Lesson Plan-Computer Science

Lesson Topic: Micro:bits

Grade Level: 6-8

Subject Area(s): Computer science

Lesson Description (Abstract): Students will choose their adventure to learn about micro:bit and their application

Learning goals/outcomes:

- Students will learn basic skills of using a micro:bit including basic inputs.
- Students will apply what they learned about micro:bits to create a new product.

Wyoming Standards:

Computing Systems-Devices 6.CS.D.01
Computing Systems-Troubleshooting 6.CS.T.01
Algorithms & Programming-Algorithms 6.AP.A.01
Algorithms & Programming-Control 6.AP.C.01
Algorithms & Programming-Program Development L1.AP.PD.03
Impacts of Computing-Social Interactions 6.IC.SI.01

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Teacher Planning

Equipment/materials needed:

- 1 microbit per student
- Recommended-a storage tray(or something similar) for the students to keep their devices more accessible and organized
- Device to use the online coding site, makecode.org
- Materials to build the final product depending on the parameters the teacher sets. This could include cardboard, tape, paint, makers, LEDs, sensors.)

Time required for lesson:

5-7 hours depending on the amount of time dedicated concurrently, the amount of tutorials needed and expectations for the final project. 2-3 weeks for an elective class.

Setup required:

- The teacher will need to be familiar with the microbit and coding
- Set up a microbit with accessories needed for the selected lessons.
- Share the Google Slide presentation (make changes as necessary to the template)

Technology

Materials
Device with the browser to create and download the code
1 microbit/student is preferable

Instructional Plan

Prior Knowledge Needed

- Foundational knowledge of block coding
- Foundational knowledge of basic circuits
- Unplugged activities prior to the micro:bits could be beneficial.

Benefits/Explanation/Real-World Connection:

Using the micro:bits is an opportunity to model how this small device is essentially a computer and make connections to how this is basically the same thing used in numerous other technology devices. Students will have the opportunity to make a choice of a project they can create using the microbit in a different way.

Activity (Activities may need to be adjusted depending on student background and familiarity with micro:bits and computers)

1. Pre-survey to check for understanding of what computer science is and and where they have seen it used in society, the importance of computer science.
2. As a class, brainstorm all the things they can think of that are operated by a computer. Select items to discuss how they are used in the industry, why they improve how the work is done and could it be improved.
3. Introduce micro:bits and explain their use and purpose.
4. Develop and class guidelines for using the micro:bits (organization, power, cleaning, etc)
5. Present a basic lesson on how to use the micro:bits. Use the videos and information from this link. Overview user guide. Include the vocabulary and terms needed to complete the lessons (LED, micro USB, hex file, file management).
6. Demonstrate and check for understanding on how to save, download and transfer program files.
7. Introduce activity and the Google Slides. Share it with the students. Determine how students will show understanding or proficiency at each stage (send the code, take a picture of the code, Flipgrid).
8. Students may work independently through the Google Slides with checkpoints as determined by the teacher.
9. Students will create a short video or in-person presentation to share with peers and receive feedback to improve the final product. Feedback could be shared in responses to the video, comments on a document or in person.
10. Present final product to the class or other selected audiences.

11. Revisit the first question. How have student views changed on how computers are used and where.
12. Optional. Complete a project reflection on their learning.
13. Post survey.

Closure
Reflection on the final project. Create a gallery walk or exhibition for students to share their creations.

Assessment

This project can be assessed in a variety of ways and can include assessments from other content if you include written narratives, summaries or instructions. Levels 1, 2 and 3 can be assessed through a checklist, observation and demonstration. The final project can be assessed through demonstration, reflection and the rubric.

Supplemental Information

Modifications:

- This lesson could be adapted to grades 3-5 with guidance and experience
- This lesson could also be adapted to be used with the Makey Makey kits
- Students could be paired to complete the lessons together.
- The Google Slides could also be changed to a badging system and students could earn badges through the activities.
- This lesson can be shortened, changed or adapted to meet the learning level of the students. If changes are made, don't forget to update the links.

Resources:
Getting started-links to videos and information.
LEDS and Buttons information link
Sensors information link
Radio and pins link
Coding blocks reference
Using CS standards with microbits link

Additional Information
Lesson plan was developed using lessons from https://makecode.microbit.org/#
Micro:bit provides numerous resources, guides and videos, this is just one way to use their information and put it in an organizational format for students.