Teacher's Name: Ticey Little

Domain: Exploring Computer Science

Date Range: October 28, 2024 – November 1, 2024

ACOS Standard: 2&3- Explain the concept of a computer program.
Research technological impacts on society.

Student Friendly Outcome: **I CAN** explain the concept of a computer program.
I CAN research technological impacts on society.

Monday	Tuesday	Wednesday	Thursday	Friday
Following directions Quiz (10 minutes) Drawing directions activity (15 minutes) Discussion directions as they relate to coding (15) Designing a program (15 minutes)	Finish designing a program (10 minutes) Running a program (20 minutes) Being more precise with instructions (25 minutes)	Journal entry (10 minutes) Think - Pair -Share (20 minutes) Final Project Intro (25 minutes)	Journal entry (10 minutes) Research (100 minutes)	Presentations (55 minutes)

Instructional Lesson # 12. Days 29-30

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:

Segment	Reason/Purpose
Day 1 Following directions Quiz (10 minutes) Drawing directions activity (15 minutes) Discussion directions as they relate to coding (15) Designing a program (15 minutes)	Level up the importance of precise directions for computational thinking Design a program written with computational thinking.
Day 2 Finish designing a program (10 minutes) Running a program (20 minutes) Being more precise with instructions (25 minutes)	Test a program written with computational thinking. Improve on program design using iteration.

Student Activities:

Day 1

- Complete following directions quiz.
- Complete drawing pictures activity
- Begin designing a 'program', writing directions using computational thinking

Day 2

- Finish designing a program, then test it by executing it
- Improve your program by being more precise with instructions for your program

Teaching/Learning Strategies:

Day 1

- Following directions
    - Distribute copies of Following Directions Quiz (see below) 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.)
- Complete the Drawing Pictures Activity.
    - Give students about 10 minutes to complete the Drawing PIctures Activity (See resources.)
        - 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 and allow for discussion.
- Discussion
    - 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
    - This is going to be an iterative process. Students will write programs, you will test them by acting them out, and they will revise. This will be repeated as you see fit.
    - In groups, ask students to write down a set of instructions for a computer to make a peanut butter and jelly sandwich. Give them 5 minutes to write down these instructions on a poster.
    - *(Check in advance to determine if any students have peanut allergies. Other spreads can easily be substituted. Teachers have used cold cuts and ice cream sandwiches, or have not used food at all. You can have students write directions for any task you would like, as long as you can act it out.)*

Day 2

- Finish designing a program
    - Collect the instructions. You will act these out next.
- Running (testing) 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. Most groups will want their instructions tested.
    - 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.
    - Students should update their posters using sticky notes to improve their 'programs'.
- Repeat as necessary within time limits.
- Journal: How does today's lesson relate to computer science? What is important when giving instructions?
    - 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 that defines very precisely what the computer does. 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. This is also a good place to discuss iteration, failure and testing.

- Discussion: How is machine learning related to giving instructions to a computer such as those we wrote in this lesson?
    - Teachers can also revisit the discussion of language from the Meeting of Native Peoples activity in the 'CSDT' lesson

Resources

- Following Directions Quiz
- Drawing Pictures Activity

Teacher Reflection Notes

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 X 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 your 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.

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 house in the middle of the page.
2. Draw three stick figures who live in the house.
3. Draw a letter near the house.
4. Draw a sun in the sky.

Instructional Lesson # 13. Days 31-34

Topic Description: Students will work in small groups to research an aspect of technology and its impact on society. They will analyze the positive and negative impacts with suggestions on how to minimize the negatives.

Objectives

The student will be able to:

- Research technological impacts on society
- Evaluate resources for credibility
- Collaborate with peers in creating a presentation
- Present information to peers
- Discuss the positives and negatives of a technological innovation or invention

Outline of the Lesson:

Segment	Reason/Purpose
Day 1 Journal entry (10 minutes) Think - Pair -Share (20 minutes) Final Project Intro (25 minutes)	Students will reflect on what they have learned in this unit and determine the positive and negatives
Day 2 /3 Journal entry (10 minutes) Research (100 minutes)	The journal will be a review on evaluating sources before students conduct research for their final projects.
Day 4 Presentations (55 minutes)	Students will present their information to the class.

Student Activities:

Day 1

- Complete journal entry.
- In groups, students will create a visual representing one positive and one negative impact of one of the discussed answers for the journal.
- In groups students will begin the final project

Day 2/ 3

- Complete journal entry.
- Students will research and create a presentation for the final project.

Day 4:

- Students will present their final projects.

Teaching/Learning Strategies:

Day 1

- Journal Entry: *What are 3 technological inventions or computational innovations that have impacted society?*
    - Throughout the unit, students should reflect after each lesson on the technological topic that was discussed and how it impacted society. If students get stuck, teachers can prompt questions about societal shifts of economic impacts from their chosen topic. They can reflect on that or bring in outside knowledge to answer this question. Teacher can create a list of answers that would be appropriate for the final project.
- Think - Pair -Share
    - Discuss with your group and pick one to explain its impact. Create a visual including one positive and one negative. Students will share with the class.
        - Possible probing questions during group work time
            - Do you have any experience with this topic?
            - Has your experience been positive or negative?
            - Does everyone have that experience?
            - Are there any groups of people that have a negative experience?
            - Are there any groups of people that benefit from it?
    - Students will do a gallery walk and leave feedback for other groups.
- Final Project Intro
    - Introduce the final project to students. Students can choose to do the one that they discussed, one from the list compiled during the journal, or choose an option given by the teacher.

Day 2 /3

- Journal Entry: *What are three things to look for when checking the credibility of a resource?*
    - Teacher keeps track of the discussion to create a checklist of what students should keep in mind when doing research.
    - Teacher tells students to look back at their rubric for evaluating websites from lesson #5.
- Research
    - Students will have approximately two days to research and create a presentation for the final project. Each group should be divided in two with half researching the positives and half researching the negatives. Together they will decide the best ways to minimize the negatives.

Day 4:

- Presentation
    - Students will present their information to the class. This can be done as a gallery walk or a traditional presentation to an audience. Students can ask questions and offer

suggestions to each other.
    - Possible discussion questions:
        - Does anyone have any experiences with _____? Was it positive or negative?
        - Does this relate to anyone else's topic?
        - How else might you negate the drawbacks?
        - Are there any other positives not mentioned?
- Reflection Questions for Teachers to continue discussions into the next units:
    - What topics were successfully discussed?
    - Were there any guiding questions that helped with discussions?
    - Are there any topics that needed more support than others?
    - How might you continue these conversations

Resources:

- Final Project Societal Impact of Technology
- Final Project Sample Rubric

Teacher Reflection Notes

Final Project Societal Impact of Technology

In your groups, research one technological invention or computational innovation and its impact on society. This can be an innovation that we have discussed in class, that you have written about in your reflective journals, something else that you find interesting or have previous knowledge on. Half of your group should research the benefits, while the other half should research the drawbacks. As a group, you will need to decide on ways to minimize the negative impacts on individuals.

Possible, but not limited to, these Topics:

- Artificial Intelligence
    - Automated Ethics
    - Use of robots
- Self-driving cars
- Social Media
- Sustainability of technology vs. hardware advancements
- Online Security
- Spread of information
- Changes in communication

Research

Research three benefits or drawbacks of your group's selected topic as well as best ways to negate the negatives. While researching, check the credibility of the website and the information being given. Each side should have a minimum of three sources. Each source should be on the worksheet with an explanation of why it is credible and how it will be used.

Presentation

Each group should prepare a presentation for their chosen topic. The presentation should have a visual. After each presentation, the class will discuss the topic. Be prepared to answer questions from your classmates.

Final Project Sample Rubric

	1	2	3	4
Research	Limited or unreliable sources used for research.	Some credible sources used, but not consistently.	Mostly credible sources used; clear evaluation of their credibility	All sources are credible, reputable, and well-evaluated.
Benefits	Limited or incorrect benefits identified.	Some benefits identified, but lacking depth or accuracy	Thoroughly researched benefits with clear explanations.	In-depth analysis of benefits, supported by evidence from multiple sources
Drawbacks	Limited or incorrect drawbacks identified.	Some drawbacks identified, but lacking depth or accuracy	Thoroughly researched drawbacks with clear explanations.	In-depth analysis of drawbacks, supported by evidence from multiple sources
Strategies to Minimize Drawbacks	Strategies are missing or irrelevant.	Some strategies suggested, but not well-developed	Clear and relevant strategies proposed to mitigate drawbacks.	Comprehensive and well-thought-out strategies to effectively counteract drawbacks.
Presentation	Visual aid is absent or irrelevant to the topic. Presentation lacks quality, effort, and polish.	Visual aid is present but not engaging or supportive. Presentation is somewhat prepared but lacks finesse.	Visual aid effectively enhances the presentation. Well-prepared presentation with good quality.	Engaging and highly relevant visual aid that strengthens understanding. Exceptional presentation with high-quality content and delivery.
Group Interaction and Participation	Lack of collaboration, uneven participation, and disengagement.	Some group members participate, but interactions are limited.	Most group members contribute and interact well.	Advanced: Strong collaboration, active participation, and seamless interactions.