Using Blooms Taxonomy and the SAMR Model to Map Content and Technology Standards

Making Connections

The purpose of this activity is to begin making connections between your content standards and the new K-8 Computer Science Standards or 9-12 AP Computer Science standards. As you think about integrating technology, you ALWAYS want to start with the content standards and then build from there. Think about how you normally teach the content standards and then determine if there is a place where the computer science standards can be intertwined. For example:

- Math: There are Algorithms and Data standards for both math and computer science.
- Social Studies: There are Impact of Computing standards for both the social studies and computer science.
- Science: There are Communication standards for computer science that could be matched to collecting or disseminating information about content learned in the science curriculum.
- English Language Arts: There are Digital Literacy standards for computer science that could be matched to language standards of writing and presenting information.

For this activity:

1. Find the content standards for your grade level or subject- https://ed.sc.gov/instruction/standards-learning/
2. Choose 2-3 standards from each of the core subjects and enter them in the SC Content Standards column
3. Choose 1-2 computer science standards from that same grade level and enter them into the Computer Science Standards column
   - K-8 Computer Science Standards- https://ed.sc.gov/scdoe/assets/File/FINAL_South_Carolina_Computer_Science_and_Digital_Literacy_Standards_SBE%20Approved_May_9_2017.pdf
   - AP Computer Science Principles- https://secure-media.collegeboard.org/digitalServices/pdf/ap/ap-computer-science-principles-course-and-exam-description.pdf
   - AP Computer Science A- http://media.collegeboard.com/digitalServices/pdf/ap/ap-computer-science-a-course-description.pdf
4. Match content standards to the computer science standards
5. Work with a partner to determine if your choices make good matches

SC Content Standards	Computer Science Standards
2.MDA.4 Measure to determine how much longer one object is than another, using standard length units	**2.DA.2.2 Collect, organize and display data using object graphs, picture graphs, and bar graphs**

Creating Activities Using Blooms Taxonomy as a Guide

The purpose of this matrix is to help you begin to plan out how you can create activities that match your identified content and computer science standards. Good activities are good activities and will stand on their own when technology tools are introduced. Focus on creating a good activity.

At this point in thinking about your activities, you want to pay attention to Blooms taxonomy to help you determine what your activity idea(s) might look like. Use the Blooms verbs to help guide your description of what students will be able to do as a result of this integrated activity. **DO NOT include a specific technology tool at this point in planning for your activities.**

For this activity:

1. Choose 5 of your standard sets from above and copy to the first column
2. In the first column, underline the Blooms verbs in both sets of standards
   - Blooms Verbs- http://www.apu.edu/live_data/files/333/blooms_taxonomy_action_verbs.pdf
3. Identify where the verbs fall on the levels of taxonomy and place in order from lowest to highest level of thinking in the middle column
4. Write an activity idea (or more than one) that uses the Blooms verbs as guidance. Make sure that verbs from all standards are represented in your activity idea(s).
5. Work with a partner to review the activities. Your partner should help you determine whether the activities match all standards.

SC Content Standards and Computer Science Standards (copy from above)	Bloom's Connections	Activity Idea(s)
2.MDA.4 Measure to determine how much longer one object is than another, using standard length units **2.DA.2.2 Collect, organize and display data using object graphs, picture graphs, and bar graphs**	**Organize (Apply)** **Measure Determine (Evaluate)**	**Measure the length of my classmates' shoes and organize the data to show the number of students who have the same shoe lengths. Create at least two different types of graphs to display this data. Determine which graph best represents the data collected. Write 2-3 word problems based on the data in the graph that will help others determine differences in the lengths of classmates' shoes. Write the answers to the problems.**

Using SAMR to Ensure Activities are Student Centered

The purpose of this matrix is to help you think about whether or not your activity is student- or teacher-centered, and whether or not technology use for this activity is being forced, or whether it fits into the activity with ease. When technology is forced, the end product does not usually turn out how you expect, and the level of student learning is not high. **DO NOT include a specific technology tool at this point in planning for your activities.**

For this Activity:

1. Choose 3 activity ideas from above
2. Copy your content and computer science standards to the first column
3. Copy the activity ideas into the second column
4. Determine what your activity idea would look like at each of the SAMR levels- http://www.schrockguide.net/samr.html
5. Highlight in yellow the SAMR level that best matches your idea of teaching this content standard in an ideal situation.
6. Keep in mind: If you are teaching a math skill like counting 1-10, you may want to teach at a substitution level because you are focusing on students recalling and remembering information quickly. If you are teaching a difficult concept like the causes of the Civil War, you may want to teach at the modification or redefinition level to help students think through difficult concepts on multiple levels. There will be no penalty if all of your activities fall at the same level, this is just a way for you to think through if this is really how you want instruction to look in your classroom.
7. Under your activity, write a short justification for why you will teach these standards at this SAMR level.

Content AND Computer Science Standards (Copy from above)	Activity Idea(s) (Copy from above)	Translate Activity Ideas into the SAMR Levels (How will students complete the activity at each SAMR level)
2.MDA.4 Measure to determine how much longer one object is than another, using standard length units 2.DA.2.2 Collect, organize and display data using object graphs, picture graphs, and bar graphs	Measure the length of my classmates' shoes and organize the data to show the number of students who have the same shoe lengths. Create at least two different types of graphs to display this data. Determine which graph best represents the data collected. Write 2-3 word problems based on the data in the graph that will help others determine differences in the lengths of classmates' shoes. Write the answers to the problems.	*Substitution* **Students are given a worksheet with 2-3 pre-made charts that they need to color in on their device to represent the data they collected. Students are given a worksheet where they can type their word problems.** *Augmentation* **Students use a pre-made template in a spreadsheet to create their graphs and a word processing tool to write their word problems** *Modification* **Students will collect data to show the length of 10 classmates' shoes in inches, and will digitally represent the data. Students will create two graphs, to communicate how many students have the same length shoes. Students will create 2-3 word problems using their data that other classmates will solve which include differences in the lengths of the data collected. Example Word Problem: What is the difference (in inches) between the longest and the shortest shoe?** *Redefinition* **Students use a spreadsheet to enter data collected, and create their own graphs to display information. These graphs are shared with the class in a presentation explaining the data that takes into account their audience. Students will create an online quiz to publish their word problems and collect results from their classmates to see how many understood their data and associated word problems.**

		Substitution
		Augmentation
		Modification
		Redefinition
Justification:		
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Justification:		
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		Augmentation
		Modification
		Redefinition
Justification:		

Choosing the Appropriate Technology Tool for the Activity

The right technology tool can make all the difference between creating a successful activity or one that fails miserably. In this matrix, we will be looking at the activity and investigating options for which technology tool would best suit the activity. Many times the tool is the starting place for the activity, and this is where the consequences can be dire. Trying to force the tool to match the activity is a sure way for the activity to fail in your classroom.

For this Activity:

1. Copy the standards to the first column
2. Copy the SAMR level you identified to the second column
3. Identify the technology tools you might be able to use to complete the activity and add to the last column. Remember to include the URL to where you found information about the tool so that you can go back and look at it for references like tutorials, cost, troubleshooting, lesson ideas, etc.
4. After looking at and trying the tools, highlight the tool(s) you would use in your classroom to complete the activity.

RESOURCES

Common Sense Media- https://www.commonsense.org/education/reviews/all
Common Sense Media- https://www.commonsense.org/education/lesson-plans
Common Sense Media- https://www.commonsense.org/education/standards/common-core
Kathy Schrock's Guide to Everything- http://www.schrockguide.net/
EDTech Blogs- https://www.winthrop.edu/itc/default.aspx?id=25014

SC Content Standards and Computer Science Standards (copy from above)	Activity Idea at the SAMR Level I Want to Teach (copy from above)	Technology Tool(s) Needed to Teach at This Level
2.MDA.4 Measure to determine how much longer one object is than another, using standard length units **2.DA.2.2** Collect, organize and display data using object graphs, picture graphs, and bar graphs	*Modification* **Students will collect data to show the length of 10 classmates' shoes in inches, and will digitally represent the data. Students will create two graphs, to communicate how many students have the same length shoes. Students will create 2-3 word problems using their data that other classmates' will solve which include differences in the lengths of the data collected. Example Word Problem: What is the difference (in inches) between the longest and the shortest shoe?**	**National Library of Virtual manipulatives- Graphs** http://nlvm.usu.edu/en/nav/category_g_1_t_5.html **Curious Ruler App-** https://www.commonsense.org/education/app/curious-ruler **Hohli Chart Builder-** http://charts.hohli.com/new/ **NCES Graph Maker-** https://nces.ed.gov/nceskids/createagraph/ **Pie Color-** http://piecolor.com/ **Microsoft Excel** **Microsoft Word**

Justification: The NCES Graph Maker is an online tool that allows students the opportunity to create simple graphs quickly. This is easier than using Excel to create the graph. For the word problems, I will have students use Microsoft Word since this is a program we use on a daily basis.

Justification:		
Justification:		
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