Bay County Scientist in Residence Project
Lesson Plan

Session 1: Monday, February 13 (1-4 PM central)
Topic: 3D Printing, Part I
Materials Needed: 3D Printers, PLA 1.75 mm filament, Cura or other compatible slicing software pre-loaded on laptops, Wi-Fi access

Learning Objectives related to 3D Printing (from grant application):
1. Students will be able to select a model from the sharing site Thingiverse and print it on a 3D printer.
2. Students will be able to use software to create a 3D design with multiple parts, print it on a 3D printer and assemble the parts.
3. Students will be able to demonstrate how to use a 3D printer, including how to change filament reels and troubleshoot common technical problems.
4. Students will be able to discuss the legal, intellectual property, and environmental issues related to 3D printing.

Assignments to be completed BEFORE this class:

1. The Scientist in Residence Grant award includes funds to purchase 3D printers which will be in use by the public beginning August 2017. Before we can make 3D printers available to the public we must have a policy in place. Please read the following articles and library policies and consider the questions below.   Email your thoughts on the policies and questions below. Your comments will be incorporated into the policy developed for the Northwest Regional Library System.

    Read the articles below, which are from the American Library Association series, *Progress in the Making: A series of 3D printing tip sheets for library professionals*:

    [Progress in the Making: An Introduction to 3D Printing and Public Policy](...) (September 2014)

    [Progress in the Making: 3D Printing Policy Considerations through the Library Lens](...) (January 2015)

    [Progress in the Making: Librarians' Practical 3D Printing Questions Answered](...) (May 2016)

    Read the library policies below. What do you like or not like about these policies? Do they provide the guidelines you need to implement use of 3D printers? What questions do you have after reading them? Read these not only as a staff member, but also as a member of the community who wants to use a 3D printer.

    Sacramento (CA) Public Library, http://www.saclibrary.org/about-us/policies/3d-printer-policy-and-procedure/

Tampa-Hillsborough County (FL) Public Library,
http://www.hcplc.org/hcplc/thpl/policies/1100/1113.html

Cranston (RI) Public Library, http://www.cranstonlibrary.org/3d-printing

Jericho (NY) Public Library, http://www.jericholibrary.org/policies/3D%20printer%20Policy.pdf

Consider the following questions regarding use of 3D printers for the public:

- Will the public have private access to 3D printers? (Unsupervised use of equipment)
- Will the public be required to use Library provided filament or can they bring their own? (There are safety issues regarding different types.)
- Will access to library 3D printers be free or will there be a charge? If there is a charge how is the amount determined?
- If the library provides the filament, how will this expense be funded?
- If the library does not provide the filament, what is the process of ensuring library-approved filament is used?
- Will there be restrictions on what types of files may be printed? (Dangerous items such as weapons, or designs that violate copyright?) If so, how will staff monitor this?
- Where, in the library, will printing be permitted? Is there a designated location?
- Will access to 3D printers be available during all operating hours or specified hours?
- Will there be an age restriction for use of the printer?
- If users can sign-up for use of the printer, what is the length of each session? Is there a limit on the amount of time each person can use the printer?
- Should there be a limit on the duration of each print job? (maybe should not exceed reserved session)
- Will printing be allowed if no one is monitoring the machine (such as after hours for long duration print jobs)?
- What else should we consider before writing a draft policy?

2. Watch the following videos:

   3D Printing Basics, https://youtu.be/cn2edTT3JUI (4:00)

   Mashable 3D Printing, https://youtu.be/Vx0Z6LplaMU (4:49)

   Intro to Filaments, https://youtu.be/vy26jm9zYto (4:49)

   Downloading from Thingiverse (Basics), https://youtu.be/l3TnxxFWnd8 (2:05)

   Thingiverse Walkthrough (More In-Depth), https://youtu.be/wkHnKJrIuSA (watch first 8:25)

Class Outline for 3D Printing, Part I:
- Introductions
- Create a 3D design together and save as an .stl file
- Break into groups and print the .stl file on a Printrbot printer
- In groups, select a design from the Thingiverse website and print it on a Printrbot printer
- Discuss the homework assignment: pros and cons of different types of filament; what rules should we impose on public use of 3D printers?

Post-class Assignment:
- Post something on the Florida Panhandle STEM Programming Facebook page. This can include photos from class, questions, observations or comments. Participants are also encouraged to post on their organization's Facebook page.
- Each organization represented is encouraged to submit a press release to the media in their area to alert their own communities about this project. (Sarah Burris has created a press release for NWRLS locations which will be available on the project webpage.)