

Instructional Days: 15-16

Topic Description: This lesson introduces the concept of a computer program within the context of a set of instructions for completing a common activity.

Objectives:

The student will be able to:

- Explain the concept of a computer program

Outline of the Lesson:

- Following directions (55 minutes)
- Designing a program (15 minutes)
- Running a program (25 minutes)
- Being more precise with instructions (15 minutes)

Student Activities:

- Complete the Following Directions quiz.
- Complete the Drawing Pictures Activity.
- Write the instructions for making a peanut butter and jelly sandwich.

Teaching/Learning Strategies:

- Following directions
 - Distribute copies of Following Directions Quiz to each student face down in front of them. Each student should have a blank piece of paper and a pencil as well.
 - Give the students five minutes to do the quiz. Make note of how many students stand up and shout “hooray.”
 - Collect the papers when time has expired.
 - Point out that a perfect paper is one which has only the word “December” written in the top left corner. (The directions said to read all parts of the test before doing anything and step 14 says to only complete step #3.)
 - Give students about 10 minutes to complete the Drawing Pictures Activity.
 - Ask volunteers to show their pictures and explain why they drew the pictures as they did.
 - After the first volunteer, ask if someone drew it differently.
 - Ask the students what following directions has to do with computers. Prompt them as necessary that a computer follows a specific set of instructions called a computer program and must follow all of the directions precisely.
- Designing a program

- Ask the students to write down a set of instructions for a computer to make a peanut butter and jelly sandwich. (Check in advance to determine if any students have peanut allergies. Other spreads can easily be substituted.) Give them 5-10 minutes to write down these instructions.
- Collect the instructions.
- Running a program
 - Take out the bread, peanut butter, jelly, and knife and put them on your desk. Pick a set of instructions for making a sandwich (best to pick one which is not too detailed).
 - Read each instruction and carry it out—literally. For example, if the first instruction is “put the peanut butter on the bread,” take the jar of peanut butter and put it on the loaf of bread. If an instruction says to “spread the peanut butter on the bread,” use your fingers rather than a knife. If an instruction says to “cut the sandwich in half,” be creative and cut it between the two slices of bread. In other words, your goal is to show that instructions need to be very precise.
 - Repeat the process with another set of instructions.
 - Highlight the implicit knowledge that students bring to the task and how that has to be “unpacked” for the computer.
- Being more precise with instructions
 - Clearly, no matter how precise they tried to be, the instructions for making a peanut butter and jelly sandwich were open to interpretation. Ask the students to brainstorm how we could overcome this problem so that a computer could follow the instructions and make a perfect sandwich each time.
 - Guide the students toward the idea that we need a better “language” than English for describing the instructions. This is, in fact, the idea behind a computer program. There is a limited set of instructions which define very precisely what the computer does. For example, we can have a computer turn on a “dot” of a specific color in a specific location on the screen. By having the computer turn on many different dots in different colors, we can have the computer draw a picture. Note though that we don’t have an instruction for the computer to “draw a picture of a house” as that’s much too general and too open for interpretation.

Resources:

- <http://www.justriddlesandmore.com/direct.html>
The basis for the “following directions” quiz (the quiz was modified slightly.)
- Following Directions Quiz
- Drawing Pictures Activity
- Bread, peanut butter, jelly, and a knife.

Following Directions Quiz

Directions: You have a 5 minute time limit to complete the parts of this quiz. Carefully read all of the parts of the quiz before doing anything. In order to ensure the accuracy of this quiz, you should not use more than the allotted time of 5 minutes. Good Luck!!

You may begin now!!

1. Write today's date—month-day-year in the top right hand corner of your quiz paper.
2. Write the answer to the following multiplication problem directly underneath the date on your quiz paper— $6 \times 5 = ?$
3. Write the name of the month that begins with the letter "D" in the top left hand corner of your quiz paper.
4. Add 15 to the answer you got in part #2, and write this new total directly underneath your answer for part #3.
5. In the lower left hand corner of your quiz paper, write the names of your favorite singer and your favorite group.
6. Just above your answer to part #5, write "This quiz is very easy."
7. In the lower right hand corner of your quiz paper, draw a rectangle and inside the rectangle draw a five pointed star. The size of these drawings is not important.
8. Directly above your answer to part #7, draw a row of three small circles. Once again, size is not important.
9. Write the name of the first president of the United States on the back of your quiz paper anywhere you choose. If you don't know who this is, write your own name instead.
10. Write the name of any country that begins with the letter "I" directly underneath you answer to part #2.
11. Stand up, shout "hooray!", and sit down.
12. Take the number of dwarfs in the Snow White story and add it to the number of bears in the Goldilocks story. Divide by 2. Write this total in the approximate center of your quiz paper.
13. Think of a number between 1 and 50. Double that number. Add 20. Add 6. Subtract 17. Subtract 9. Divide by 2. Write this number on your quiz paper directly underneath your answer to part #11.
14. Now that you have carefully read all of the parts so far, and you have not carried out any of the actual work, skip the next 2 parts and go back and only complete part #3.
15. The name of the first president of the United States is George Washington. He was president from 1789 until 1797. Add the 2 dates together to see if the total is less than 5000.
16. You should not be reading the end of the exam before the beginning of the exam, but now that you are here you have just wasted some of the time you may need to complete the quiz.

Drawing Pictures Activity

1. Draw a picture of a house in the middle of the page.
2. Draw a picture of a stick figure father, mother and daughter.
3. Draw a picture of a mustang next to the house.
4. Draw a picture of the sun in the sky.