Water challenge

The educational area (name): Ecology
Recommended age group: 9-16 years

Annotation
This map contains a world in which students are about to colonize and build water irrigation system. At the start, students appear at the top of the hill, on which source of water and small restplace are. The whole area, in which students are allowed to move is bordered by borderblocks. The function of these blocks is to prevent students from moving outside of the designated area.

While playing the game, students can play their own roles. Teachers can give students their own roles, in which they specify what they are supposed to do.

Story
You are a member of a group of settlers, scientists, and farmers whose task is to inhabit a new land. You’ve traveled for weeks living only on food that your group divided into portions for the whole trip, but this morning the last of the reserve supply ran out. As hunger begins to push you to cross over the barren land, suddenly someone in your group begins to shout. When you step on the top of the hill you see it too: grass, tress, flowers! Lush and green, the vegetation here is healthy and thriving. You haven’t seen rain for many weeks, but these plants clearly have a source of water. If only there was a way to make it last...

First stage:
Participants enter the water challenge with only one place to rest and a water fountain that pours into a small ditch. While they may collect water in buckets and transfer it manually, participants have only a few food sources and will need to collaborate to establish a network of water flow.

Task: Exploring a System
Participants may have certain expectations about how water may work in Minecraft based on their experience with water in real life. Let participants hypothesize how specific structures in the game world will affect the flow of water and experiment with those structures to observe the results.

Some questions for guiding participants include:
1. What do we know about water that can inform hypotheses about how water functions in Minecraft?
2. What happens to water if you cut off the source?
3. How does water disperse when it drops onto a surface?
4. After testing, how does the water in Minecraft compare to real life water? How is it similar or different?
5. What does playing with water in Minecraft teach us about real water?
6. What else might behave similarly to water? How might it be different? Can we test any of them in Minecraft?

Second Phase:
They are challenged to plan and develop a functioning settlement around a single water supply. Through collaborative building participants practice problem-solving and system thinking and apply understanding of real world phenomenon such as water flow to a simulated environment.

Settlement Building
When participants are comfortable with how water functions in Minecraft they can be challenged to develop a system of irrigation networks. This activity is perfect for pre-planning and group work but can also be used as an opportunity to do quick, free form exploration. Participants should think about how to structure the settlement as a whole.

When planning the building, use OneNote shared workbook. Divide students into teams. Individual teams draw up its own proposal for a solution. Embed floor plan maps and layouts of individual buildings into MS Excel file in OneNote workbook. One cell in Excel functions as the 2D model of one Minecraft cube. Compare the individual solutions and select the best option, followed by the character in Minecraft.

Tasks
1. How might a settlement build their city around this water source? What precautions must you take in order to utilize it?
2. Have participants calculated the distance between the camp and the well and constructed a to-scale plan of their settlement?
3. In addition to paths for the water to irrigate, what other features should the settlement have? How will they locate housing, crops, and social spaces?
4. What features of the landscape are helpful for building? What are the obstacles?
5. Participants can also calculate how long the characters in the world would take to build the planned settlement, accounting for time to eat, sleep, and relax. How should they budget their time for leisure activities and work?
6. Participants can allocate priority to essential tasks. What tasks need to be addressed immediately and what can wait?
7. Restrict available tools to challenge participants even further. How will they structure their settlement when they, for example, cannot make stone axes?
8. How do we construct a settlement that uses our water efficiently? What building practices waste water and how can we avoid them?

Self-sustaining Farm
Participants familiar with Minecraft or looking for an even greater challenge which might be tasked with creating a self-sustaining irrigation system that supplies crops and housing with water with little or no maintenance. Participants may wish to utilize redstone in these projects.