**AP CSP CodeBot**

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| **LESSON: Lists #2** | | **Time: 45 minutes** |
| **Project Goal:** Students will evaluate code segments that involve lists and list methods.  **Learning Targets**   * I can define and identify parts of a list. * I can access an element of a list. * I can evaluate code segments with lists and list methods. | **Key Concepts**   * A list can be used when you have, or could have, many similar variables. * A list has elements, or items, organized in order by number. * The number used to organize the elements is called an index. * Data in a list can be changed, removed, inserted, and used in calculations. | |
| **Assessment Opportunities**   * Lists #2 Activity Guide | **Success Criteria**   * Define list vocabulary * Access and manipulate elements in a list * Evaluate list code segments | |
| **AP CSP Framework**  **AAP-1.C** Represent a list or string using a variable.  **AAP-2.N** Evaluate expressions that use list indexing and list procedures.  **Computational Thinking Practice 3.A** Generalize data sources through variables.  **Computational Thinking Practice4.B** Determine the result of code segments.  **Computational Thinking Practice 6.A** Collaborate in the development of solutions. | **Materials**   * Lists #2 slides * Lists #2 Activity Guide / Answers * Lists #2 Code Tracing Examples (to be printed) | |
| **Vocabulary:**   * **List:** (from Mission 7) A sequence of items you can access with an index.   (from Lists Vocab) an ordered collection of elements   * **Index**: (from Mission 7) A number that keeps track of what choice should be displayed.   (from Lists Vocab) a common method for referencing the elements in a list or string using numbers   * **Element:** an individual value in a list that is assigned a unique index * **List Length:** how many elements it contains. Lists can grow or shrink as elements are added or removed. You can calculate the current length by using the function: ***len(list\_name)*** | | |
| **Teacher Notes**   * This lesson is best with partners or in groups of three. * This lesson has Tracing Examples that should be printed for each student group. * The activity guide can be distributed digitally; it is used as a review after group work. * The topic of lists continues in the next lesson, where students are given more practice. * The teaching guide (below) gives the narration for one way to present the lesson and help students review a mental model of lists. | | |

**Teaching Guide**

**Warm-up / Design Process (10-15 minutes)**

The purpose of the warm-up is to review the first lists practice lesson and the shared mental model. It could last between 10 and 15 minutes, depending on the type of warm-up / review you do with the students.

💡 **Teaching tip – warm-up (if needed)**

* You, as a teacher, need to determine the warm-up / review that is needed for your students. It could be:
  + Practicing the mental model with another example, like student names
  + Going over Example A or Example B (or both)
  + Displaying the Lists Vocab slides

**Group Practice (20-30 minutes)**

💻 Students will NOT work at computers for this lesson. I recommend groups of three standing at vertical white boards. Print the three Tracing Examples in advance and have them ready for students to work through.

💡 **Teaching tip:**

Students will have three examples to work through in their groups. They can do them in any order. They should compare their answers with other groups and discuss or re-work examples they do not agree on. The teacher can monitor and support as needed.

Answers to Examples:

* Example C – by groups Final clist = [4, 5, 2, 37, 20, 5, 6, 24]
* Example D – by groups Final dlist = [1, 1, 3, 3, 3, 5, 2]
* Example E – by groups Final elist = [2, 5, 6, 4, 3] count = 5, total = 20

**Assignment Review and wrap-up (15-20 minutes)**

💻 Students can work individually, with a partner, or even at the white boards (if you print the assignment).

This assignment is a review of the concepts worked on today. It is the wrap-up. If time permits, you can go over the answers to the assignment, or have students check with each other on their answers to the assignment.

✅ Review assignment is complete and ready to turn in

Formative Assessment:

* Lists #2 Activity Guide
* Daily reflection journal or
* Class discussion on what they learned about lists
* Exit ticket

**SUCCESS CRITERIA:**

* Work in a group to complete example C, D and E
* Define list, index and element
* Access a single element in a list
* Manipulate values in a list by changing an element, adding elements, and removing elements