



Pacific Science Center is proud to have collaborated with Minecraft's education team to develop the following activity.



Exploring Systems of Measurement

Subject Areas

History, Mathematics, Social Studies

Grades

3-5. Note that this activity assumes a basic familiarity with Minecraft's tools and functionality.

Approximate time

60-75 minutes

Minecraft Application

Students will use Minecraft to reimagine system of measurement in ancient China.

The Challenge

Can you use the materials available in Minecraft to create a system of measurement similar to those used by people living in ancient China.

Guiding Ideas & Questions

What kinds of things do we measure today?

What do you think ancient Chinese were interested in measuring?

What types of measuring system might they have devised?

What can we learn from their measuring practices?

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Curriculum Content Standards

[CCSS.MATH.CONTENT.4.MD.A.1](#)

Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36)

[CCSS.MATH.CONTENT.4.MD.A.2](#)

Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

[CCSS.ELA-LITERACY.RH.6-8.1](#)

Cite specific textual evidence to support analysis of primary and secondary sources. Students identify connections between the visual arts and other disciplines in the curriculum

[NGSS: 5-PS1-3](#)

Make observations and measurements to identify materials based on their properties. Cite specific textual evidence to support analysis of primary and secondary sources.

Student Activity

1. (10 minutes) Introduce the history and background on terracotta army and their attire using these articles:

<http://www.ancient.eu/china/>

<https://www.britannica.com/science/chi-unit-of-measurement>

https://en.wikipedia.org/wiki/Chinese_units_of_measurement

Discuss the role of measurement in the design and construction of the terracotta army.

2. (5-10 minutes) Before they begin their work with Minecraft, ask students to reflect on these articles by formulating a hypothesis on how the ancient Chinese used measurement to build the terracotta army.

3. (20-30 minutes) Ask students to design and build an every-day shape or object in Minecraft (e.g., a house or a person).

With that design in mind, ask them how they would describe the design it to another person who is in Minecraft. For example, if trying to build a cube that is 4x4x4 blocks, they might say, "Build a row of four blocks, put 4 down next to them, duplicate that four times."

Next, challenge them build their design at $\frac{1}{4}$ scale, and describe that scaled-down version to someone else in Minecraft.

4. (15-20 minutes) Ask students to revisit each of the steps above, but using units other than blocks. Some examples could include slabs (half blocks), character steps (based on speed of character), fallen items, or coordinate locations. Ask them: are there systems of units that make the process easier? Do others make the process more difficult?
5. (10 minutes) Ask students to reflect on their work and write a short piece explaining their choices and reasoning.

Suggested prompts for student written reflection:

What was this experience like for you?

What did you find most interesting about the history of Chinese measurement system?

What are some of the challenges you faced in designing your own system of measurement in Minecraft?

How did you overcome those challenges?

Optional additional activities:

1. Have students study another ancient civilization and their measurement system, they might want to choose from India, Egypt, Mexico, or Greece.
2. Challenge students to investigate how their measurement system would relate to our standard SI units (meters, kilograms, seconds, etc.).