

# Source Code - How To Coach

## Trial Event – Michigan Science Olympiad

Below are some helpful tips on how to prepare for the Source Code event. The event utilizes the Python programming language (all tools are free and available online). There are many other programming languages. Python was chosen because of its simplicity, large user community, and current application in many science related fields.

### **Overview**

1. Classroom Resources
2. Learning to Code
3. Solving Event Problems.
4. Additional Information.

### **1. Classroom Resources**

The entirety of the Source Code event will take place on a computer. More specifically, the student's work will be done in a given python file. (See the example python file). To prepare for the event, you will need to be able to develop Python programs on your computer.

1. A Computer w/ Python Installed.
  - a. Verify a computer has Python installed. (Ask an IT Administrator if you are unsure).
  - b. If Python is not installed, you should follow the tutorials and documentation at Python.org. In fact, it may be quite beneficial for the students to install the software themselves.
  - c. <https://www.python.org/about/gettingstarted/>
  - d. Following the installation documentation on python.org will also teach you how to run your first Python program. You may also choose to install a different IDE (Integrated Development Environment) to write your python programs in. Most IDE's are similar. A List is available here:  
<https://wiki.python.org/moin/IntegratedDevelopmentEnvironments>
  - e. We recommend using: IDLE (comes default with your Python installation)
  - f. At the event, the provided computers will already have Python installed, with the python file ready for editing.
2. There is an alternative to installing Python on your computer. There are many websites that allow you to develop and run Python programs in your web browser. This is a quick option to begin programming right away. Some of those are listed here:
  - a. <http://www.skulpt.org/>
  - b. <https://repl.it/>

### **2. Learning to Code**

1. One of the best ways to learn programming is through guided tutorials:
  - a. Codecademy.org - <https://www.codecademy.com/learn/python>
  - b. Learn Python - <http://www.learnpython.org/>
2. Like learning to play an instrument, practice makes perfect. Understanding and memorizing keywords and syntax without continually referencing materials is important. Students will be allowed to bring a 3" x 5" card of notes. This is not a large amount of space, so students will need to choose, which Python syntax, algorithms, or other notes they record.

3. As mentioned in the rules, students should run their program often to check for errors. If an error exists, the Python interpreter will normally tell the user what is causing an error in the program.
4. As with most programming languages, Python has many features and advanced concepts. The Source Code event will be limited to the topics listed in the rules. Most introductory tutorials will teach these topics.

### **3. Solving Event Problems**

1. Event Problem Types (see sample program for examples)
  - a. Multiple Choice - Return the correct choices letter
    - i. Questions about Python Syntax
    - ii. Questions about logic
    - iii. Correct/incorrect code snippets
  - b. Code Implementation - Writing code to solve the problem and return the answer.
    - i. Solve a mathematical problem
    - ii. Completing or modifying an incomplete block of code
2. Mathematical concepts used will be those described in the rules. While the focus of this event is learning to code, it is important to note that math is a part of computer science. You should expect concepts similar to those taught in an Algebra and Geometry class.
3. A quick search on the Internet will show there are many websites offering programming challenges similar to those in Source code. In fact, it is from these sites where the idea for this event originated. Most website's challenges range in difficulty from easy to extremely difficult. You can expect the Source Code problems to be toward the easy range. Some examples:
  - a. <http://www.codeabbey.com/>
  - b. <http://codingbat.com/python>
  - c. <https://projecteuler.net/>

### **4. Additional Information**

1. <https://www.python.org/>
  - a. <https://wiki.python.org/moin/BeginnersGuide>
  - b. <https://wiki.python.org/moin/>