



Lesson 1.2: Program Structure and Basic Output

<https://codehs.com/course/18440/lesson/1.2>

Description	In this lesson, students will be introduced to the basic structure of a C++ and use this as they create their first programs outputting to the screen.
Objective	Students will be able to: <ul style="list-style-type: none">• Write a basic output program in C++• Explain the key parts of a C++ program, including the main function and include statements
Activities	1.2.1 Video: Program Structure and Basic Output 1.2.2 Quiz: Quiz: Program Structure and Basic Output 1.2.3 Example: Hello World 1.2.4 Example: Using a Library 1.2.5 Exercise: Guided Activity: Your First C++ Program 1.2.6 Exercise: Introduce Yourself 1.2.7 Exercise: Ascii Art
Prior Knowledge	None needed.
Planning Notes	<ul style="list-style-type: none">• You can choose to present the content yourself using the guided lesson plan slides. These slides incorporate the discussion questions as well as topic questions for the examples and exercises. If you choose to use these, you may want to customize which slides you show.• This lesson uses a guided activity. It is scored like an exercise, but since students are given explicit instructions, the point value in the grade book is reduced from 5 to 3. You can update this value if you would like.• This is a shorter lesson and may be easily combined with the previous lesson.• Most activities in this lesson are pretty basic because students have not been introduced to much code yet. As a result, many students will likely complete the lesson relatively quickly.

Standards Addressed	
Teaching and Learning Strategies	<p>Lesson Opener:</p> <ul style="list-style-type: none"> • Have students brainstorm and write down answers to the discussion questions listed below. Students can work individually or in groups/pairs. Have them share their responses. [5 mins] <p>Activities:</p> <ul style="list-style-type: none"> • Watch the lesson video and complete the associated quiz [6-8 mins] • Explore the <i>Hello World</i> example [5 - 7 mins] <ul style="list-style-type: none"> ◦ This example shows the basic code structure students would use without the <code>util.h</code> library. You can challenge students to rewrite the code with the <code>util.h</code> library. To do this, they would replace the <code><iostream></code> on line 1 with <code>"util.h"</code> and remove the line with the namespace command. • Explore the <i>Using a Library</i> example [2 - 3 mins] <ul style="list-style-type: none"> ◦ Have students play around with the <code>endl</code> command. They can add it on additional lines and try putting two in a row. • Complete the <i>Guided Activity: Your First C++ Program</i> activity [7 - 10 mins] <ul style="list-style-type: none"> ◦ This is a guided activity. Students should follow the comments in the code to help guide them through the exercise. • Complete the <i>Introduce Yourself</i> activity [3 - 5 mins] <ul style="list-style-type: none"> ◦ This is a relatively basic exercise and a good one to learn something about students. ◦ You can consider adding an extra line or two to the requirements so that they print out more information about themselves. • Complete the <i>Ascii Art</i> exercise. [5 - 7 mins] <ul style="list-style-type: none"> ◦ Consider switching this up and having students create their own art project. Give them specifications, such as requiring at least 5 lines. <p>Lesson Closer:</p> <ul style="list-style-type: none"> • Have students reflect and discuss their responses to the end of class discussion questions. [5 mins]
Discussion Questions	<p>Beginning of Class:</p> <ul style="list-style-type: none"> • Why is program syntax important in computer code? <ul style="list-style-type: none"> ◦ <i>Computers are very literal and cannot interpret intent, so it is important to get the exact syntax correct each time.</i> • Why is it important for a program to print to the screen? <ul style="list-style-type: none"> ◦ <i>Many programs need to interact with the user and printing out to the screen is a key part of this.</i> • What are some computer programs that you use that display messages to you?

- *All of them! SnapChat- tells you when you received/sent a message, Facebook- tells you when you have a friend request, Instagram- tells you when someone liked or commented on your picture, Venmo- tells you when someone sends you money and how much, etc. (Answers may vary)*

End of Class:

- Why do programs have standard formats? Why not just write a list of instructions in order?
 - *Answers will vary and students may not get all of this yet. Using a standard format helps the computer know where to start and stop the program. Writing a list of instructions may work for simple programs, but as programs get more complex, things like loops, if statements, and functions will alter the order programs run.*
- How do we print a single line in C++? What are the two ways that you can move to a new line?
 - *In C++, the `cout` command followed by `<<` is used. To move to a new line, you can either add an `endl` into the output stream or a `\n` inside the string literal.*
- What are some of the advantages of using a library?
 - *It can help simplify code by handling routine things that you do all the time. Students will see more examples of this in upcoming lessons.*

Resources/Handouts	Guided Lesson Slides
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Vocabulary

Term		Definition
Modification: Advanced	Modification: Special Education	Modification: English Language Learners
<ul style="list-style-type: none"> • Have students create a program in the Sandbox to give them additional practice printing. 	<ul style="list-style-type: none"> • Pair programming with another student • Print out video slides for students to reference 	<ul style="list-style-type: none"> • Print out video slides and have students use a dictionary to translate unknown vocabulary • Pair programming with another student