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MATH IN MINECRAFT

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NCTM 2020 STANDARDS FOR MATHEMATICS TEACHER PREPARATION

- **3c. Positive Mathematical Identities**. Candidates understand that teachers' interactions impact individual students by influencing and reinforcing students' mathematical identities, positive or negative, and plan experiences and instruction to develop and foster positive mathematical identities.

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EDTPA

Rubric 3: Using Knowledge of Students to Inform Teaching and Learning

personal, cultural, or community assets.

"play and learning are inextricably intertwined"

(Hirsh-Pasek & Golinkoff, 2008)

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MATH IN PLAY

- Children spontaneously do math as they play
  - shapes and spatial reasoning
  - magnitude
  - counting and numeracy

(Hirsh-Pasek & Golinkoff, 2008)

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WHAT IS PLAY?

- pleasurable and enjoyable
- no extrinsic goals
- spontaneous
- involves active engagement
- is generally engrossing
- often has a private reality
- nonliteral
- element of make-believe

(Hirsh-Pasek & Golinkoff, 2008)

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INCORPORATING PLAY IN MATH

- Encourages creativity
- Improves motivation
- Improves Social Emotional Learning
- Incorporates student culture

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Math in Minecraft

If you enjoy playing Minecraft, I have a math challenge for you. Watch one of the videos, complete the exercise in Minecraft, take a picture of your screen, and send it to me. See how creative you can make your math models. Remember they will be judged on how well they represent the math.

Videos:

- **The Setup (grades K-12)**
- **Base Ten and Factoring (grades 1-3)**
- **Area and Volume (grades 3-5)**
- **Algebra Tiles (grades 5-8)**
- **Trinomials and Perfect Squares (8-12)**
- **Pythagorean Triplets (8-12)**
- **3rd Degree Polynomials (beyond)**

Send your completed models to kbutler2@udayton.edu

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THE SETUP

- Single Player
- Game Mode: Creative
- Difficulty: Peaceful
- Allow Cheats: ON
- Game Rules: All OFF
- Generate Structures: OFF
- World Type: Superflat

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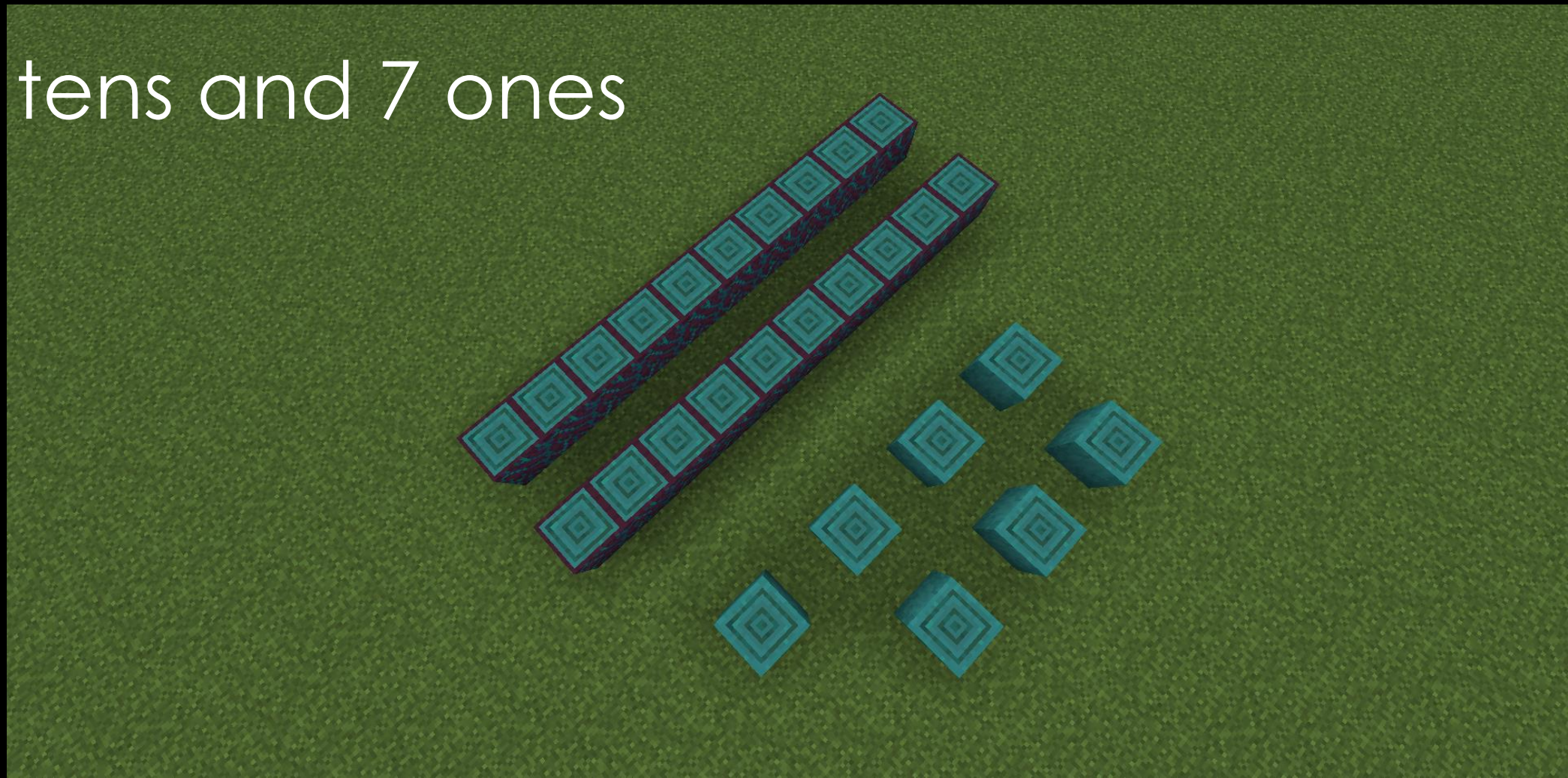
BASE TEN

27 is 2 tens and 7 ones



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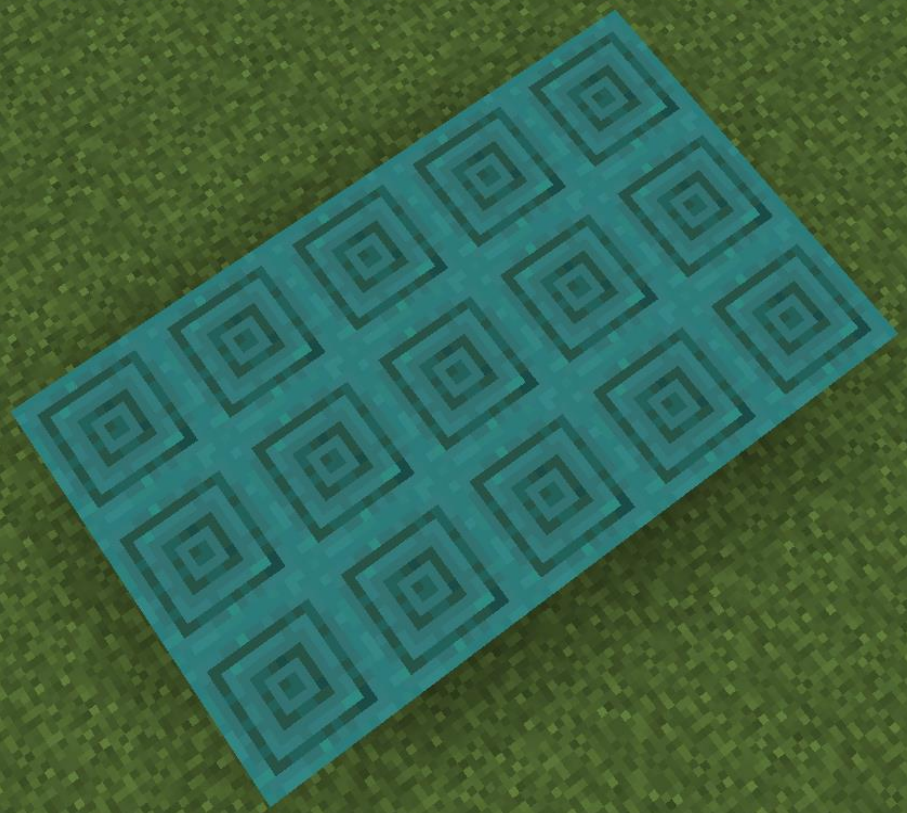
COMPOSITE NUMBERS

15 is 5 times 3



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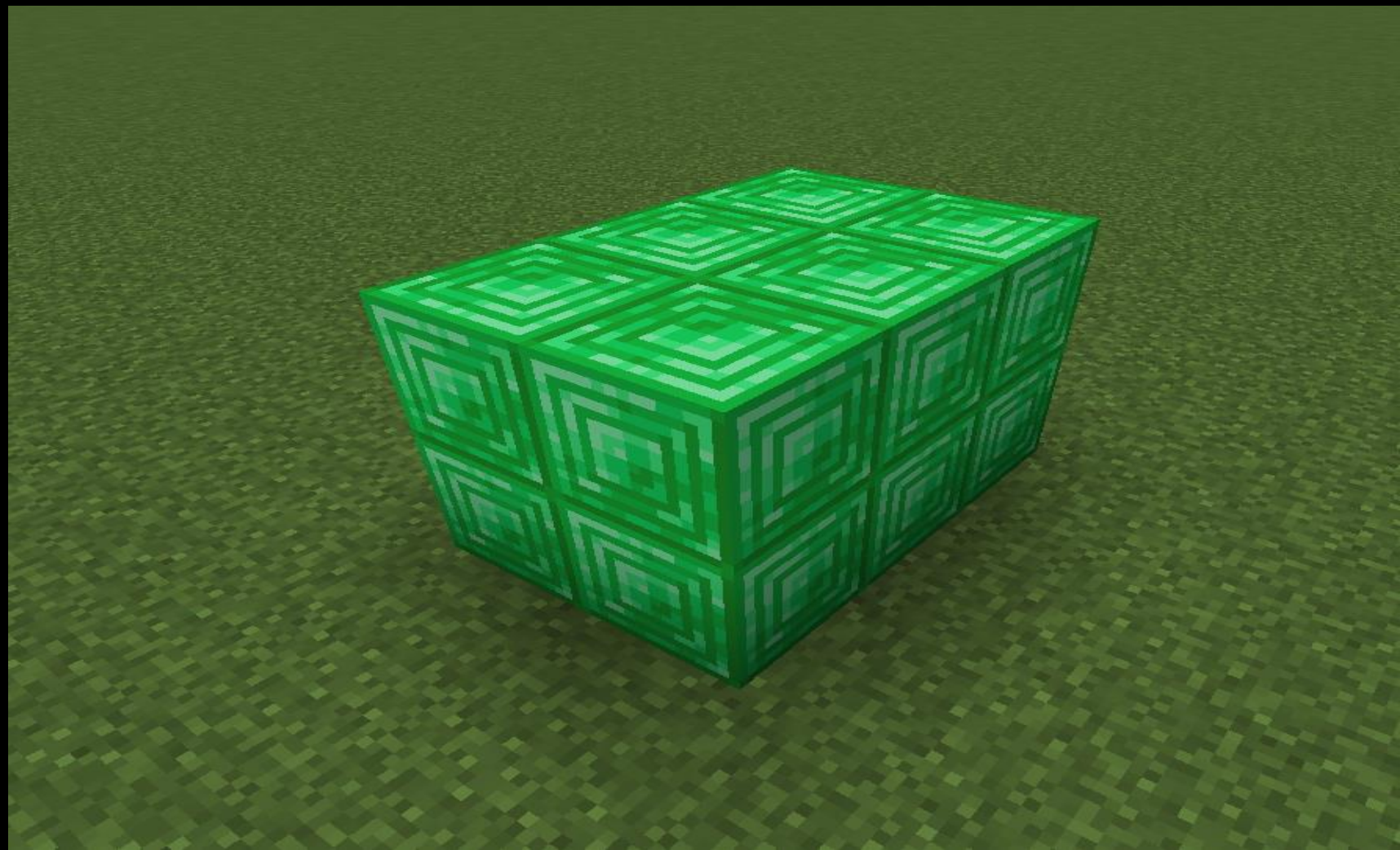
COMPOSITE NUMBERS WITH 3 FACTORS

- 12 is 2 times 2 times 3



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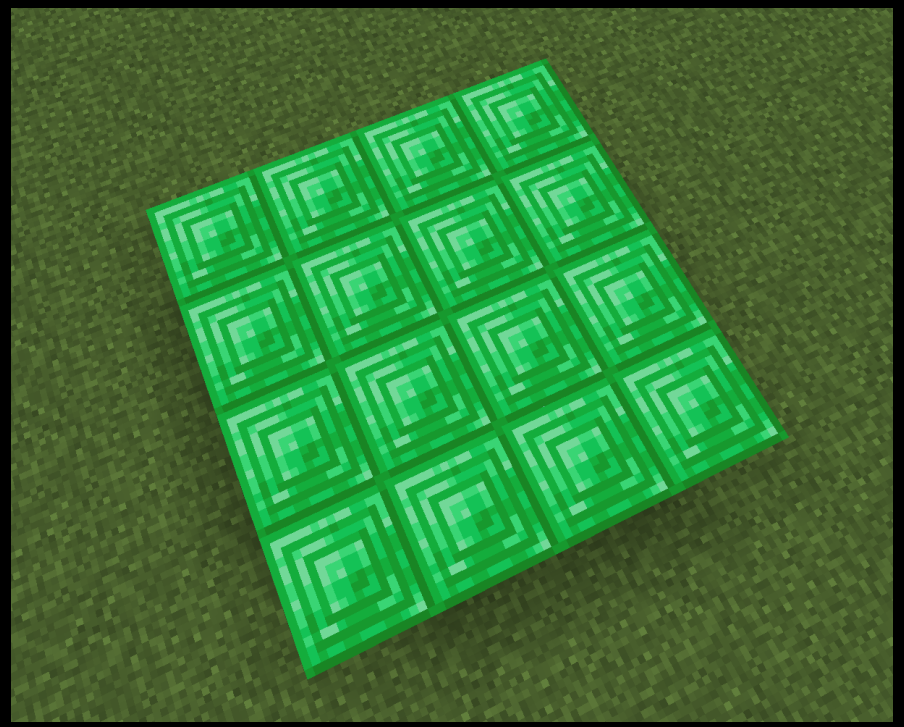
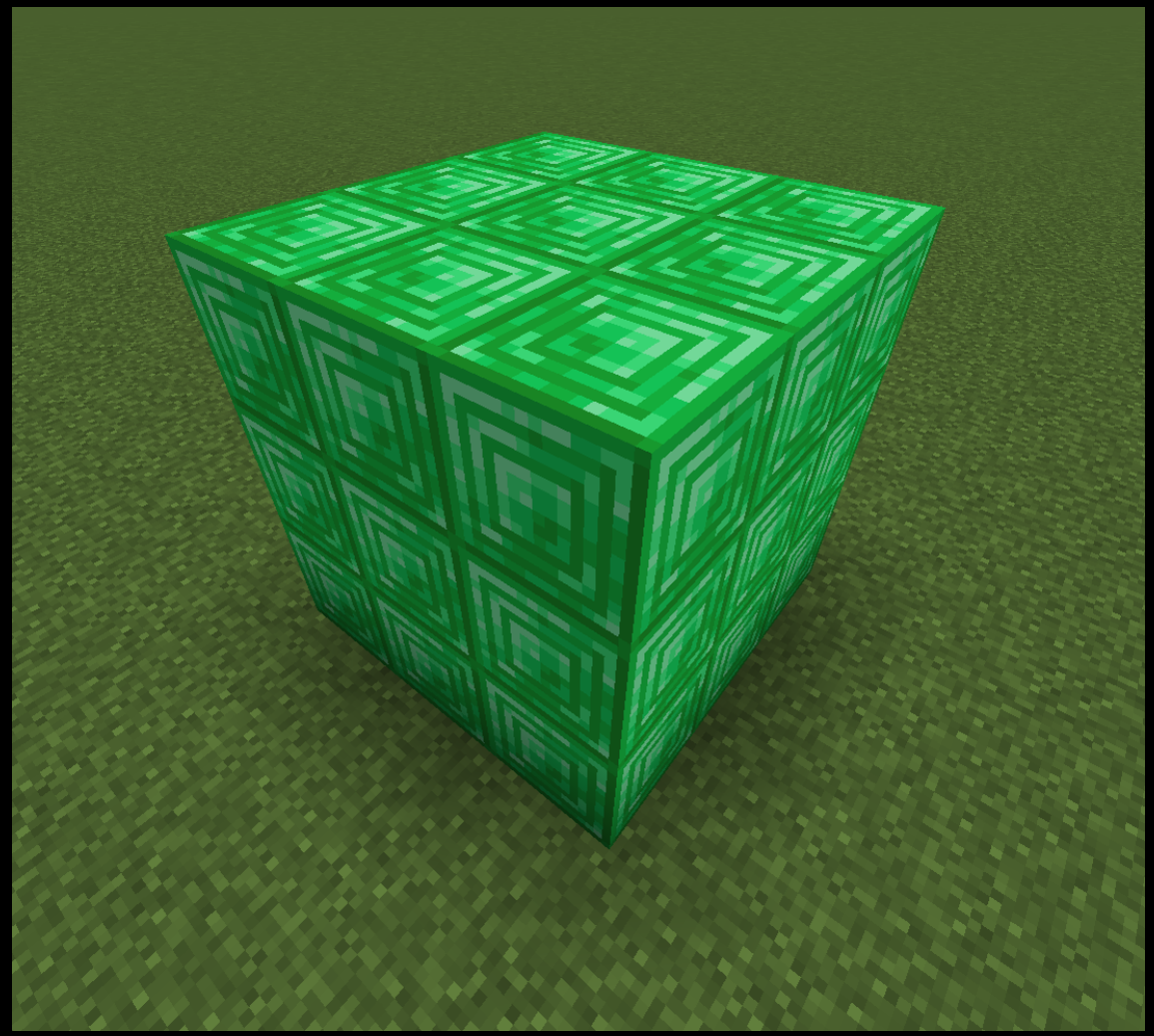
SQUARES AND CUBES





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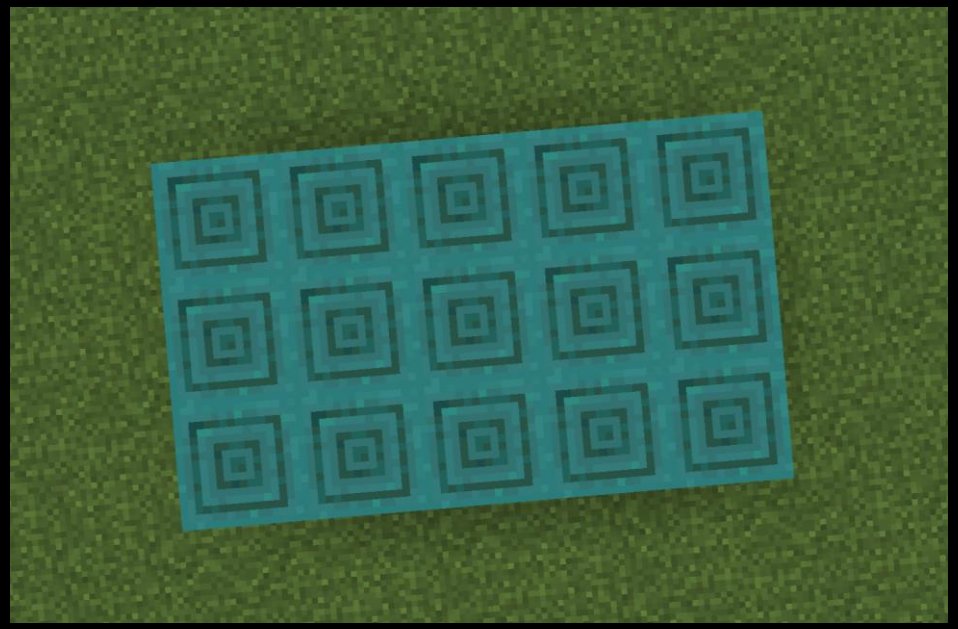
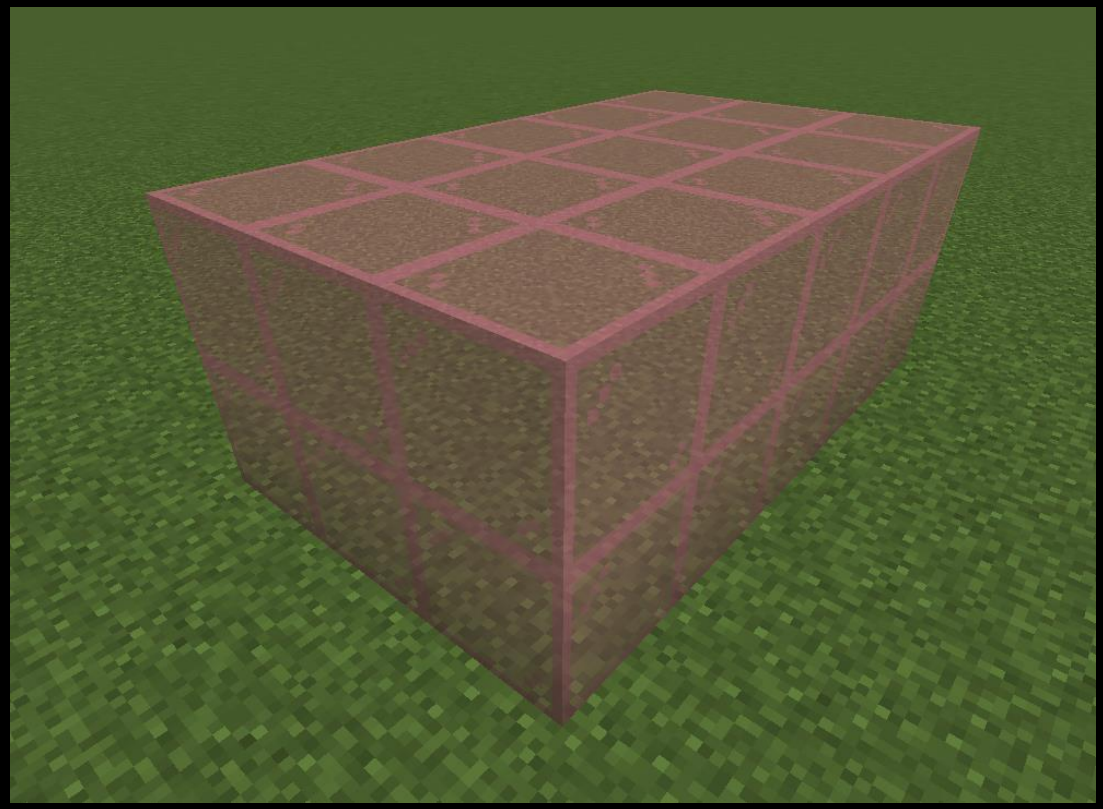
AREA AND VOLUME

- These representations also apply to area and volume.
- A block is the unit of measure.





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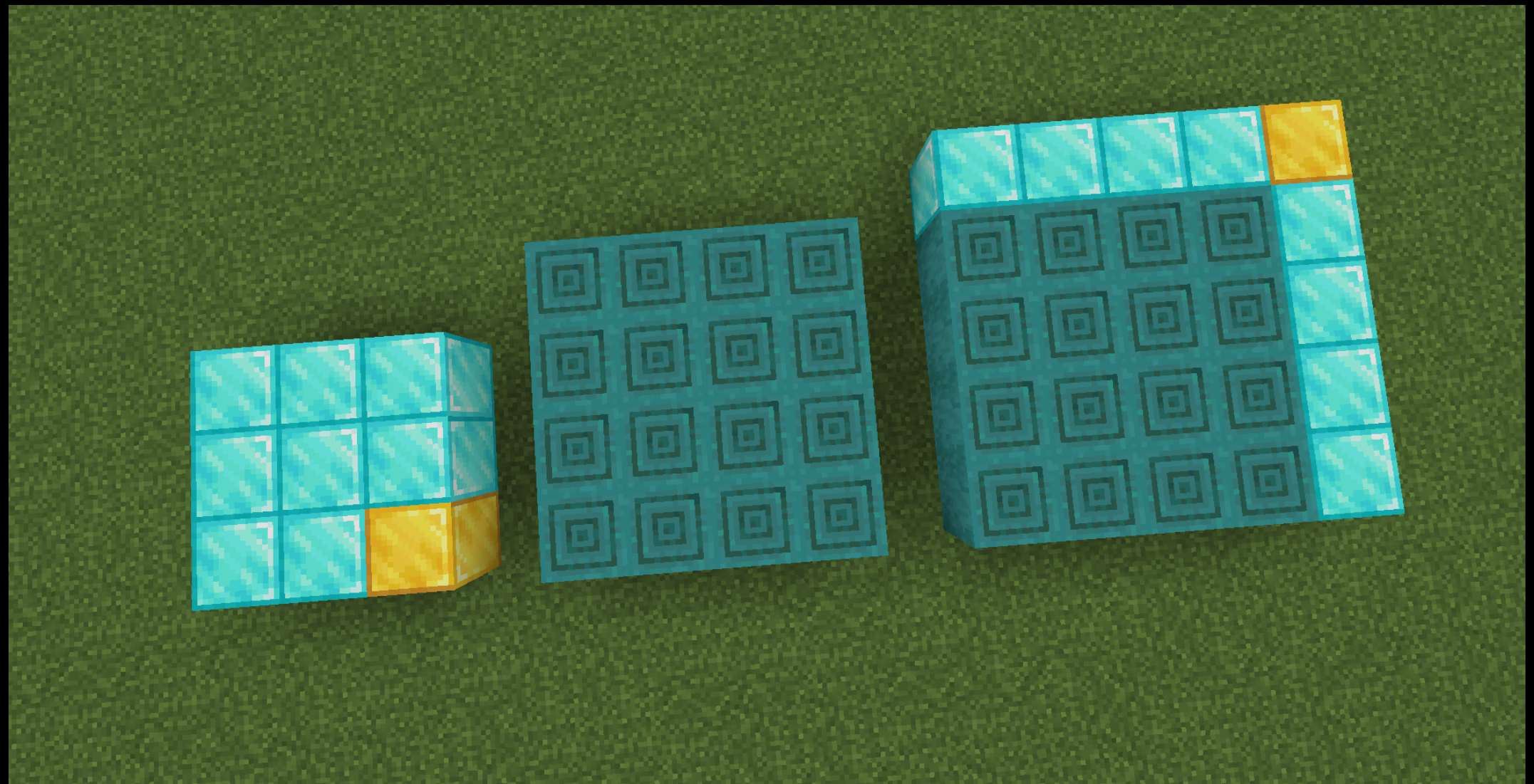
PYTHAGOREAN TRIPLETS



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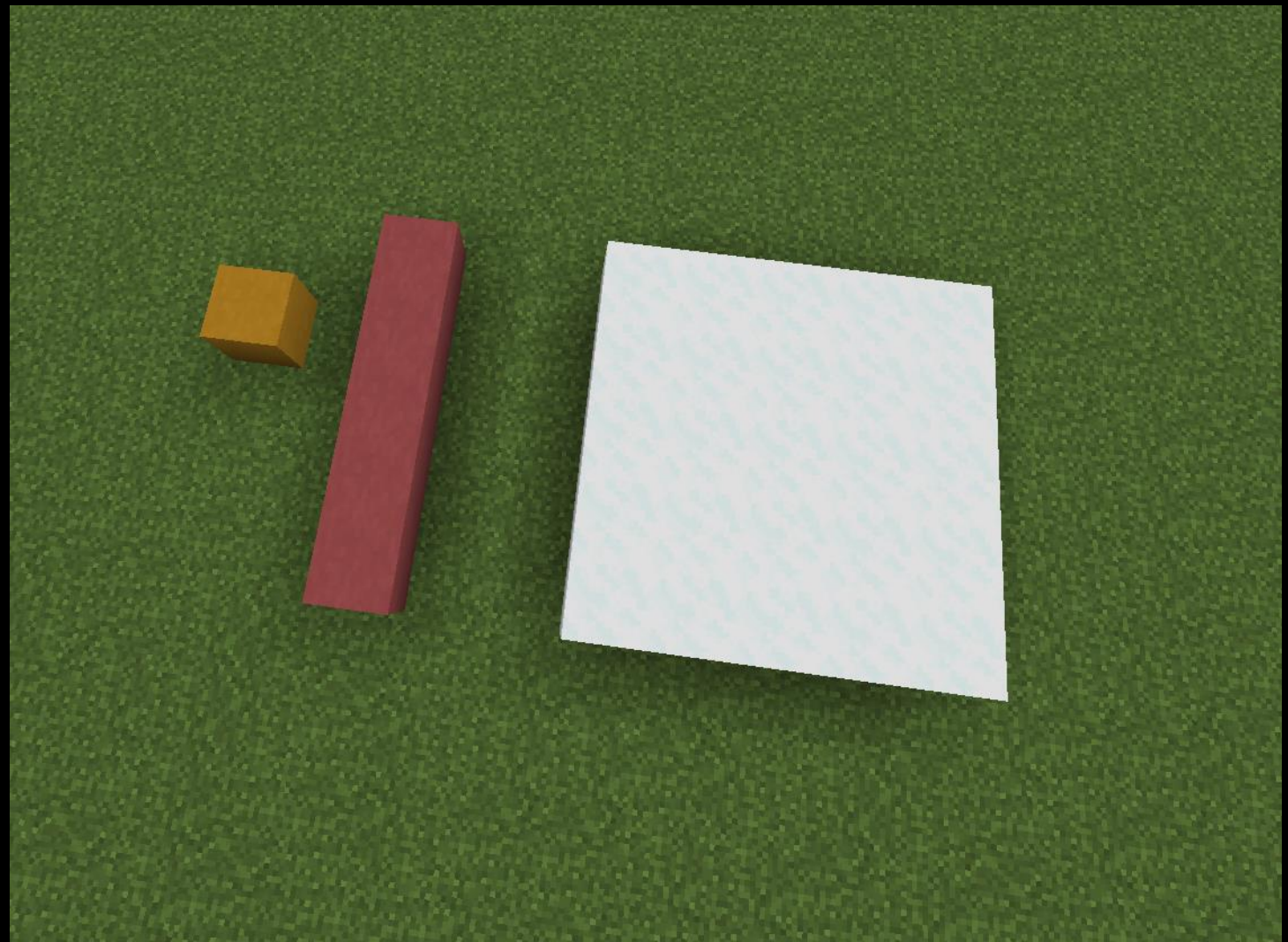
ALGEBRA TILES

- Unit
- Rod
- Slab



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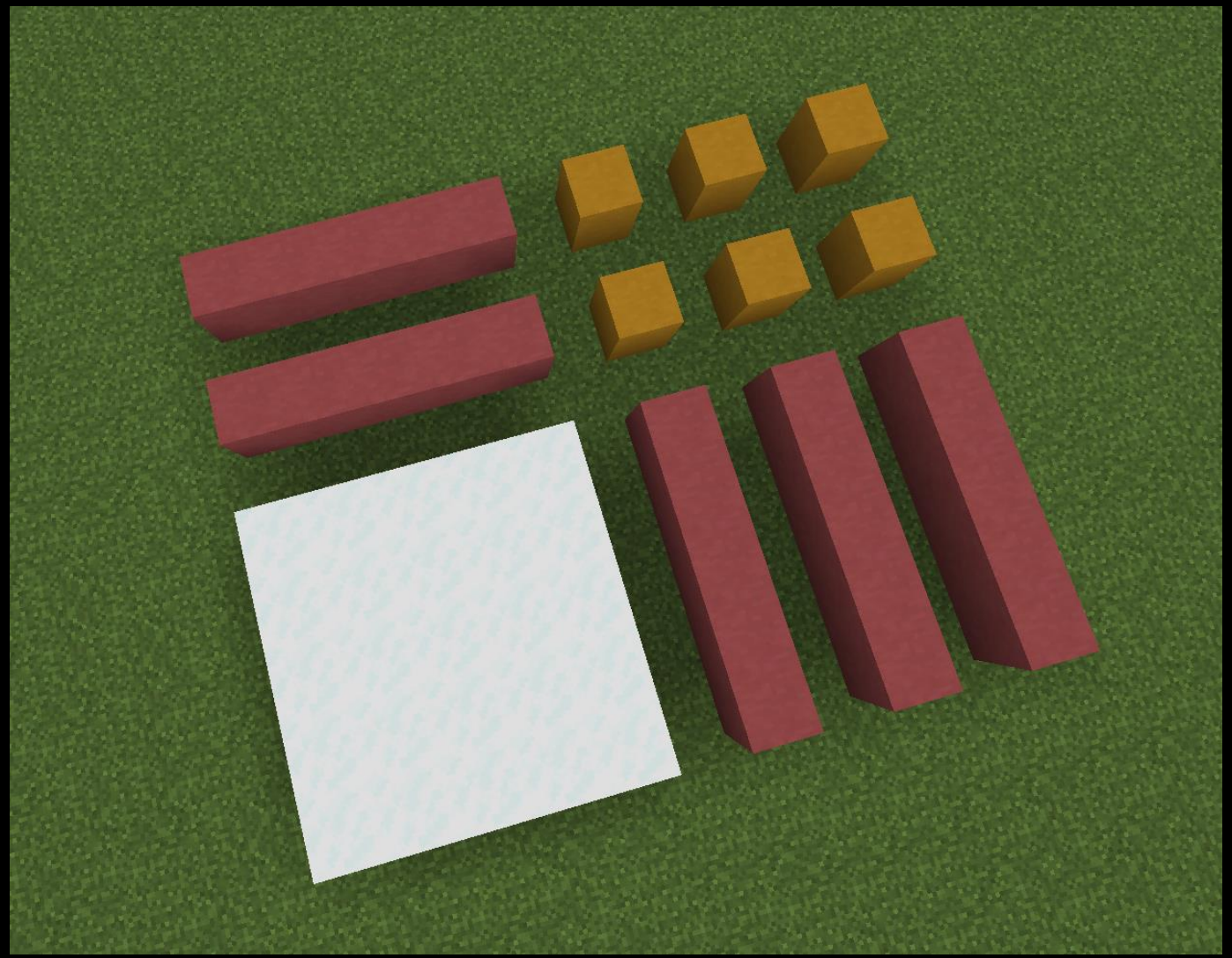
$$x^2 + 5x + 6 = (x + 2)(x + 3)$$



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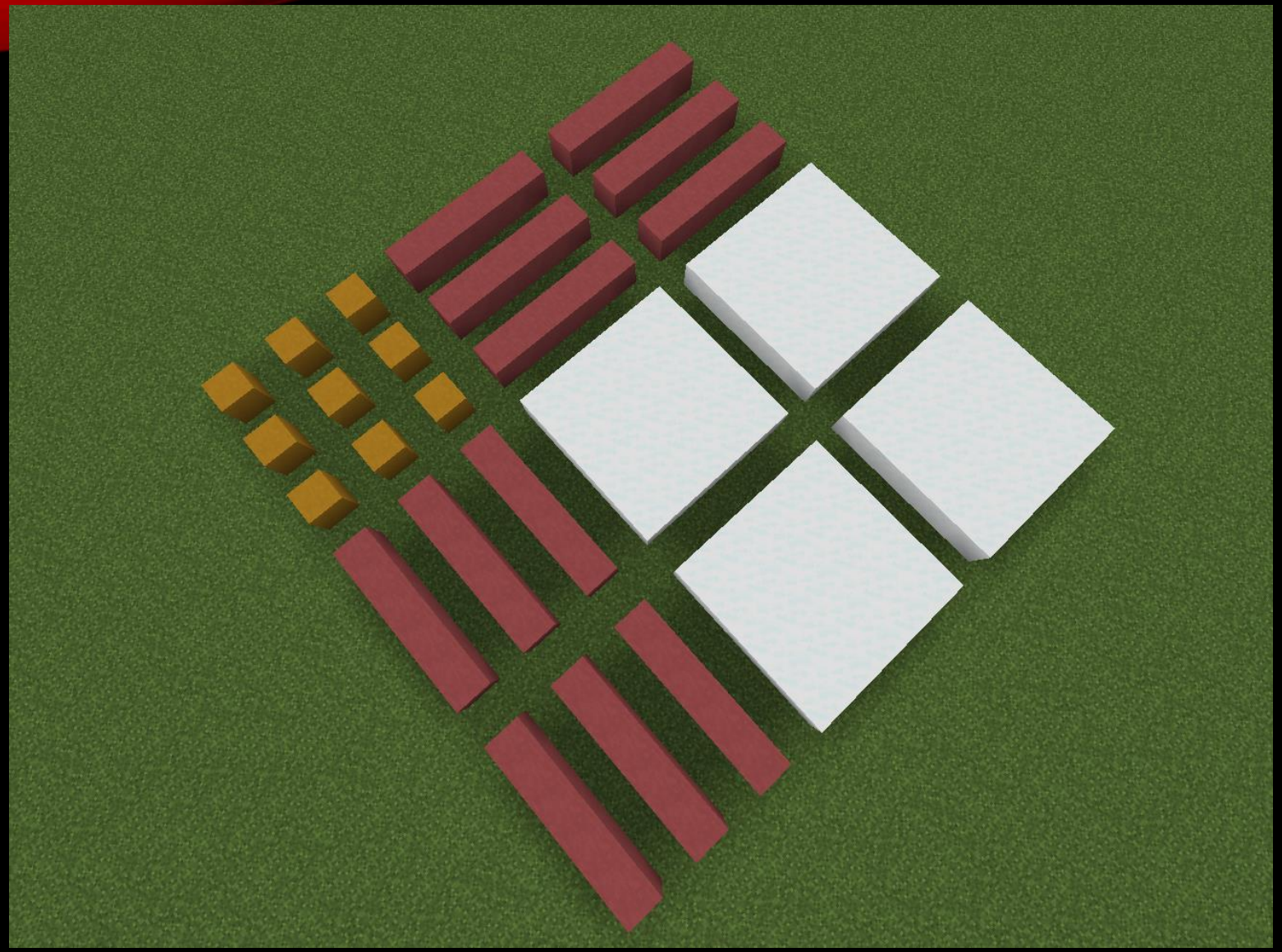

PERFECT SQUARE TRINOMIAL

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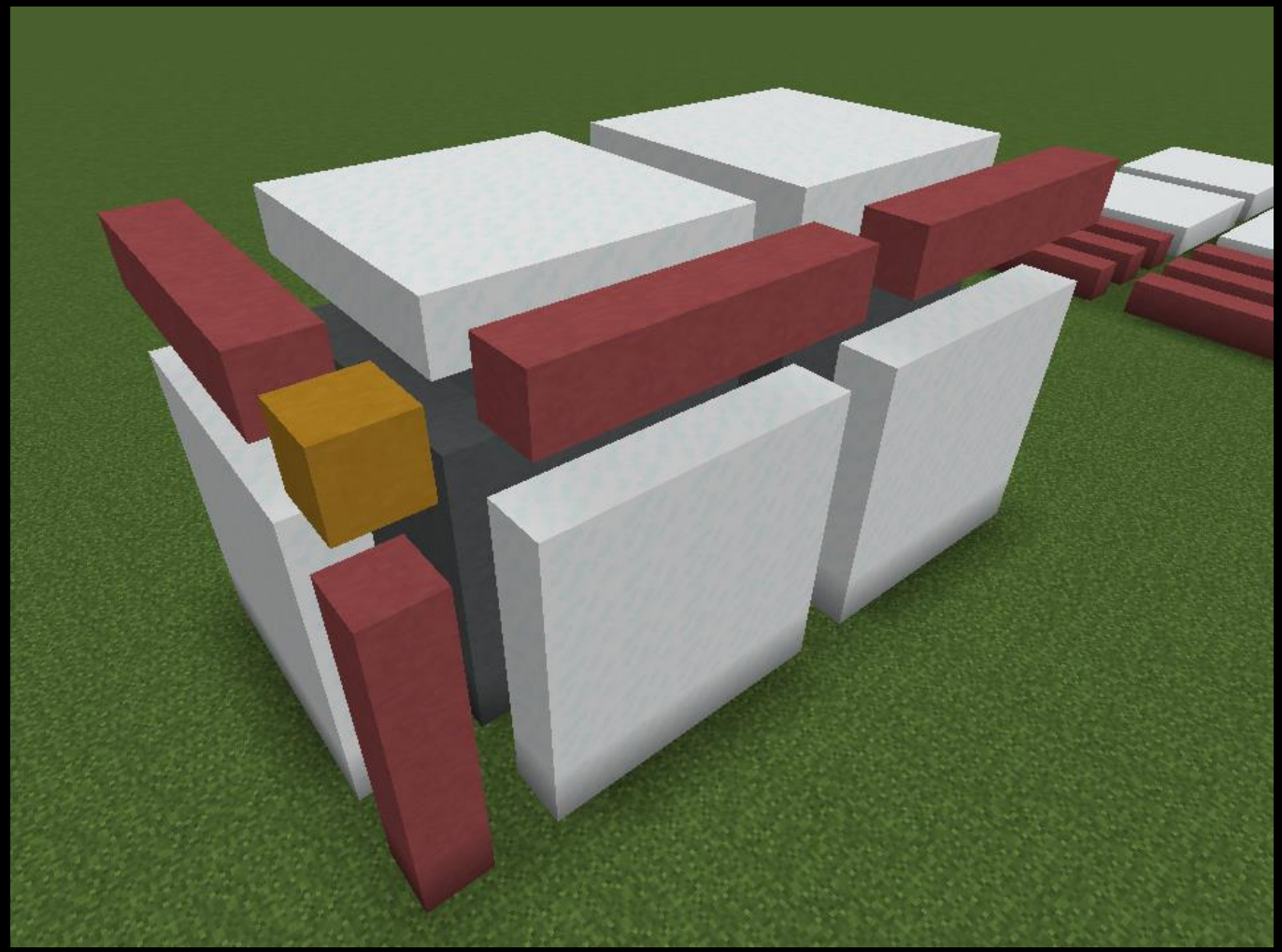
FACTORING 3RD DEGREE POLYNOMIALS



$2x^3 + 5x^2 + 4x + 1 =$
(2x+1)(x+1)(x+1)

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STUDENT TESTIMONIALS

- you can just see the answer
- Why hasn't anyone shown me this before?

- Hirsh-Pasek, K., & Golinkoff, R. M. (2008). Why play= learning. *Encyclopedia on early childhood development*, *1*, 1-7.