

# Pop Up Card

In this challenge, you have 5 missions:

1. Figure out your task and the requirements (Specifications) needed for creating a desired final product
2. Research pop-up cards and circuits and brainstorm ideas for building your own
3. Communicate with your client to determine the ideal product
4. Design, create, and improve a pop up card with a circuit for your client
5. Reflect upon your results, efforts, and experience going through the Engineering Design Process

Let's Get Started!

1. Complete each activity/question before moving on to the next
2. Go through each Step completely before moving on to the next Step
3. Answer all questions, written in **RED**, directly in this document
4. Please DO NOT erase any of the questions
5. If you re-submit, please DO NOT remove any of my comments

[Step 1: Engage](#)

[Step 5: Plan](#)

[Step 2: Introduction & Request](#)

[Step 6: Create & Improve](#)

Quick Jump Bookmarks	<a href="#">Step 3: Ask</a>	<a href="#">Step 7: Reflect</a>
	<a href="#">Step 4: Imagine</a>	<a href="#">Step 8: Share Out</a>



# Step 1: Engage

1. Go back to your 4.5 Rube Goldberg Machine HyperDoc and read the advice you gave yourself in your Reflection, Question #6.
  - a. **What was your own advice?**
2. Watch the following video and answer the questions under it:
  - a. [Engineering the Perfect Pop](#)
    - i. **What elements of the Engineering Design Process did you see/hear in the video? Describe **at least 2** processes and examples (ex: "He does the IMPROVE step because he created 12 versions of his design")**
      - 1.
      - 2.
    - ii. **What is your reaction to the video? (2-3 sentences)**



## Step 2: Introduction & Request

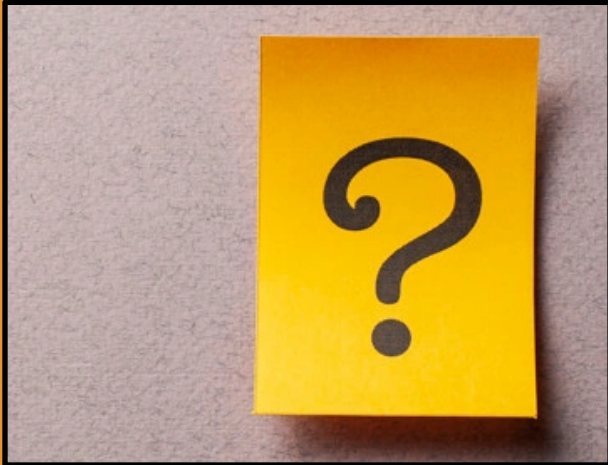
1. **Introduction:** Pop up cards and books require a large amount of engineering, and the artists who design them are often called “paper engineers.” A quality card with creative elements can convey care and concern for someone, and *brighten* up their day. We are going to do that, literally!
2. **Request/Challenge:** You are going to design and create a pop-up card that incorporates a circuit to illuminate a light feature. You will get to choose your client (if you can’t think of someone, you could pick a classmate or a teacher as a client)

**Requirements:** (see the [RUBRIC](#) for more detail)

- The card contains a complex pop-up mechanism
- Multiple pop-up mechanisms are included
- A light feature is included, and is lit either by the action of the reader (basic) or by the opening of the card (complex)
- The client is satisfied with the design- rates it a 7/10 or better
- The pop-up features must move with the opening and closing of the card
- All elements fit within the closed card, the card can fit in its envelope

### 3. Tutorial Videos:

- a. [How to Make a V-Fold](#)
- b. [How to Make a City Pop Up \(Box folds\)](#)
- c. [How to Make a V-Fold on a Box Fold](#)
- d. [How to Make a V-Fold Lifter](#)
- e. [Master Class with Matthew Reinhart \(https://bit.ly/2FiceTs\)](#)
- f. [How to Make Circuits with Copper Tape](#)



## Step 3: ASK

What does your client want?

What are the specifications?

(Assessment Grade)

Use the information from the section above ([Step 2: Introduction & Request](#)) to complete this section

1. What is your **Problem Statement**?

*The challenge is to create...*

2. Who is your client?

a.

3. Who will they be giving the card to? (ex: keeping it for themselves, for a brother's birthday, etc)

4. What does the final recipient like? What are some ideas for the subject of your card?

a.

5. What **specifications (requirements)** are needed for a good solution? Don't forget to look at the [Rubric](#) to find more specs!

*(remember, you can always add more rows if you have more Specs)*

Specification	Weight (1-5)	Justification
<i>Contains a 2nd degree complexity mechanism</i>	5	<i>Client request</i>
<i>Contains a 4th degree complexity mechanism</i>	3	<i>To get a higher grade</i>



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# Step 4: Imagine

How to make Pop-up mechanisms and Basic circuits

## 1. Learning to create Pop-up mechanisms

If you are in class, watch each tutorial video and follow along to make the folds too. You will show Ms. Padilla your practice rounds as we go through the tutorials- she will check them off. You can use regular computer paper/scratch paper to make your practice cards.

If you are NOT in class (doing this asynchronously), please post a picture of your practice folds under each tutorial video link. You can use regular computer paper/scratch paper to make your practice cards.

- a. [How to Make a V-Fold](#)
- b. [How to Make a City Pop Up \(Box folds\)](#)
- c. [How to Make a V-Fold on a Box Fold](#)
- d. [How to Make a V-Fold Lifter](#)
- e. You don't HAVE to do these ones, but here are additional resources in case you want to learn more methods:
  - i. [Master Class with Matthew Reinhart](#) This is a playlist of tutorials done by the guy who was in the opening video from Step 1 (this is a YouTube playlist, so you'll have to use a non-school device & account)
    1. Here's the bit.ly address, so it's easier to type in: <https://bit.ly/2FiceTs>
  - ii. You can also search youtube for Howcast videos about making pop up cards

## 2. Learning to Make a Basic Circuit: **DO NOT use the LED stickers yet... those are for the final card only!**

If you are in class, watch the **FIRST 2 MINUTES** of the tutorial video and follow along to make

the circuit too. Use the LED bulb (NOT the stickers) for your practice circuit. You will show Ms. Padilla your circuit when you're done.

**If you are NOT in class (doing this asynchronously)**, please post a picture of your circuit under the video link.

- a. [How to Make Circuits with Copper Tape](#) Remember: watch the **FIRST 2 MINUTES** of the tutorial video and follow along to make the circuit too. Use the LED bulb (NOT the stickers) for your practice circuit.
  - i. There are more tutorials in the video- watch them for ideas about how to use the LED sticker and how to include more than one sticker in a PARALLEL circuit

3. **Brainstorm and draw** at least 2 possible designs for your card (different subjects, different mechanisms). You may hand-draw or use Google Drawings (or any other CAD software you like). IF you hand-draw, please go over the sketch in pen/Sharpie so it is visible in your photos and TAKE A GOOD-QUALITY photo.

- Requirements:
  - Label the type of mechanisms (box fold, v-fold, etc)
  - Label the dimensions
  - Draw your circuit elements- copper tape, battery, switch mechanism, light
  - Include the whole card space, and where your mechanisms “fit” within that space
  - Embed the photo directly in this HyperDoc (not just a link) if possible, so we can see it below

A. (drawing)

B. (drawing)



# Step 5: Plan

(Assessment Grade)

1. Time to present your ideas to your client!

- a. Meet with your client and show them your Imagine drawings
- b. Ask for feedback and have them choose which general design they want you to create
- c. Take DETAILED notes (in the chart below) about the feedback they give you so you can make changes for your final PLAN diagram
- d. You can also troubleshoot with one another and figure out ways to fulfill the [RUBRIC](#)

Design	Feedback (+/Δ)
A	+ Δ
B	+ Δ

2. Create your final Plan diagram for your card, based on the feedback from your client

**a. Requirements:**

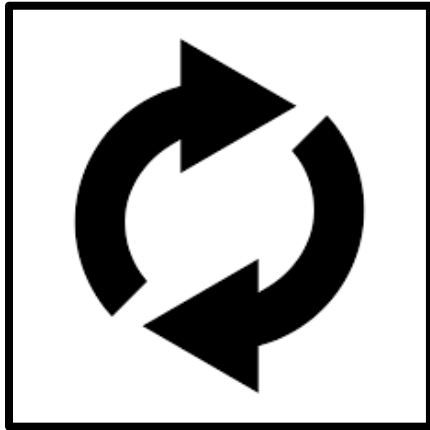
- Label the type of mechanisms (box fold, v-fold, etc)
- Label the dimensions
- Draw your circuit elements- copper tape, battery, switch mechanism, light
- Include the whole card space, and where your mechanisms “fit” within that space
- Embed the photo directly in this HyperDoc (not just a link) if possible, so we can see it below

**1. (Final PLAN drawing)**

You will be making 4 iterations (including the final). Each iteration will focus on adding more elements and experience, as follows:

Iteration	Elements/focus
1st	White cardstock only, figure out fold mechanisms (general shape silhouettes)
2nd	White cardstock only, improve fold mechanisms, 1st iteration of circuit (use bulb)
3rd	White cardstock only, finalize fold mechanisms, finalize circuit (use bulb)
4th (final)	Colored paper, final shapes, clean taping, use LED stickers for circuit light





# Step 6: Create & Improve

(Assessment Grade)

1. For each iteration you will:
  - a. Create the iteration
  - b. Conference with your client
  - c. Reflect on “next steps” before your next iteration
2. As you work on your build, keep track of what you have done.
  - a. Think of this as a justification for your “pay”- what did you do to earn your pay? **BE SPECIFIC!**
  - b. **Include photos of the creation process for each day- AT LEAST 2 per day**
  - c. Add more rows as needed
  - d. **Example:**

<i>Date</i>	<i>Work completed today</i>	<i>V F o h r o k t t o o s b ( i n e o c</i>

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8/14/20	<p><i>-cut out the cardboard components for Step C</i></p> <p><i>-created the hinges on the cardboard elements by attaching brads at the hinge</i></p> <p><i>-arranged 3 ramps, PVC pipe, cup, pulley system, dominoes, and ball on the pegboard</i></p> <p><i>-tested the first 2 steps on the pegboard 5 times</i></p>	<p>o n p l e t e d n e x t t i n e</p> <p>l u d e c a p t i o n s f o r e a c h p h o t o</p> <p>- ( a e d x j a u m s p t l t e h ) e p l a c e m e n t o f t h e r a d c o m p o n e n t s o n t h e p e g b o a r d</p>
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### 1st Iteration (white paper only, folds, general shape silhouettes)

1. As you work on your build, keep track of what you have done.

Date	Work completed today	Work to be completed next time	Photos (include captions for each photo)
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2. **Feedback session with your client:** Record the feedback you receive and plan your next steps based on that feedback.

Session/ Iteration	Feedback from client	Next steps based on the feedback
1 (white paper)		

### 2nd Iteration (white paper only, folds, circuit)

1. As you work on your build, keep track of what you have done.

Date	Work completed today	Work to be completed next time	Photos (include captions for each photo)

2. **Feedback session with your client:** Record the feedback you receive and plan your next steps based on that feedback.

Session/ Iteration	Feedback from client	Next steps based on the feedback
2 (white paper, circuit)		

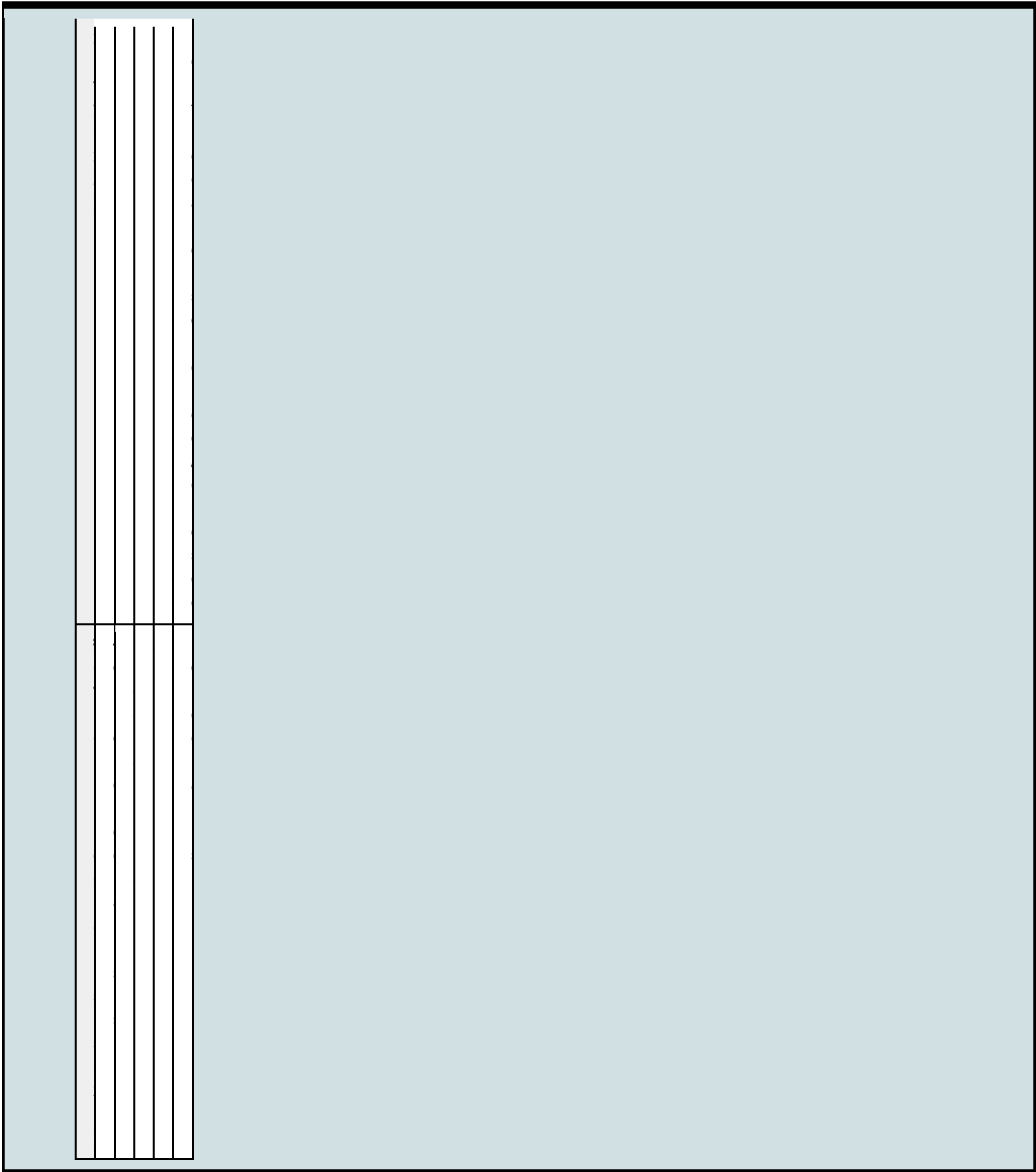
### 3rd Iteration (white paper only, folds, circuit- last practice)

1. As you work on your build, keep track of what you have done.

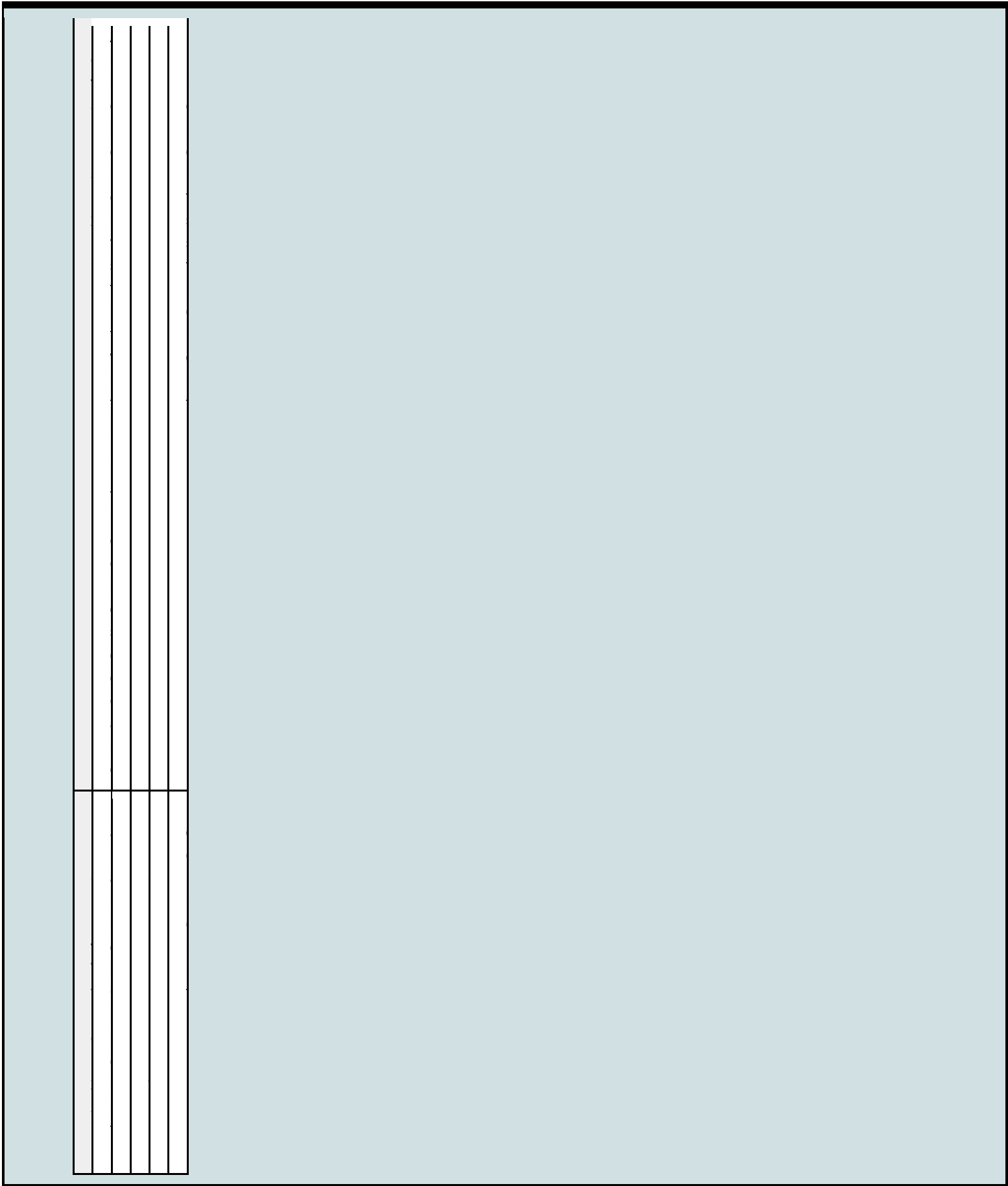
Date	Work completed today	Work to be completed next time	Photos (include captions for each photo)

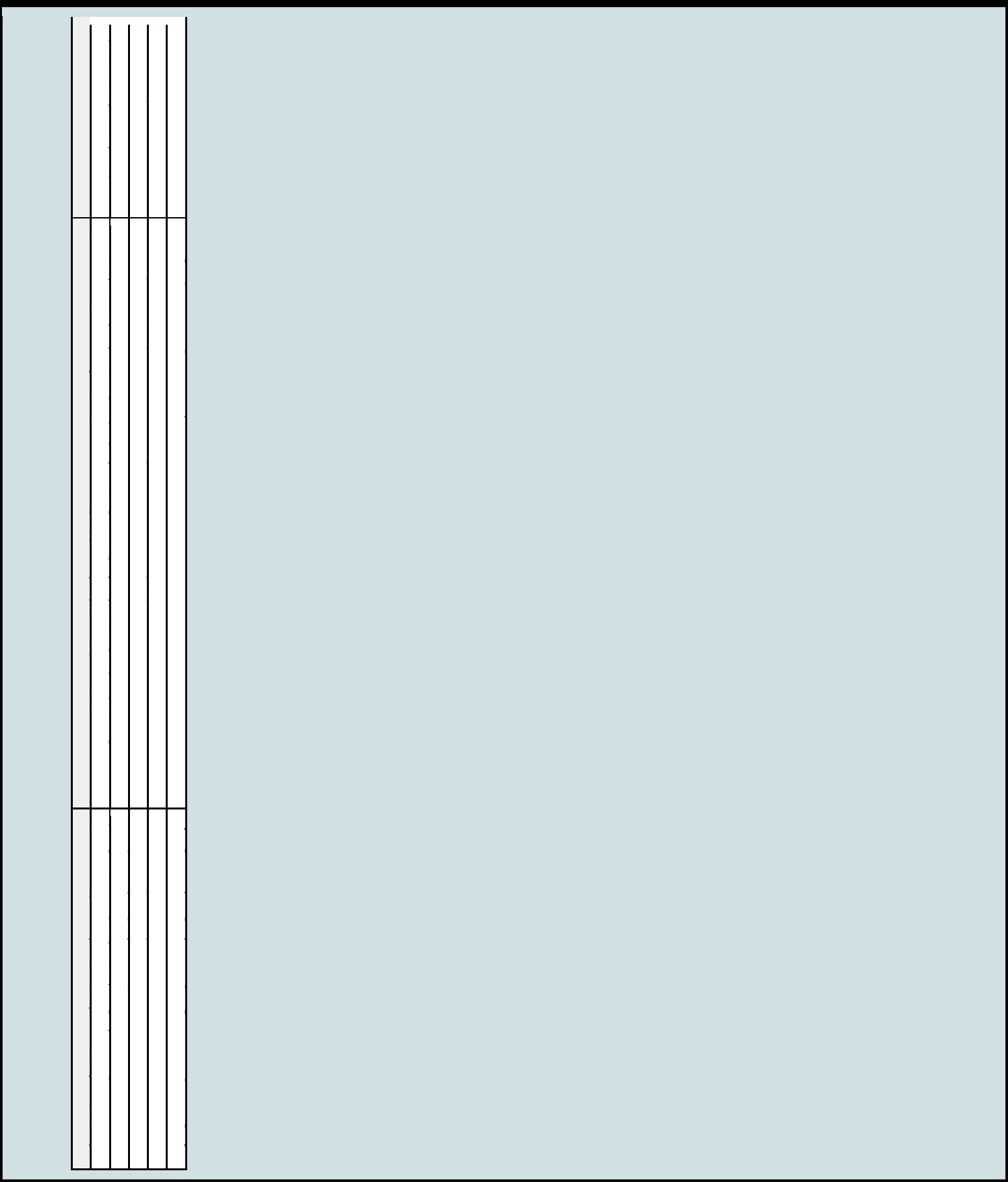
2. **Feedback session with your client:** Record the feedback you receive and plan your next steps based on that feedback.

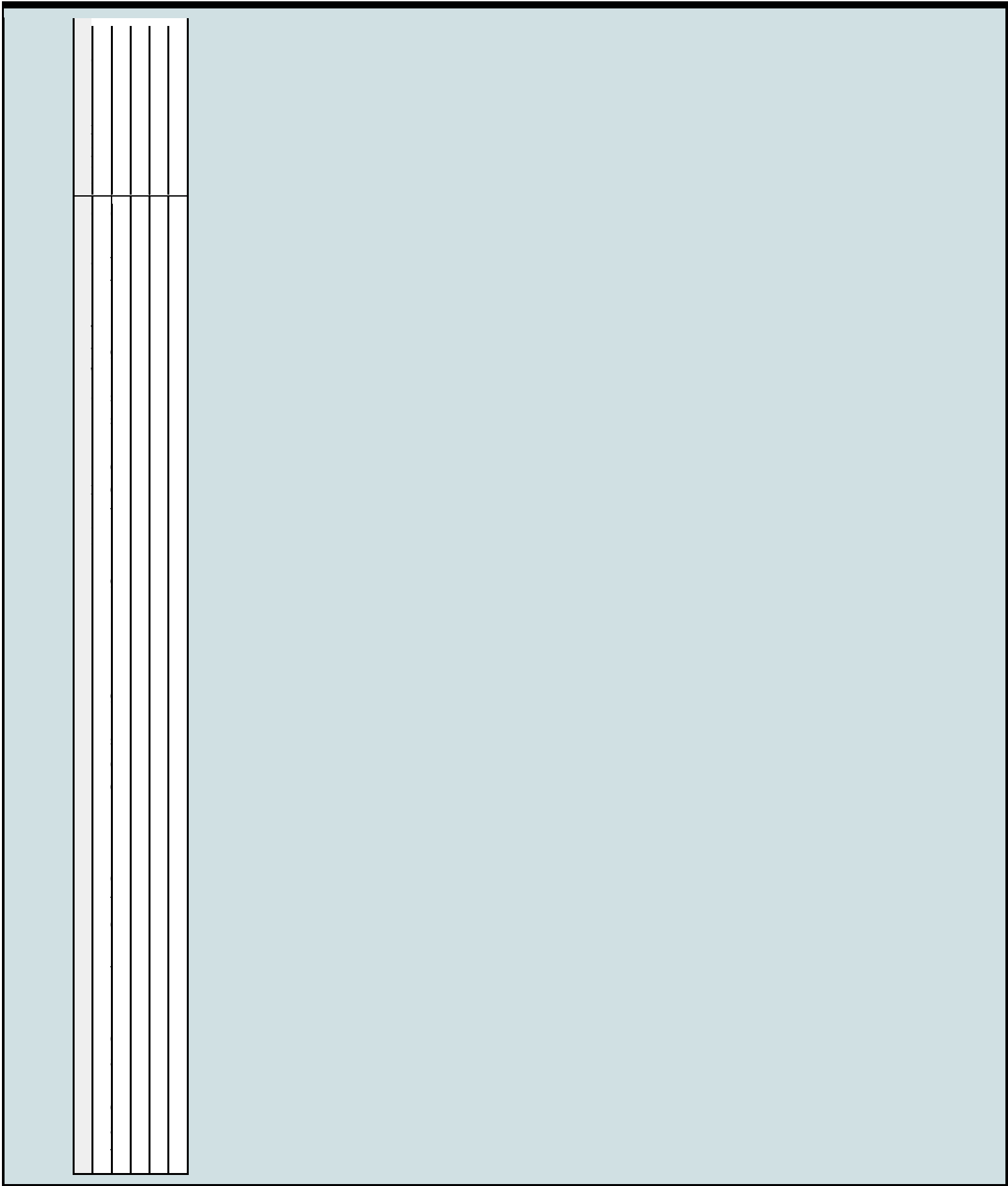




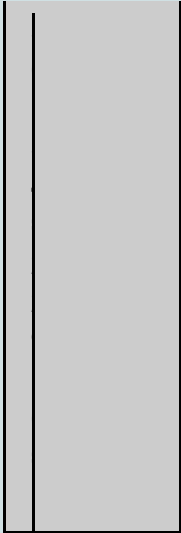




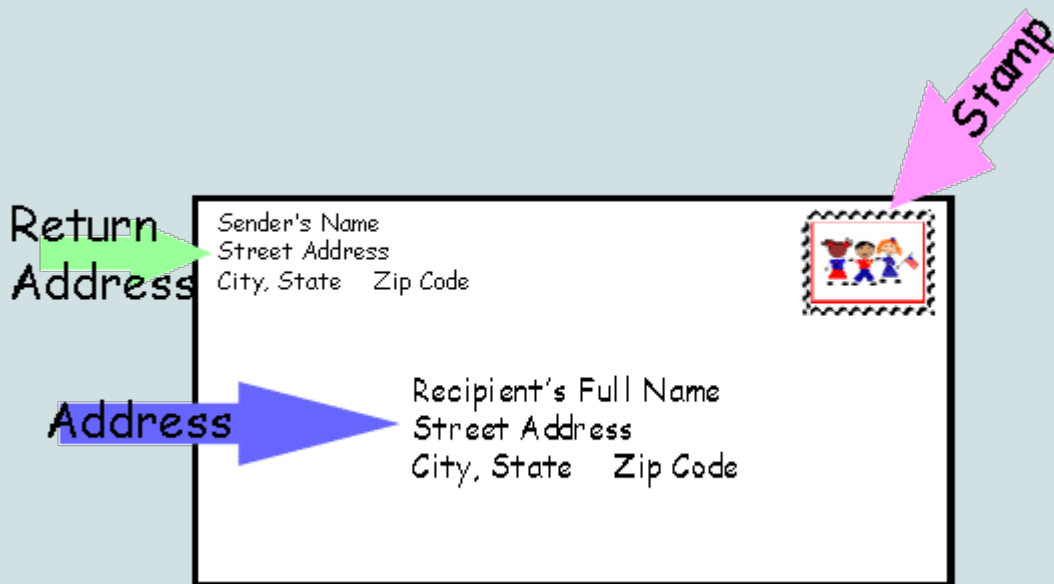








4. **Take a video and photos** of your card opening and closing AND turn your light(s) on. Make sure I can see your mechanism movements- if you're able to record it in SLO-MO, please do! Use a tri-pod or some sort of mount for your camera so it's not shaking around while you open and close your card!
  - a. Upload your video here: **My Final Pop Up card iteration video** (don't forget to change your sharing settings!)
  - b. Upload **AT LEAST 4 photos**, from different angles, of your final card below:
5. **Mail your card to your client! WooHoo!**
  - a. In case you need a reminder of how to address an envelope, here's a diagram:



- b. When we come back after Break, I will have a Google Form where everyone can confirm that they received their cards.



# Step 7: Reflect

(Assessment Grade)

Answer the following questions in complete sentences. Each response should be **at least 2-3 sentences** long (unless otherwise instructed). Please be **THOUGHTFUL** and **THOROUGH** in your responses.

1. Which (if any) Specs did you not meet? Why not? Is it a deal-breaker? Why/why not?
2. How many rounds of Improvement did you go through for your card?
3. Which element of your card required the most rounds of Improvement?
4. Which step(s) could use additional Improvement? What improvement do they need?
5. What surprised you about this project? Or what was unexpected? Elaborate on that.
6. REFLECT upon your results and the overall design process you and your team went through for this project. (Be sure to include **challenges**, **successes**, **insight** about *teamwork* and *individual work*, and **overall experience**) [your response should be at least 4-5 sentences].
7. What are *at least* TWO pieces of advice you have for yourself for future EDP challenges?

