

WAMC Lab Template

Math Concept(s): This is an introduction to Orthographic drawings.

Source / Text:

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Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

- This is an introduction to Orthographic drawings using a simple 3D shape to draw it in the Orthographic view.

Lab Plan

Lab Title: Intro to Orthographic drawings

Prerequisite skills: The student should understand what construction drawings are and what they are used for.

Lab objective: In this lab the student will create an Orthographic drawing using their cell phone as the 3D shape/model.

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

- **HSG-CO.D.12**
Make formal geometric constructions with a variety of tools and methods.
- **SG-MG.A.1**
Use geometric shapes, their measures, and their properties to describe objects.
- **HSG-MG.A.3**
Apply geometric methods to solve design problems.

Standards for Mathematical Practice:

- **MP6**
Attend to precision.
- **MP7**
Look for and make use of structure.
- **MP8**
Look for and express regularity in repeated reasoning.

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K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- **11-12.3**

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

- | | | |
|---|---|---|
| <input type="checkbox"/> Global Awareness | <input type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy | <input type="checkbox"/> Civic Literacy |
| <input type="checkbox"/> Health/Safety Literacy | <input type="checkbox"/> Environmental Literacy | |

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation

- x Think Creatively
- Work Creatively with Others
- x Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
- x Use Systems Thinking
- x Make Judgments and Decisions
- x Solve Problems

Communication and Collaboration

- x Communicate Clearly
- Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
- Use and manage Information

Media Literacy

- Analyze Media
- Create Media Products

Information, Communications and Technology (ICT Literacy)

- Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
- Be Flexible

Initiative and Self-Direction

- x Manage Goals and Time
- x Work Independently
- Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
- Work Effectively in Diverse Teams

Productivity and Accountability

Productivity

- x Produce Results

Leadership and Responsibility

- Guide and Lead Others
- Be Responsible to Others

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- 1@ 11" x17" sheet of paper
- 1@ pencil or marker
- 1@ personal cell phone
- 1@ scissors or utility knife

Set-Up Required:

- To do this lab effectively the student will need a clean flat surface or desk top.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected): In this lesson the students will think creatively, use systems thinking and solve problems while constructing this project. The student will work independently and provide assistance to fellow students as needed.

Cooperative Learning: In this lesson the student will work independently and offer assistance or ask for assistance from fellow students as needed.

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Expectations: My expectation for this lab is to show the student what and how to draw a basic Orthographic drawing

Timeline: This lab should be completed within 30 mins.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- This lab will provide basic understanding of construction/project drawings.

Career Applications

- This understanding is used in all trades, architecture, engineering, and design.

Optional or Extension Activities

- This Basic understanding will lay the foundation for the next drafting unit.

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Introduction to Orthographic drawing

Materials you'll need

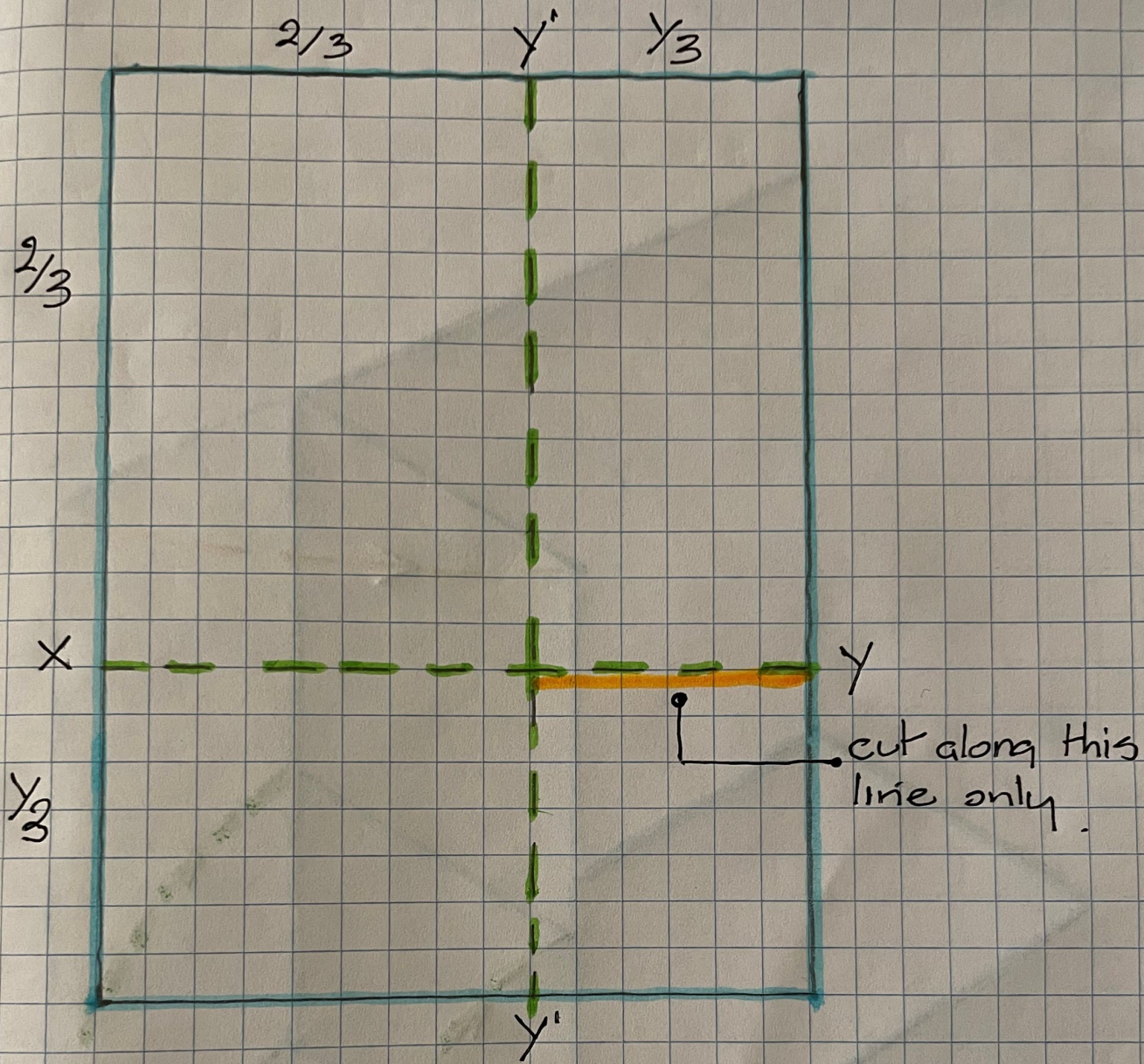
1@ 8 ½' X 11" sheet of paper

1@ pencil or marker

1@ personal cell phone

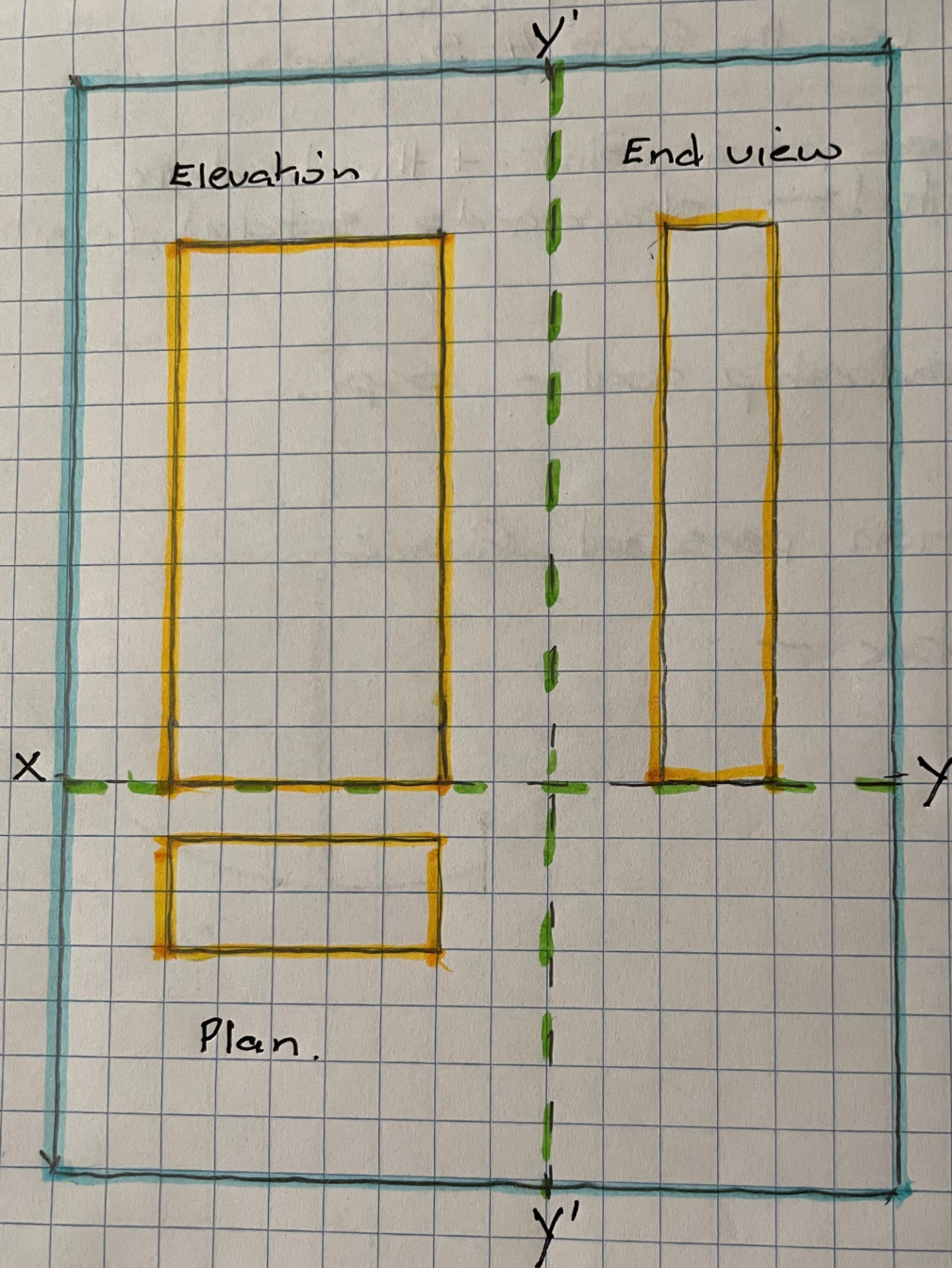
1@ scissors or utility knife

1@ piece of tape



Fold paper along green lines
and then flatten

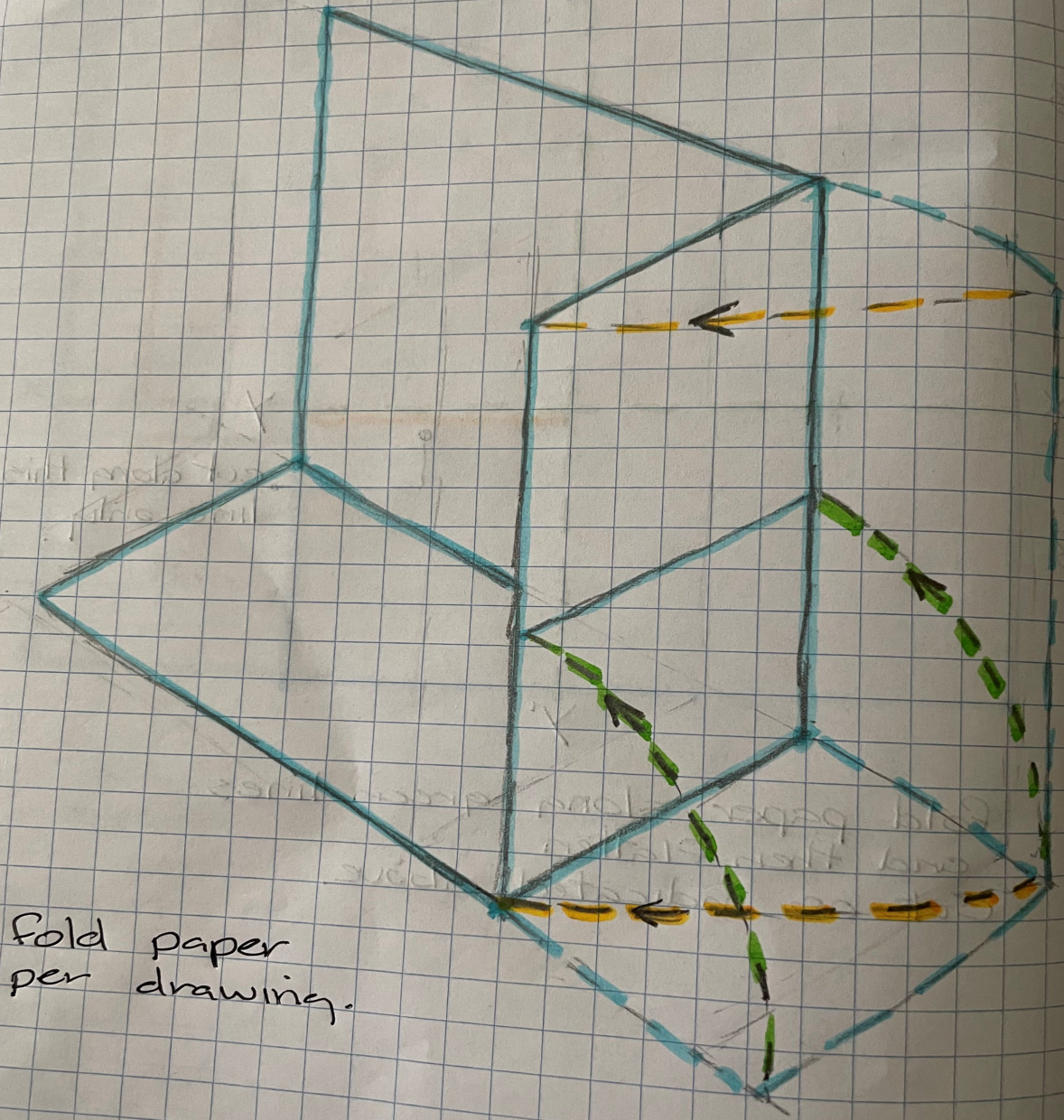
1. Fold the sheet of paper along the 11" side approx. $\frac{1}{3}$ from the bottom and mark it the X-Y line.
2. Flatten the sheet and then fold the sheet of paper along the $8 \frac{1}{2}$ " side approx. $\frac{1}{3}$ from the right side and mark it the Y-Y line.
3. Flatten sheet
4. Cut the horizontal crease (step 1) from the right side to the point it intersects with the vertical crease (step 2)
5. Flatten sheet again.



6. Lay your phone on the sheet of paper with the bottom of the block on the horizontal X-Y line on the left side of the vertical Y-Y line. (Place approx. in the middle of this space left to right). Trace your phone with marker or pencil. Label your image as the **Elevation view** above the image.

7. Stand your phone and place it directly below the first image (step 6) and approx. 1" below the X-Y horizontal line and trace it with pencil or marker. Label this image as **Plan view** below the image.

8. Place your phone on its edge or side standing vertical approx. 1" on the right side of the Y-Y vertical crease above the X-Y crease directly in line with the Elevation view and trace your block and label it **End view**.



Fold paper per drawing.

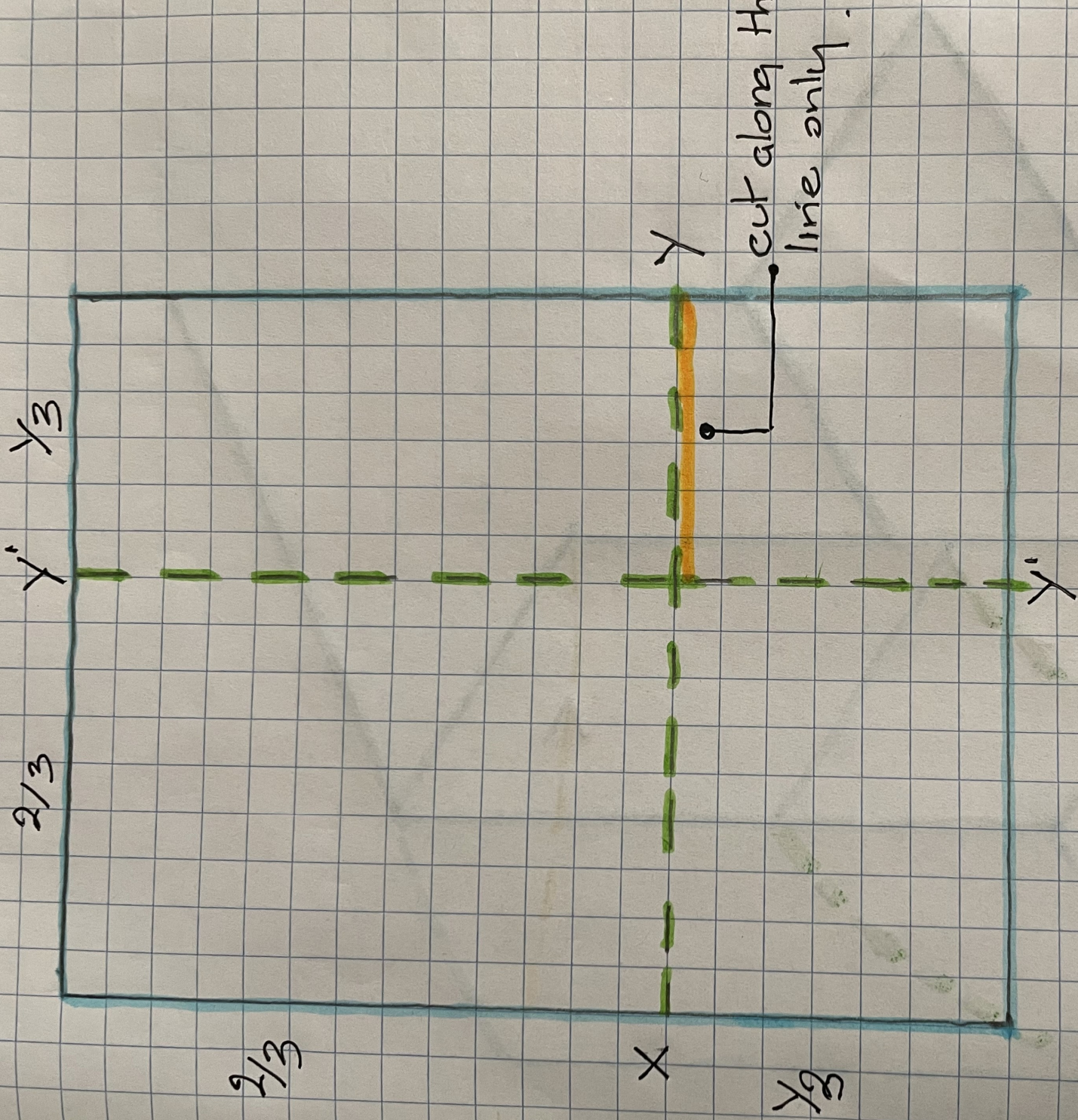
9. Fold the sheet per the creases and apply tape to the bottom of the vertical crease and cut portion.

10. Stand up your wooden block on the plan view.

Well done!!!!

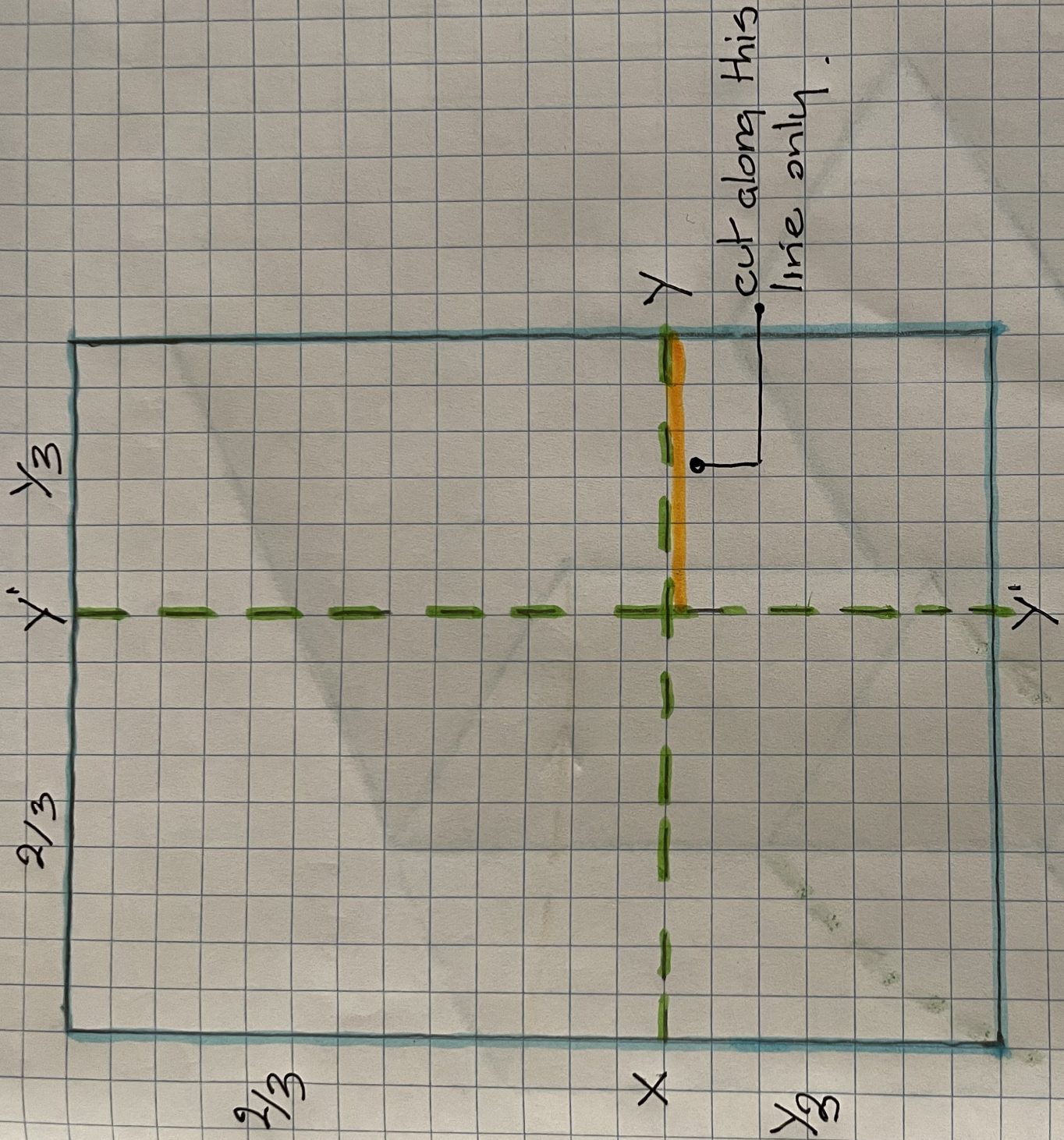
You can now see each view.

Elevation, Plan and End view.



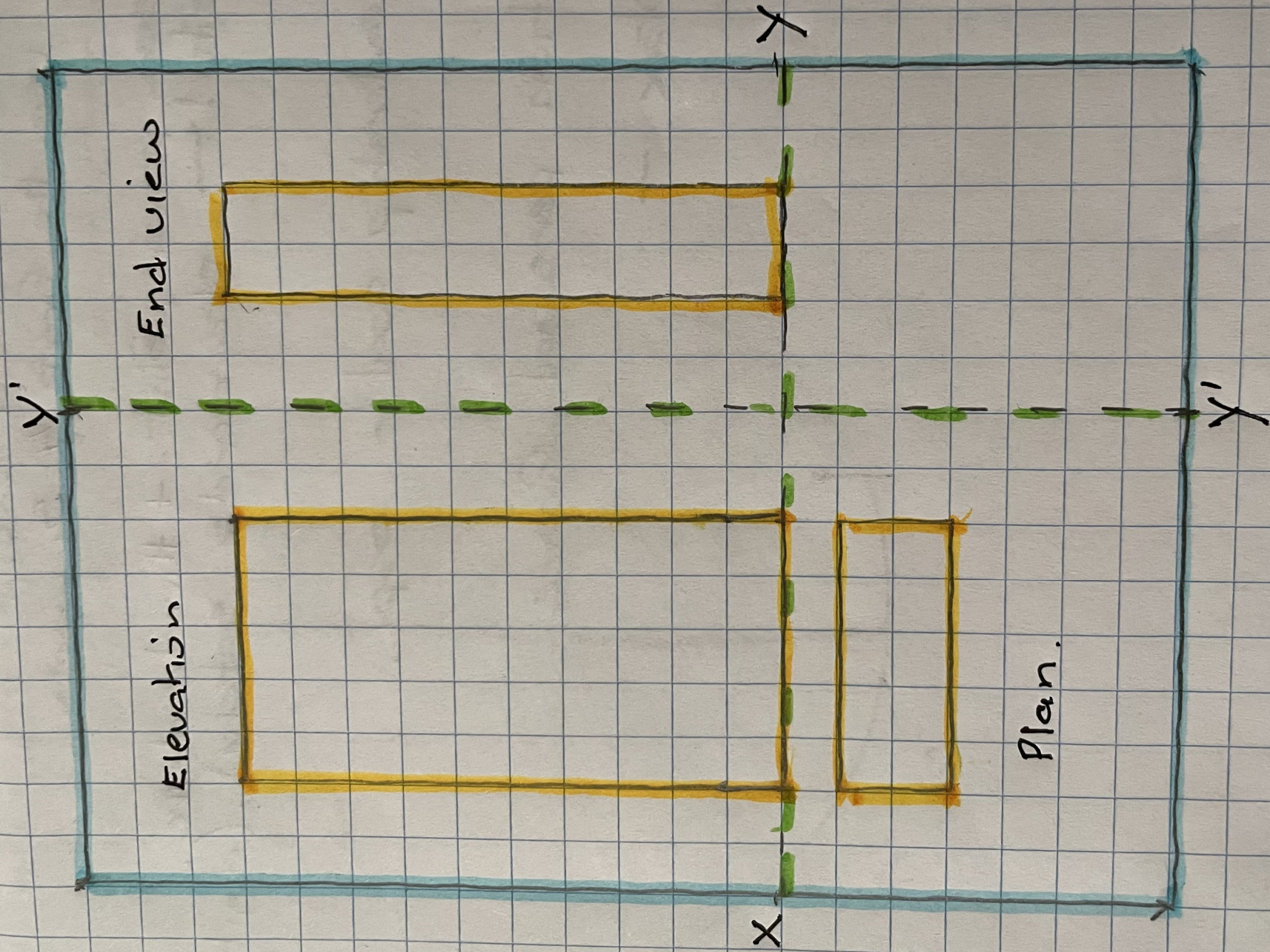
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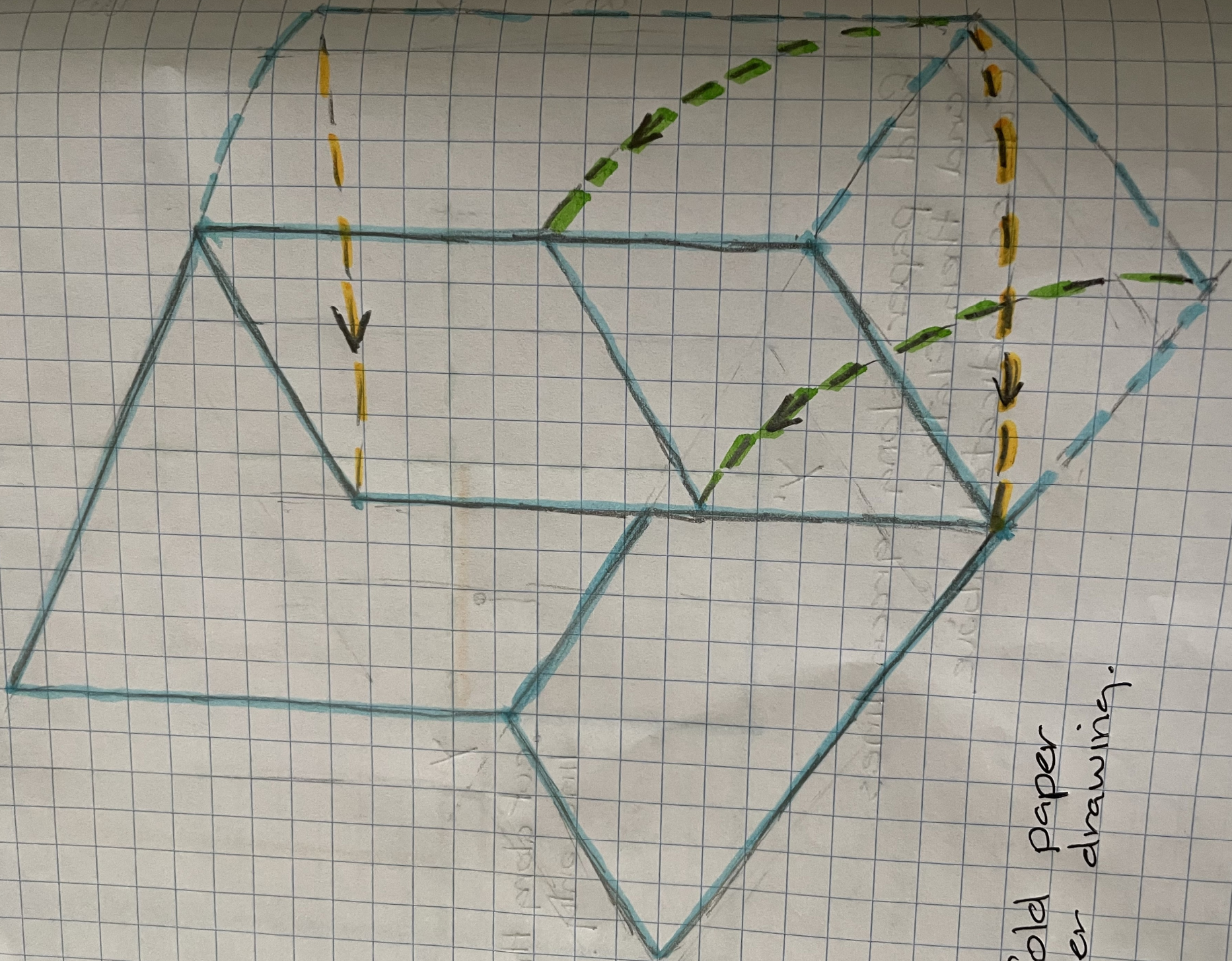


Fold paper along green lines
 and then flatten
 Cut as indicated above.

Copy paper
 70gsm



Place block on sheet and trace w/ pencil or marker.



Fold paper
per drawing.