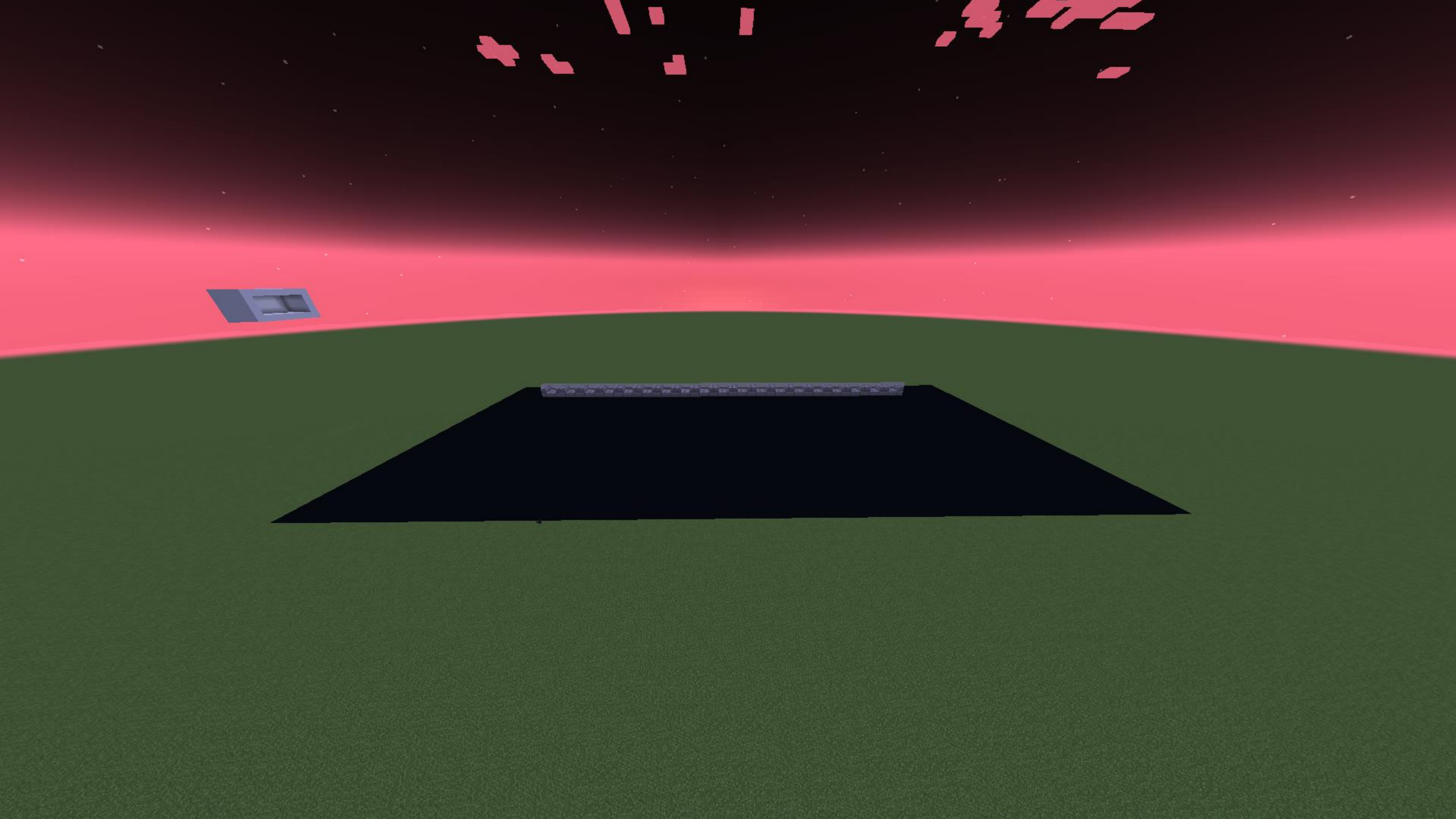
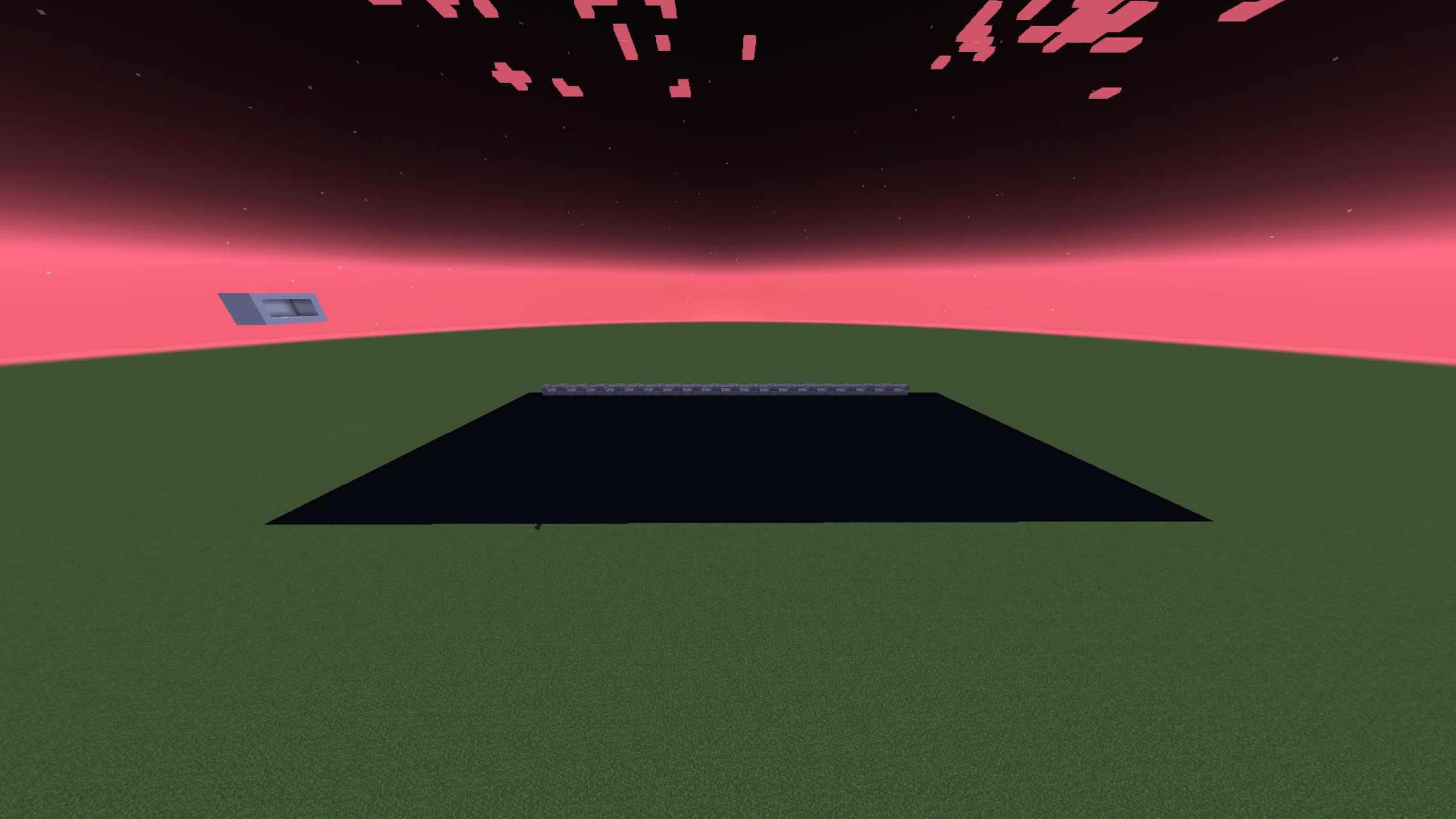


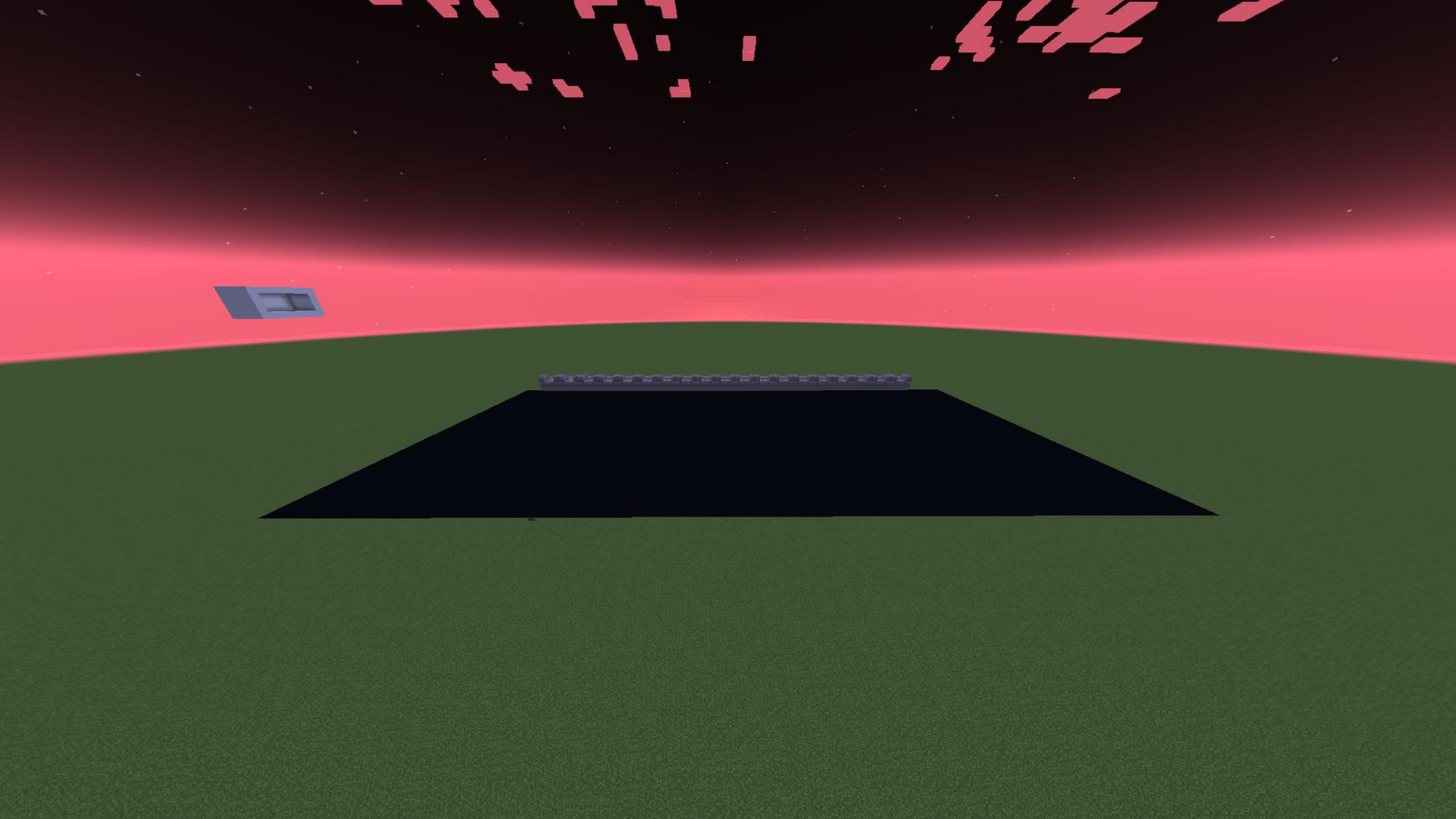
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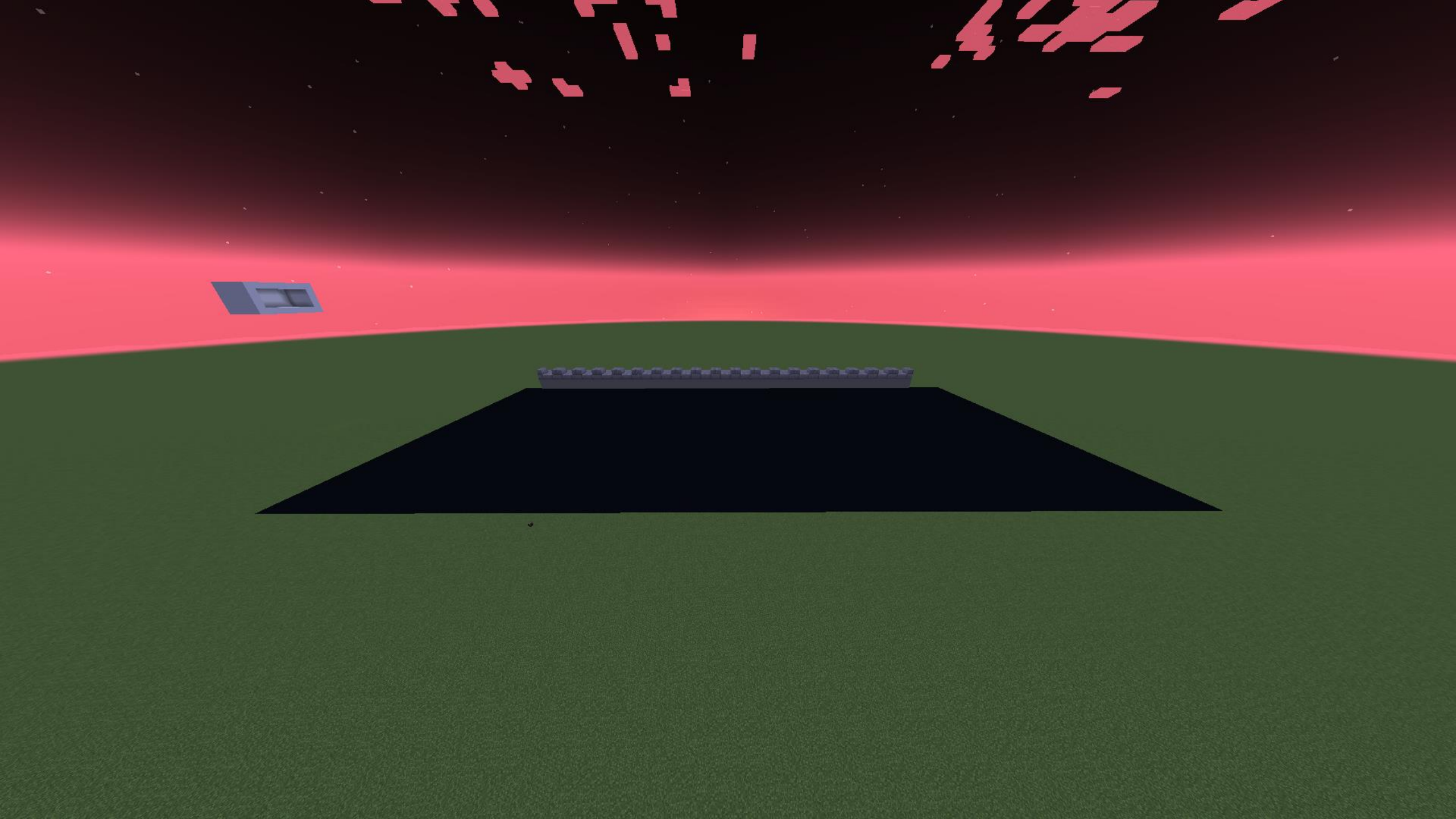


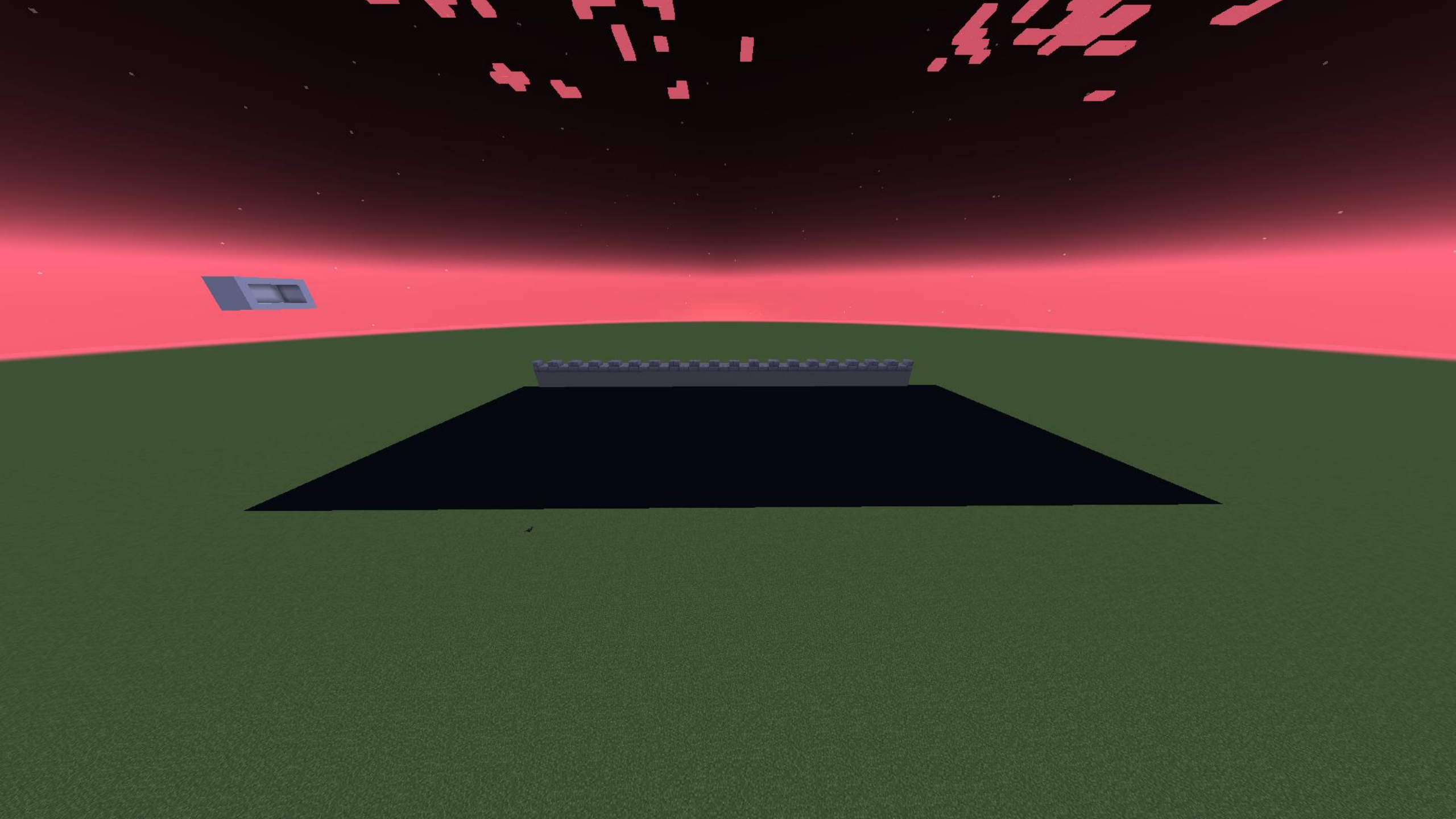
11 ottobre 2024

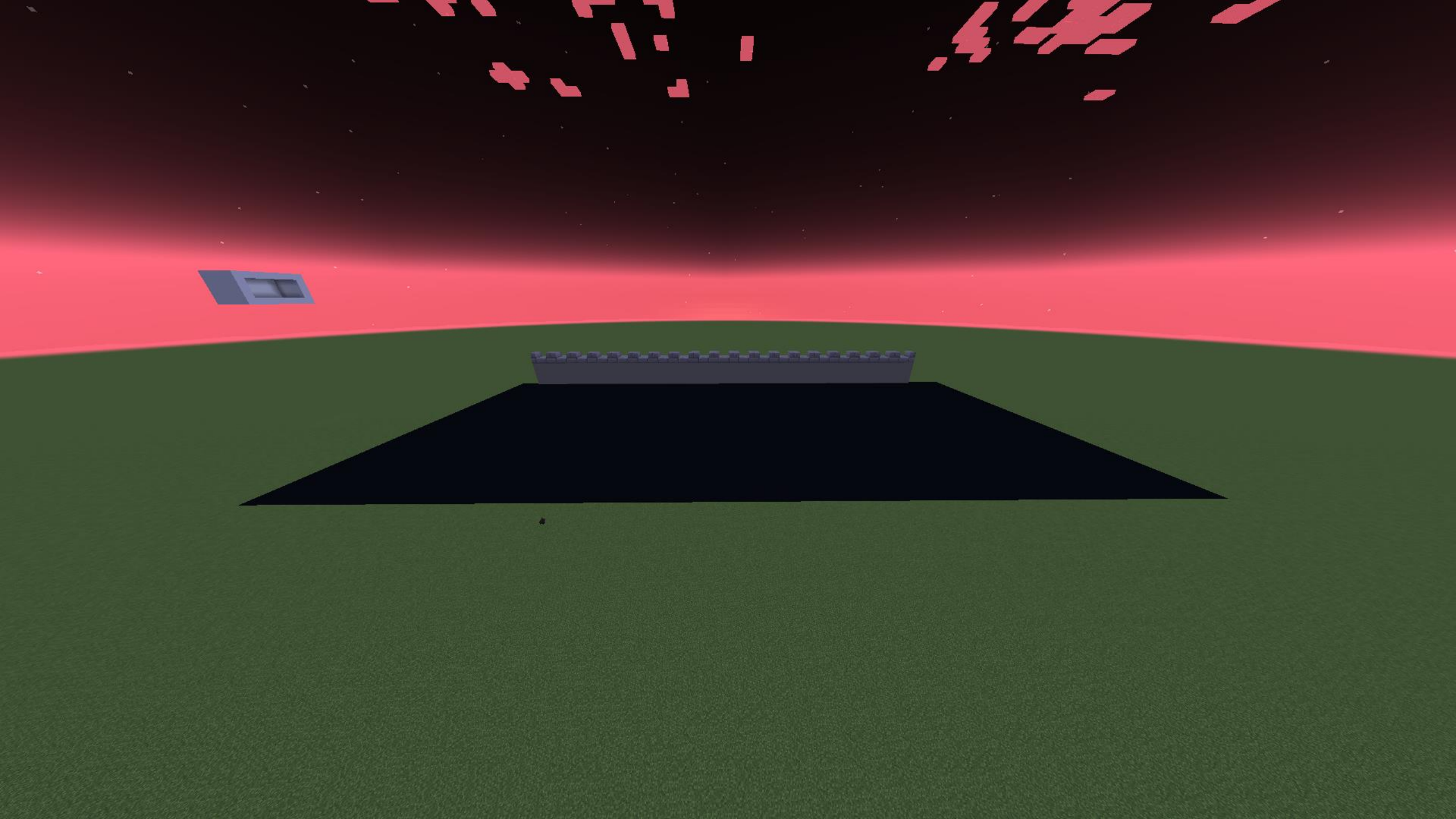


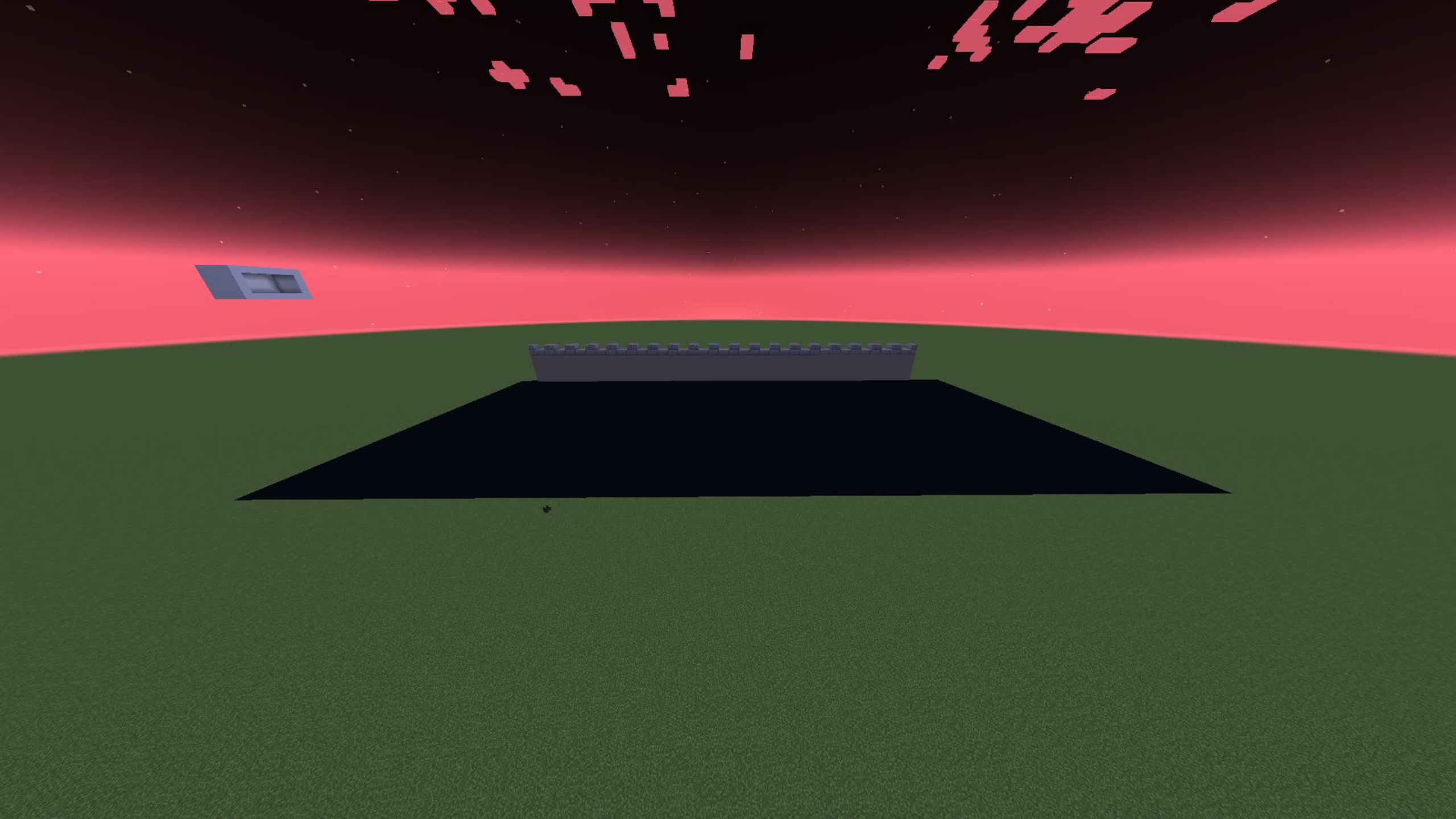




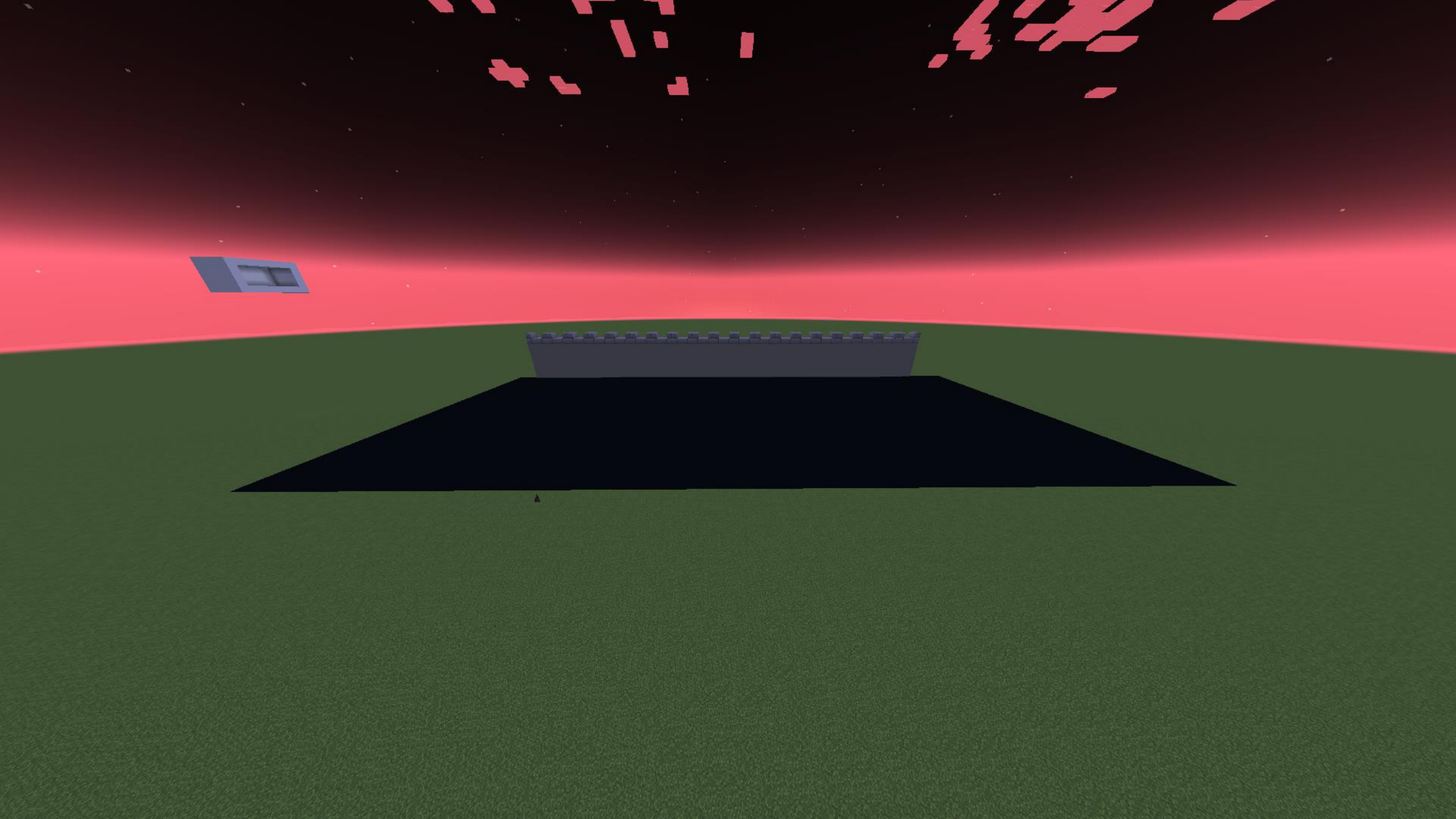


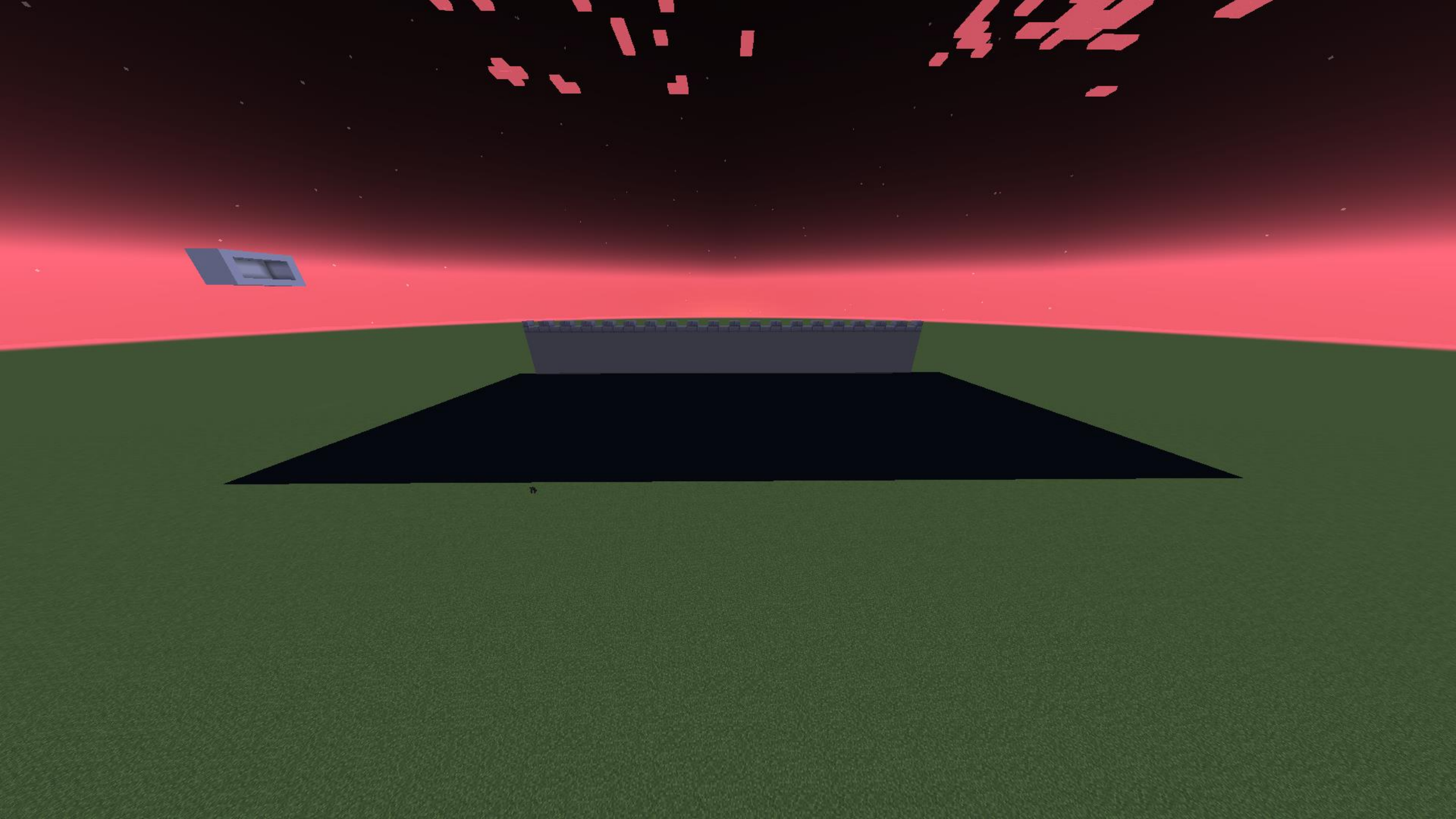


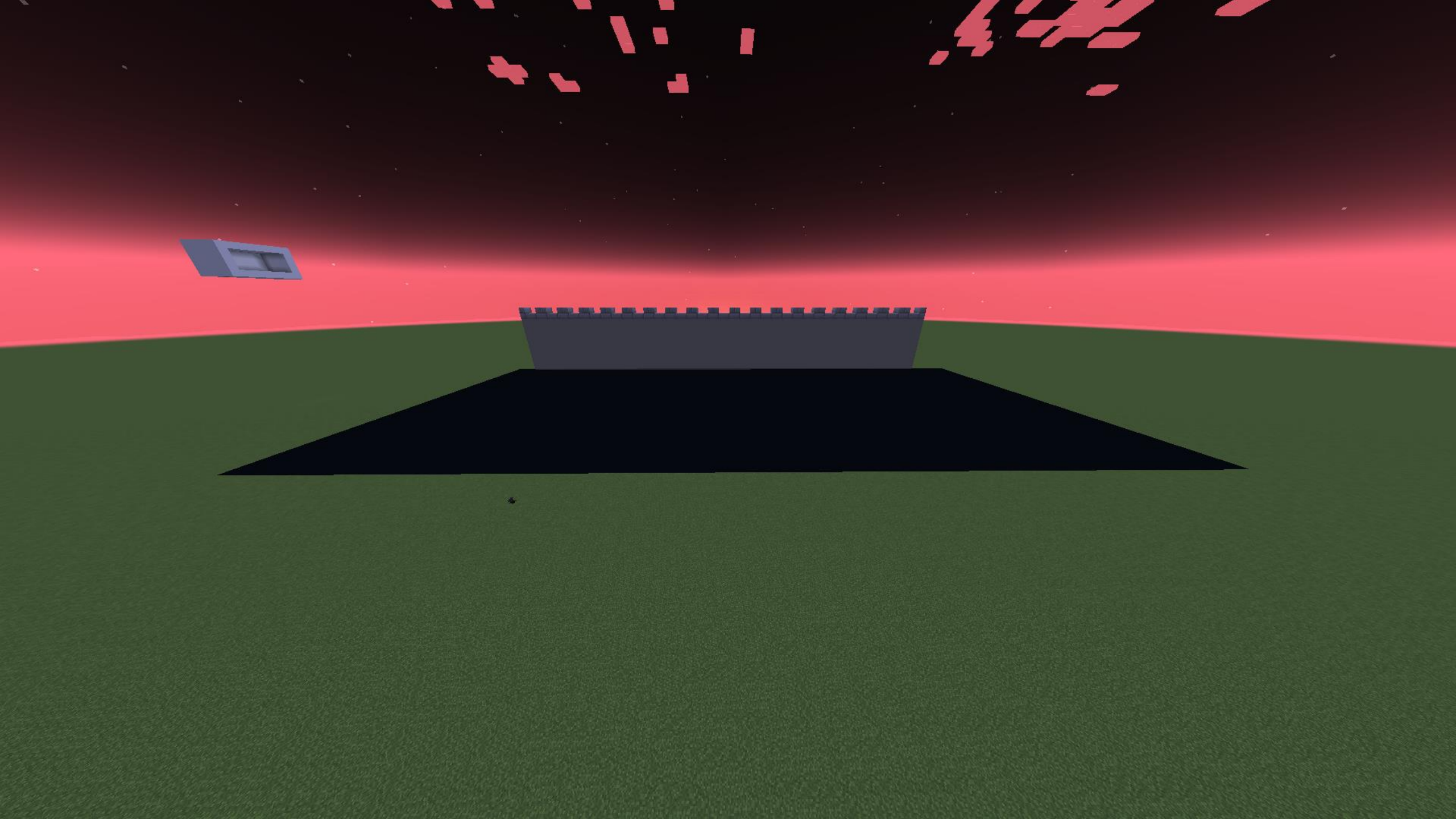


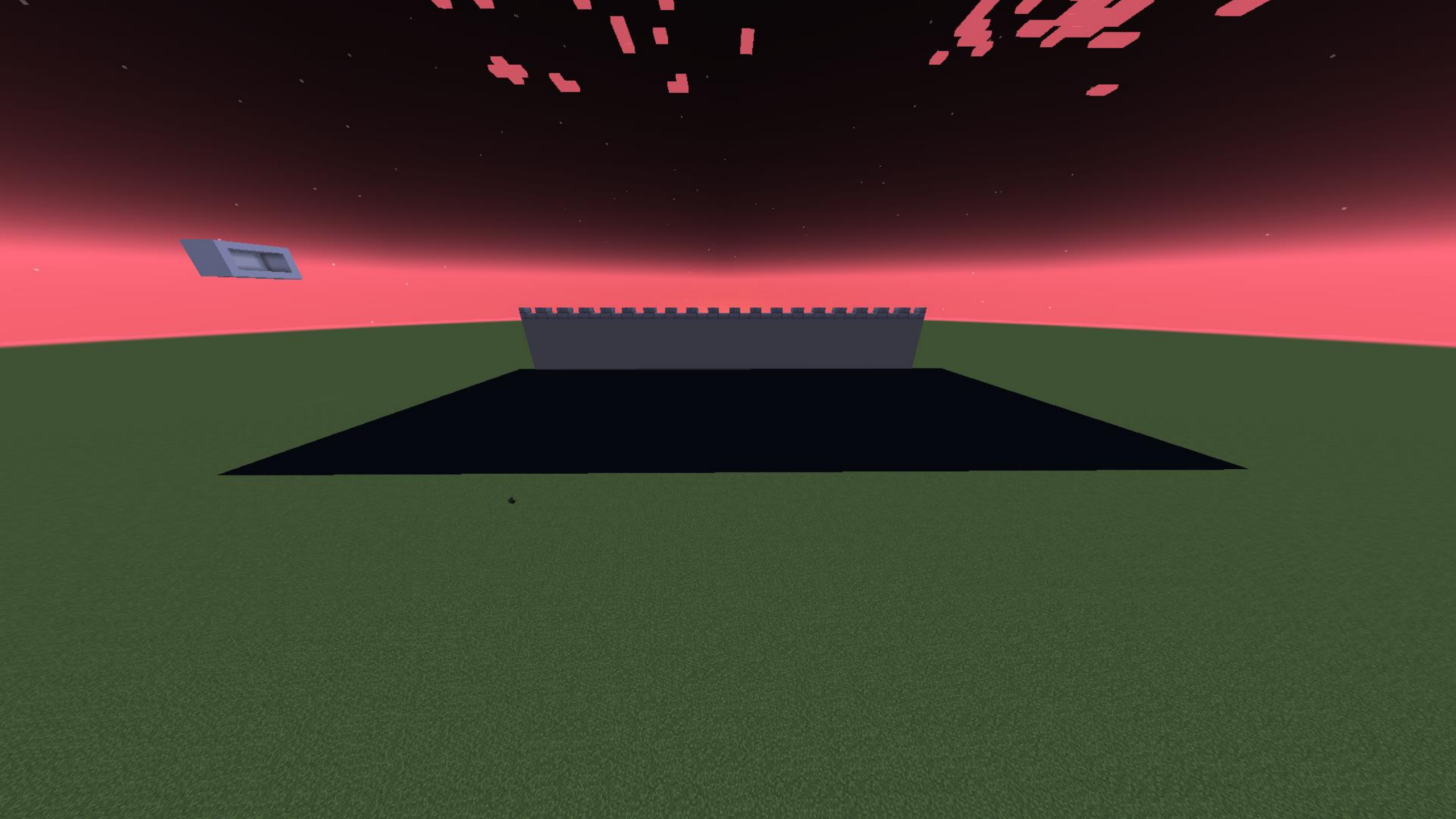


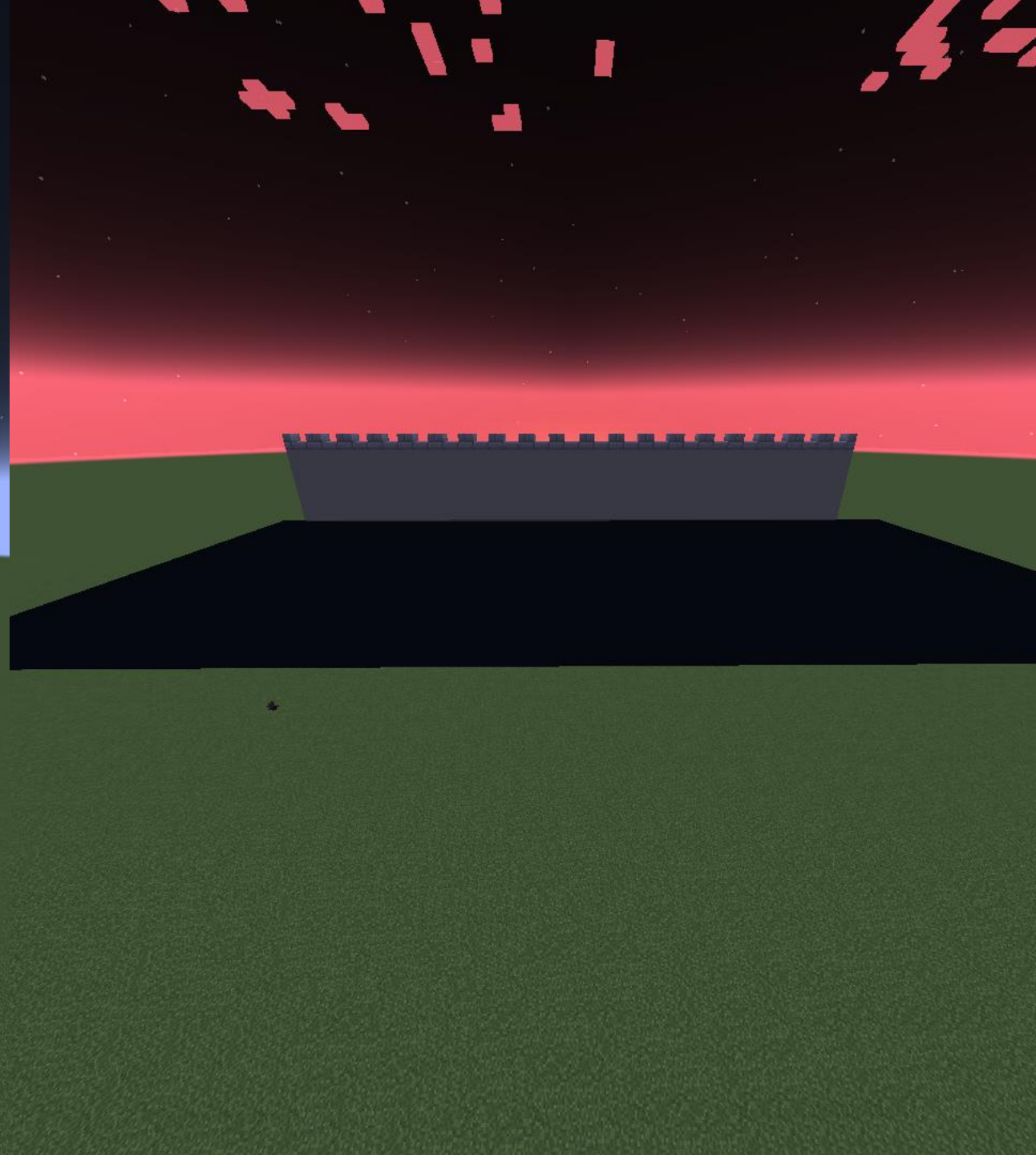
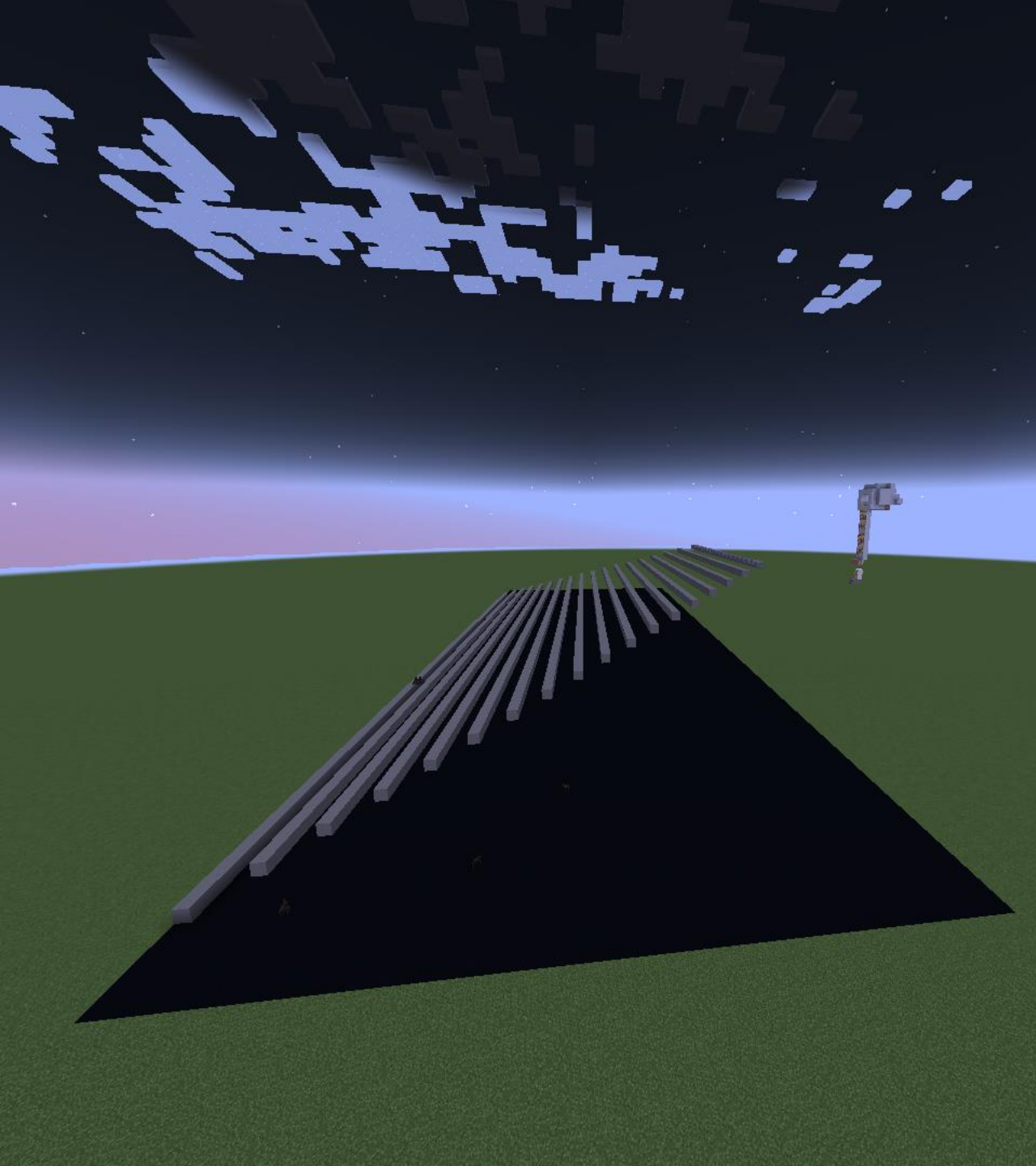


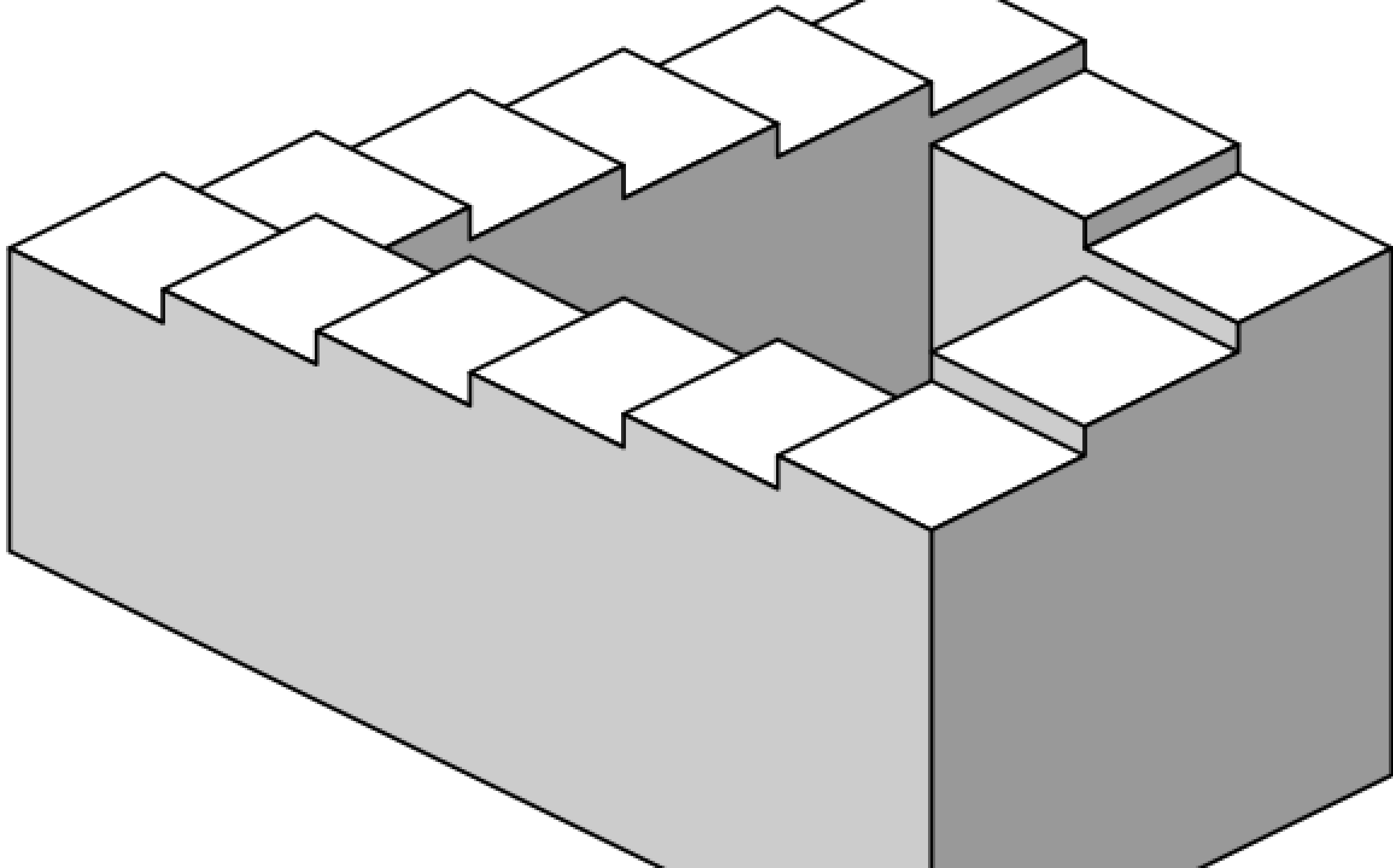


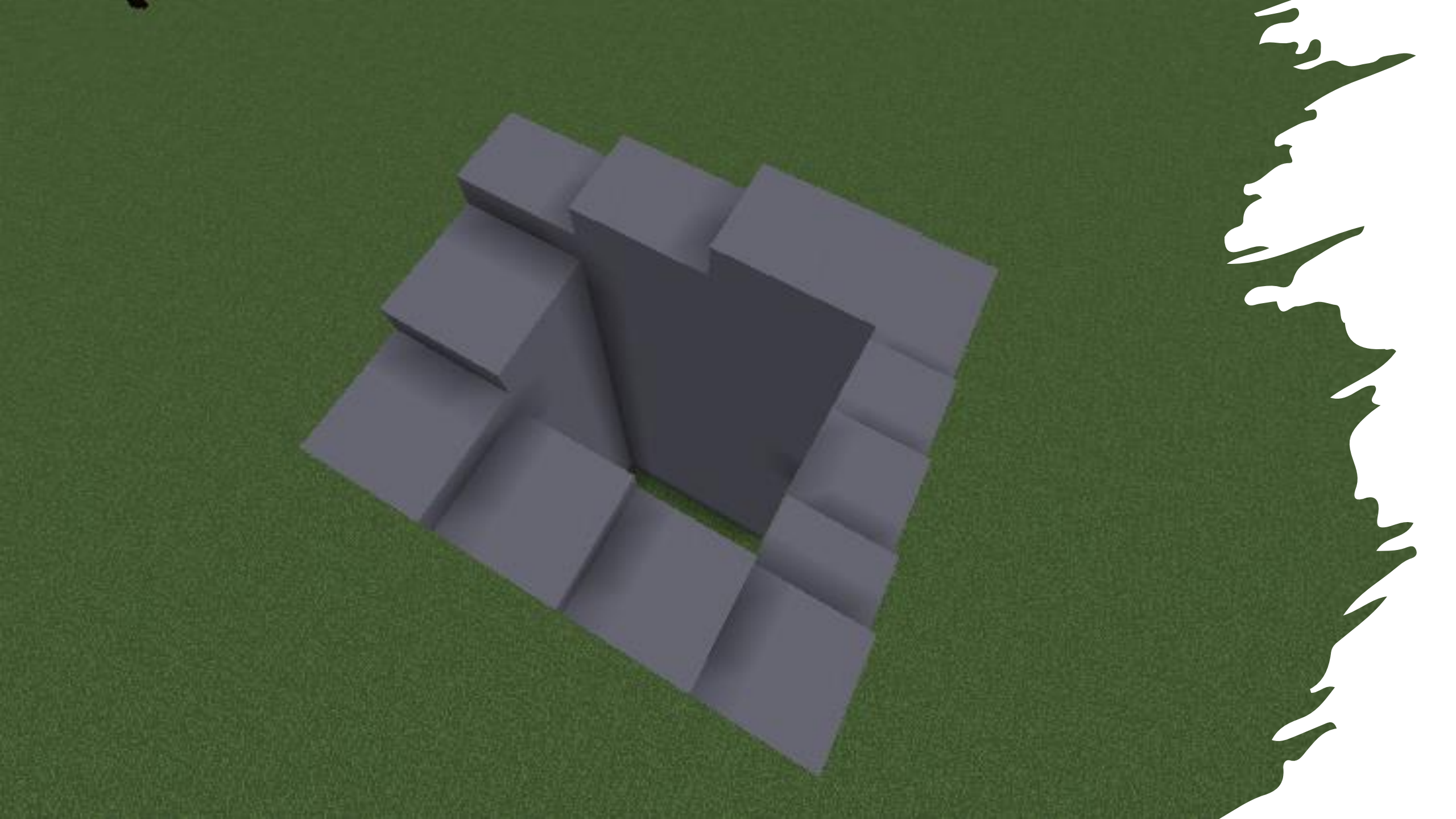


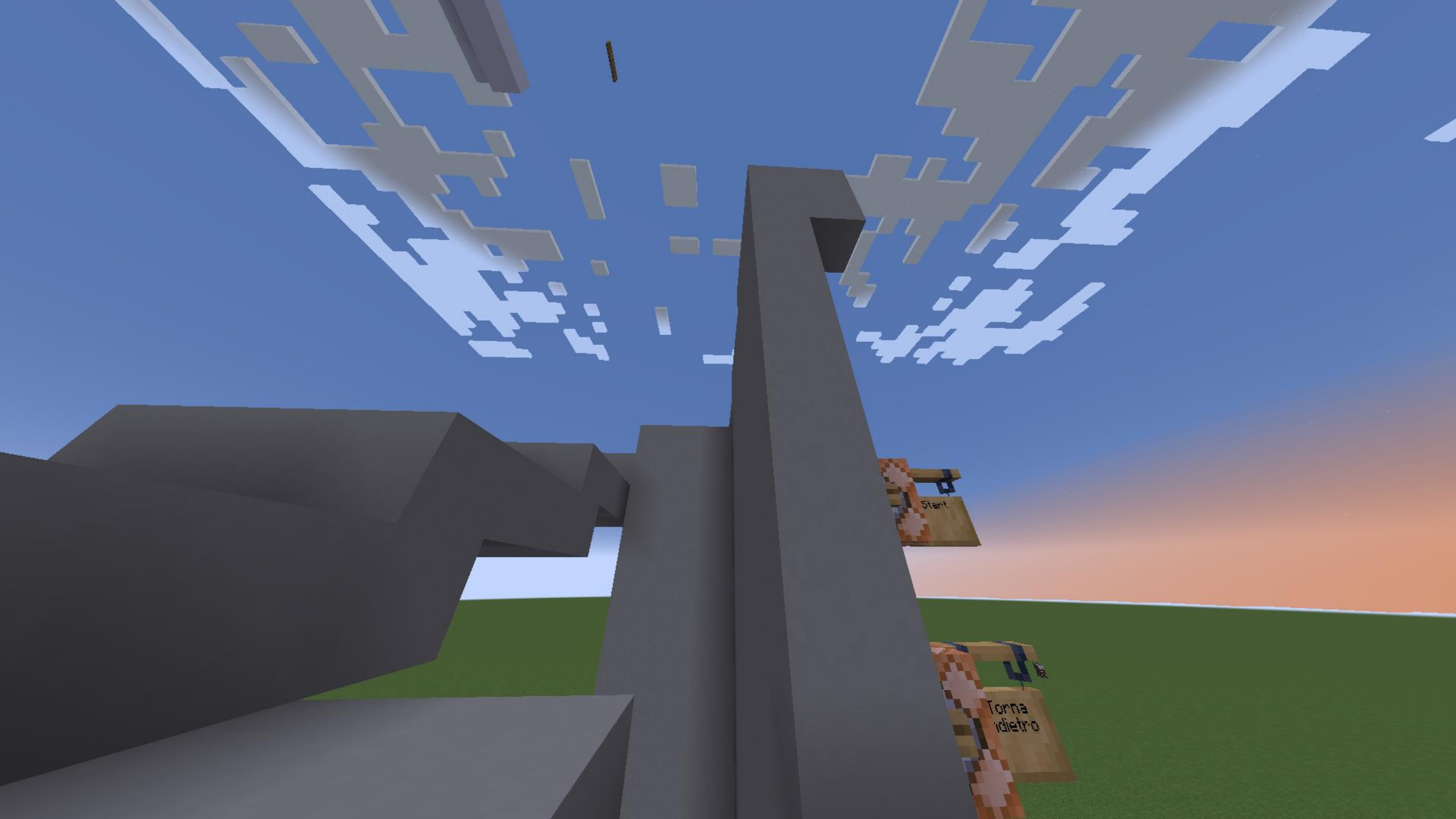




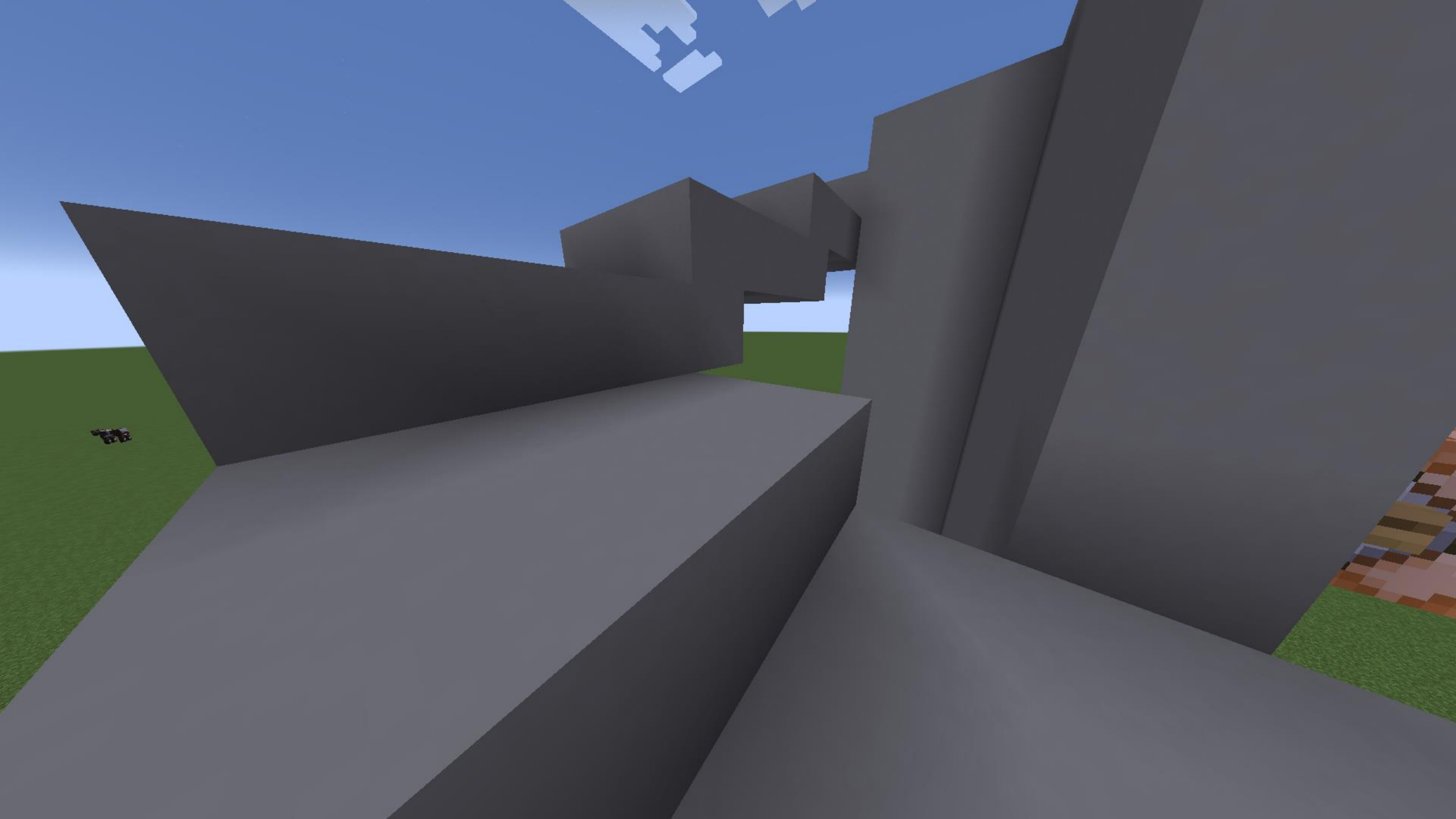




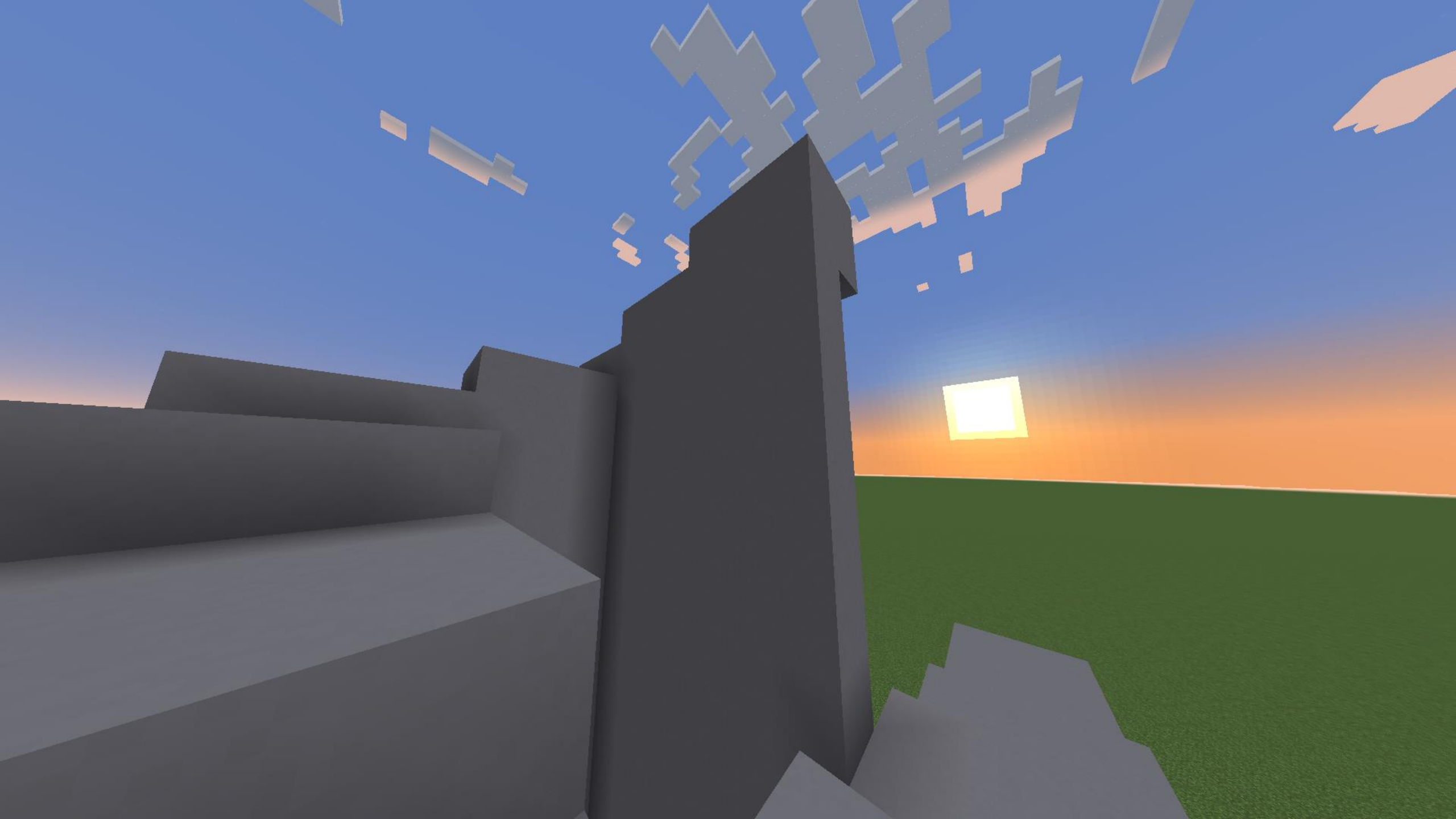


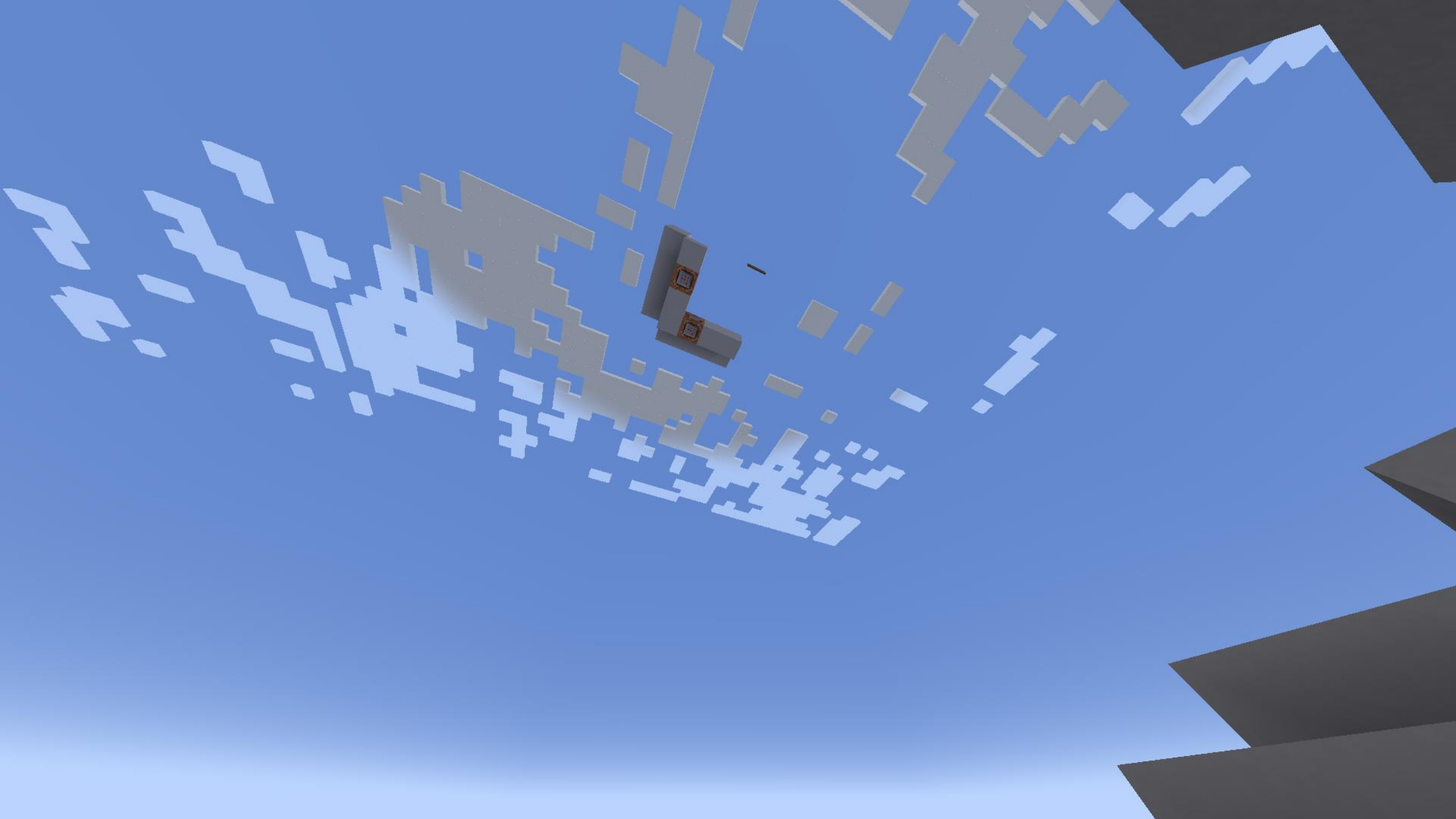










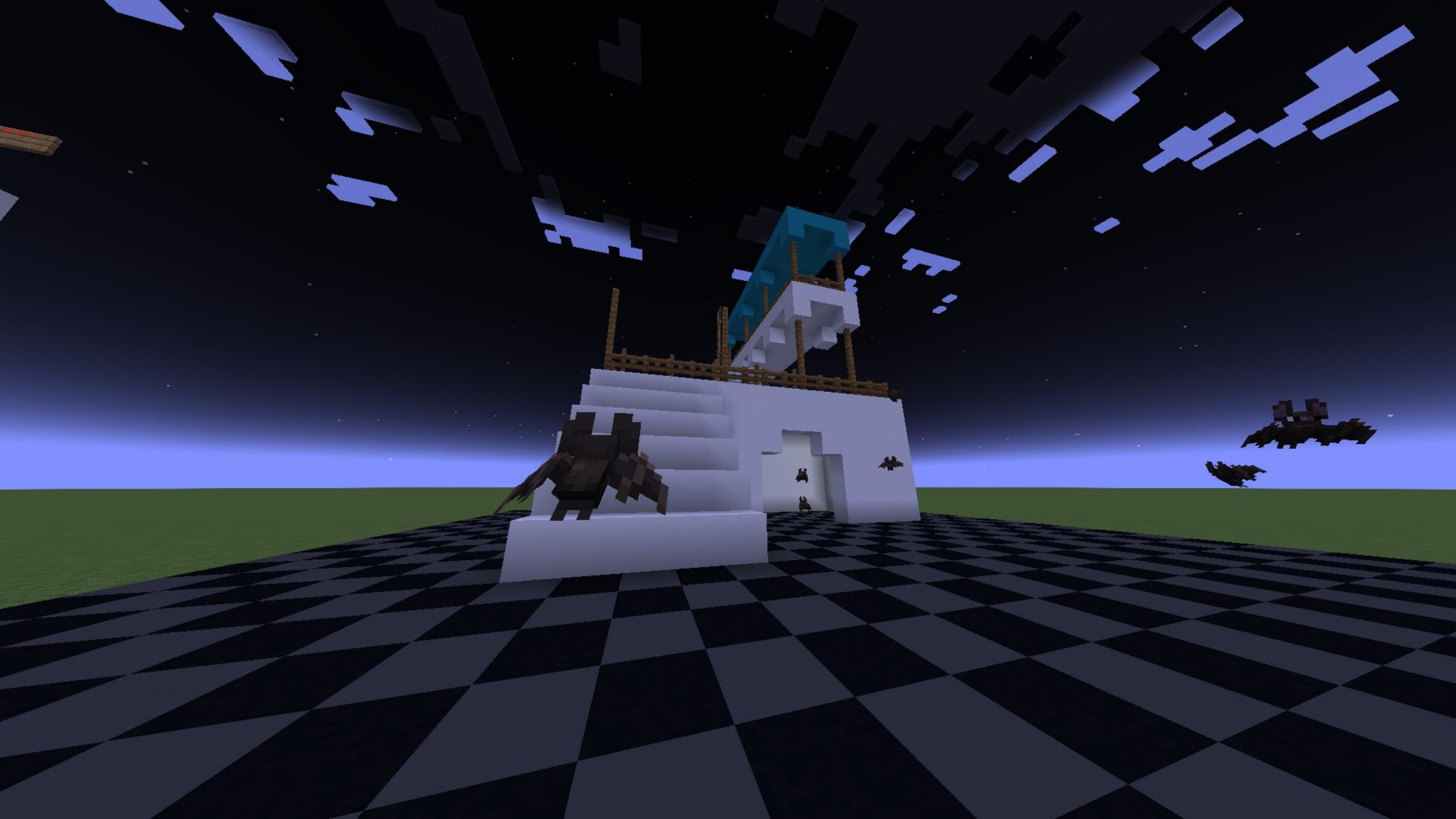


Belvedere



Belvedere



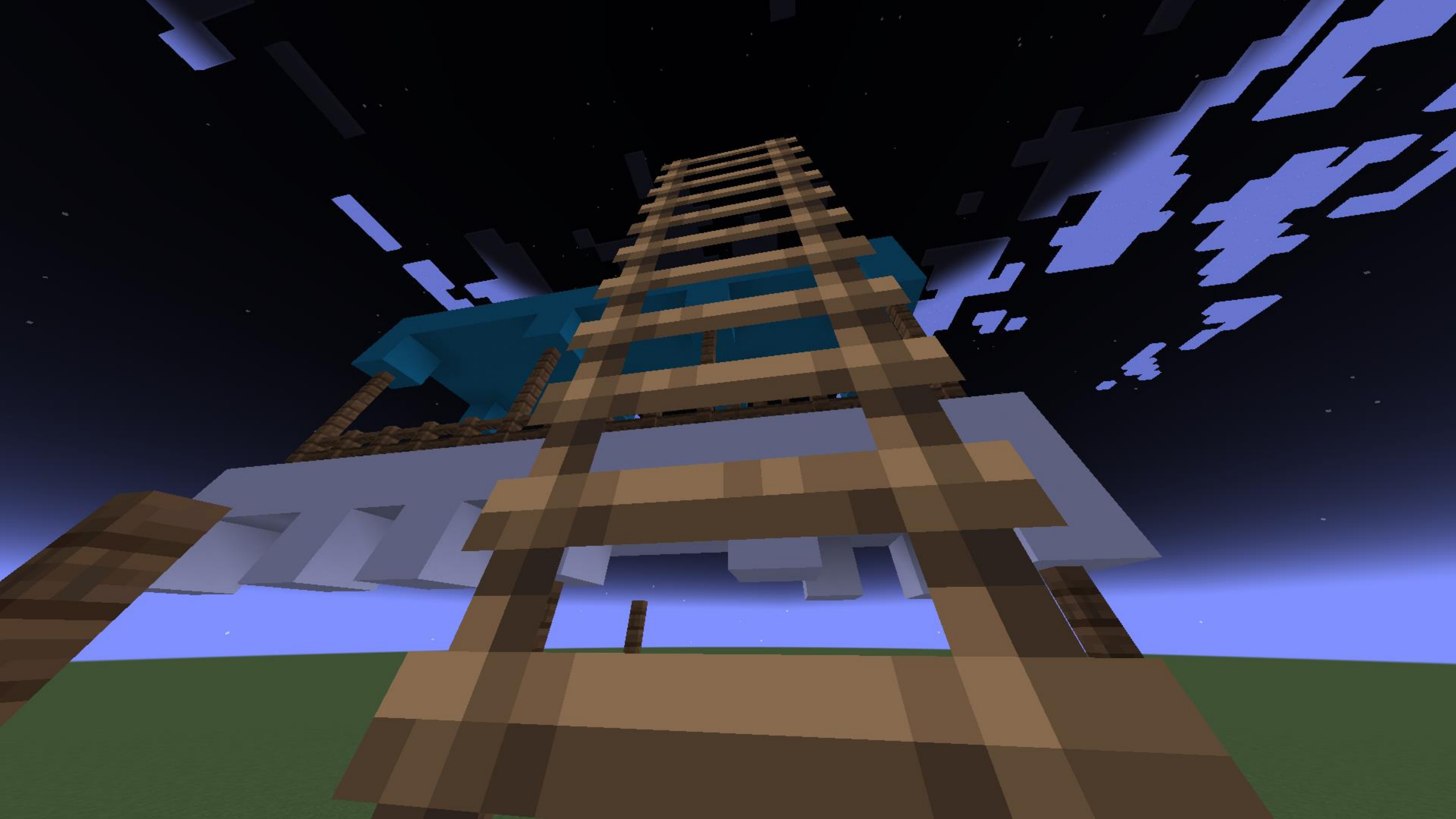




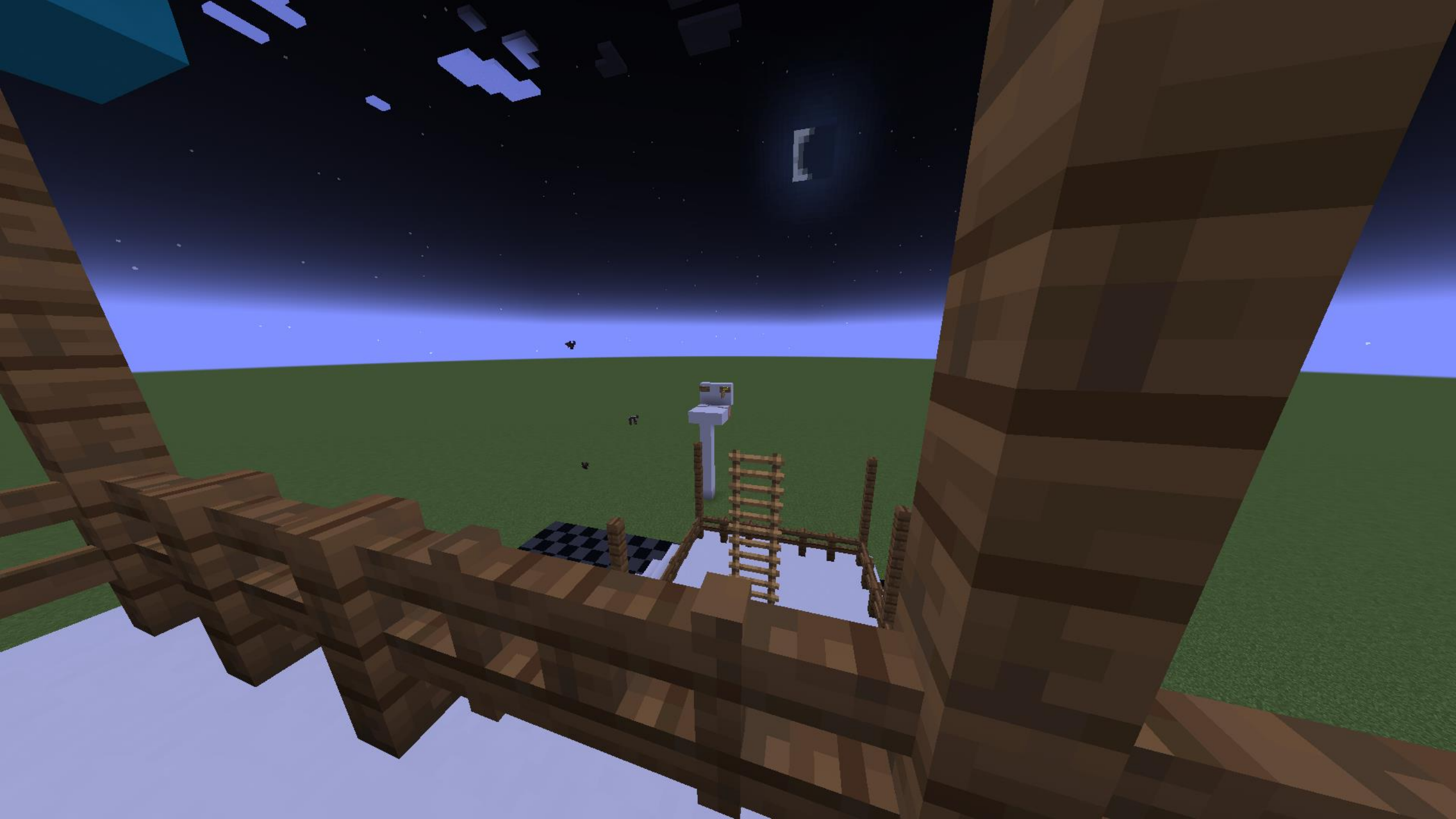


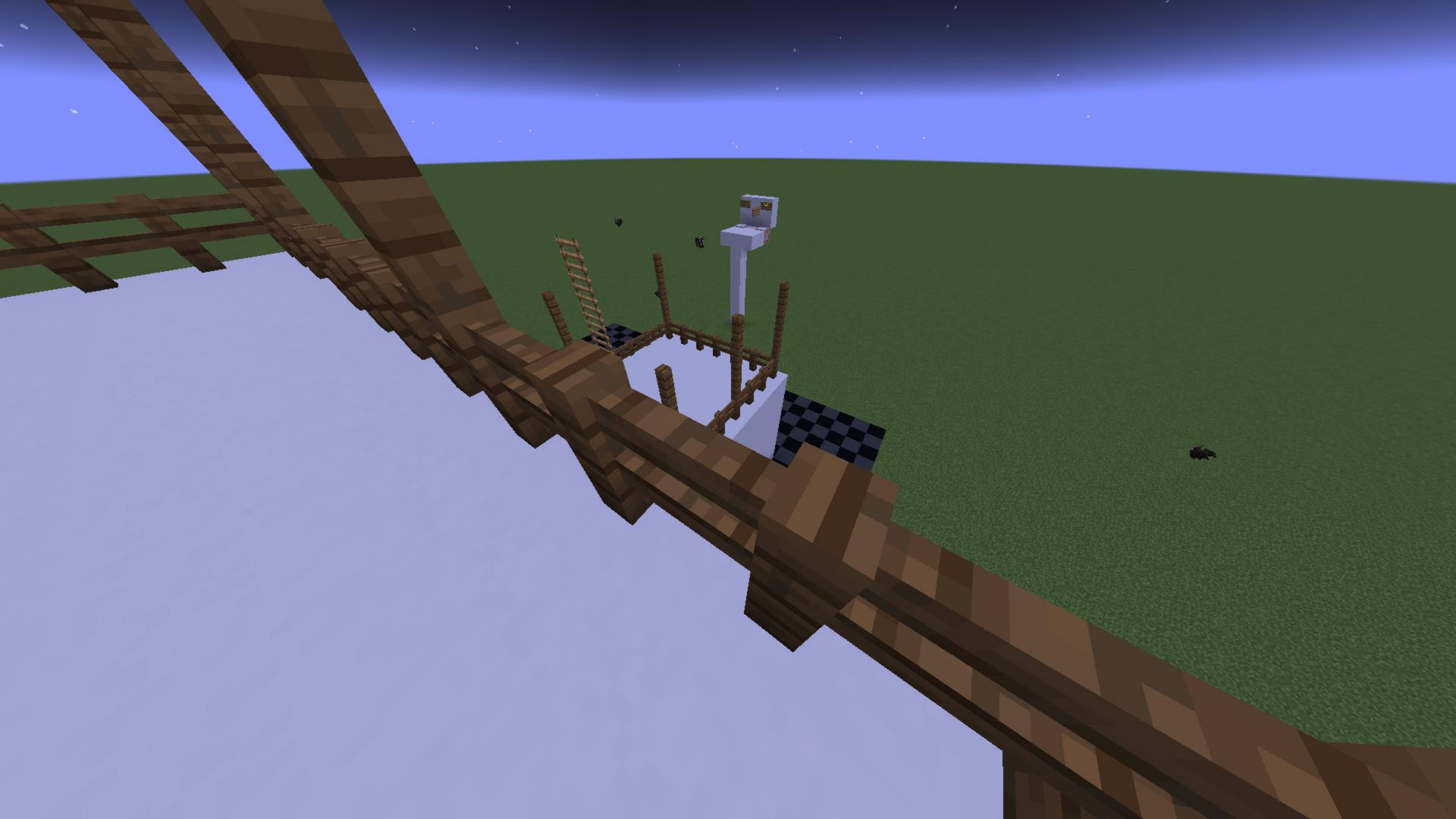












# Il gioco della PROSPETTIVA

Beatrice









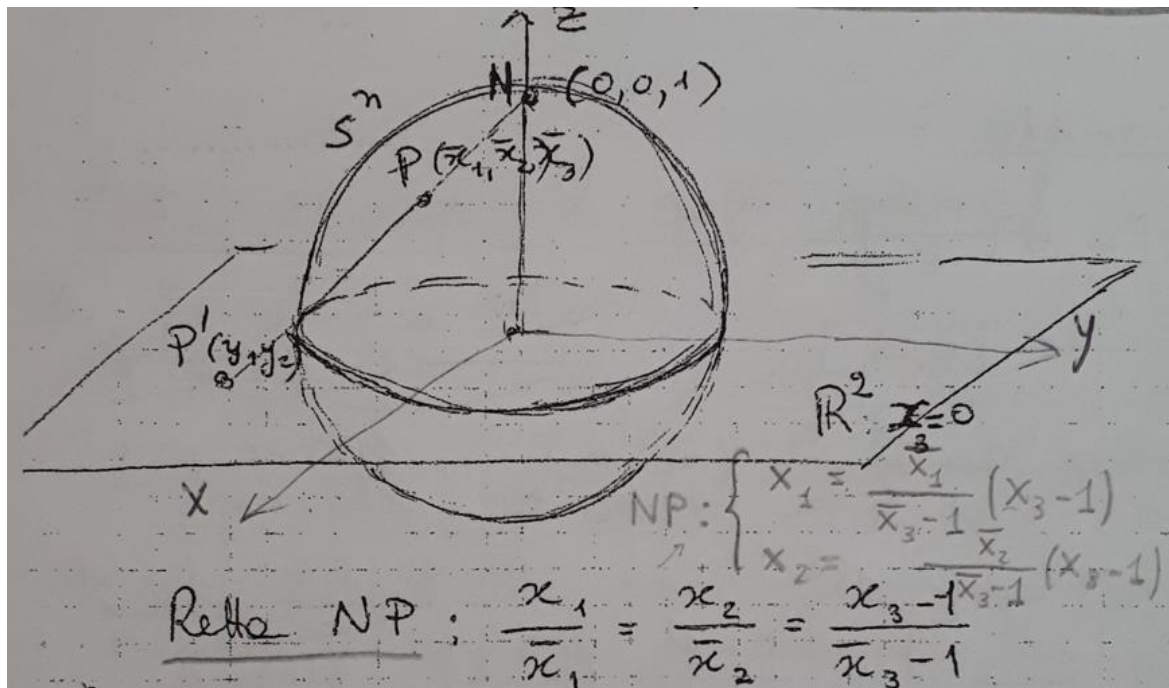




# La PROSPETTIVA in matematica

Francesco e Lorenzo





$$S^2: x_1^2 + x_2^2 + x_3^2 = 1$$

$$N = (0; 0; 1)$$

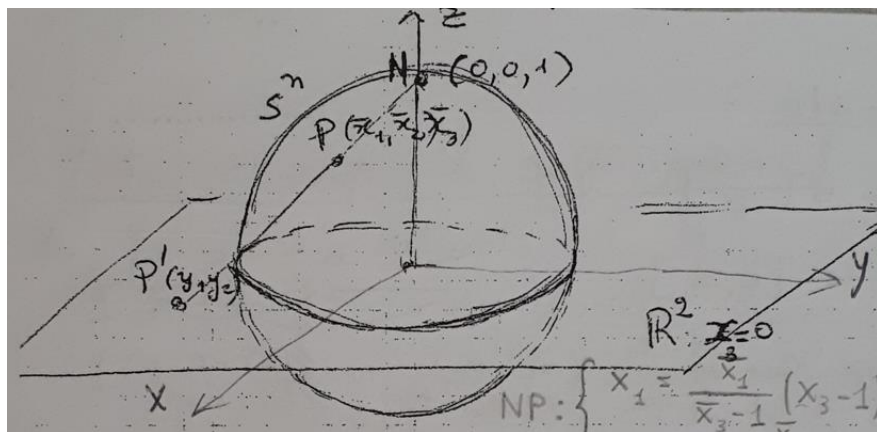
$$P = (\bar{x}_1; \bar{x}_2; \bar{x}_3)$$

$$P' = (y_1; y_2)$$

$$P' = NP \cap \{x_3 = 0\}$$

Equazione di NP:  $\frac{x_1 - 0}{\bar{x}_1 - 0} = \frac{x_2 - 0}{\bar{x}_2 - 0} = \frac{x_3 - 1}{\bar{x}_3 - 1}$

$$NP: \begin{cases} x_1 = \frac{\bar{x}_1}{\bar{x}_3 - 1} (x_3 - 1) \\ x_2 = \frac{\bar{x}_2}{\bar{x}_3 - 1} (x_3 - 1) \end{cases} \rightarrow NP \cap \{x_3 = 0\}: \begin{cases} y_1 = \frac{\bar{x}_1}{\bar{x}_3 - 1} \\ y_2 = \frac{\bar{x}_2}{\bar{x}_3 - 1} \end{cases}$$



Proiezione stereografica della 2-sfera:

$$\begin{aligned} \pi_N : S^2 \setminus \{N\} &\rightarrow \mathbb{R}^2 \\ (x_1; x_2; x_3) &\mapsto \left( \frac{x_1}{x_3 - 1}; \frac{x_2}{x_3 - 1} \right) \end{aligned}$$

Generalizzando al caso con n qualsiasi (ESERCIZIO!):

$$\begin{aligned} \pi_N : S^n \setminus \{N\} &\rightarrow \mathbb{R}^n \\ (x_1; \dots; x_{n+1}) &\mapsto \left( \frac{x_1}{x_{n+1} - 1}; \dots; \frac{x_n}{x_{n+1} - 1} \right) \end{aligned}$$

inversa:

$$P^1: \frac{x_1}{y_1} = \frac{x_2}{y_2} = \frac{x_3 - 1}{-1}$$

$$\text{cioè } 1) \begin{cases} x_1 = y_1 \cdot (1 - x_3) \\ x_2 = y_2 \cdot (1 - x_3) \end{cases}$$

se, intersechiamo  $NP^1$  con la sfera:

$$NP^1 \cap S^2: y_1^2 (1 - x_3)^2 + y_2^2 (1 - x_3)^2 = 1 - x_3^2$$

$$\Rightarrow y_1^2 + y_2^2 - 1 = x_3 (y_1^2 + y_2^2 + 1)$$

$$x_3 = \frac{y_1^2 + y_2^2 - 1}{y_1^2 + y_2^2 + 1} \quad \text{e} \quad 1 - x_3 = \frac{2}{y_1^2 + y_2^2 + 1}$$

$$x_1 = \frac{2y_1}{y_1^2 + y_2^2 + 1}$$

$$x_2 = \frac{2y_2}{y_1^2 + y_2^2 + 1}$$

$$x_3 = \frac{y_1^2 + y_2^2 - 1}{y_1^2 + y_2^2 + 1}$$

$$\Pi_N^{-1}: \begin{cases} \mathbb{R}^2 \longrightarrow S^2 \setminus \{N\} \\ (y_1, y_2) \longmapsto \left( \frac{2y_1}{y_1^2 + y_2^2 + 1}, \frac{2y_2}{y_1^2 + y_2^2 + 1} \right) \end{cases}$$

Generalizzando al caso  $n \in \mathbb{N}$ :

$$\Pi_N: \begin{cases} S^n \setminus \{N\} \longrightarrow \mathbb{R}^n \\ (x_1, \dots, x_{n+1}) \longmapsto \left( \frac{x_1}{1-x_{n+1}}, \dots, \frac{x_n}{1-x_{n+1}} \right) \end{cases}, \quad \Pi_N^{-1}: \begin{cases} \mathbb{R}^n \longrightarrow S^n \setminus \{N\} \\ (y_1, \dots, y_n) \longmapsto \left( \frac{2y_1}{1 + \sum_{i=1}^n y_i^2}, \dots, \frac{2y_n}{1 + \sum_{i=1}^n y_i^2} \right) \end{cases}$$

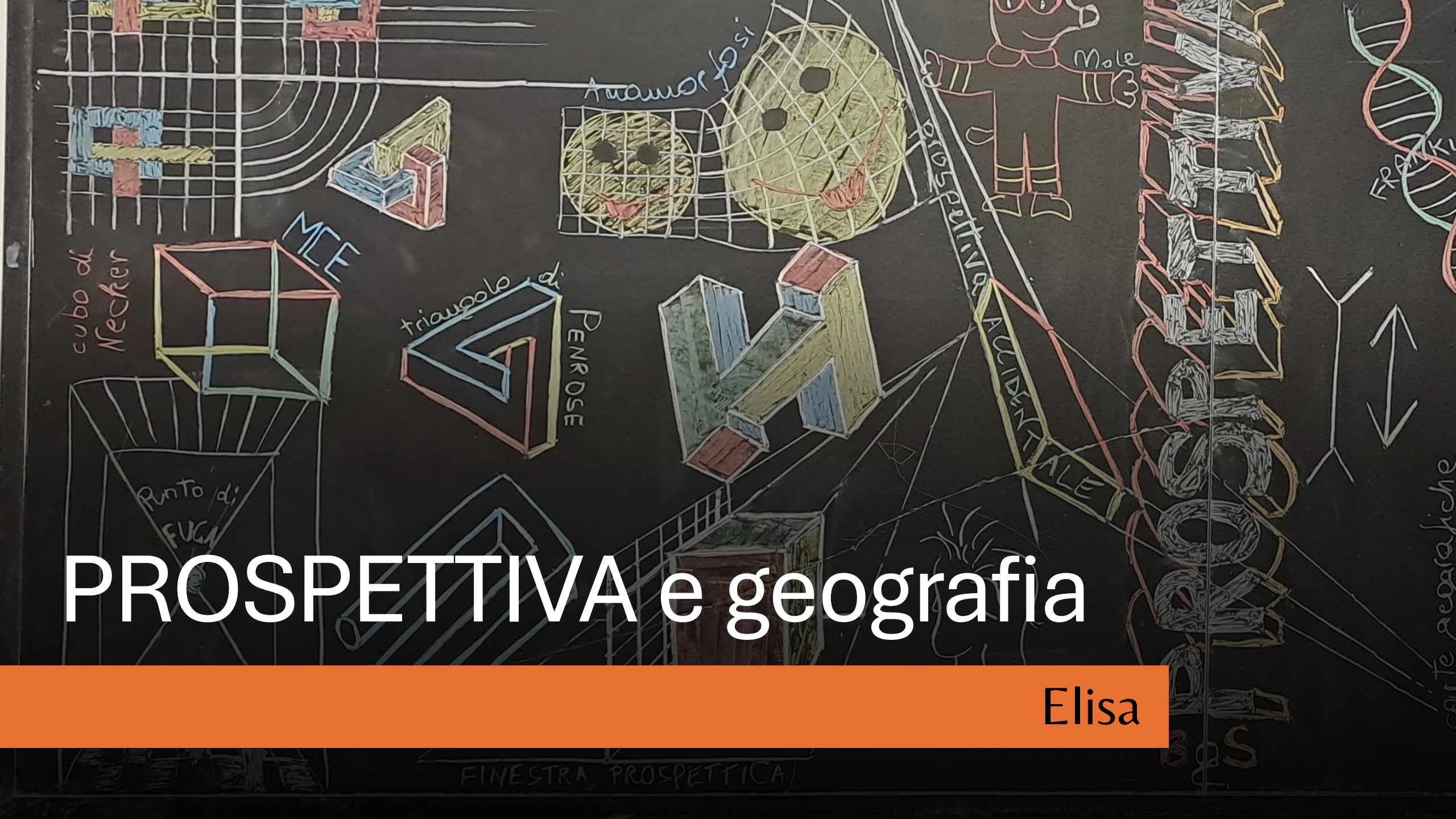
BASTAAAAA!!!

$P' : \frac{x_1}{y_1} = \frac{x_2}{y_2} = \frac{x_3-1}{-1}$   
 cioè  $\begin{cases} x_1 = y_1(1-x_3) \\ x_2 = y_2(1-x_3) \end{cases}$  con la sfera  $x_1^2 + y_1^2 - 1 = x_3^2$   
 e, intersechiamola con  $x_1^2 + y_1^2 + y_2^2 - 1 = x_3^2$   
 $\Rightarrow \begin{cases} y_1^2 + y_2^2 - 1 = x_3^2 \\ y_1^2 + y_2^2 - 1 = x_3^2 \end{cases} = (1+x_3)(1-x_3)$   
 $\Rightarrow y_1^2 + y_2^2 - 1 = x_3^2$   
 $\Rightarrow x_3 = \frac{2y_1}{y_1^2 + y_2^2 + 1}$   
 $x_1 = \frac{2y_1}{y_1^2 + y_2^2 + 1}$   
 $x_2 = \frac{2y_2}{y_1^2 + y_2^2 + 1}$   
 $x_3 = \frac{y_1^2 + y_2^2 - 1}{y_1^2 + y_2^2 + 1}$   
 Generalizzando al caso  $n \in \mathbb{N}$  :  
 $\pi_N : S^m \rightarrow \mathbb{R}^m$   
 $\pi_N : (x_1, x_{n+1}) \mapsto \left( \frac{x_1}{1-x_{n+1}}, \dots, \frac{x_n}{1-x_{n+1}} \right)$   
 $\pi_N^{-1} : (y_1, y_2) \mapsto \left( \frac{2y_1}{y_1^2 + y_2^2 + 1}, \frac{2y_2}{y_1^2 + y_2^2 + 1}, \frac{2y_1 y_2}{y_1^2 + y_2^2 + 1} \right)$   
 $\pi_N^{-1} : (y_1, \dots, y_m) \mapsto \left( \frac{2y_1}{1 + \sum_{i=1}^m y_i^2}, \dots, \frac{2y_m}{1 + \sum_{i=1}^m y_i^2} \right)$

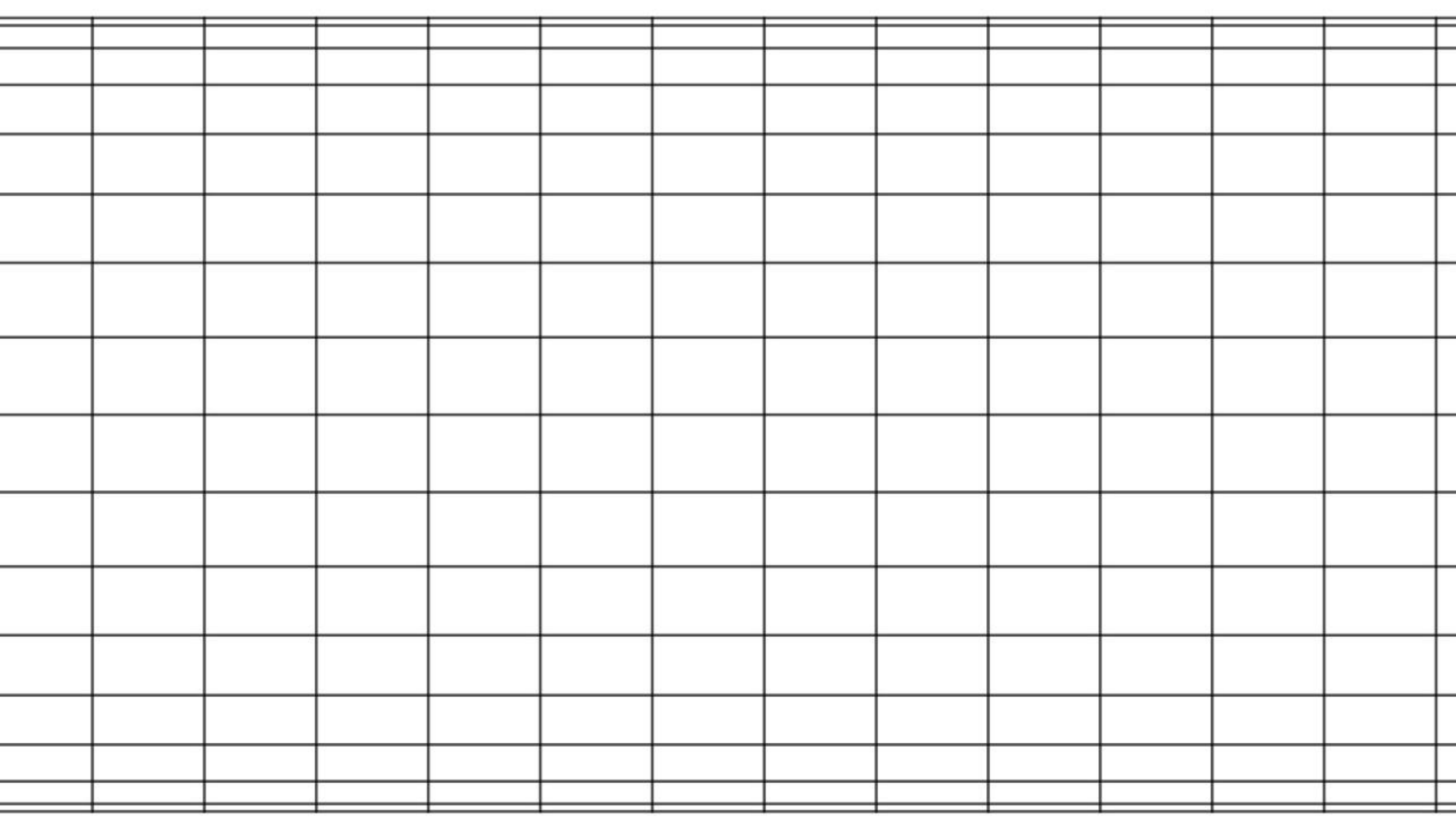


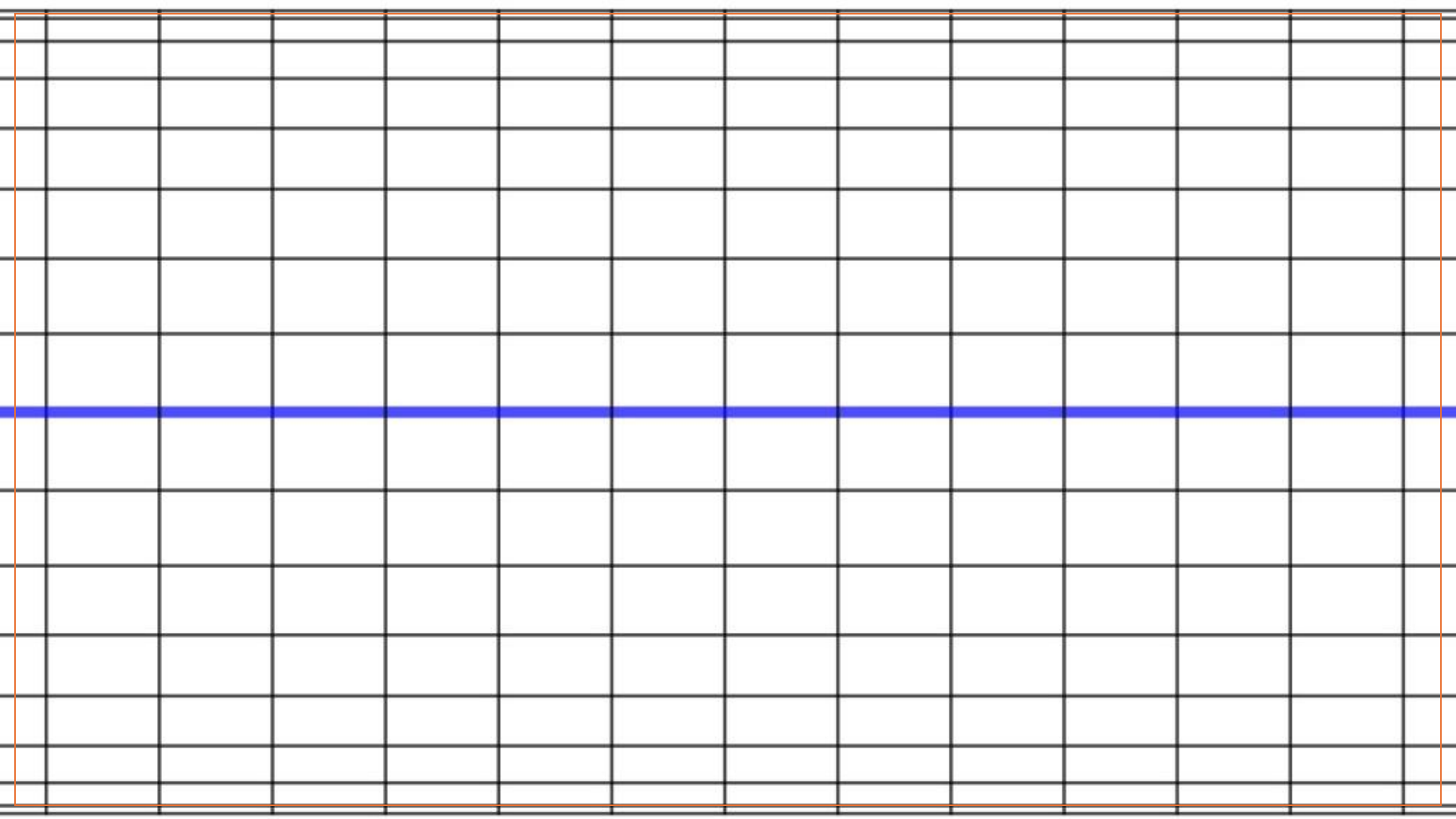
# PROSPETTIVA e geografia

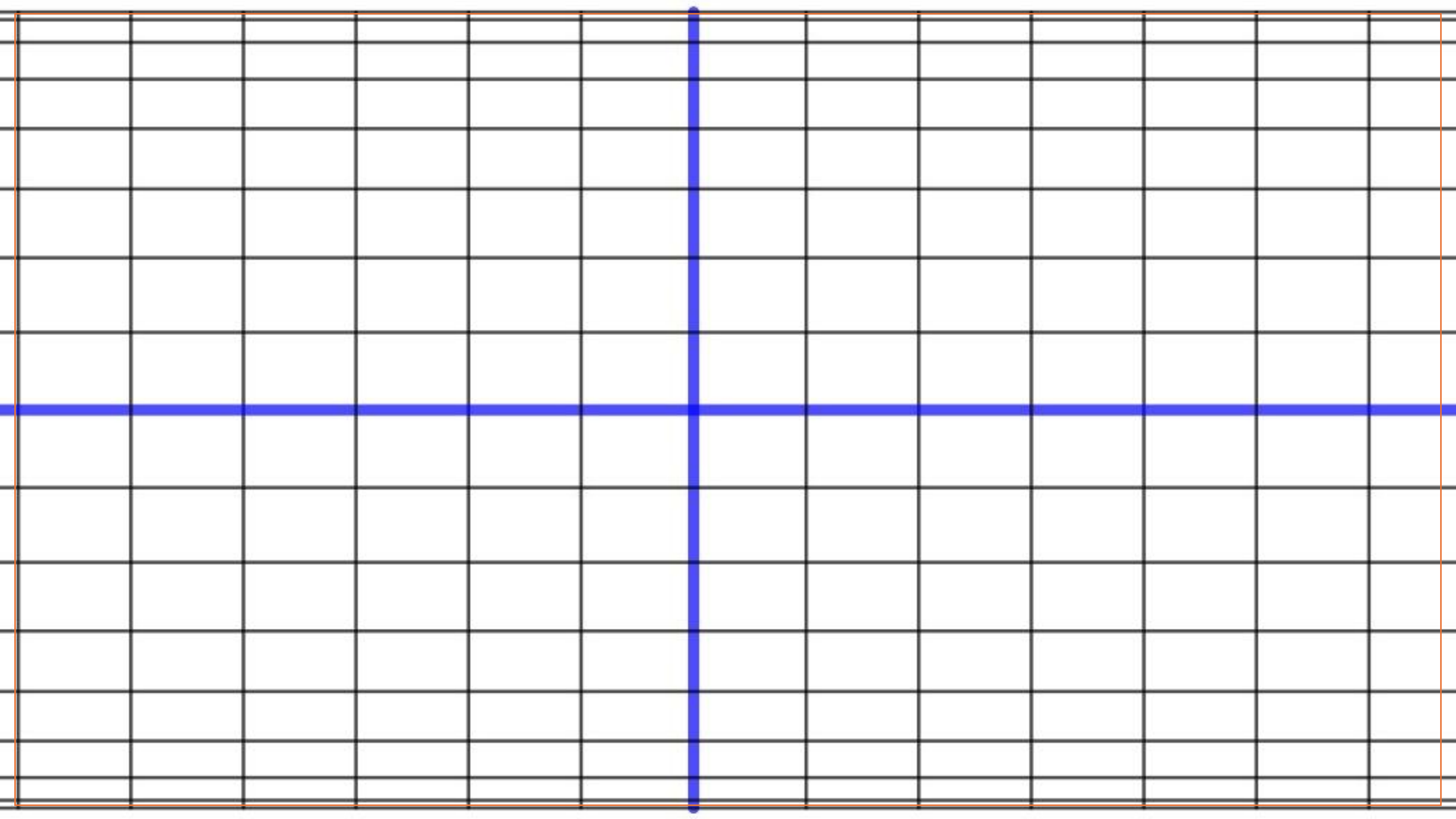
Elisa

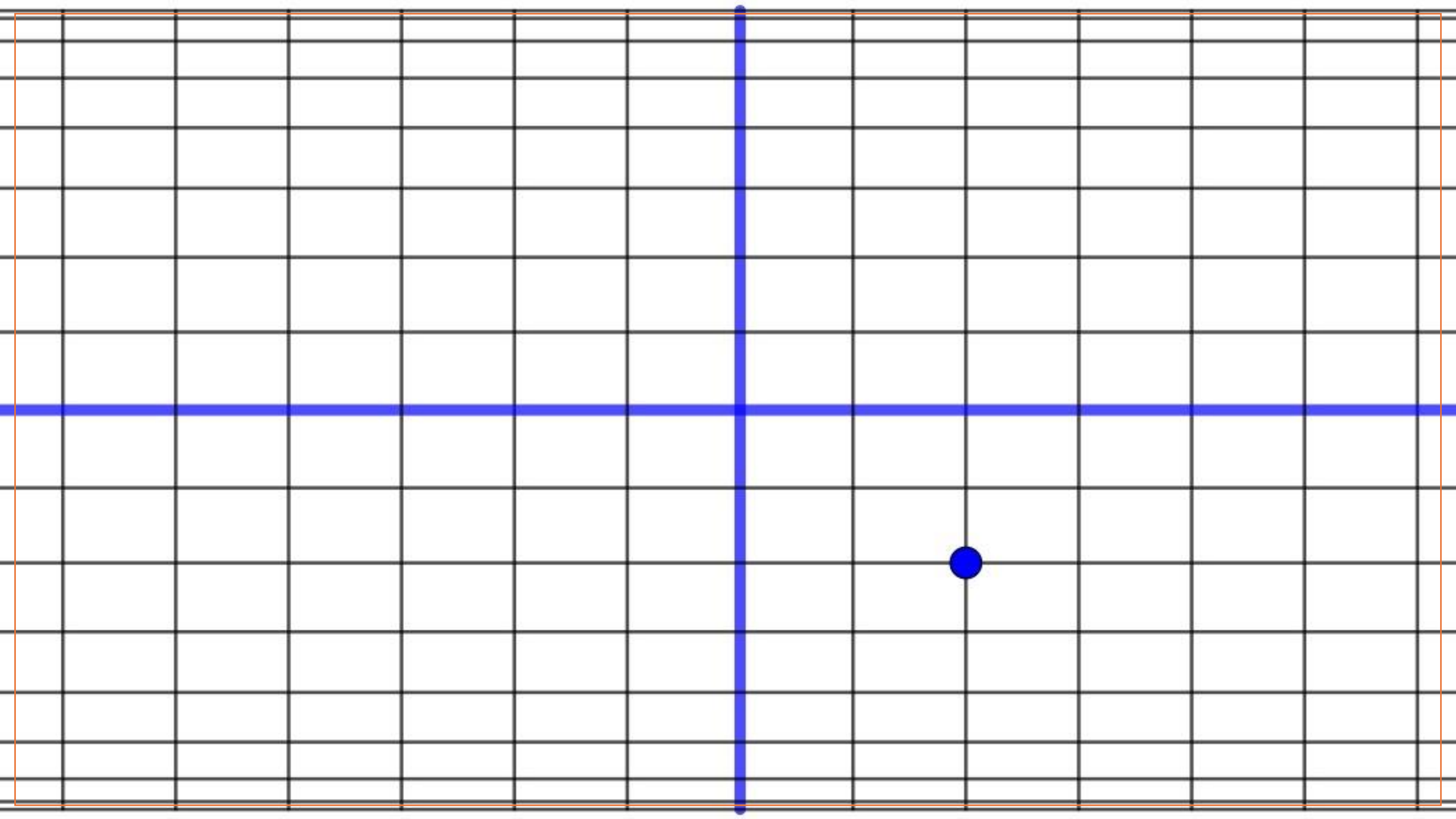


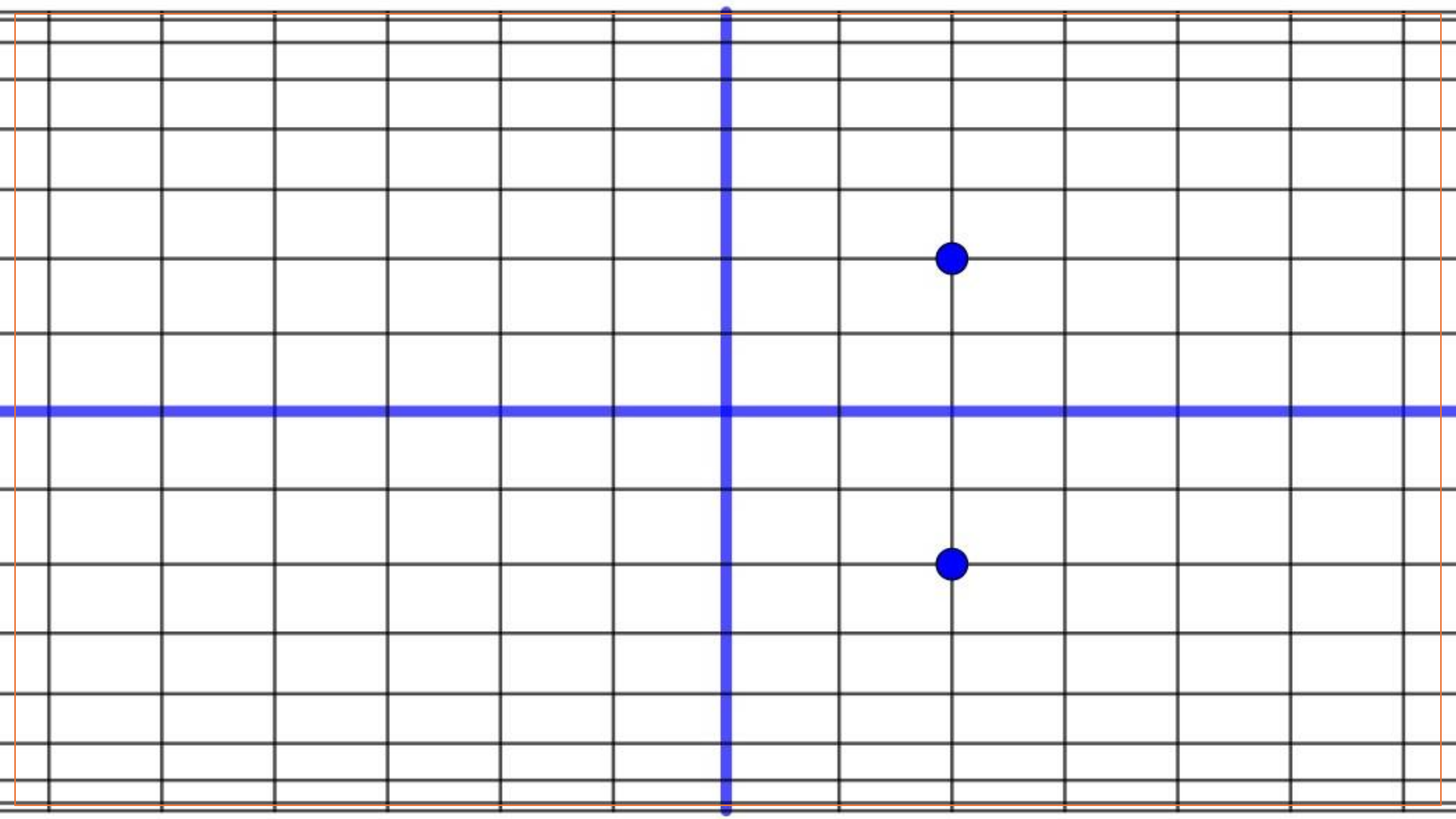


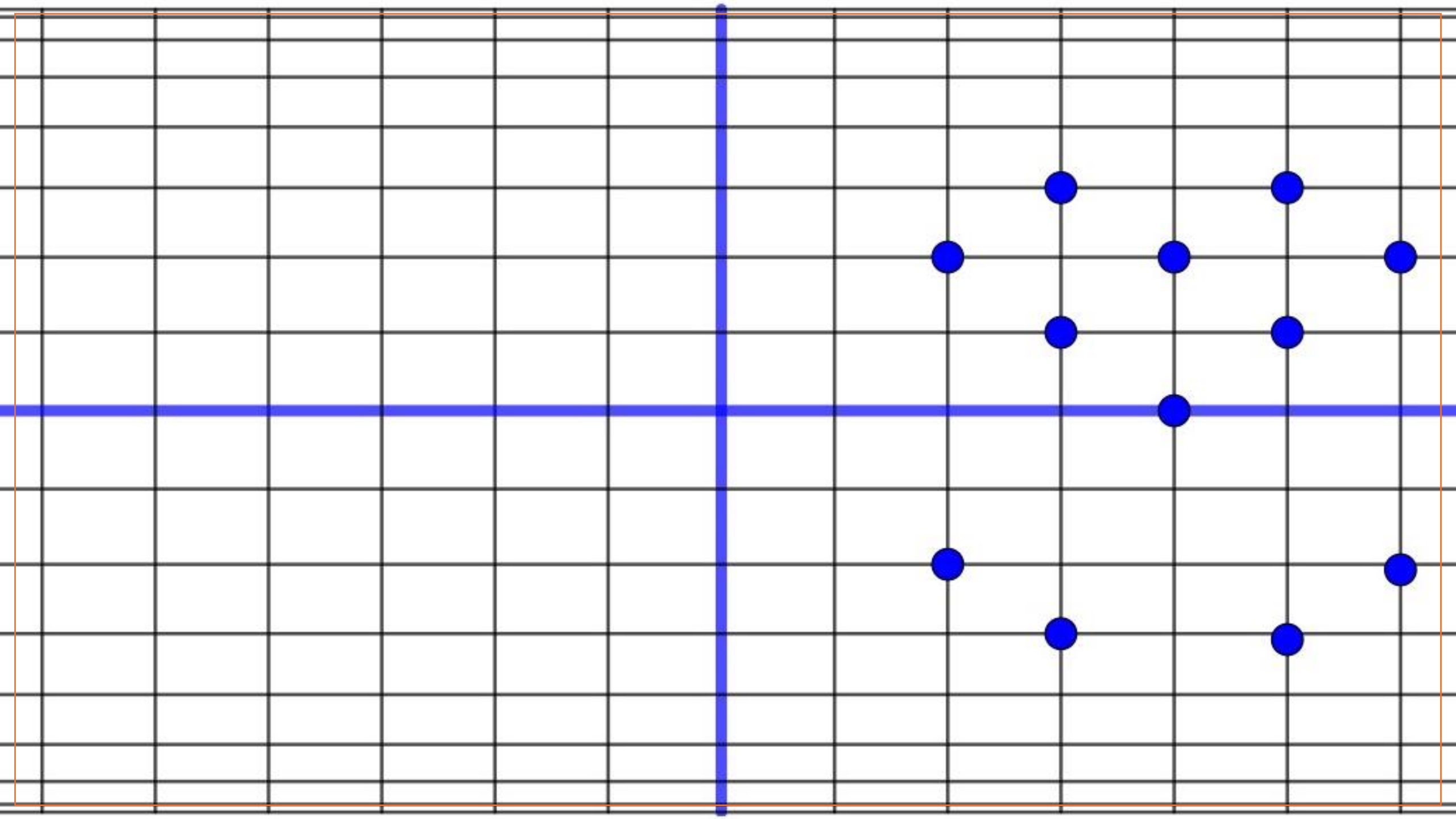




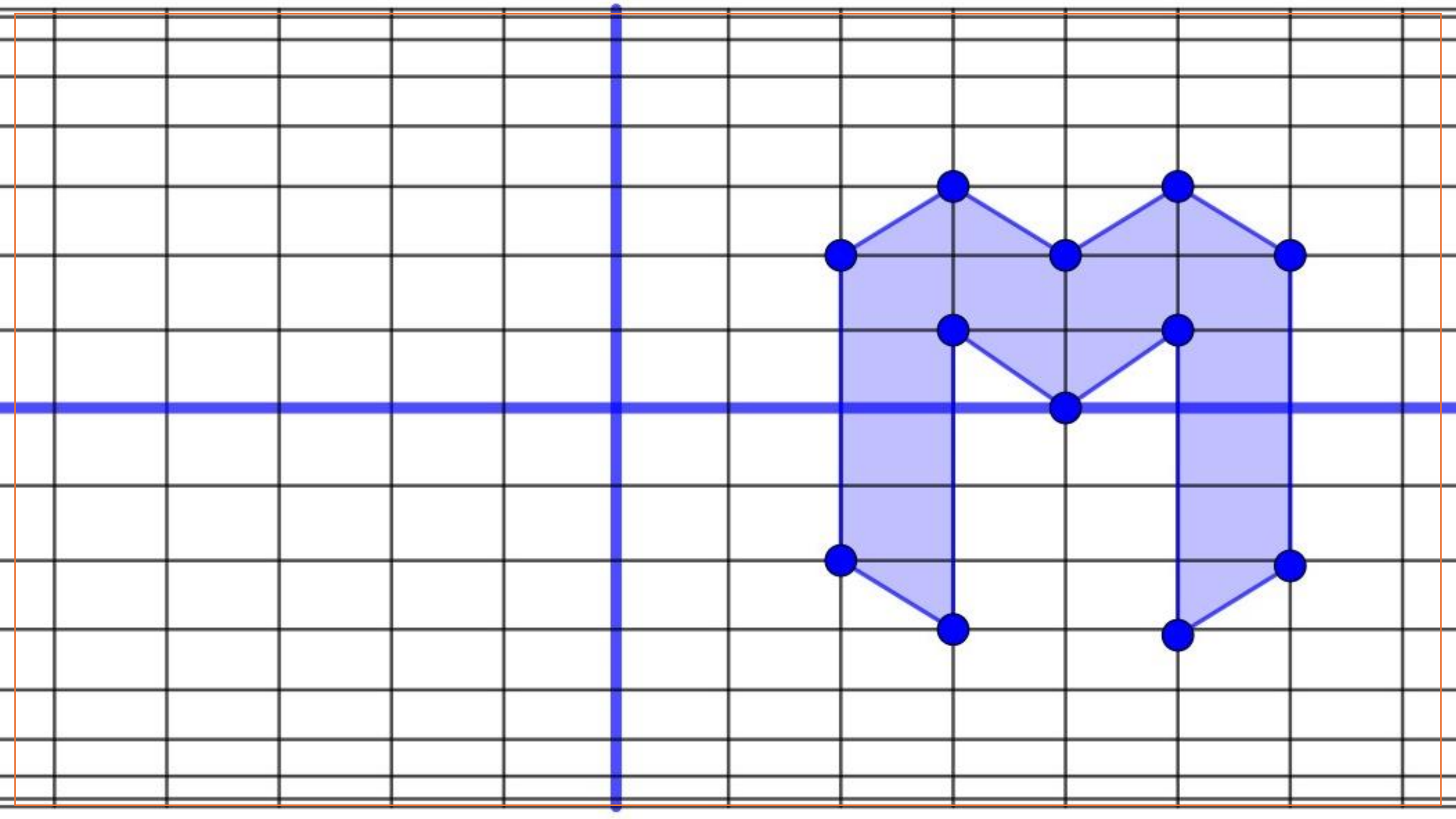


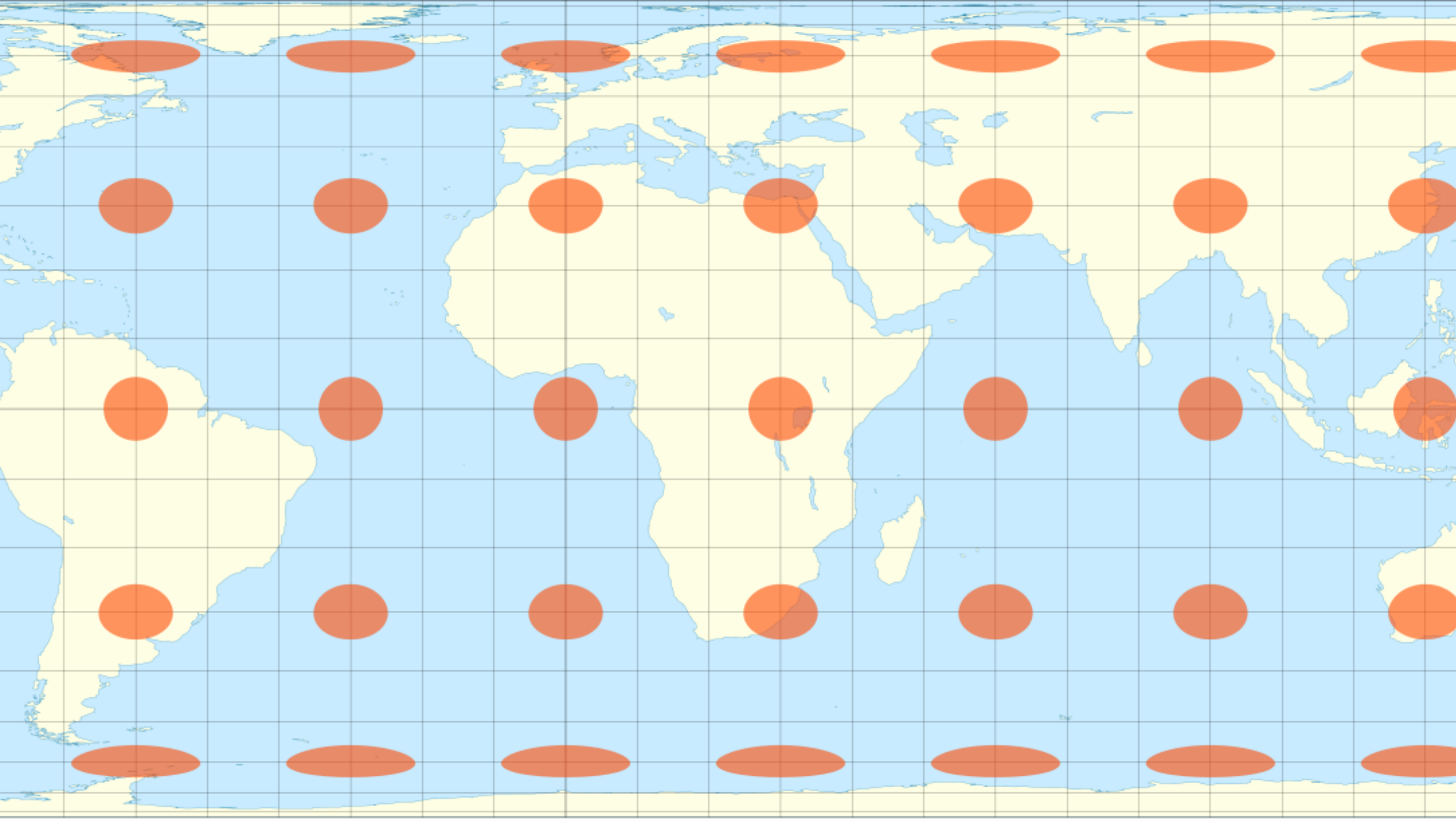


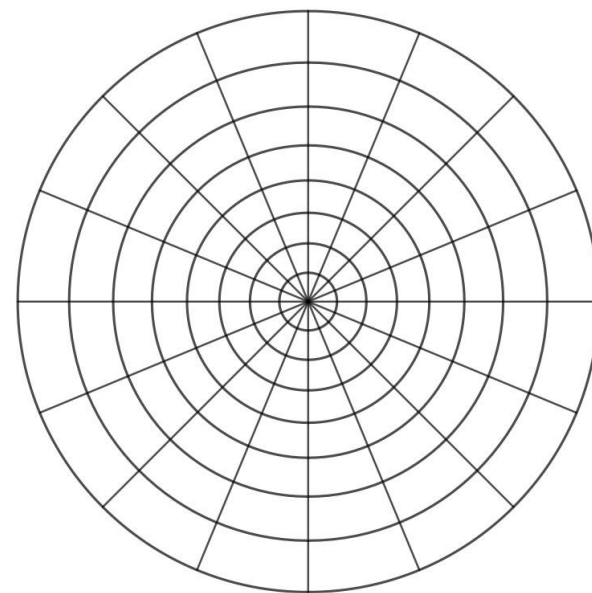
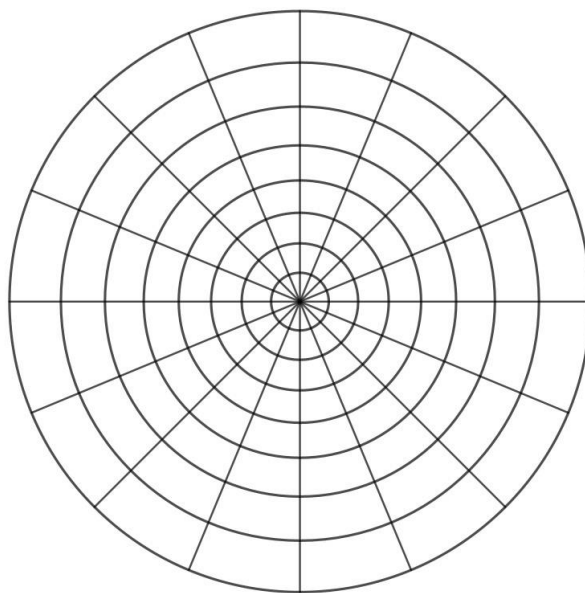
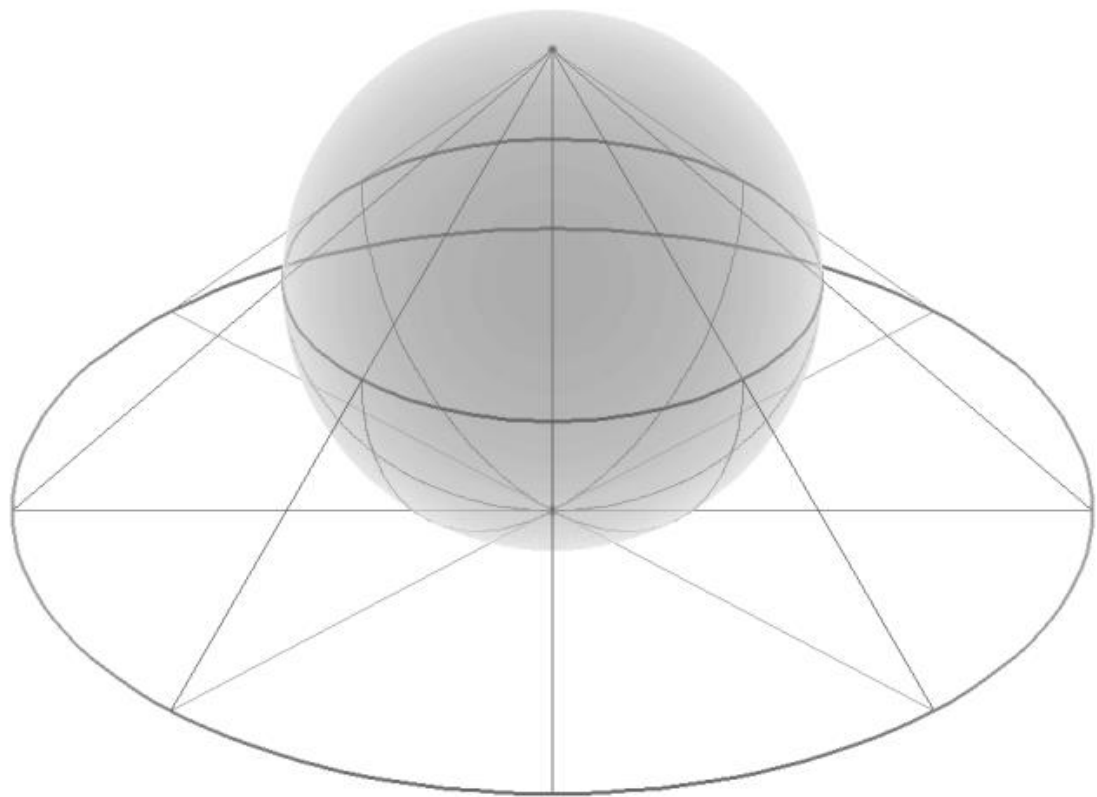


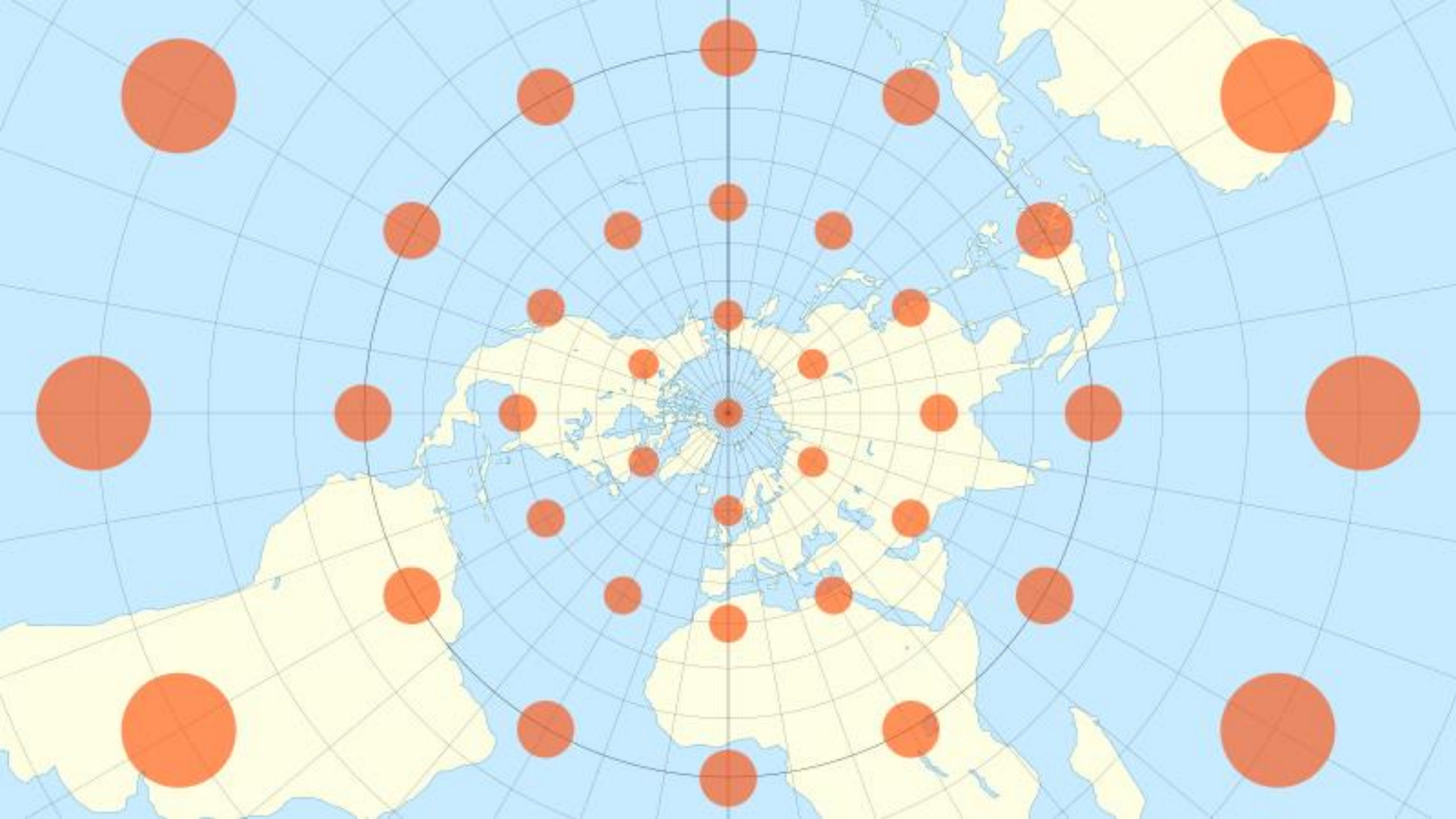


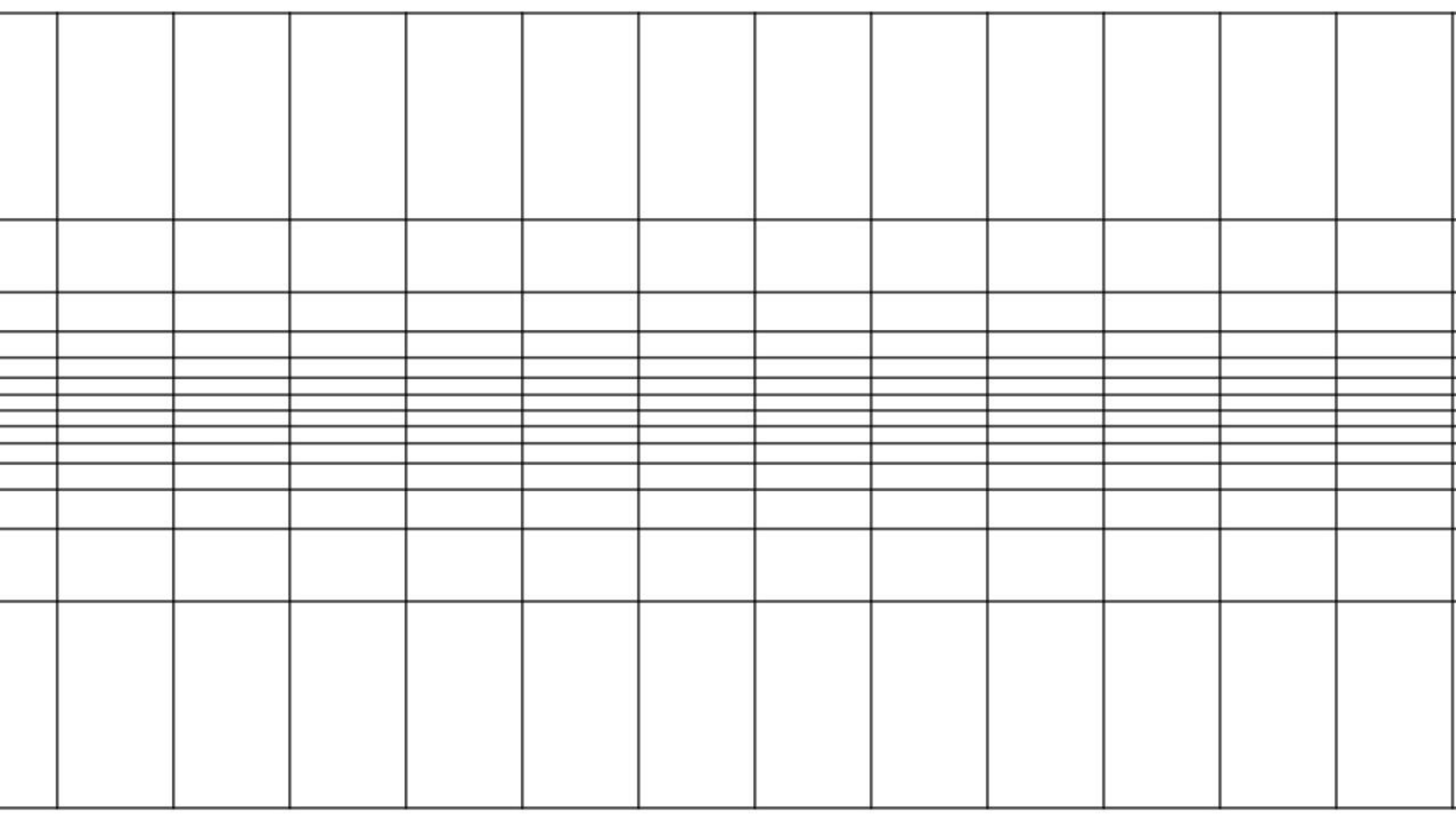


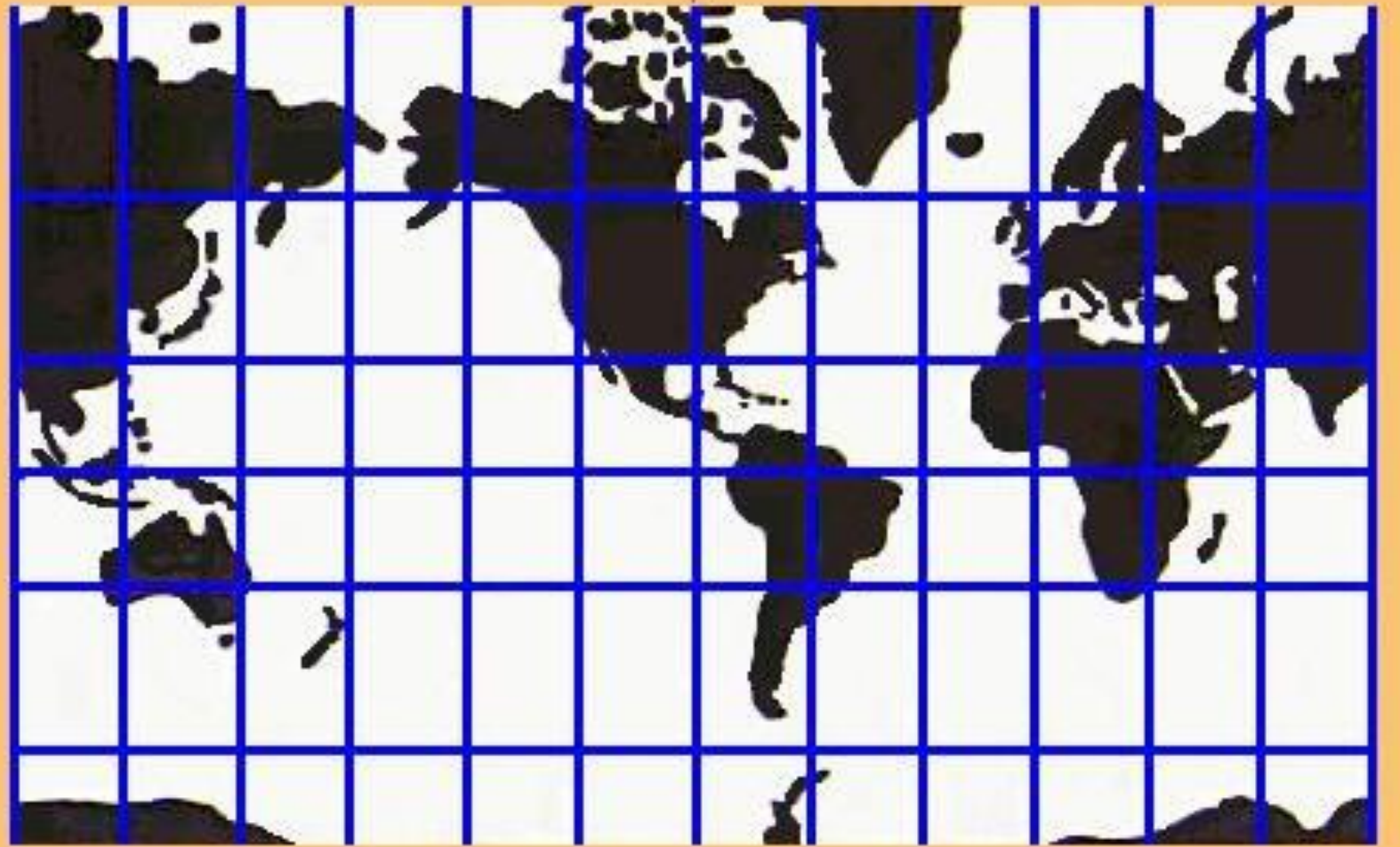


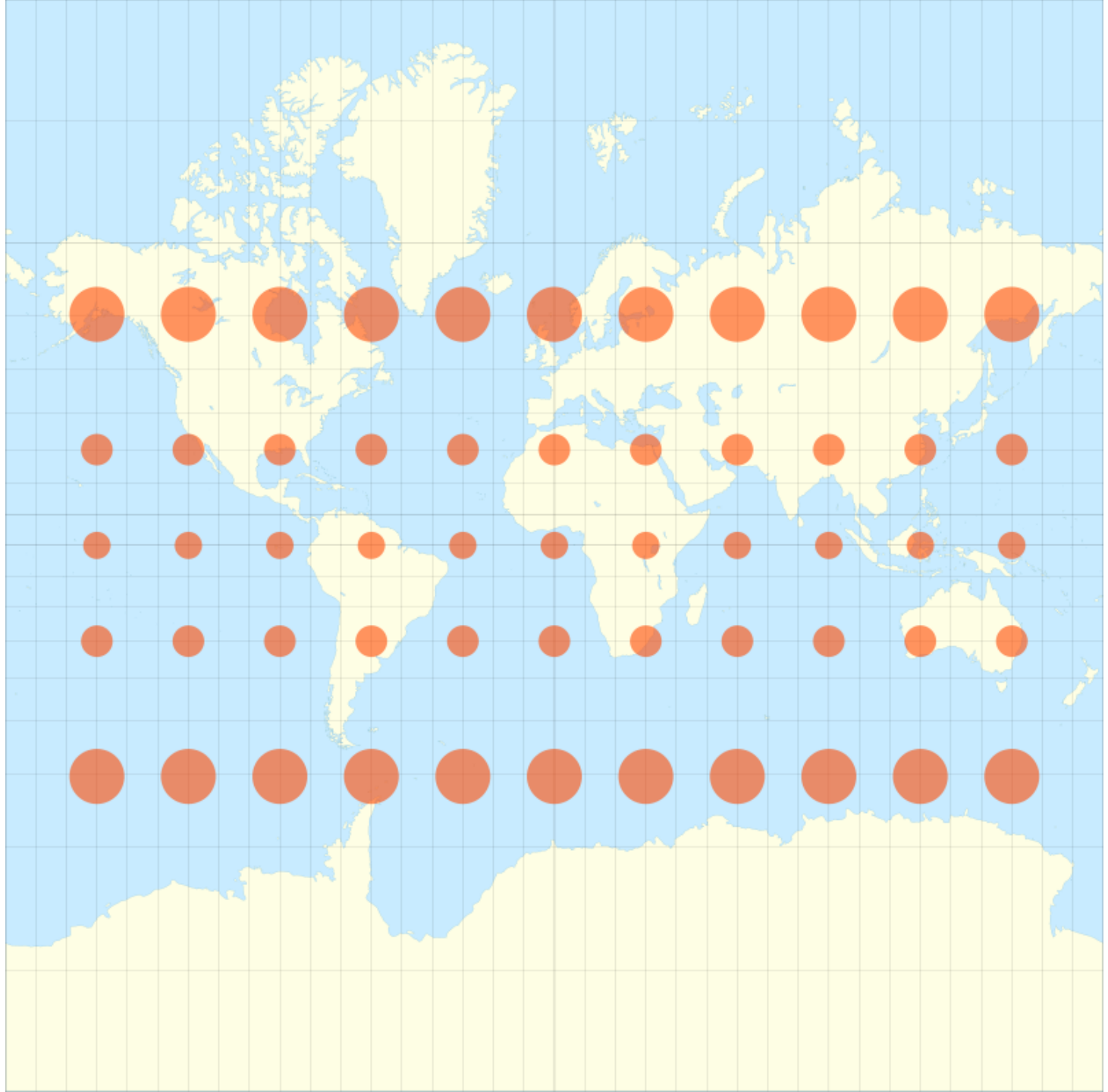












# La PROSPETTIVA delle stelle

Luca e Nicole





οιοτ





Bilancia



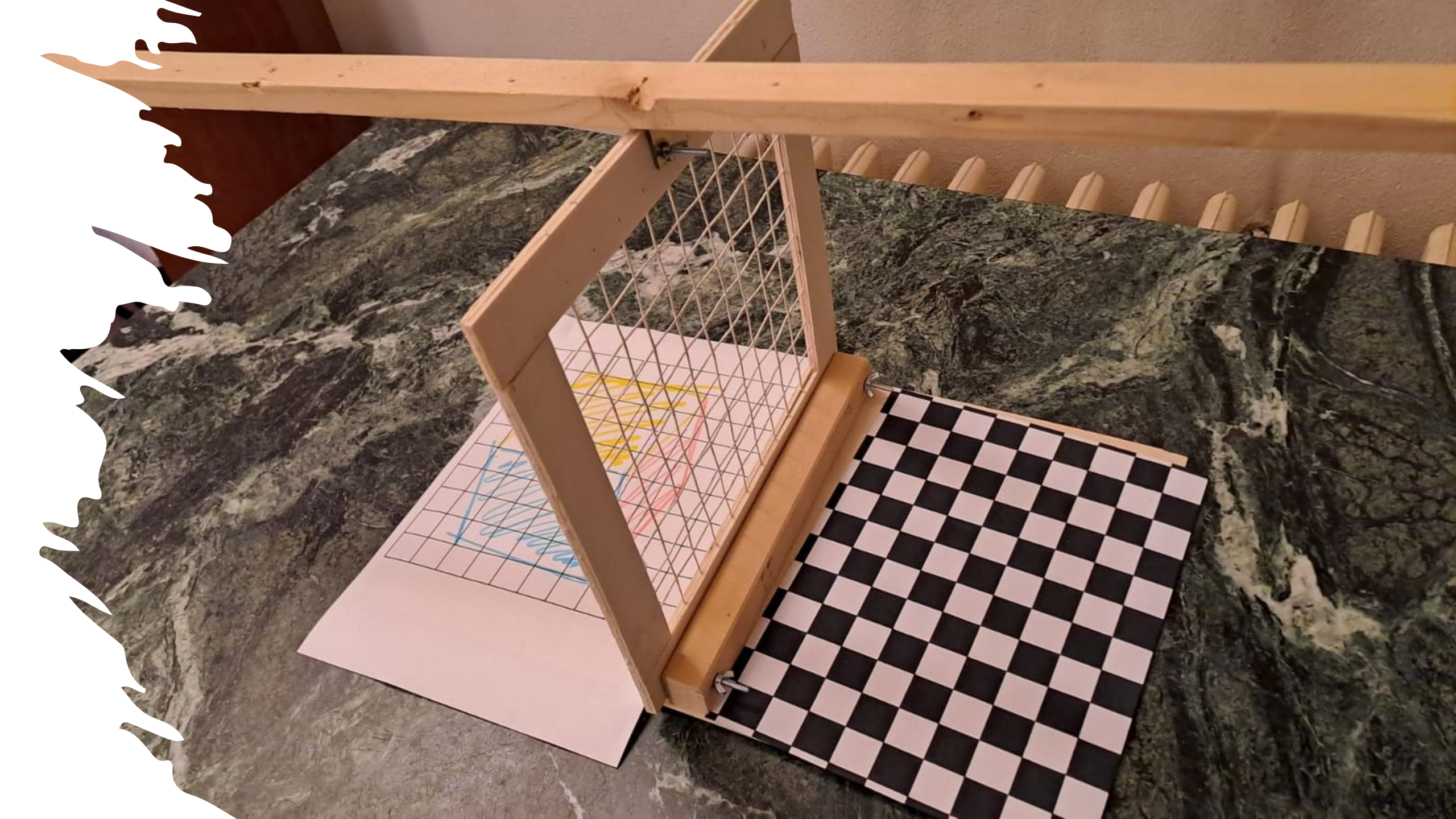


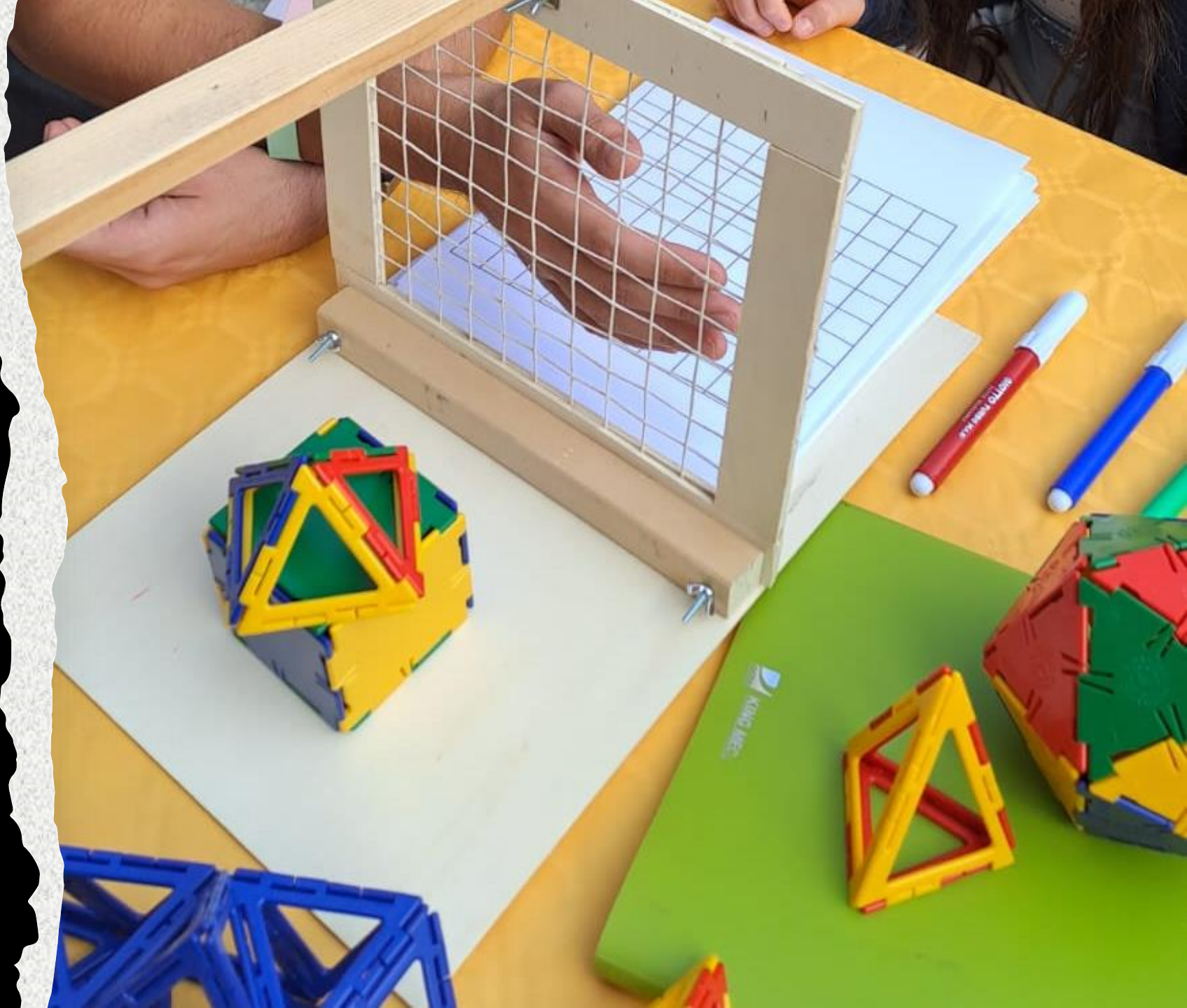
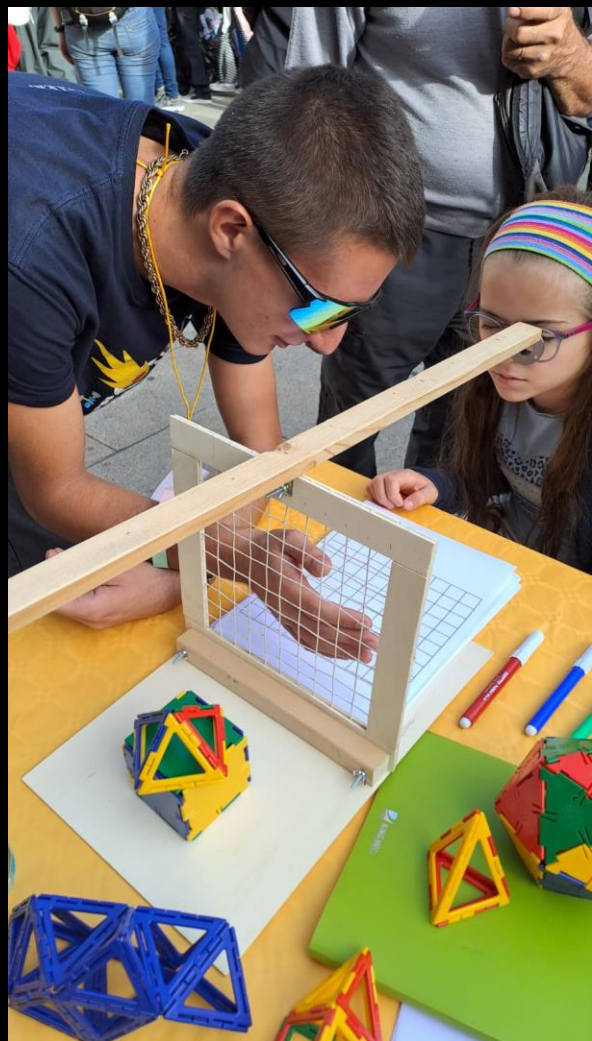


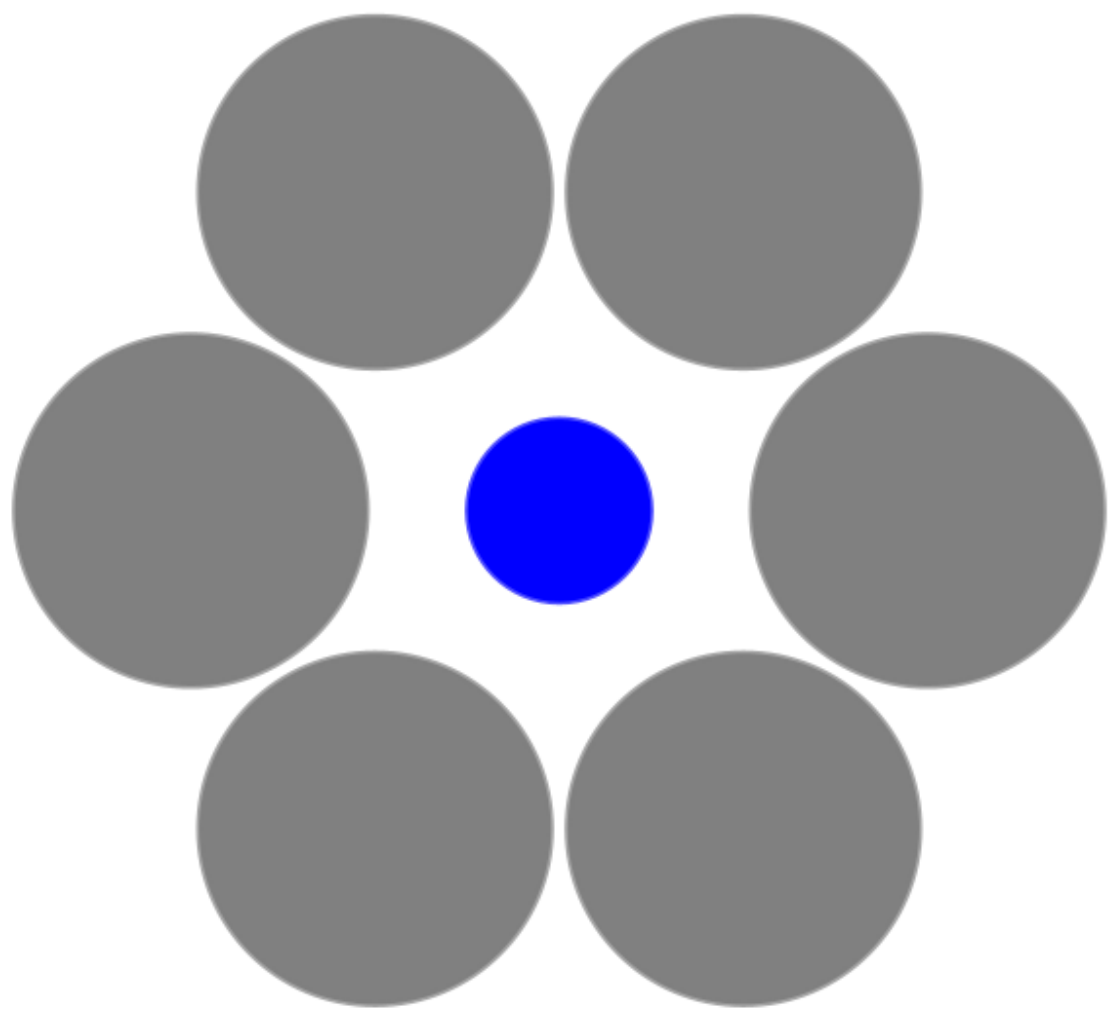
# PROSPETTIVA meccanica

Emma e Federica (e Davide)









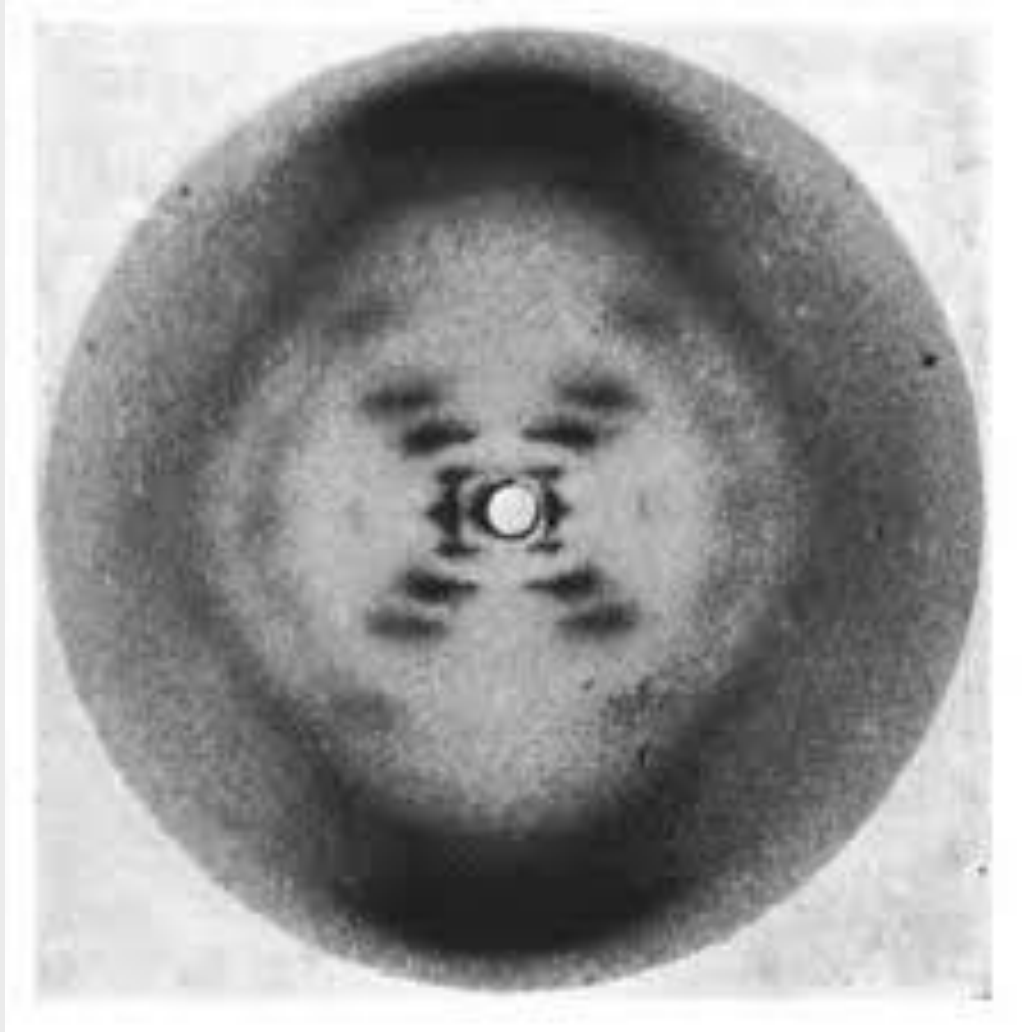


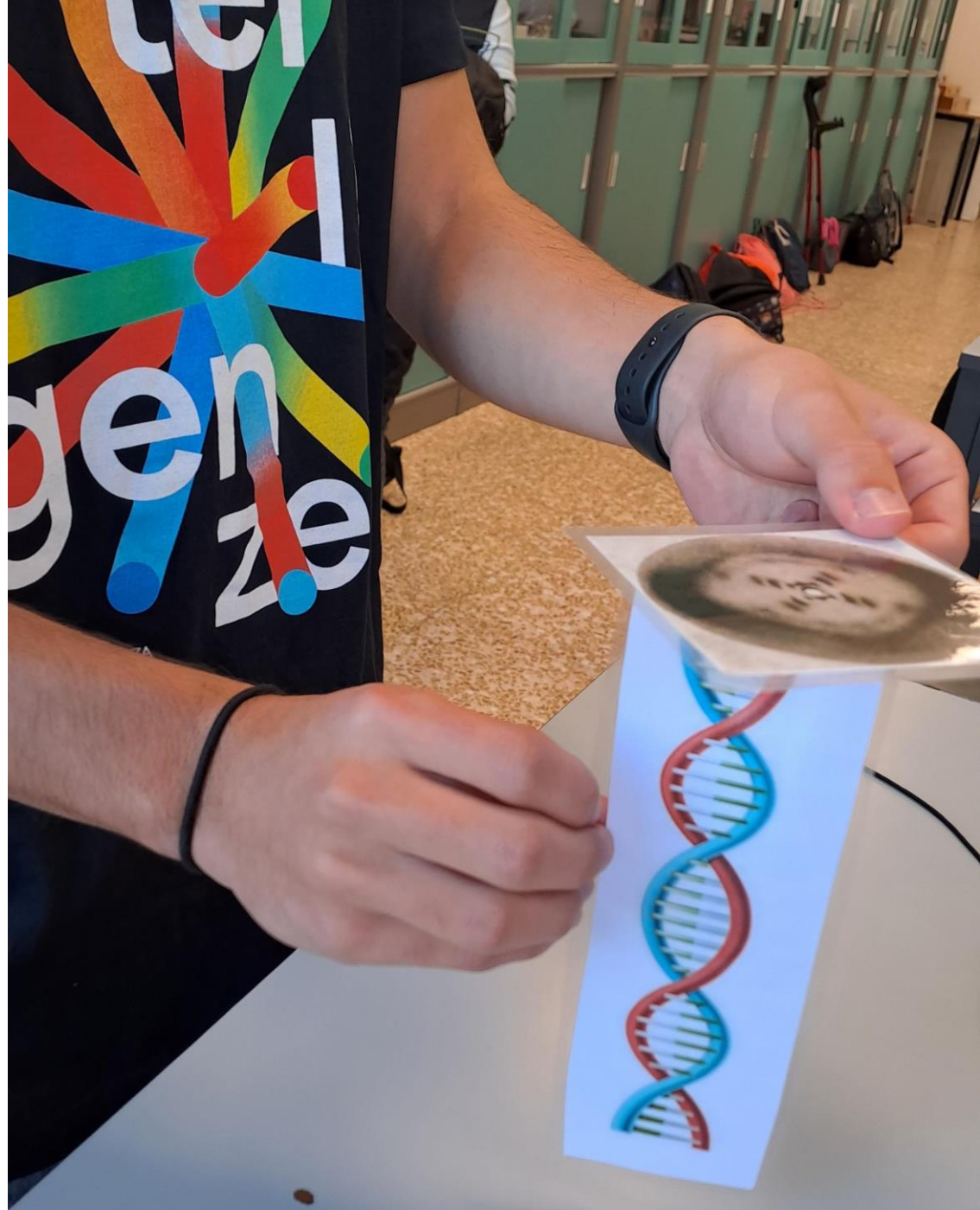
# PROSPETTIVA chimica

Chiara, Rossana, Luca e Alessio





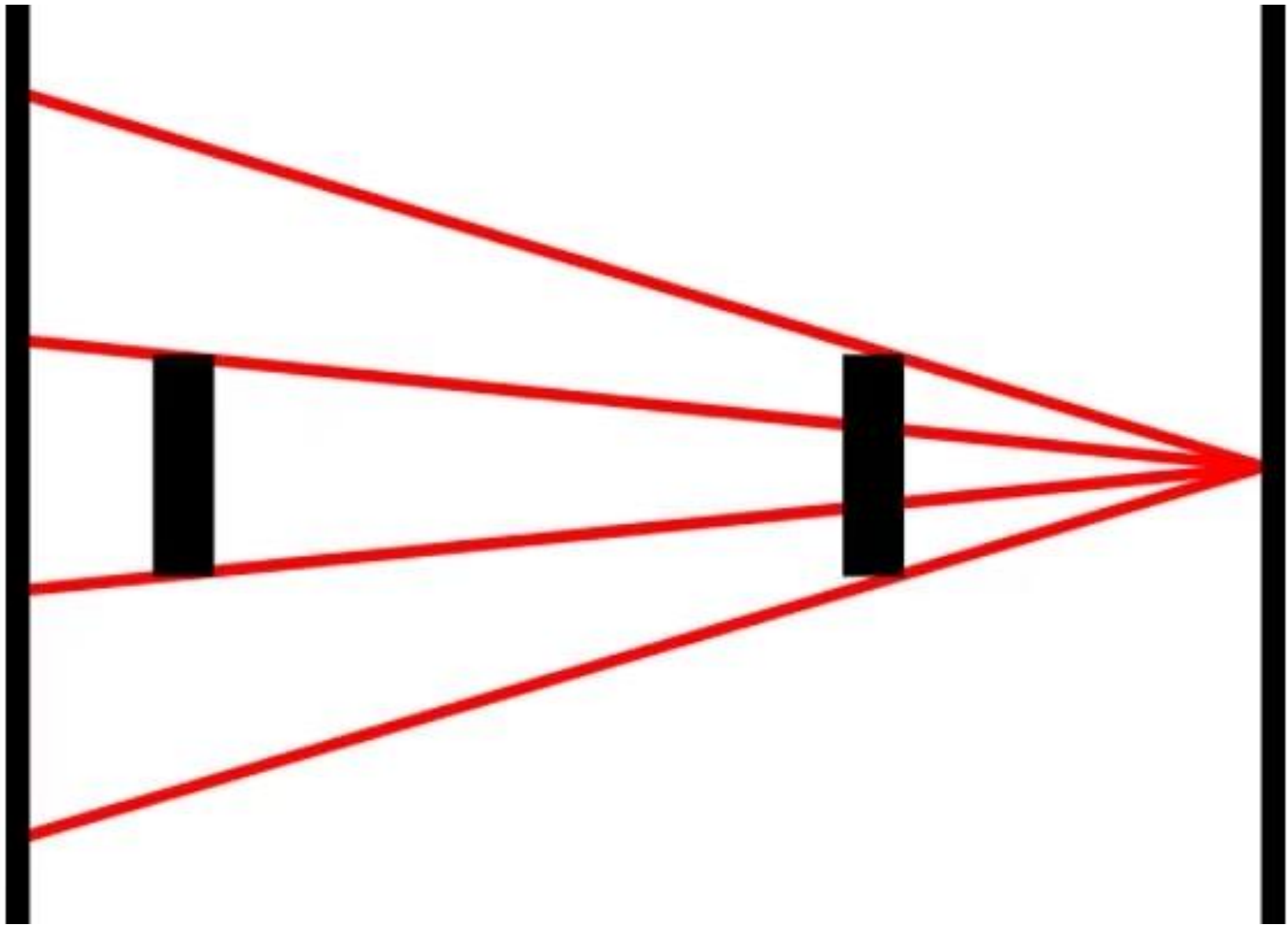


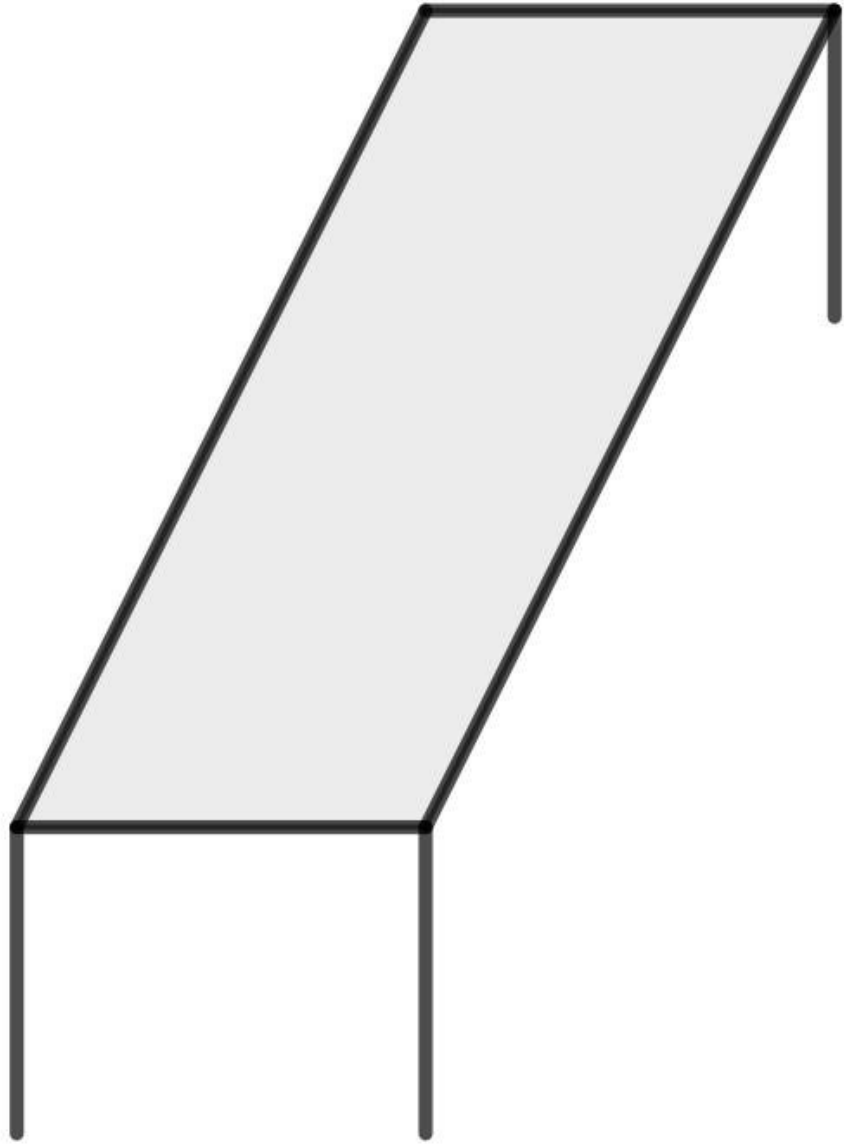


# Illusioni PROSPETTICHE

Beatrice e Chiara







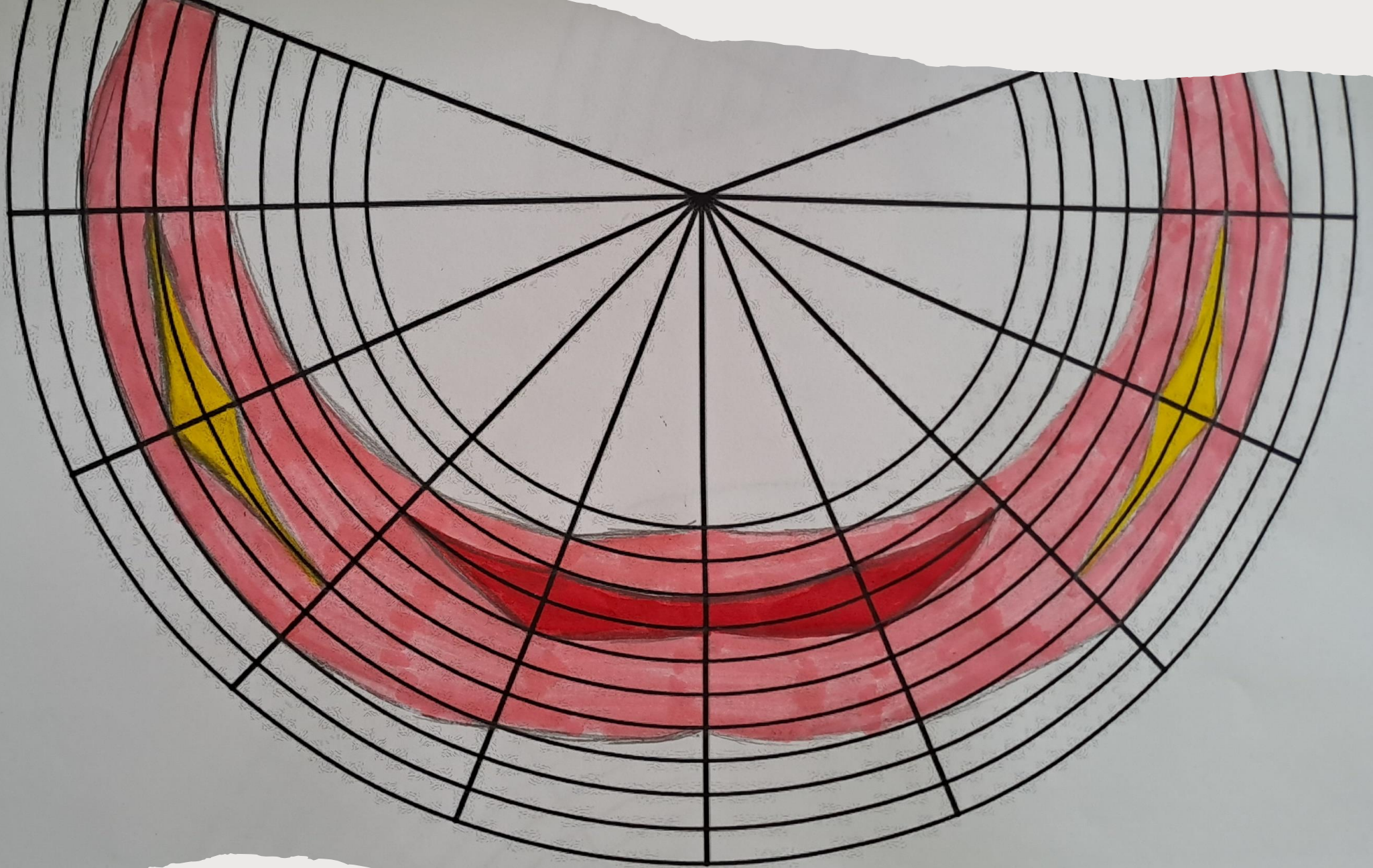
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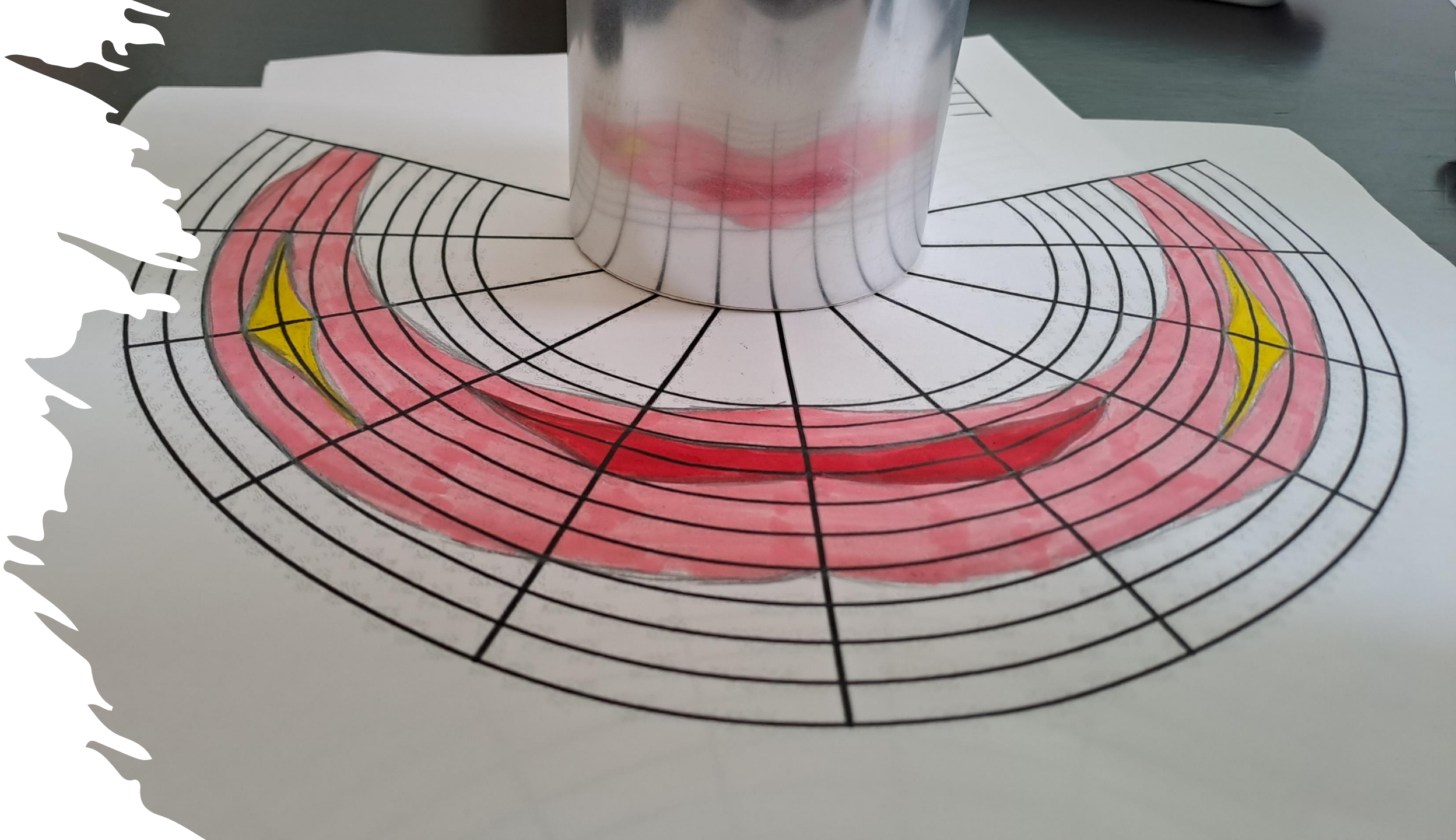
Agata e Asia



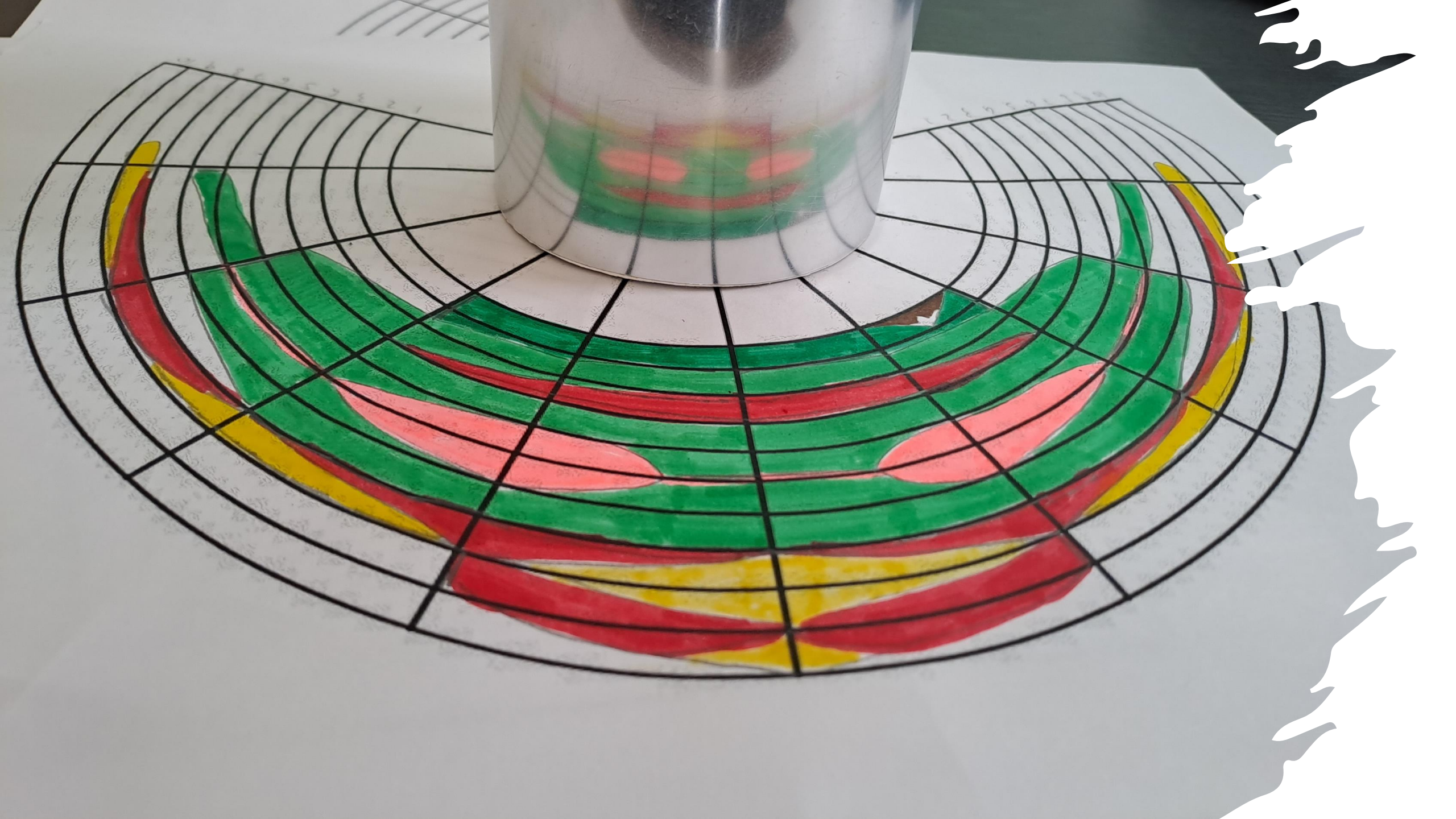


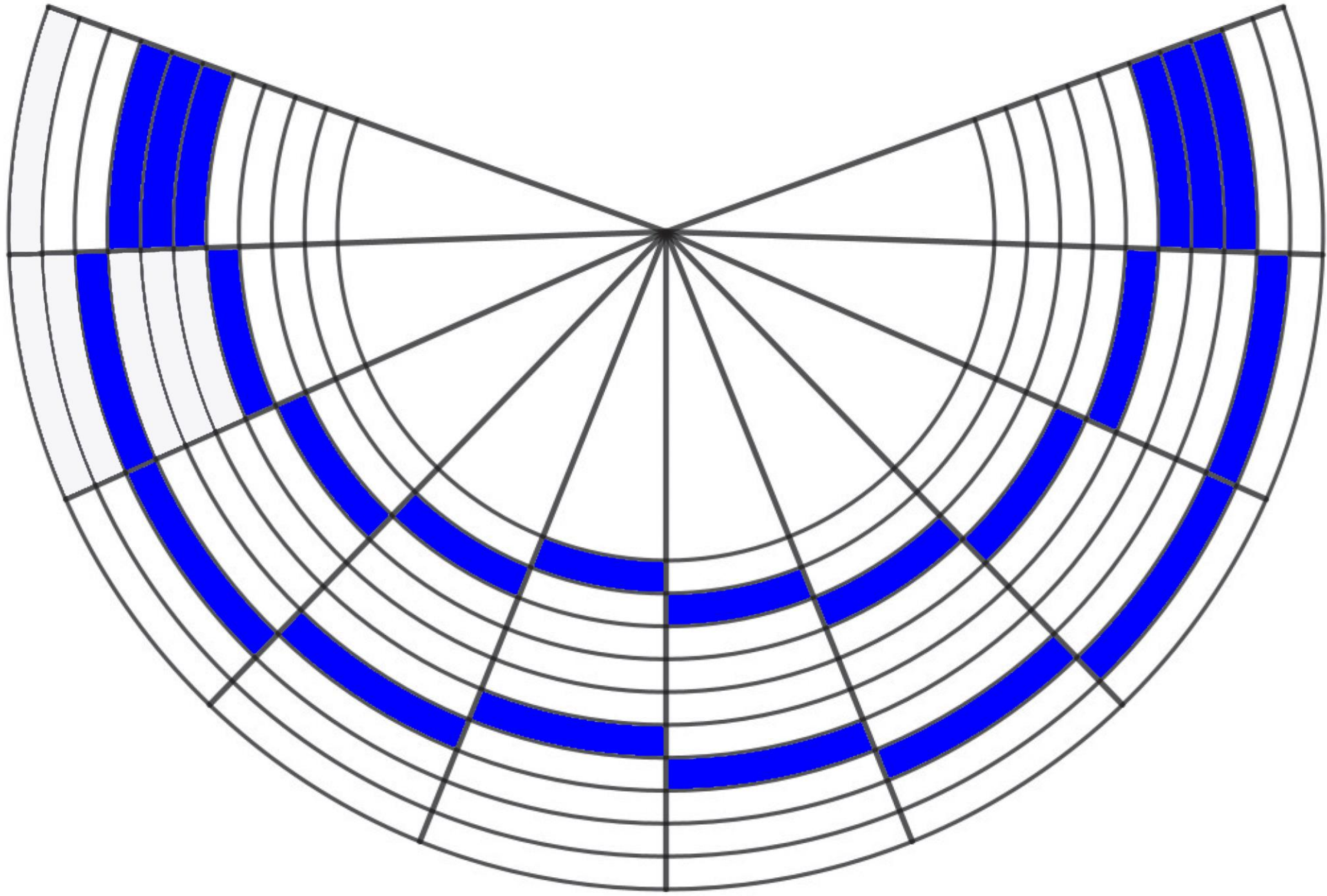


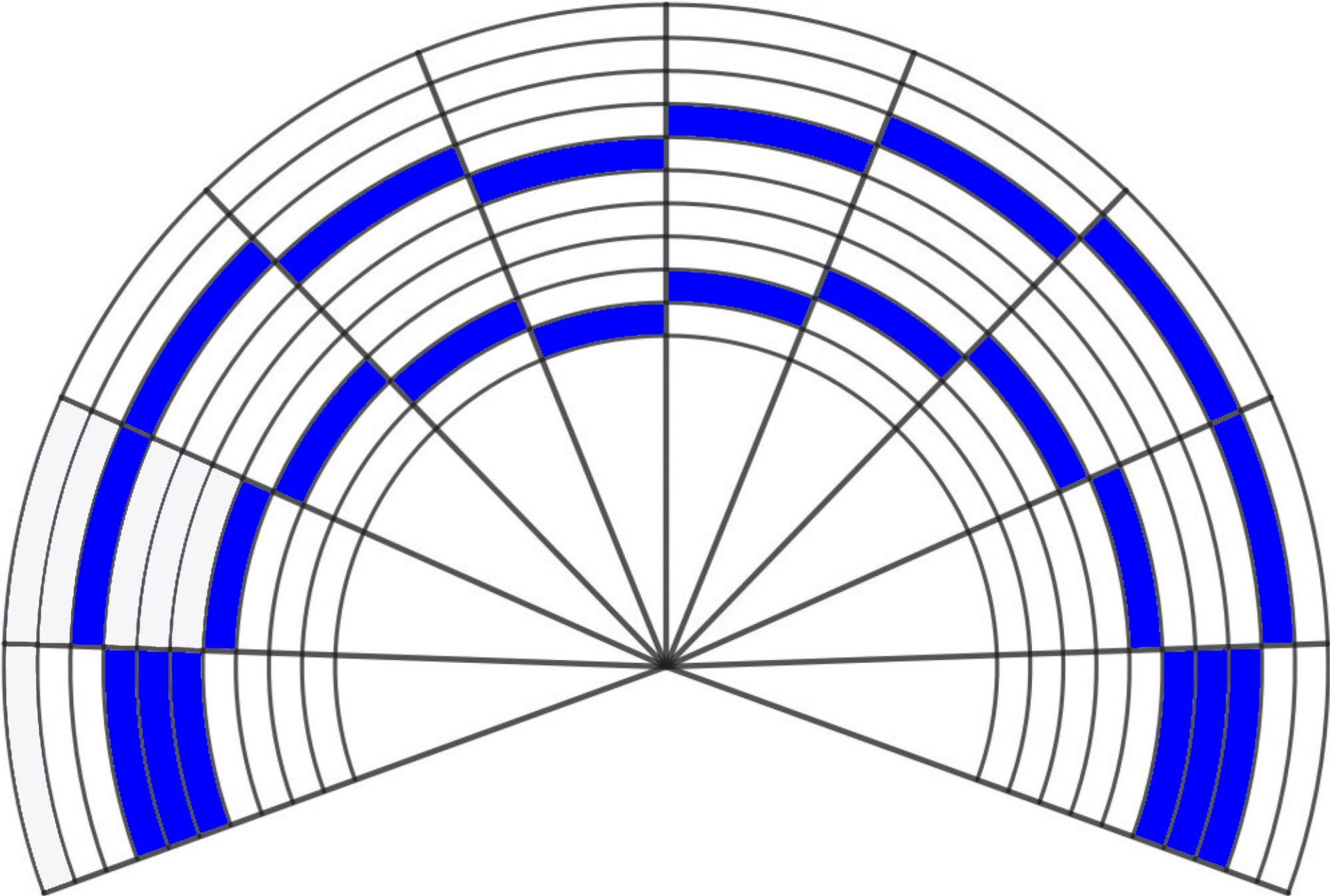


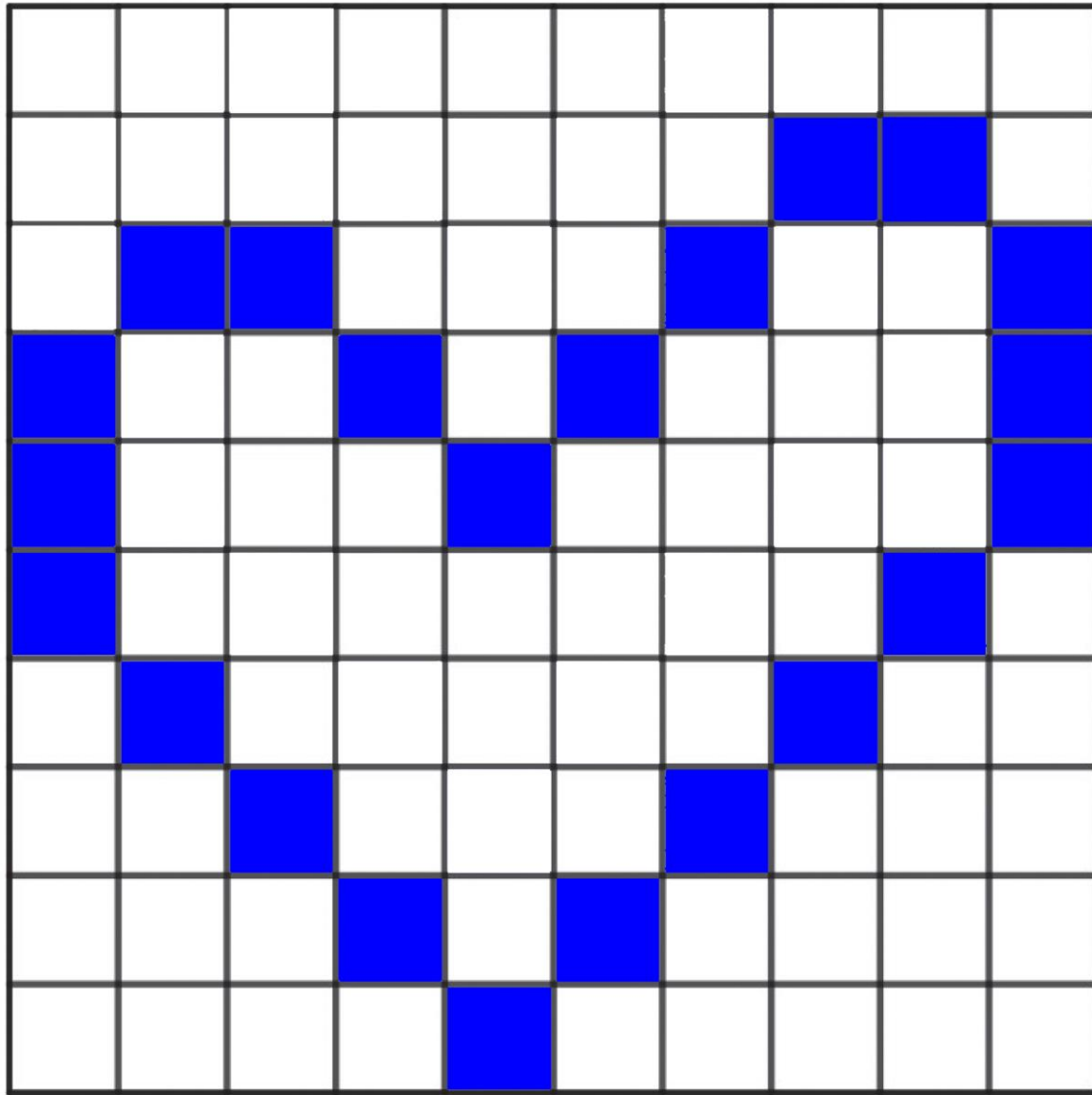












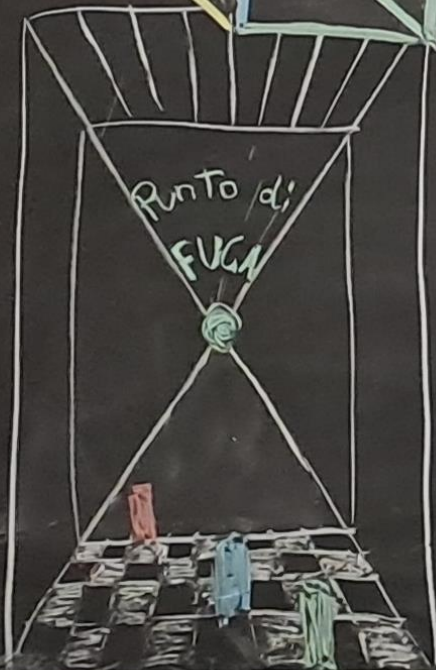




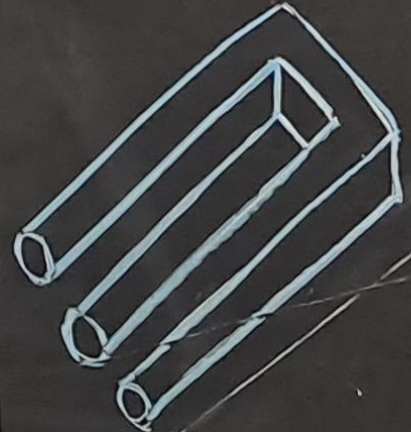
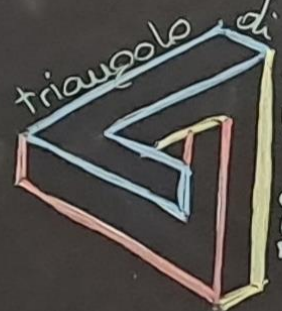
cubo di Necker



MEF



triangolo di PENROSE



FINESTRA PROSPETTICA



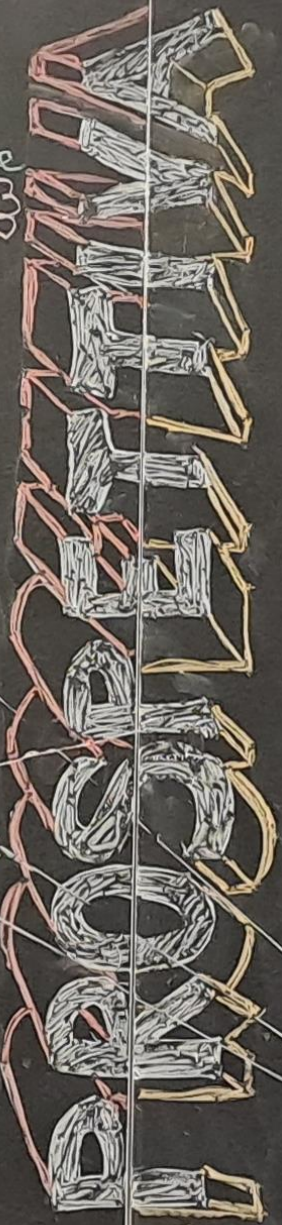
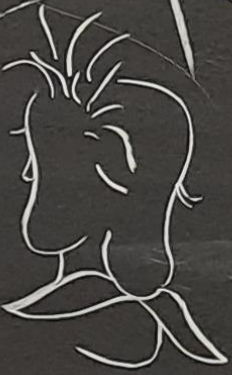
Amorpsi



prospettiva

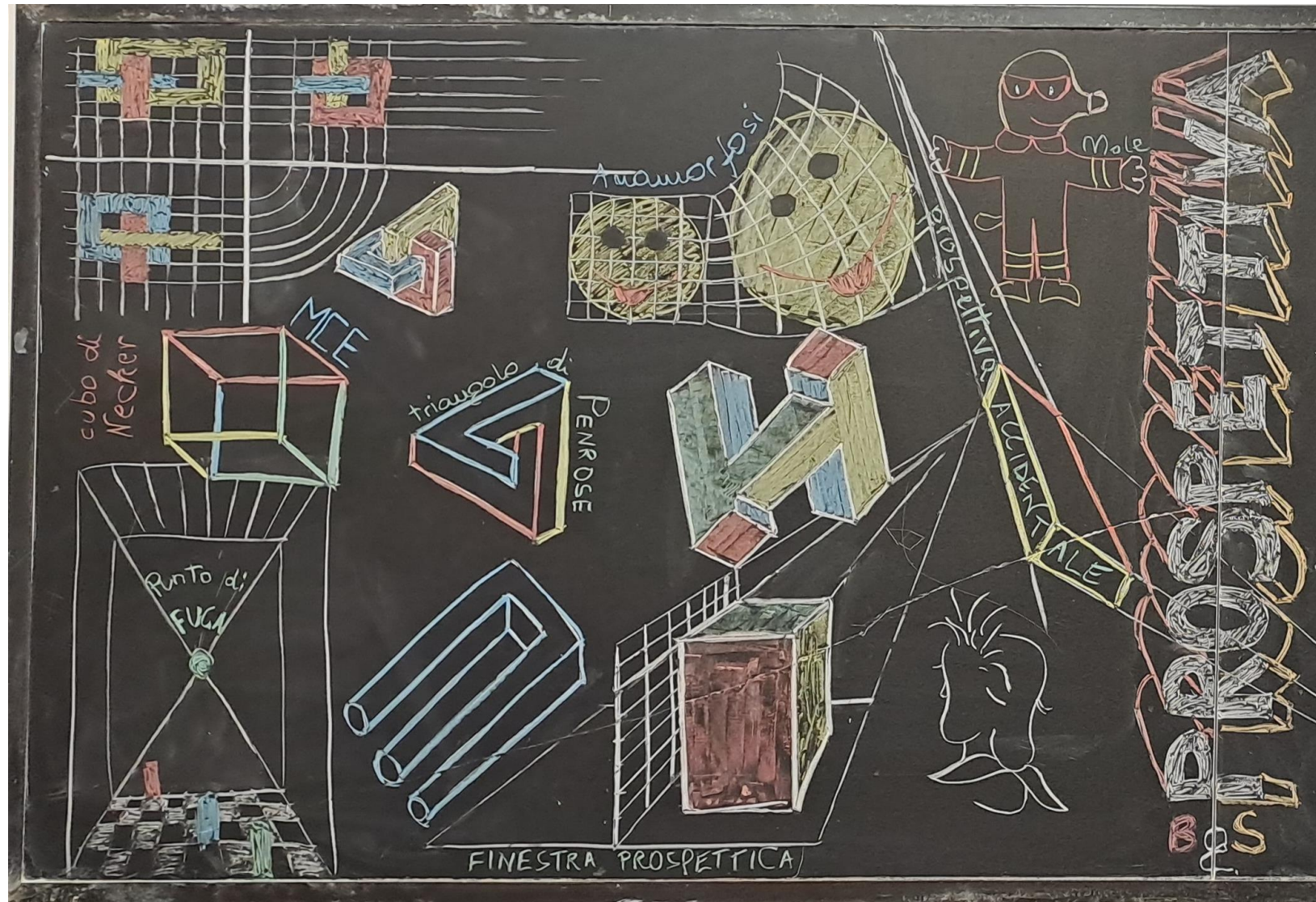


ACCIDENTALE

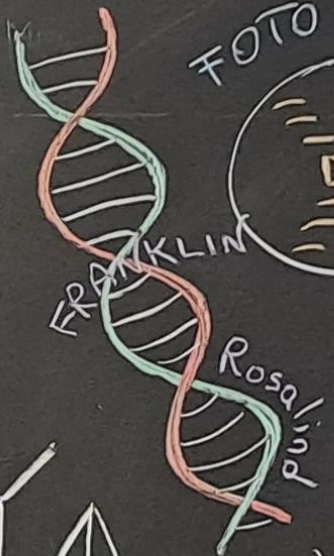
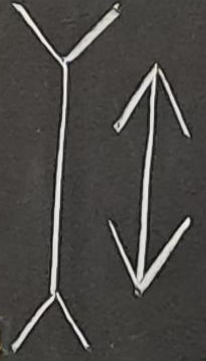


B&S

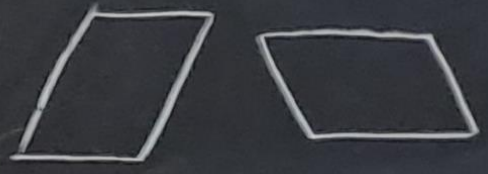
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STEFANO Bolandrina  
INDIA Cortesi  
SIMONA Cretti  
ALESSIA Fenaroli  
MARIA Gatta  
NICOLA Lai  
AGATA Olivari  
FEDERICA Pianetti  
ALESSANDRA Quivi  
EMMA Silini  
GIULIA Zatti



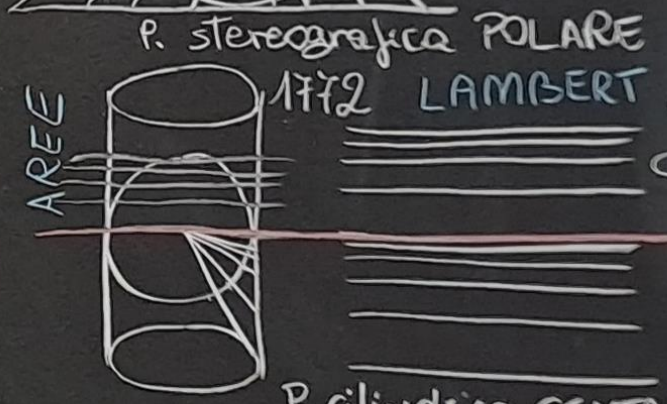
MAP  
B&S



illusioni



Tavoli di SHEPARD



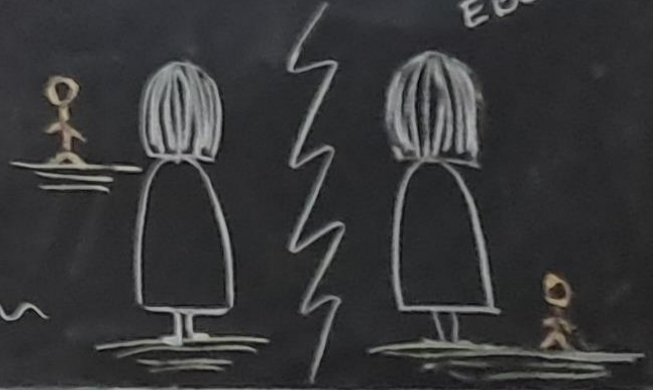
P. ort. CENTRALE



illusione di EBBINGHAUS

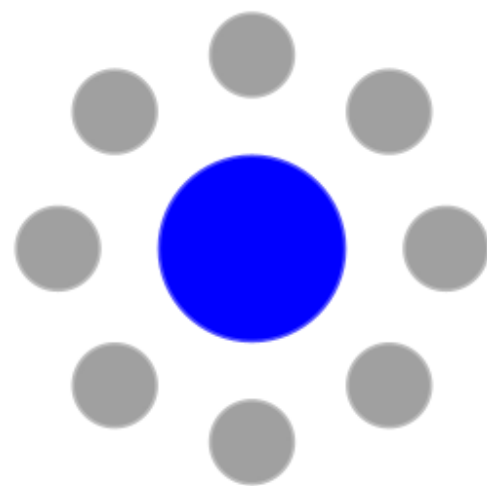
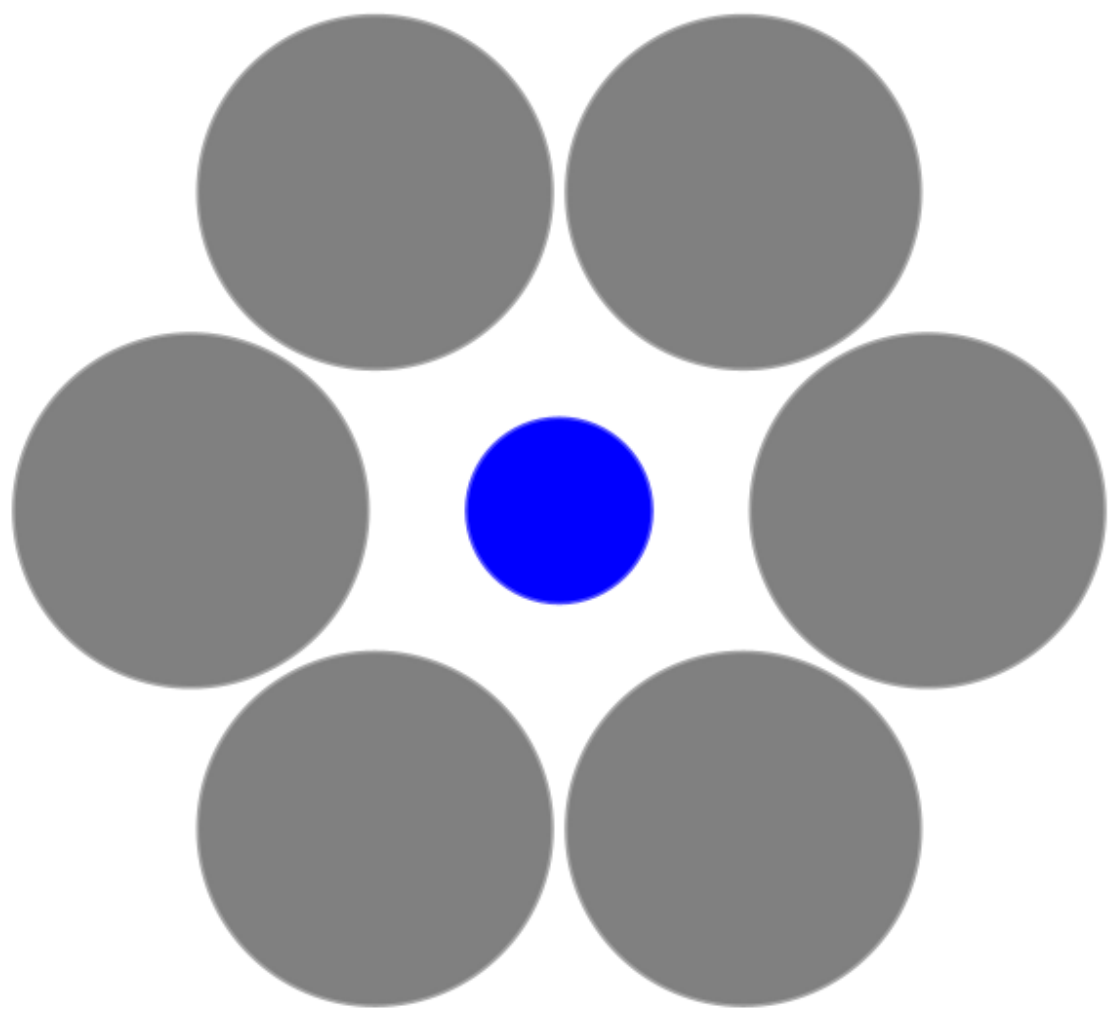
P. cilindrica CENTRALE

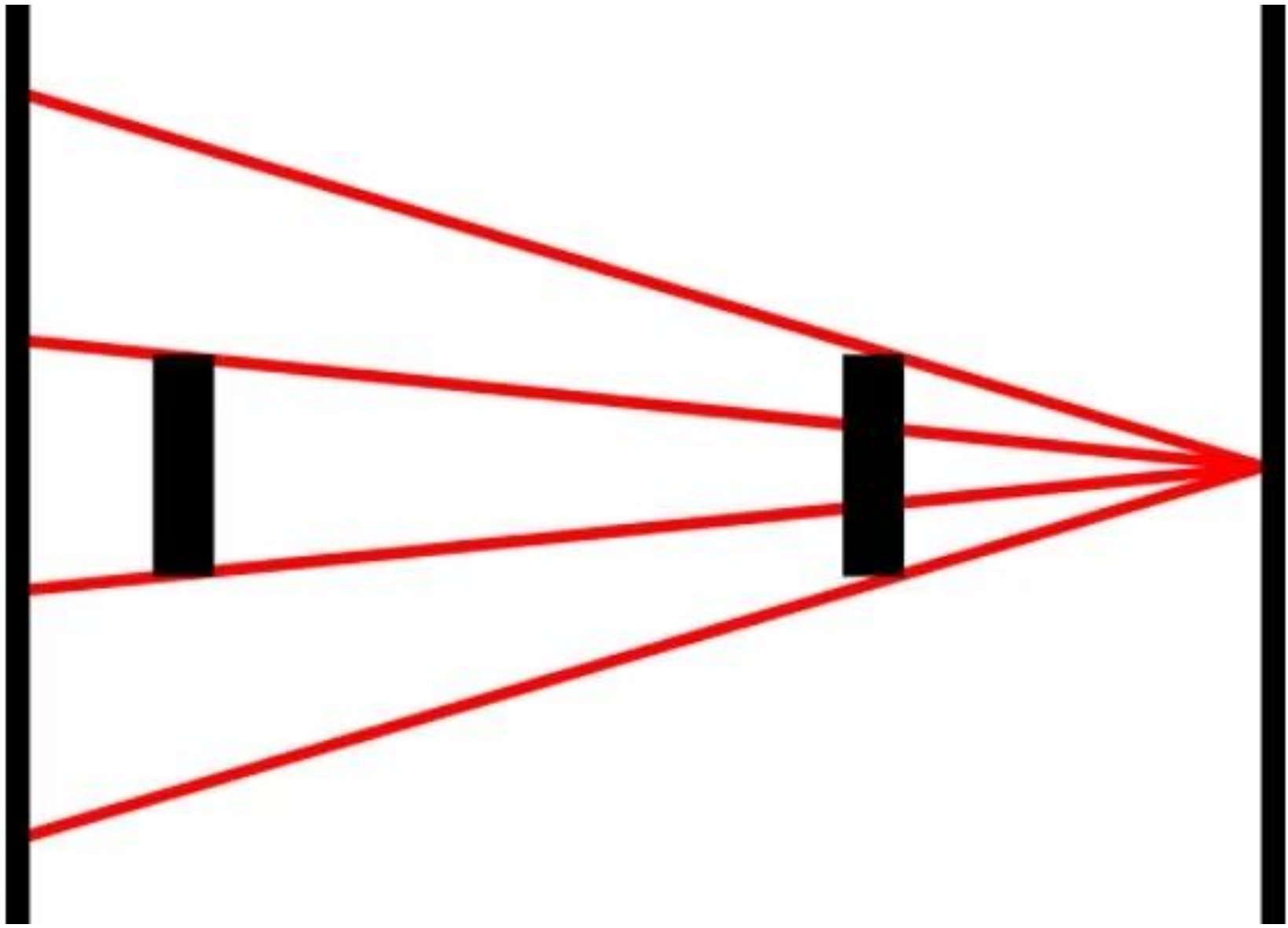
1569 MERCATORE angoli



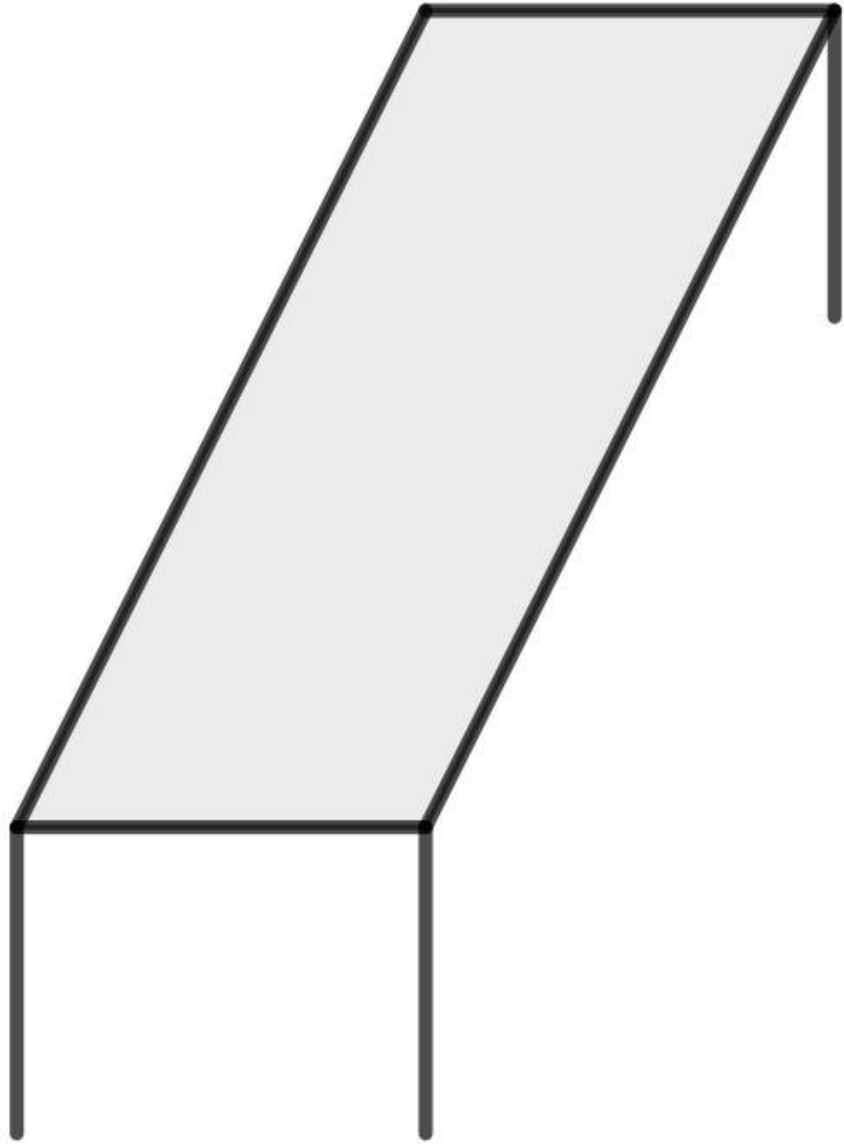


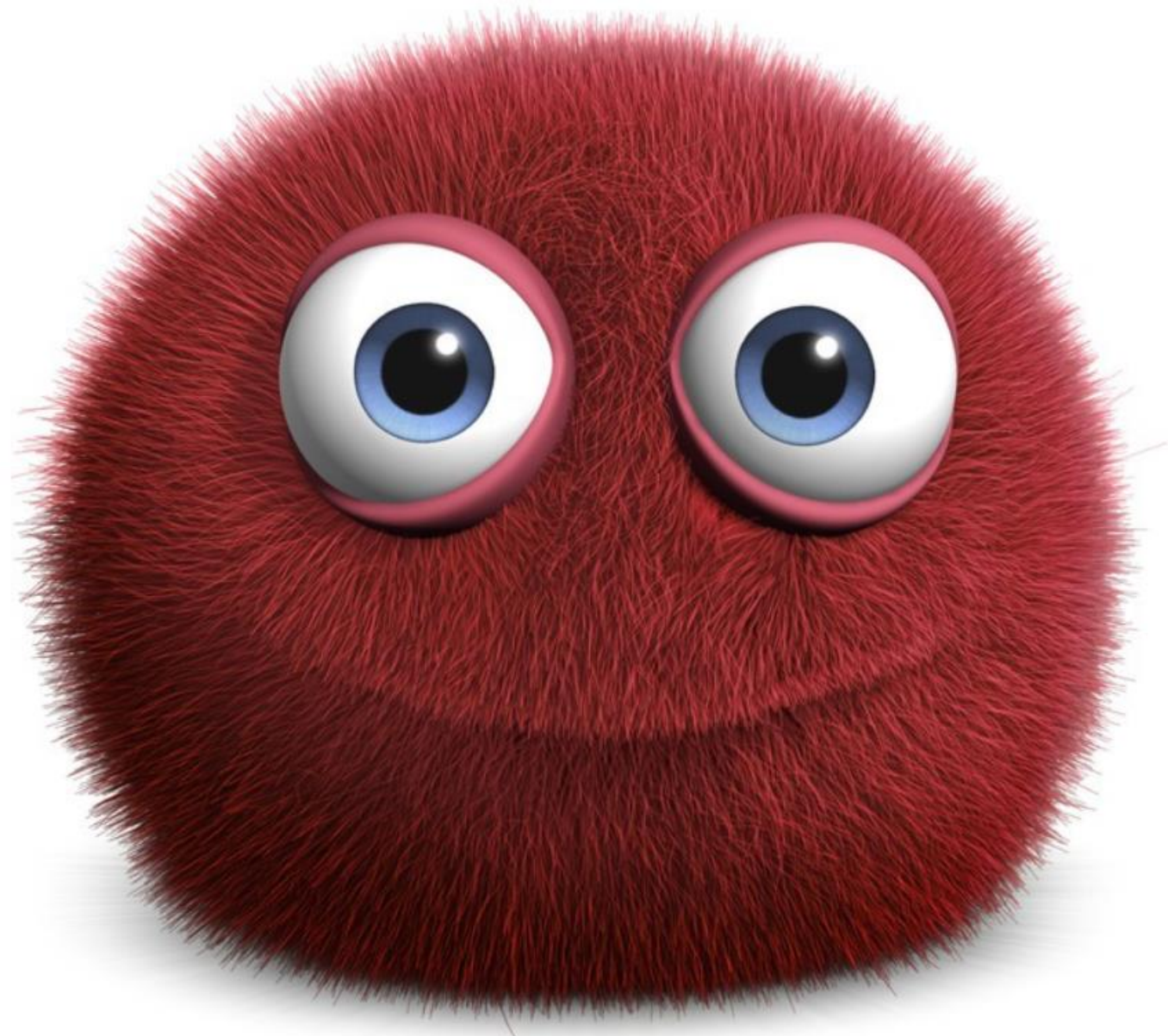














Grazie a tutti voi!!!



cubo di Necker

ME

triangolo di Penrose

Anamorfosi

Mole

PROSPETTIVA ACCIDENTALE

FRANKLIN

Rosalind

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FINESTRA PROSPETTICA

B&S

corte geografiche

AREE

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