BLOXELS™

5 Day Lesson Plan Summary

This 5 day plan (5 60-minute classes or 3 90-minute classes) will introduce students to the process of **design thinking** using the Bloxels Builder app and Bloxels Box Set. Design thinking is a user-centered (or better put, student-centered) approach for solving everyday problems made popular by the Stanford Design School. Bloxels allows students to experience the entire design thinking process in a short time period. This lesson can also serve as an introduction for content-based enrichment using Bloxels.

* For more information about design thinking in education visit: www.designthinkingforeducators.com

> ➡ **Teacher's Tip**
> This lesson is aligned to the Next Generation Science Standards (NGSS): MS-ETS1-1.
>
> Learn more and watch a video of Bloxels in the classroom at bloxelsbuilder.com/education

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About TAGS
At the beginning of each section we will show you which TAGS are needed with this green symbol.

We found it helpful for students to have a separate notebook dedicated to this lesson. The TAGS serve as a header for the notes students should take in each section. They can be cut out and pasted to the section in the notebook that they will take notes in.

The TAGS can be found in this PDF packet.

Lesson Timeline

We have facilitated this lesson with middle school students during three 90-minute block period classes. The timeline we used is listed below:

- **Day 1:** Lesson Opening & Logbook **TAGS 1-4**

- **Day 2:** Logbook **TAGS 5-14**

- **Day 3:** Logbook **TAGS 15-20**

This lesson could also be facilitated with a traditional schedule (60 minute class). Here is a suggested timeline:

- **Day 1:** Lesson Opening & Logbook **TAGS 1-3**

- **Day 2:** Logbook **TAGS 4-6**

- **Day 3:** Logbook **TAGS 7-9**

- **Day 4:** Logbook **TAGS 10-14**

- **Day 5:** Logbook **TAGS 15-20**

Materials

- Devices with Bloxels Builder app installed

- Bloxels TAGS printed for each student (see included PDF)

- dedicated notebook for each student

- Bloxels Project Rubric (see included PDF)

- Projector (Device adapter optional, ideal for show & tell)

- The "Color Guide" from the Bloxels Guide Book for each student (see included PDF)

- Bloxels Brainstorming sheet for each student (see included PDF)

- Bloxels Gameboard: (one per student recommended, minimum one per group)

- Bloxels Blocks

- Colored Pencils

Understandings, Essential Questions & Objectives

Understandings

Students will understand that...

- Design thinking is a mental model that utilizes rapid prototyping with multiple iterations based around a wealth of user feedback.

- Design thinkers have a bias toward action (versus thinking or "research").

- A good idea is never finished.

- Effective design requires willingness to show users unfinished work.

Objectives

By the end of the unit, students will be able to...

- Explain the design thinking process.

- Describe the steps associated with design thinking.

- Apply design thinking to a challenge.

- Test a design and observe the user's interaction.

- Design a game in the Bloxels Builder app.

- Understanding that design thinking is a mental model that can be applied to everyday challenges.

Essential Questions

- What makes a game fun?

- How can we empathize with a user to design a product?

- How can we use design thinking to innovate?

- How can we utilize user feedback too improve a design?

Engage the Classroom

As students walk in, have the following questions displayed on the classroom board to answer.

1. What is your favorite game to play?

2. Why is this game your favorite?

3. What characteristics make this game fun?

Discuss student responses to the questions. Emphasize that there are multiple characteristics that make a game "fun." (i.e. challenging, funny, etc.)

Unveil the Design Challenge

Classroom Announcement
***This box includes examples of announcements you can make to the class about the upcoming lesson.*

"Your challenge is to design the most fun game. All games you create may be submitted and available to players across the world."

Note: Based on your students' familiarity with Bloxels it may be useful at this point to show them the tutorial videos.

Tutorial Videos
bloxelsbuilder.com/tutorials

Explain the process of design thinking and the steps that will be taken to make a fun game that meets the design challenge goal.

📢 **Classroom Announcement**

"To help us design the most fun game game, we will use a process called 'design thinking.' Design thinking is a problem solving process used to develop new products. In this section you will play test three games and describe what exactly makes a game fun. From there you will ideate/brainstorm game obstacles, develop a prototype game, and have users test it and give you feedback."

Introduce Students to the Rubric

We've observed that when students knew at the beginning how the project will be assessed, they tend to strive for higher quality products. It was also helpful to remind students about each strand of the rubric as that part of the project occurs and before they completed those tags.

Note: Though it's not included it in the rubric, it might be motivating to include a marketing portion of the project where students seek the most game plays and "likes" after it is posted on the Infinity Wall, followed by a discussion of what made that particular game fun.

Introduce the Logbook TAGS

The Bloxels logbook TAGS are used to document the design thinking process students will undertake throughout this lesson. They can be printed on sticker paper or cut & pasted into notebooks as students document the various aspects of their design.

We've had success printing the TAGS on copy paper and having students paste them into composition notebooks as they proceeded through the unit. This allowed flexibility during project documentation, as some students wrote more than others. If your students use some form of notebook or binder, it's likely that the TAGS will be a low-resistance method for documentation throughout the project.
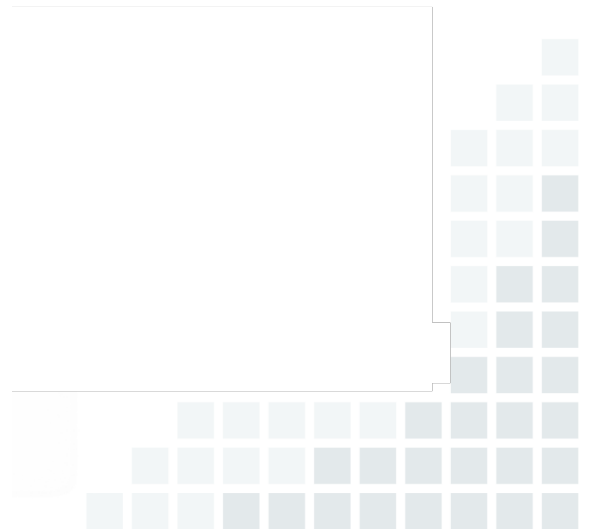
Credit to Dave Baggeroer for the concept of design logbook stickers

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About TAGS
At the beginning of each section we will show you which TAGS are needed with this green symbol.

The TAGS can be found in this PDF packet.

Guidelines: Design thinking starts by gaining empathy for potential product users. To design an effective product, we must put ourselves in the shoes of the users to identify the scope of the challenge.

Conduct Interviews

There are many ways to approach gaining empathy for the game design challenge. We've found it fun to integrate multiple sources for this portion of the lesson.

Students can interview:

- video gamers (friends outside of class)

- game designers

- or each other in class

This is the method for empathy building assumed in the logbook TAGS. If you opt not to use this method, feel free to adjust the TAGS accordingly.

Before beginning interviews, we found it useful to facilitate a mini-lesson about open-ended questions and interview techniques. Example mini-lessons can be found here and here. *Credit: Stanford d.School Wiki*

Following the mini-lessons, pass out **TAGS 1 & 2** for students to paste in their logbooks. We've found that middle school students need about 5 minutes to brainstorm 10 open-ended questions. It can be helpful to have students divide their questions based on the interviewees they were able to schedule.

> **Classroom Announcement**
>
> "Write 5 questions for someone who considers themselves an avid video gamer and 5 questions for a video game designer."

Note: Before this and each TAG, it may be useful to revisit the rubric to set expectations for what is necessary for project documentation.

Example Student Questions

- *"What is your favorite video game? Why?"*

- *"What makes a game fun?"*

- *"How do you feel when you encounter a really difficult challenge in a game?"*

We also found it helpful to roam the classroom and ask students to read questions that they have written down (especially if they are not open-ended questions)

Following the brainstorm process, ask students to read through their questions and put a star by three that stand out as being especially helpful to gaining user empathy.

Once students have written interview questions, pass out **TAG 3**. Students should write the name of the interviewee on the line, and jot down notes during the interview. It may be helpful to model the note taking process before the first interview and explain that not every word of the interview can be documented by hand, but rather just the most important points. Encourage students to organize the interview notes in a fashion that will make it easier to refer back to later.

Repeat the Interview Process

Complete the interviews with **TAG 4 & 5**, then pass out **TAG 6**. Ask students to re-read their interview notes and jot down the three biggest lessons learned about designing a video game.

Example Student Response

Gamers play games for a variety of reasons. Most find them entertaining or relaxing. Some like to play games that are shorter in time, but have high replay value (like Minesweeper) while others enjoy in depth gaming that has a longer play time (like World of Warcraft). Perseverance is important in gaming, but frustrating obstacles can sometimes cause a gamer to give up and quit the game.

Have students play games that have been published on the Bloxels Infinity Wall.

Instruct students to open the Bloxels app and click *Infinity Wall*, where games created by other players are shared. Have students choose three games to play. We've had success giving students 4 minutes to play and evaluate the pros & cons of each game, for a total of 12 minutes.

Roam the classroom and give feedback on the pros/cons students have noted.

Example Student Response

PRO: The enemies in this level made it really intense and exciting!

CON: The hazards were way overdone. It was too difficult to navigate the game, and practice didn't make it easier, just more frustrating.


Classroom Announcement

"If we're going to design the most fun game, we need to know a bit about what is out there. Take 12 minutes to play test three games. Make notes on the handout that include the game title, 'pros,' things you liked, and the 'cons' things you did not like."

Optional: **Student can watch gameplay from other successful platformer games. Video of gameplay can be found on YouTube.**

Bloxels is a "platformer" style game, meaning players guide a character through obstacles to the end of the level by running and jumping on platforms. We've found that it can be helpful for students to observe gameplay from other platformer games like Super Mario Bros. and Metroid to infer as to what made them fun.

Example Student Observations

- *Hidden coins and power-ups can make people want to play the games again and again.*

- *The game starts off very easy and teaches the player how to move/ jump before it goers more difficult.*
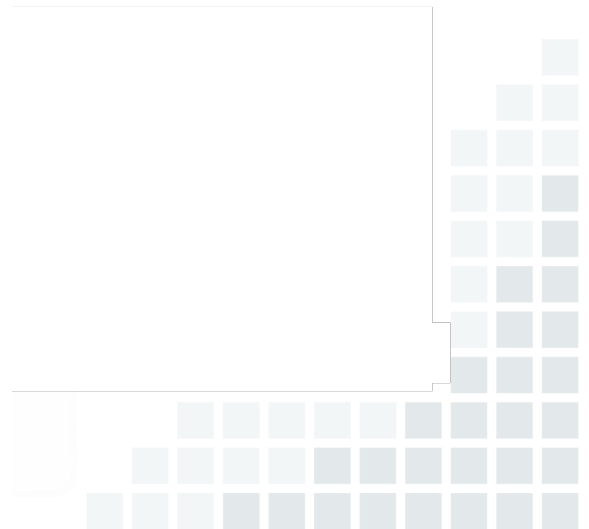
Guidelines: Design is most effective when it is aligned to a short and specific goal that guides the development of a solution. This goal may change throughout the process, but clearly defining an initial challenge will help focus brainstorming of potential solutions.

Define a Challenge

Pass out **TAGS 7 & 8**. Give students 5 minutes to reflect on the observations during the empathy step and define a challenge. Roam the classroom and give feedback that pushes students to be specific with the challenges they define from games they played on the Bloxels Infinity Wall.

📢 Classroom Announcement

"Now that we've gained empathy for our users, the players of our games, let's define what a game needs to be fun. Refer back to our notes from the empathy section. Based on what you learned, you will define the scope of your challenge. We'll use this 'define' step throughout the rest of the design process to guide the design of our game."

Guidelines: Ideation is the creative process of generating ideas. Having an initial collection of numerous, varying and unbounded solutions to the design challenge leads to innovative thought once constraints are in place.

📢 Classroom Announcement

"Now that we have a challenge defined, let's brainstorm obstacles for the games. Take 15 minutes to sketch some example game obstacles. Refer back to the challenge you defined in the last step to help guide your brainstorm. The goal of this step is to have a high *quantity* of obstacles sketched. Since you only have 15 minutes, they may not be of the highest *quality*, but by sketching many ideas, you will have more to choose from when it comes time to design the actual game."

Brainstorm

Pass out **TAG 9** and give students 15 minutes to brainstorm as many game obstacles as possible on the brainstorm worksheet (PDF included in this packet). We've found it helpful to set a goal for the number of obstacles. A dozen obstacles in 15 minutes should be reasonable. Roam the classroom and provide comments that encourage quantity over quality.

Once students have brainstormed potential game obstacles, the next step is peer feedback. Effective design requires willingness to show users unfinished work, and feedback during the ideation step will help ensure student designers are working toward their vision of a fun games.

Note: To promote rapid ideation, and quantity over quality, we've found that using colors during this step is not necessary, and can take away from the focus on ideation. We recommend pencil or black marker.

Feedback

Pass out **TAGS 10-13** and a colored pencil to each student. Students should partner with each other and show the level obstacles that were brainstormed. As a student is receiving feedback, he or she should make notes under the appropriate sticker. The colored pencil can be used to make notes/changes directly onto the brainstormed obstacle ideas so those marking stand out as improvements to be made.

Note: We've found it useful to partner students by the quantity of ideas they brainstormed. A quick tactic would be to have students line up by the number of ideas. Then partner the students with the highest/lowest etc.

📣 Classroom Announcement

"Designers utilize feedback throughout the design process to ensure that their product is meeting the needs of users. It can be uncomfortable to have others look at work that you know is unfinished, but will help ensure that you are on the right track to making a fun game."

Example Student Feedback

These two obstacles are quite similar. Could you add a hazard to make this one more difficult?

Is there a way to add a second pathway to get through this obstacle? That might make it more fun. Would adding a power-up to this obstacle give something for the player to strive for?

Guidelines: Developing a rapid product prototype allows a designer to quickly get the product into the hands of a user for testing and feedback. Because a prototype is unfinished, the "cost" for changing course based on feedback is low.

Prototyping with Bloxels

Now that the students have received feedback on obstacles that align to the challenge they defined, the next step is to begin forming the ideas into a playable prototype.

Pass out the Bloxels Gameboard, Blocks, the "color guide" from the guidebook (see PDF in this packet), and **TAG 14**. For the prototype, students will need to create games using the gameboard and blocks associated with the Bloxels Builder app. The purpose of the different color blocks is so that the app can recognize and translate them into a playable game. Color Guides will show students the meaning of each colored block.

➡️ Tutorial Videos
bloxelsbuilder.com/tutorials

Classroom Announcement 📣

"Now that we're ready to prototype, let's learn the basics of our design tool, Bloxels."

Getting Started with the App

1. Watch the Tutorial Videos

2. Open the Bloxels Builder app

3. Click "Quick Start", Go to "Games"

4. Build a Game Layout

5. Select the Camera button to capture a game

Building Your Game

Once you've created your first game layout, place the Bloxels gameboard on a white surface with good lighting. The app will recognize the Bloxels gameboard and capture the game. It's possible that in the translation process, some of the blocks will require slight fixes. These can be completed with the in-app game editor.

We've found it may be helpful to watch the tutorial videos in advance and demonstrate use of the game editor to the entire class.

- Show the use of the layout tools including the eraser and map.

- Show students how to use the configure tool to customize enemies, power ups, and story blocks.

- Show students how to add a new character to the game.

- Show students how to select music and name their game.

- Click the "Decorate" tab to show how to change the appearance of the level using assets from the library.

- Show students the use of the mid and far backgrounds.

- Explain that play testing is an important part of game design and now that one obstacle is drawn, we should test to see if it works. Click the "Play" button to show how to test the game.

Students will need time to capture, edit, and test their levels. We've found that 20-30 minutes is typically enough time for a student to capture a Bloxels board into the App to make their own game.

Note: We've found that the shorter the tutorial the better. After an overview of the basics, students are able to pick up level design quite quickly, and assist each other. This may vary by classroom and their experience with technology and more specifically, game building software.

After demonstrating the in-app game editor and map functionality students should begin designing game prototypes. Roam around the classroom and encourage students to play test their obstacles regularly.

Based on the time you have in class, we've found that it is helpful to encourage students to work on a single board in their game, versus working on all multiple boards in a short time period. Most students are able to get a functional and fun game designed in 20 minutes.

Send Your Ideas to Us!

Some students will request for features to be available in the app. If you encounter a student who has ideas for new game features, please encourage them to make a feature suggestion for a future app update. As designers, we too continually improve our products based on user feedback.

Feedback on the Bloxels Builder app, including ideas/suggestions, can be e-mailed to: support@bloxelsbuilder.com

Guidelines: Effective design requires a willingness to show users unfinished work. Observing users interact with the product helps a designer see if the product is meeting its goal. In the software development industry, this practice is often referred to as 'beta testing'.

Play Testing

Once students have their games to a playable point, they should have other students play test and provide feedback. Many students may feel like their game is unfinished. They can be reminded that the game is just a prototype and getting feedback on unfinished work is an important part of the design process.

Pass out **TAGS 15-18**, then have students partner up and playtest each game. Assign a partner A and partner B. First, partner A should playtest partner B's game, while partner B observes. Partner B should make notes about learnings and problem areas on the appropriate TAG. After playtesting, partner B should interview partner A for feedback on the game.

Remind students that the best feedback is often not that coming from the tester's verbal or written feedback, but rather just by observing the tester play. Much can be learned from the process of watching a user use or even break a design (often referred to as a "bug"). Have students reflect on the statement they wrote for **TAG 8** and probe them for what changes could be made to make the game more fun.

Guidelines: A good design is never finished. User demand and interest is continually changing. Successful designers stay ahead of the curve and continually tweak their products.

After students have each received three pieces of feedback on their games, pass out **TAGS 19 & 20**. TAG 19 asks students to reflect upon what worked and didn't work. TAG 20 asks students about what changes were made to improve the game design. Students should reflect upon the feedback received and observations made to tweak their games. They can make adjustments using the Bloxels in-app game editor.

Note: We've found it useful to partner students by the self-assessed difficulty of their game. Some students enjoy making/ playing incredibly difficult games, while others enjoy easier games. Partnering students from the same category can result in higher quality feedback. Based on the time you have in class, encourage students to have one fun room completed if multiple rooms feels too overwhelming.

Assessment Questions

What is Design Thinking?

How can it be used to make a product?

If you had 5 additional minutes during this process what would you spend it on and why?

A) gaining more empathy

B) re-defining your challenge

C) ideating

D) continuing to develop the prototype

E) observing a playtester

Example Student Responses

Selects A. It would be helpful to see other examples of what is out there before continuing to work on my game.

Selects C. If I had more obstacles brainstormed, I could piece them together to make my level more fun.

Share Your Creation

After play testing, encourage students to publish their games to the Bloxels Infinity Wall. Add #dt (design thinking) to the game name. We look forward to playing your class's games!

Share your classroom's work with us! We would love to see your creations.

- Facebook facebook.com/bloxelsbuilder

- Twitter twitter.com/bloxelsbuilder

- Instagram instagram.com/bloxels

Feedback

Feedback on the Bloxels app, including ideas/suggestions, can be e-mailed to: support@bloxelsbuilder.com

Additional Resources

For more Bloxels activities visit bloxelsbuilder.com/education

To get started download the Bloxels Builder app and purchase a Bloxels Box Set. Box sets are available to teachers in bulk packages for a discount here.

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