BALL STATE UNIVERSITY – CS4MS+

Additional Activities

12/3/2020
Taken from *Indiana State Computer Science Academic Standards*

http://www.cs.bsu.edu/cs4ms/docs/StandardsResources.pdf

Additional Activities

Abstraction of People

6-8.DI.4

Explore the aspects that all people have. For example, think about how people can be viewed as their mind, their body, or their atomic (biological) makeup. Let students offer their own examples of how humans are abstractions to see if the students understand the concept.

Algorithmic Task Completion

6-8.DI.5

Have students, in groups of 4, decide on a Rube Goldberg machine each to complete an arbitrary task. Instead of having a student design a full machine, students will draw a piece of the machine. Then, the students will rotate their paper right in their group. The next student will draw another piece to the machine. When the student gets their paper back, it should be a completed Rube Goldberg machine that completes their task. You can have a kind of bank of suggested ideas of pieces of the machine, such as a marble run or a lego robot kicking a ball.

Animal Classification

6-8.DI.2

6-8.DI.3

Use a flowchart to classify an animal into a class and species. Assign each student an animal and have them find the class and species based on the sorting network. This activity can be incorporated into science classes as well.

Binary Bracelets

6-8.DI.3

Have students create bracelets using the first letters of their first names. The following worksheet from code.org explains what beads correspond to each letter:
https://code.org/curriculum/course2/14/Activity14-BinaryBracelets.pdf
This project can also be accomplished using string and black and white beads.

Board Game Instructions

6-8.DI.1

Divide the class into small groups or pairs. Assign each group a card or board game, and have the students write down step-by-step instructions for the game using their memories. As a class, use the board game pieces or cards to play the game following the students' specific instructions. Determine whether the instructions for the game were written down clearly and what steps were included in the rules for playing each game.

Circuit Board Math

6-8.DI.5

Have students build an addition circuit to demonstrate to students how a computer does math at it's core. See the following online resource: *http://www.snapcircuits.net/*

Computational Differences

6-8.DI.4

Demonstrate how a computer program may convert a decimal number to a binary number. Then demonstrate the steps of the conversion on the chalkboard or dry erase board. Compare the easiness and the directions that are involved with both procedures.

Computer Component Sorting

6-8.CD.1

Take small paper squares and write computer components on each square. Distribute the squares to the students and have them sort the squares as to whether the component belongs to the software or hardware category.

Dark Classroom

6.8.IC.2

Experience a classroom without technology for a brief period of time. Have all students disregard electronic devices, turn off lights and computers, and hold a lecture without technology. See what changes and whether or not there are advantages or disadvantages to learning in an environment with technology. Do students seem more engaged? Are questions harder to answer? Is it more challenging to take notes or stay focused?

Fair Use of Media Files

6-8.IC.1

Identify if the use of a video or audio file is classified as fair use. Find a video on YouTube that may contain copyrighted material. Have the students identify the author of the video and determine whether the material is fair use or not.

Focused Feedback

6-8.NC.2

At the end of an activity, have students provide feedback and instructions to their peers. Encourage constructive criticism on topics in the class, such as algorithm design. One approach is to have students write feedback for students' projects on sticky notes and to have the responses hung on the board beside the project. Have students discuss what their peers did well and where they may need to seek improvement. Brainstorm ways as a class that the students can improve their work.

Future Technology

6.8.IC.2

Brainstorm and predict the future of technology. Have students draw pictures of what they think is going to happen next in technology, and devise a path for getting to this step. What is this new technology going to accomplish? Who will use it? Are there known consequences of this tool if it becomes integrated in the future society?

Hands On Troubleshooting

6-8.CD.2

Attempt to recreate everyday computer issues and have the students resolve the problems. Disconnect computer cables, if applicable, and have the students put the computer back together. Have students check for software updates and determine if any applications are outdated.

Human Bar Graph

6.8.PA.1

Have students line up along a whiteboard or blackboard in order from shortest to tallest. Mark each of their heights on the board. Once all of the students' heights has been marked, have the students move back to see the bar graph they created as a class.

Human Network

6-8.CD.3

Build a human network by having students stand in a line. Transport a verbal message from the first student through the last by having them whisper the phrase to each other. At the end of the line, determine whether the message changed. Repeat this process using a written message on a piece of paper. Have students pass the paper down the line. Which process was the most efficient? What must be done to ensure the information retains its original meaning? Are there any ways to guarantee that the information hasn't changed by the other end of the human network?

Intended Message Tone

6-8.IC.1

Determine the intended message tone from a written format and predict how the message will be received. Read a message in different emotions (angry, happy, hopeful, sad), and notice the changes that the reader may sense.

Legitimacy of Mail

6-8.IC.1

Collect examples of junk or spam mail in various mediums (email and physical mail). Have the students identify the sender, subject, and intentions of the mail. Have the students determine the trustworthiness of the mail and whether actions need to be taken (replying or blocking email).

Lego Structures

6-8.DI.1

Divide the class into pairs and give each student the same collection of Lego blocks. Have the students sit back-to-back so that they are not able to see what the other is doing. Have one student build a Lego structure. Then have the student give directions to the second student to build an identical Lego structure. After a few minutes, have the students compare their structures. Compare the results based on the order and clarity of directions. An additional approach to this assignment would be to use drawings or folded paper instead of Lego blocks.

Magazine Credibility

6-8.IC.3

Distribute magazines and tabloids around tables in the classroom. Determine what stories contain trustworthy information and which ones are not credible. To relate this activity to English courses, have the students create citations from the magazine articles they are using and ask how the information they are reading is useful. Should the information from the magazine be used in a research essay? How believable are the articles? Who is the target audience for this literature?

News Biases

6-8.IC.3

View news recordings from different news networks in order to identify political biases. Ask students what personal beliefs may influence the author's interpretation of the current event.

Objects and Emotions

6-8.CD.4

Have an inanimate object in the center of the room. Think about how the object may be personified and what feelings the object may appear to have. For example, consider a stuffed animal toy or a small robotic toy. Are the emotions genuine? How do human emotions differ from machine emotions?

Program Data Path

6-8.CD.1

Draw out the data path for what happens when a person clicks on a program to run it. Show that when a user clicks on a program, the computer will register the click, copy the file from the hard drive into RAM, and run the program. This activity can be drawn on whiteboard, blackboard, or any computer. Students can try to guess the path to start and the teacher can show the correct path. See Wiki Page for more information about how a program executes.

Replicated Troubleshooting

6-8.CD.2

Create a paper diagram labeled with parts of a machine or process. This could even apply to everyday processes, such as washing your hands or making a peanut butter and jelly sandwich. Label each piece of the diagram with its specific function. Remove one step in the diagram, and show how it breaks the system. Hide the removed piece of the process or machine and have students try to figure out what is missing.

Representing Data

6.8.PA.1

Have the students measure some arbitrary data (i.e. arm length, foot width, how far tables are away from the wall, how many siblings each student has, etc.). Compile all of the student's data into a single list. Teach students how to use a program like Excel or Google Sheets. Have them turn the data into different graphs and charts to represent the data. Show why differences in graph types and differences in the data will create differences in the results.

Technology Timeline

6.8.IC.2

Create a paper timeline of technological advancement. Get a large strip of paper and label it with dates. For example, the timeline may start in the 1800s and progress to modern day. For each technological invention, have students approximate where on the timeline the technology originated. Chart the dates for each evolving technology leading to modern technology. Possible technological inventions to include are the microwave oven, the iPod, the first cell phone, and websites such as Wikipedia or Google.

Troubleshooting Solutions

6-8.CD.2

Propose various computer issues and ask students how they would resolve the problems. If students have multiple solutions to the same problem, have them evaluate the solutions to determine which will be the most effective.

Further Resources

Name	Homepage	Focus	Paid Material	Coding Specific	Accounts
Alice Programming	http://www.alice.org/	Grades 3-12		Yes	No
Code Academy	https://www.codecademy.com/		Yes	Yes	Yes
Code Avengers	https://www.codeavengers.com/		Yes	Yes	Yes
Code School	https://www.codeschool.com/		Yes	Yes	Yes
Code.org	https://code.org/				
CodeCombat	https://codecombat.com/	Grades 4+	Yes	Yes	Yes
CodeHS	https://codehs.com/	High schoolers	Unsure	Yes	Yes
CS Teachers Association	https://www.csteachers.org/	Teacher Help			Yes
CS Unplugged	http://csunplugged.org/	No technology			
Free Code Camp	https://www.freecodecamp.org/			Yes	Yes
GitHub	https://github.com/			Yes	Yes
HackerRank	https://www.hackerrank.com/	Experienced coders		Yes	
Khan Academy	https://www.khanacademy.org/computing/computer-science	General			
Lightbot	http://lightbot.com/	Simulations	Yes		
Nextech	http://nextech.org/programs/csedweek/	Indiana			
Rosetta Code	https://rosettacode.org			Yes	
Scratch	https://scratch.mit.edu	Kids		Yes	
Spritebox	http://spritebox.com	Kids	Yes		
SQLZoo	http://sqlzoo.net/			Yes	
Teaching Kids Programming	http://teachingkidsprogramming.org/	Kids			
The Odin Project	https://www.theodinproject.com/	General		Yes	
Treehouse	https://teamtreehouse.com/		Yes	Yes	Yes
Tynker	https://www.tynker.com/	Grades 3-8	Yes	Yes	Yes
Upskill	http://upskillcourses.com/	General		Yes	