

HOW DO TEACHERS USE MINECRAFT INSIDE THE CLASSROOM?

“It’s my personal opinion that an hour and ten minutes of straight typing practice is just cruel and unusual so I was trying to kind of think of something interesting that we could do other than just typing.”

- Minecraft Teacher

Steal this Chapter

This chapter is primarily a summary of what these teachers did with Minecraft in their classrooms. Early in my teaching, I heard the adage, “Good teachers plan lessons, great teachers steal them,” and took it to heart. Looking for ‘great’ ideas, I committed one prep hour per week to visit other teachers classrooms of all subject areas to see how they start class, how they organize their planning, how they led their classes. At times, I came across ideas I could copy or adopt, mostly I just enjoyed the brilliance and diversity of my colleagues. Hopefully, this chapter provides a similar experience for you and expands your list of ideas you can steal.

Everything in this book so far has led up to classroom applications. How do teachers actually use Minecraft in the classroom? How do they refine their ideas? Finally, what can we learn and what ideas can you generate when reading about what other teachers have done? Here we can start to see both common uses and a range of uses across the teacher stories. The first half of the chapter, I will present three different pedagogical approaches found across our narratives - open creative building, playing out a story, and using Minecraft to build examples and demonstrations of ideas. In the second half of the chapter, you will find classroom examples gathered around core subject areas. All of the teachers involved in this study would be flattered and excited to hear that you stole any of them for your learners - so steal, or more gently liberate, these ideas!

Creating Amazing

Like teachers using Minecraft outside of class, it is clear that first attempts to use Minecraft in the classroom were often perceived as trials under careful observation by teachers. As innovators, they are looking to see how and what learners would design with the tool before intrusively conquering it for their objectives. To do this they either use extra class time and have kids play freely, or, more commonly, start with “a basic idea” and see what they do. First the ‘sandbox’ examples:

“The kids created projects on their own and worked together so at that point it didn’t need to have any set curricular goals. We were just exploring.”

“It ended up being a class completely on its own with a free range of what direction we wanted to take. We ended up sort of like a sandbox class.”

At this point the teachers would say they are just trying it out, seeing how the students would use it, or trying to discover new ideas. This may sound fairly chaotic in the classroom, but when pressed, these teachers also shared how they introduced students first:

“With all four of those classes, I created a separate ‘natural’ Minecraft world for each one and I spent maybe 10-15 minutes at the front of the class with the kids on the floor and I was projecting on an [interactive whiteboard] and I just showed them the basics of how to move around, how to collect blocks and how to place blocks and that is really it.”

So even in free play settings, teachers commonly provided introductory instruction or used game-like badges or challenges to direct early learning curves.

“[We] developed challenges and rewards and we have upwards of 80 of those where a kid could choose a reward and then do it earning badges and leveling up.”

Two important side notes: First, notice that these sample passages are very similar to teachers that had open play time in the after-school programs. This testing approach serves the teacher’s learning across times. I suggest teachers that feel license to experiment in class do, and those that feel they have to convince administration more use outside of class experiences to show validity to others.

Second, for these teachers, the importance of open creative time had to be relevant to their overall classroom goals. We do not find any math or science teachers, for instance, that allowed open Minecraft time; on the other hand ‘writing’ teachers commonly saw the open time as generative for later writing projects. With only seventeen teachers, this is far from conclusive, but we do see hints that curricular obligations may affect pedagogical ‘fit’ for the teacher.

Part of 'watching' was for teachers to join in with students. They used class time for their own learning, often combining physical classroom management with online management.

"I've always got my character on and my character is online and is in the server and sometimes I can do special things like we have restricted their water bucket usage for flooding purposes... But, yeah, I'll play with them."

Playing with students also led to collaborative design of ongoing learning for a few teachers. More teachers found that open play did not naturally lead to their learning goals.

"Some built the Eiffel tower and others started messing around with lava. It wasn't a very constructive, cohesive production... I had imagined that some of them would get together and pioneered a little village or made something that made sense but I think the narrative that I presented them with wasn't immersive enough and didn't actually capture their imagination..."

These teachers started to experiment with more structure in the form of narratives around which the class would play a role.

Playing out a Story

A second pedagogical strategy was to have students play out a story. In these cases, teachers will share the context of game time and ask students to role play accordingly. This following example continues from where the last left off; the teacher changes what they do to add in-game and out of game elements:

"...this time we had a project where we wanted to create an infrastructure on the island and I did some preparation where I, in cooperation with the students, mapped out different zones on the island where I said ok, we're going to have a little town here, we're going to have your private houses here and we're going to have your hotel here like your Holiday Inn kind of feel and there was a railroad going throughout the island so it was like a collaborative project where the students could help each other and also build something of their own."

While this teacher still defined their approach as "open play", they have effectively told students where to build, what kinds of things to build, and began to shape how they would interact with each other. This is not the kind of free and open Minecraft experience fostered above. This is the roughest example of the teacher shaping a story for the students to play out. In this case, it was to build a town. Students were essentially in the role of villagers and they had a job to do.

Fitting with the game itself, another common starting point is to have the students survive together. This too is a basic story, 'You are stranded on an island... what do you do?' Students are in the role of survivalist and can compete or work together to get by.

"I had a basic idea about a group of kids being stranded on an island, inspired by the book *Lord of the Flies* and I said well there is a disagreement and one part of the group goes to one end [of the island] and one part of the group goes to the other end and take it from there. I just said what are you going to do? What are you going to do? They just set off building. That was basically the story."

Interestingly, some teachers chose stories with clear conflict. *Lord of the Flies* is a story that has youth eventually doing barbaric things to each other. These kinds of stories fit the gameplay itself and require little to no prior set up for class. Boot up the game and let them play out the story.

"I don't want to mess with the magic too much. The further I move my lessons away from the vanilla Minecraft experience, the further I'm getting away from something that millions of gamers know and love - which is dangerous."

Outside of this study, I also talked to one teacher that had students build their world freely, get to know the game, and come to value harder to get resources in game. Yet the students were limited to their continent. To teach European exploration, the teacher then 'unlocked' the oceans and allowed players to build boats. When they reached new land they found automated non-player characters in villages. The result was that students pillaged the villages... ruthlessly... for hard to find materials. The student story played out in a way that made European-Native American interactions much more of a personal conversation for students. When the teacher connected real history to their Minecraft story, they shared one of the most powerful classroom conversations they had that year. Here the purpose of a story framework for Minecraft is to fuel experiences that the teacher can leverage for learning.

Another form of playing a story, with a bit of set up time, is to challenge students with the teacher as the antagonist! The teacher, with control of the server, has powers the players need to overcome or solve.

"Instead of a community, they worked as a team to escape my confines. [laughter]"

"I made a puzzle for them to get into the pyramid and I made sort of a treasure room inside. I structured it... [for the] next group of classes, the tutorial world ended up being the entirety of their Minecraft experience so they stayed on my path and with my guidance the whole time."

Most teachers played with this idea of creating an obstacle course, a first person tutorial, or setting up student play time with a constructed story as one of their early efforts. Again, this requires the teacher to make time to build and design outside of class so that the time in class is spent exploring the teacher's work. This can be done as a story outside of the game, or for some teachers, it can depart from a story and start to take the form of show and tell.

Show and Tell

Another approach to using Minecraft is to stack blocks to show an idea to others. Above, teachers gave a narrative prompt, but other teachers started experimenting with Minecraft in the classroom by challenging students to build something that was relevant to their curriculum, or curriculums:

"It happens that we were working on our Greece unit as part of our world studies and in math we were working on rates and ratios so I thought why don't we do a little research on these and recreate some buildings."

And recreate they did. This early effort required less investment of prep time, but this initial classroom project grew, and grew and grew into what is known today as World of Humanities. World of Humanities, designed by Eric Walker, has grown into one of the most popular worlds for teachers to download. It includes most ancient civilizations and allows students to 'walk around' notable landmarks from each society. Downloading a world allows you to take advantage of impressive amounts of work, without having to build the pyramid yourself.

"They can't build or destroy anywhere except in designated places. They start out in a tutorial area tree house and then there are info blocks that they click and then texts come up. That is the basics of it. They go around and they find the ancient China area and they explore and they learn about all the things we've talked about in class, about ancient China or ancient Greece or the islands of mythology or the pyramids. There are tons of areas now. I've been adding to it constantly and students have too. There are specific areas where students can build and those are, there are some housing areas which are more popular at first... there is an area where they can build different schools in different styles of either Athens or Sparta, and they have to match their educational philosophies which is something we learn about in class. There is an area where they can learn how to build defense systems for an ancient city, Babylon in this case. They create an irrigation system to show how irrigation, how the Mesopotamians brought water from the Tigris and Euphrates Rivers and then created farming and agriculture. There is an area where they are just a landscape architect and are building gardens around the Lighthouse of Alexandria and a ton more than that."



Image 1: Eric Walker's *World of Humanities*. Source: <http://dig.temple.edu/wp-content/uploads/2013/03/World-of-Humanities-Map-Feb-20131.jpg>

Walker designates areas for seeing, areas for particular tasks, and areas for student building. This mix allows for different play styles, but also allows the teacher to nudge players in different directions within a complex learning environment. He sees these worlds as a giant classroom space for students to explore and learn from. This approach allows for Minecraft to operate as a presentation tool also. Another teacher used Minecraft for short demo's in the classroom:

"I was teaching a group of... 15 year olds about neurotransmitters and redstone is perfect for how neurotransmitters work so I set up a little room and a little demonstration of what neurotransmitters do and how they have to cross the synapses... so it was just a small trial, [15-20 minutes], with a class of say 17 students, just one short activity, minimum amount of set up time and it was just amazing."

This, of course, could be seen as a unique form of teasing; putting one of the most popular video games up on the big screen. Later this teacher allowed students to role play cells and he set them on fire (inside the game). As they attempted to run, he explained that when heated up, cells do the same thing - combining a show and tell setting with a kind of science 'story' experience. Naturally, the follow up assignment is to invite students to represent what they know by building their own Minecraft 'labs', showing or using short video demos, and/or actually printing physical versions of their creations.

“Now I’m moving into the 3d printing world so using it as a 3d modeling tool so students can create models using Minecraft.”

Minecraft classrooms use strategies that seem to include either creative building, playing out a story, or using Minecraft to model concepts. In fact, many of our teachers played with more than one pedagogical approach without any clear progression from one to another. Teachers that started with open creative building time, would often add story their next try. Conversely, teachers that had highly guided demonstrations, continued by allowing students open build time. That said, if you are looking for a ‘best practice’ for Minecraft, this data suggests that all three are part of understanding the tool and its uses. You’ll see below that subject area ideas for Minecraft employ these strategies in creative ways.

Using Minecraft within Subject Areas

When you choose to try Minecraft in the classroom, you may have a particular subject you are responsible for in mind. This chapter contains a variety of classroom uses and examples of teachers using Minecraft across subject areas. One goal is to have a quick reference, however I would encourage you to read examples from outside your subject area too. Many of these teachers saw ideas from other teachers and modified them to fit. If you want a particular idea, this is far from an exhaustive list of ideas and teachers suggested visiting online sites, like Minecraft EDU, for connecting with and sharing ideas with other teachers. Here, however, you can get a good sense and feel for how the above approaches are applied in classroom settings.

First, once you have played Minecraft a bit, you may see that some of the natural activity in the game already serves your curriculum. You can explore this deliberately, as one of our teachers did:

“I took out all the essential standards, all the ones that lended themselves very well to the whole Minecraft interface... So, we have been talking about forces of motion with the roller coaster aspect of Minecraft and talking about digging speeds and velocities and things like that...”

I would add that this can be done *with* students too. Sharing your entire course ‘calendar on the wall’ (or COW)¹ introduces the goals of the class and involves students in the common challenge of classroom work. Having students share ideas is not only effective professional learning for teachers, it is also engaging and fosters ownership of the learning process.

¹ I’m really not sure on the actual source for ‘COW’. This is an idea my principal, Tom Harrold, shared with my middle school team of teachers a decade or so ago. We mapped the curriculum in order to find existing interdisciplinary opportunities.

COW can be used in any subject that has clear curricular goals, and many ideas for classroom use arose because teachers knew their goals and were able to see connections. Art, technology, architecture, and exploratory teachers more often approached Minecraft as an open sandbox. Across our teachers, we saw subject specific applications arise in the core subject areas: science, math, writing, and social studies. I'll attempt to show breath of application in the following examples.

Science Stories

Use of Minecraft as a lab is suggested above. More ideas supported this approach in teacher narratives. For example:

"So what we did is rocks and minerals and I asked one of my Minecraft players to make a video which he did an amazing job of an overview of all the different types of rocks and minerals in Minecraft."

or

"I built a massive cell model they can walk through with students creating plant cells."

Really, anything physical can be 'built' in Minecraft. Students could build a cell, human heart, or a digestive system, in biology; or landforms, water bodies, and minerals for geology. In each of these examples, Minecraft is used as a 'lab' lesson, where the teacher introduces the activity and then supports it during the classtime:

"I was more of the person on the side, you know, the lead scientist, so I didn't have to do anything, I just had to supervise them. I've walked them through it and given them specific activities like the neurotransmitters maps or an open exploration with the cell map."



Image 2: A Minecraft Digestive System Science Project. Source: http://www.reddit.com/r/Minecraftcomments/1gdxmt/my_extra_credit_project_for_biology/ and [too_many_toasters](#)

Minecraft, like typing paper, can be used to represent ideas effectively and in a 3D space that is exciting.

Minecraft can be used as a context for scientific thinking too. One teacher looked beyond the 'building' nature of Minecraft, and saw that Minecraft essentially encouraged a kind of planning and purposeful thinking. He used this planning as a pathway into scientific thinking.

"So he would sit down and write 'the next time I play Minecraft I want to find out' and so from that he did science and then I said lets do predictions so from around that we did the science of inquiry. What are your theories? What are your predictions? That is how we scaffolded learning so that is what I mean when I say we take that interest and then I build on it and we go and we did."

Elements within the game can also be a focus of investigation. When students conduct more advanced crafting, or you turn on creative mode, they will find TNT in game. TNT explodes according to formulas already programmed into the game. Likewise, when you drop from a height, your character takes different amounts of damage based on the height of the fall. Day and night seem regular and the sun seems to 'move', so how is time linked to real time? How might a scientist explore these 'natural' phenomena? How long do different materials take to burn? How have scientists historically taken hypothesis toward law with data collection, replication, and measuring predictive algorithms?

As with science in the natural world, Minecraft provides a virtual world that can be explored, studied, and serve as a giant lab for the scientific process.

Writing & Language Arts

An obvious starting point is to have students re-create things they read:

“I’ve seen students create book reviews so they are creating a scene from a book and then walk through it and talk about a book they’ve read.”

Some of the more interesting story ideas create a context for players to experience a story, and then write. I remember my own writing teacher saying, ‘Most great writing is reflecting, in part, on the writers own journeys.’ Yet if students are still inexperienced and overly curated, they may not have much to write about². For instance, Hemingway went to war and did some Caribbean fishing before he sat down to write - yet neither are available for most of our students. In digital games, however, students can experience great adventures, save the world, or play out very real dramas with fellow players. For these lessons, the teacher can easily have students play the story.

“We went at it from stranded on a desert island perspective. They get in the world. They are doing survival mode so its up to them to gather their resources, to pool their talents, to find shelter, to avoid danger and they are blogging about that experience.”

² Leading, arguably, toward the thin fabrications and ponderous poetry assignments many of us remember in our own writing classes; ‘If only you could ‘dig’ deeper!!’ ;)

In the absence of real danger, students can safely have play danger. Using blogs also introduces a newer format and genre to students. The point here is that the story happens to the students first, then they write from memory, not purely imagination. Immediately, this opens the curriculum up to travel journals, memoirs, blogging, archiving history, or ethnographic work in multiplayer worlds.

This kind of immediacy is engaging and consistently hooks students - even when they are trying to 'kill' each other:

"I teach an elective class about the Hunger Games. We use the Hunger Games and we incorporate technology projects. We basically went through and recreated the setting of the story district 12 in Minecraft. It was just a great way to tie in what they were learning and what they were reading in a really fun and interactive way."

This example models existing effective teaching around a novel. Other projects have rebuilt Hogwarts, Azeroth, Middle Earth, and King's Landing. Using print media to inspire drawing, writing, conversation, or film making is established practice in language arts. In these cases, Minecraft simply adds another media format to play out what they are reading or playing.

Conversely, Minecraft design can be inspired by external resources. One teacher treated another computer game as source material and had students use Minecraft to build similar story arcs with 'quests'.

"We had a project where we did level design with the guys and had them write a story. We were inspired from the quests from Skyrim where there was very clear progression in the quests."

For this class, students would build contexts for their story and invite friends to come and play their stories. This uses Minecraft as the composition media. Instead of pure prose, the 'writers' had to build puzzles, clues, prompts, and post signs that carried a player from beginning to the end of their adventures. Finally, I would think these had to be a pleasure to grade/play when they were turned in.

Social Studies

When I first started playing Minecraft with my own two kids, we quickly built our dream houses and looked for the next thing to build. Like Eric Walker, we started to think about existing buildings that would be fun to build and the kids helped to bake bricks for a recreation of Independence Hall in Philadelphia.

“Through textbooks and through movies and through in-class activities, they can kind of get a glimpse of being enveloped in this other world, but it isn’t really deep... I always wanted to somehow communicate to my kids that there was this whole other world that you could explore, and it’s fun to do so.”

This is probably the simplest entry point for social studies teachers. Have students start exploring new worlds or have them start to build things to demonstrate of what they know.



Image 3: Beginning to build a colonial village with Independence Hall. Source: Author.

"I'm going to have them create a pioneer town and if I can do it to scale I might have them do that. I'll have to find plans and stuff like that. That is the next big project after this one."

To build a pioneer town, they have to do some research. "Finding plans" is no simple task, but made much easier with the internet. These kinds of ideas can continue to be refined by using particular historic texts, for instance, to build sets for events - like building colonial Boston for Johnny Tremain, or having the class set up camp by states at Valley Forge.

Another approach is to consider Minecraft less as a modeling tool and more of a multiplayer world. One teacher set classroom rules (no 'in game' settings needed) to only use certain tools each day to represent technological development.

"The latest project right now is the CivCraft project which is Civilization and the goal is to play through stone age, iron age and bronze age and we are working from a Danish context so we'll progress through Viking time and into the Middle Ages and this has been a great experience for seeing what a teacher can do because I'm able to develop my own content."

This kind of approach allows conversation around constraints each day and helps students connect with events from personal experience. So, in terms of history classes, students can see history, build history, or play out history. None of our teachers had students act out scenes from history, but I would see this as another easy application of Minecraft.

Minecraft actually has 'biomes' that define computer generation areas in new worlds. These biomes map fairly well onto Geography classes. Using Minecraft to identify landforms, water bodies, and to introduce irrigation or cartography are all fairly easy class lessons to develop. Human-Environment interaction is the core game mechanic for Minecraft and any of those themes would be low hanging fruit. Further, students can engage together in massive terraforming projects that may work for different kinds of geographical studies.

The World of Humanities example above could, and are, being expanded to current cultural studies. Teachers and students build modern cities and communities as a way to root discussions and lessons about modern places.



Image 4: Guild construction of a Minecraft City. Source: <http://imgur.com/gallery/tsiKf> and highrossferry

These larger projects require teamwork too. Many of our teachers explain that Minecraft leads to conversations about working together, teamwork, civics, and respect (next chapter). These aspects of citizenship can be expected as you progress in the classroom and are on the radar especially for social studies teachers that are looking for ways to teach citizenship.

“The next thing is this big project on digital citizenship where the sixth grade is going to create a world where everyone practices exemplary digital citizenship...”

Knowing the software and the issues of ownership and property that are tied to creating things in a common space, teachers can expect these issues to be learning opportunities. Or one teacher approached the idea far more directly and had students designing abstract representations of values:

“I had this idea of how about if they represent our school standards, responsibility, respect, honesty, safety, cooperation, if they represent one of those ideas abstractly it would be like a sculpture... I had them make a model of it in tinfoil first so they have a common leaving off point.”

Of course the tinfoil models were tabletop sized, and the Minecraft versions were more building sized.

Overall, no teacher stayed strictly within their subject area confines. Combining sculpture with social studies, science labs with scaled perfection, and mixing story inspiration with story representation are all common across the teachers we talked to. They explained consistently that Minecraft is a blank slate, a piece of paper, ready to be drawn on. So one activity generally leads to another. Building Mount Rushmore leads to a study of sculpture, laying out a road for Bilbo Baggins means pacing out a “day’s walk”, terraforming leads to predictive hypothesis of TNT explosions. Your role, regardless of your approach to using Minecraft in the classroom, is to frame the lens through which players will look at, design in, and compose stories within a powerfully flexible space.

Far from a complete listing of Minecraft ideas, this chapter attempted to show a range of them from within the teachers narratives to support your planning for your classrooms. For most teachers, however, planning an activity goes hand in hand with evaluating learning. Most teachers in this study were as interested in some kind of evidence of benefit to their students, as they were in the activity itself. The following chapter helps us to see what they see and what they are looking for when they use Minecraft in the classroom.