Future Ready Project - BUGS

Teacher Name:		Duration (in minutes):120 minutes (does not include time to print out the bugs)
Grade Level(s): 2	Subject/Course: Library/ELA	Unit:Bug research and writing
Resources needed: (On-site people, facilities, tools, technology, materials, community connections)	*Tinker Cad*; ipads; 3D printer Worked with classroom teacher and technology instructional coach	
Learning Standards: (content + CS & DF)	• CCSS.ELA-LITERACY.W.1.7: Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). • K-1.IC.1 Identify and discuss how tasks are accomplished with and without computing technology. • K-1.CT.4 Identify a problem or task and discuss ways to break it into multiple smaller steps. • K-1.NSD.1 Identify ways people provide input and get output from computing devices. • K-1.DL.4 Use a least one digital tool to create a digital artifact.	
Big Idea:	Can you design a 3D Bug?	
Authentic Purpose: (Why does this matter to your students?)	Students have completed a research unit on bugs. They are familiar with different bugs and their parts and habitats. They are eager to create a bug and are curious about the 3D printer.	
Future-Ready Competencies: ___Collaboration ___Communication ___Critical Thinking & Problem Solving ___Creativity & Innovation ___Other:	Objectives: • Understanding the parts of a bug (e.g., head, thorax, abdomen, legs) • Conducting research on a bug of their choice • Utilizing technology to design a bug model for 3D printing	
Project Statement: (Include: issue, problem or challenge; student role, purpose, beneficiary, and desired outcomes)	Students will be able to design a bug using Design Thinking principles and create a 3D printed bug model.	
Empathy Anchor: (How will students develop empathy and care about this problem)	Students are eager to use the 3D printer and are excited to share what they know and help their peers.	
Public Audience & Reveal: (Experts, audiences, or product users students will engage with during and at the end of project)	Future Ready Showcase	
Knowledge Construction: (How are students going to construct content knowledge and practice it)		Student Assessment:

- Introduction to Design Thinking process
- Brainstorming bug design ideas
- Creating a bug design sketch
- Utilizing a 3D modeling software to design bug
- 3D printing bug model

Opening: The lesson will begin with showing students a variety of bug illustrations and asking them to identify the shapes they see in the bugs. Talk about 3D and 2D shapes. Then, introduce the idea that they will get to design and create their bug using a 3D printer.

Introduction to New Material: The tech coach and I will guide them through the Design Thinking steps using simple language and visuals. We will also give them a chance to explore Tinker Cad and discover how to move shapes and look at objects from different perspectives.

Independent Practice: Students will use a kid-friendly 3D modeling software on computers to design their bug. Each student will then have the opportunity to 3D print their bug model using a 3D printer. Students who finish early are able to help other students troubleshoot their designs.

The bug design and self reflection

Design Process:

1. Discover
2. Research & Empathize
3. Brainstorm
4. Choose
5. Build
6. Test
7. Communicate
8. Redesign

Describe what (& how) students are going to do in each step:

1. Students will look at pictures of bugs and identify shapes they see using 2D shapes and 3D shapes.
2. Students will have an opportunity to explore tinker cad to see how to manipulate the shapes and view them from different perspectives.
3. Students will use a dome shape to create a 3D bug and identify what parts of the bug are in the design (Head & thorax); legs; abdomen.
4. Explain what worked and what didn't work when designing the bug?. What did they notice about looking at the object from different perspectives? What was easy to design and what was tricky? How did they solve problems they had?