Board	TI Image TI PlotLib Micro:bit Micro:bit with Expansion Board
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Lists (continued)

Continue learning and exploring using:

(2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, *2-AP-16, 2-AP-17, 3A-AP-14, 3A-AP-17, 3A-AP-18, 3B-AP-21, 3B-AP-11, *3B-AP-22)

[Lessons Using Python – TI-Nspire™ CX II graphing calculator](#)

- » Lists- Introduction to Lists.
- » Lists- Operating on Lists.
- » Sequential and Binary Search.
- » End of course project – Crack the Code.
- » End of course project – Match Me.

TI-BulleTIn Board

(2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, *2-AP-16, 3A-AP-17)

[Jingle Bells](#)

Explorations With Coding – Coding with Python

(2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, *2-AP-16, 3A-DA-11, 3A-DA-12, 3A-AP-14, 3B-DA-07)	
TI-Nspire™ CX II graphing calculator	TI-84 Plus CE Python graphing calculator
Simulating Fairness	Simulating Fairness
Trig Ratios: Gettin' Trig-y with Python	Trig Ratios: Gettin' Trig-y with Python
Unit Circle Cruncher	Unit Circle Cruncher
Paying Off a Loan	Paying Off a Loan

*The standard can be addressed with the listed resources but requires the teacher to ensure alignment.

Classes

6–8 CSTA Standards (2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-16, 2-AP-17)	9–12 CSTA Standards (3A-AP-14, 3A-AP-17, 3A-AP-18, 3B-AP-14)
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Sample list of outcomes:

Students will:

- » Create objects using classes.

TI-BulleTIn Board

(2-CS-03, 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, *2-AP-16, *2-AP-17, 3A-AP-14,
3A-AP-17, 3A-AP-18, 3B-AP-14)

[Adding “Class” to Your Python Code](#)

[Get Your Promposal Ready – Try Balloons and Buttons](#)

*The standard can be addressed with the listed resources but requires the teacher to ensure alignment.

Encryption

6–8 CSTA Standards

9-12 CSTA Standards
(3B-NI-04)

Sample list of outcomes:

Students will:

- » Compare ways software developers protect devices and information from unauthorized access.

[TI-Nspire™ CX II graphing calculator](#)

Cybersecurity

Looking for more ideas?

[On-Demand Python Webinars](#)