

## **Flipped Classroom**

The use of a flipped classroom approach to teaching provides a basis for personalized education customized to student's needs. Reversing the traditional classroom, lecture content is delivered via video, animation, screen casting and audio files at home while content is reinforced through activities and projects during class time. Using this model allows for more teacher interactions, differentiation of instruction, an increase of enrichment activities and support for struggling students (Bergmann & Sams, 2012). Using this flipped model to introduce 3D printing to early elementary students allows teachers to give background information through video content at home and concentrate on the actual fundamentals of printing and construction during class time with teacher support.

According to Bergmann & Sams (2012), the following guidelines should be considered in when incorporating a Flipped-Mastery Classroom model:

- Lessons should have clear learning objectives.
  - The objective of this lesson is to introduce students to 3D printing, safety guidelines, and TinkerCad basics.
- Teachers need to decide which objectives are delivered via digital content and which objectives require direct instruction.
  - Students will learn the foundational background of 3D printing at home via the digital content and use class time for actual hands-on experience and design.
- Teachers should assure students have access to the digital content.
  - If students are unable to access 3D content from home, the teacher will provide opportunities during class time, before and after school.
- Teachers should incorporate engaging in class activities.
  - Students will have hands-on experiences with the 3D printer and use class time to learn the principles of design using TinkerCad.
- Teachers should incorporate multiple opportunities for assessment.
  - Assessments are incorporated into the Edpuzzle video as well as in the online Quizizz. In-class assessments will also be incorporated

Prior to class on Monday, students will sign into their class Padlet account to access lessons 1 and 2.

Lesson 1: Edpuzzle on the introduction of 3D printing.

Lesson 2: Presi on 3D printing safety guidelines.

After students have watched the first two lessons at home, they will explore the 3D printer in class and learn about its parts and how it works. Working in groups, students will create and label a diagram of a 3D printer.

Prior to class on Wednesday, students will sign into their class Padlet account to access lesson 3.

Lesson 3: Edpuzzle on the introduction to TinkerCad.

During class time, students will sign up for a TinkerCad account and complete the first three TinkerCad tutorials on [www.tinkercad.com](http://www.tinkercad.com).

Lesson 4: Quizizz on the basics of TinkerCad (taken at home).

Please use the following link to access the four introductory 3D printing lessons.

<https://padlet.com/stalalai/lcu1rvmorg56>

#### References

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. Eugene, OR: International Society for Technology in Education.