



UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

Student Guidebook

Project Based Learning and Assessment

2025

2024

Name:

Grade, Stream, Section:

Subject:

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Introduction

Welcome to Project-Based Learning and Assessment (PBLA)

Project-based Learning and Assessment (PBLA) is a way of learning by doing! It is a different way of learning and getting grades than taking tests. It helps us work on solving real world problems, learn about big issues and think of new ways to make a difference. Working on projects also helps us learn important skills.

Through PBLA, I can:

- explore real-world problems
- build important skills
- work well in a team
- be innovative
- show what I have learned

I promise to:

- connect our projects to our community
- respect our classmates' different backgrounds and skills
- understand what our projects are about and how they will be graded
- share ideas with others
- appreciate what everyone brings to our projects
- listen to our teachers' feedback and use it to learn and get better

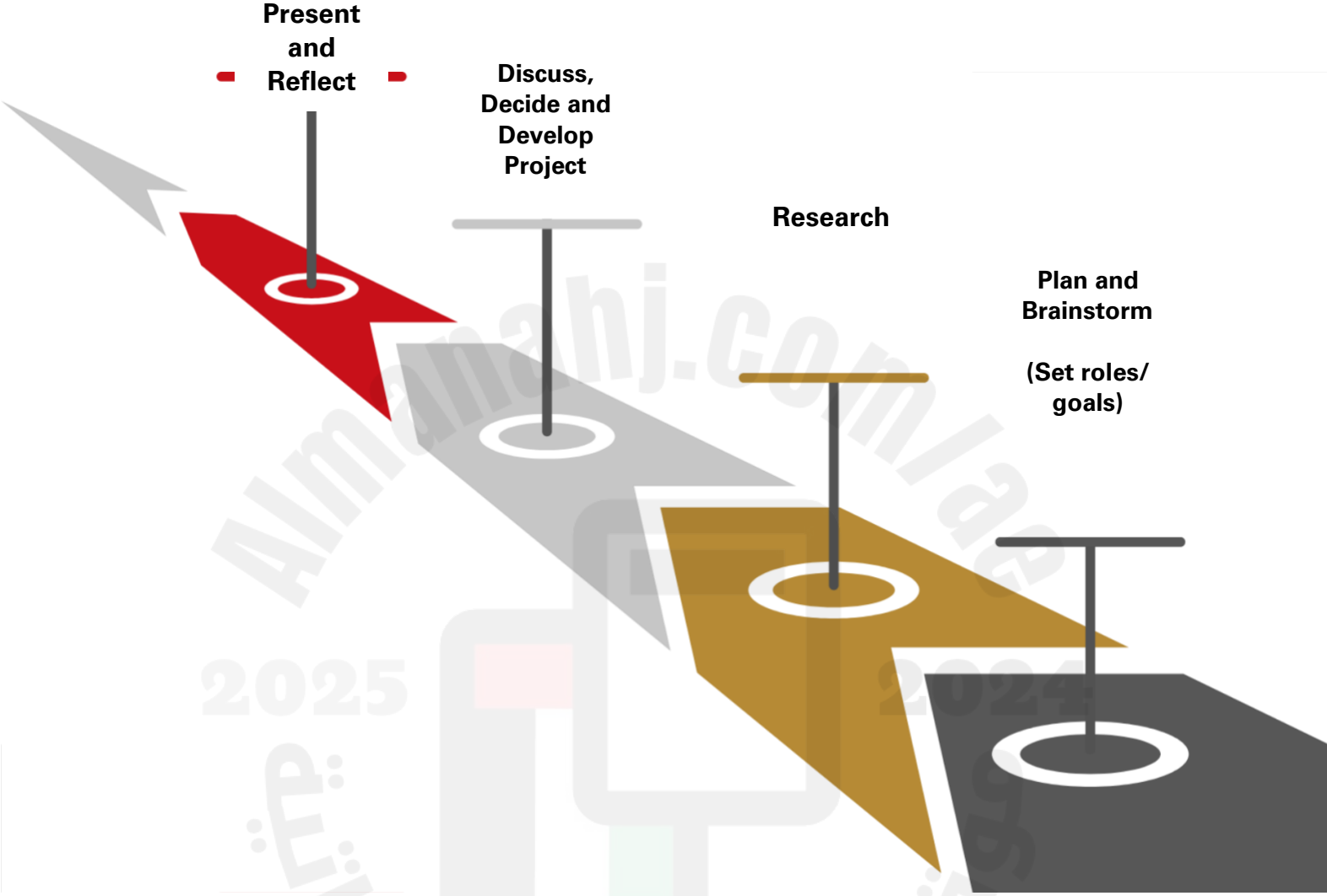
This guide will help me with my PBLA journey. It tells me what I need to do to get good scores and show my best work in PBLA. I am ready to work hard, create, and make a positive difference!

Brief description of the Project

My project is about: "A Quest to Conserve Water: Math with Decimals and Fractions". I will work with my team to understand and use math skills in real-life water conservation scenarios. We will learn how to calculate water usage and savings using decimals and fractions, applying this knowledge to track and reduce water consumption. Through teamwork and problem-solving, we will explore practical ways to conserve water and present our findings. This project encourages critical thinking, research, and hands-on math applications, giving us valuable skills in both math and environmental responsibility.

We will produce: An illustrative guidebook (using tools like paper, graphs, tables, posters, and digital tools) that includes all of our investigations. The final product (illustrative guidebook) must answer the project essential question in an effort to propose solutions that are related to the UAE. For this project, the essential question is: **How to help reduce water usage in the UAE using our knowledge of decimals and fractions?** In other words, ensure that our final project answers the essential question and proposes clear solutions and models from our investigations and creativity exercise.

My learning journey of the Project



Project Overview

Subject	Mathematics
Project title	A Quest to Conserve Water: Math with Decimals and Fractions
Project objective	We will understand and apply <u>decimals and fractions</u> to water systems.
Essential Question	How to help reduce water usage in the UAE using our knowledge of decimals and fractions?

Steps for Success

We will be evaluated on:

- Research and inquiry
- Collaboration, communication, and contribution
- Self-regulation and engagement
- Problem-solving and critical thinking
- Content Mastery:
 - Mathematical accuracy
 - Mathematical vocabulary
 - Clear and logical explanation of all mathematical solutions.
 - Clear and logical explanation of decimals and fractions and their verification.
- Presentation skills
- Innovation and enterprise
- Application of knowledge

Materials We Might Need

The following are suggested materials to choose from:

- Graph paper
- Rulers
- Colored pencils
- Reference materials on decimals, fractions, and water systems (textbook, internet resources)

Roles and Responsibilities

My Group Project Roles and Responsibilities

NAME OF STUDENTS	ROLES AND RESPONSIBILITIES
2025	2024

I know that AI tools, like ChatGPT, can help me learn, but I will use them positively.

- My work will show what I know, what I can do, and how hard I worked.
- If I include any ideas from AI, I will be honest and let people know.

I can use AI to:

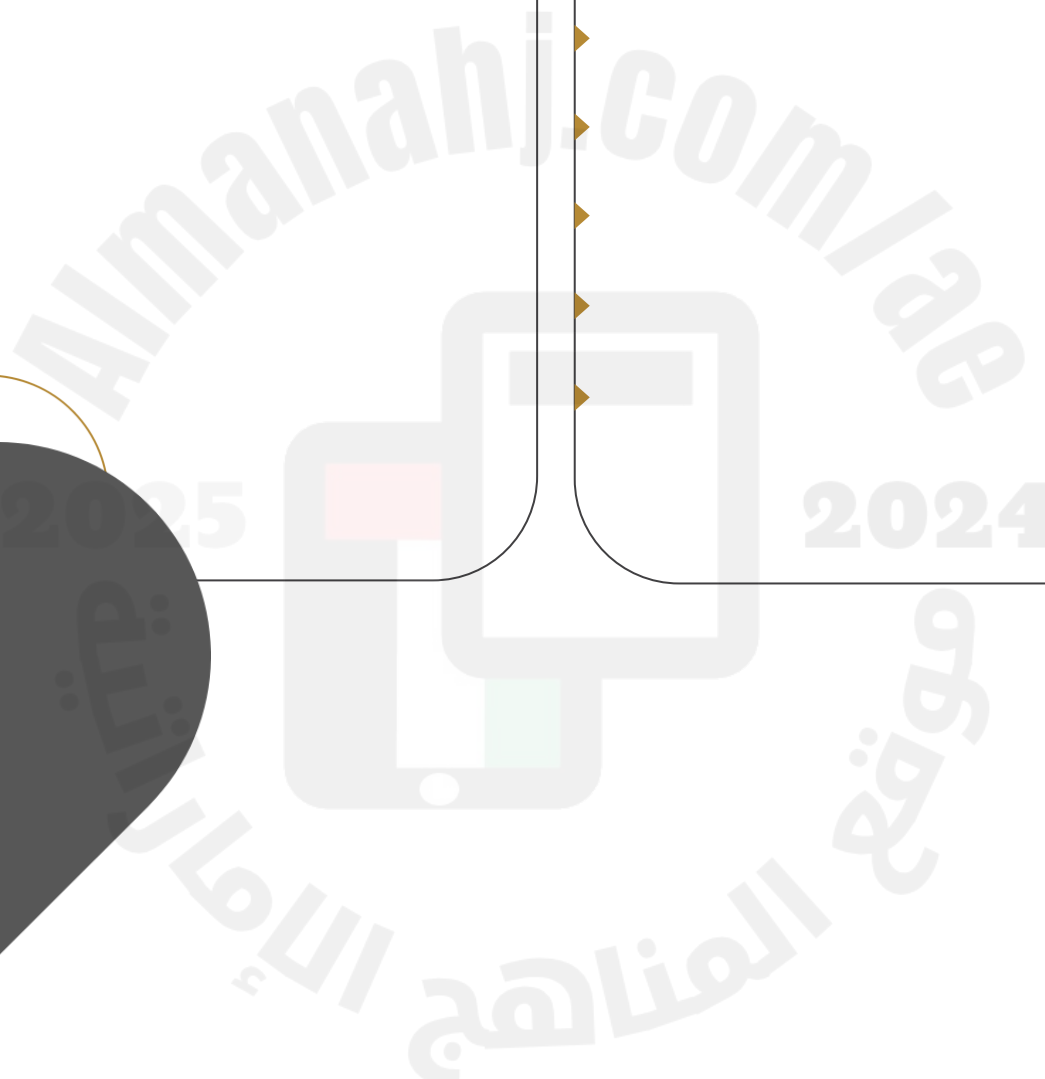
- get guidance
- brainstorm ideas
- check our understanding

Roles and Responsibilities

MY GOALS

What do I want to do?
How will I use my time in the best way?

What do I want to learn more about?
What do I want to be better at?



Milestones 1 and 2

Milestone 1 Self-regulation and engagement

Thinking about my learning:

Description: I am excited and ready for this work, and I can set goals for myself.

Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Self-regulation and engagement	<p>I find it hard to do this project work.</p> <p>I find it hard to set my goals.</p>	<p>I feel ready for the project and feel like I will try my best.</p> <p>I can think of a goal, but I need some help to understand the idea more.</p>	<p>I am excited about the project, and I am ready to work hard on it.</p> <p>I have a good idea of what learning goals I want to achieve.</p>
Action Plan for Improvement	<p>Action:</p> 		

The Project Questions

Milestone One

Research and Planning:

We need to think about the question: How to help reduce water usage in the UAE using our knowledge of decimals and fractions?

I will write about my research and the resources I use, like books, websites, or videos, and explain what I learn about decimals, fractions, and water systems. We will share ideas as a group and come up with a solution to the question. Then, we will create a timeline to make sure we finish the problems on the next pages before the project is due: **12/3/2025**

Personal Role:

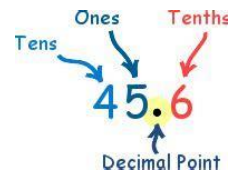
Our Group Members: _____

In our group, I will explain what my role is and how it will help us succeed as a team. I'll write about how my work connects to what my teammates are doing. I will also make a plan for myself to meet my goals, stay organized, and give my best effort. If I run into challenges, I'll think of ways to solve them so I can keep helping our group.

Answers:

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Thinking about my learning:

Description: I can find out more about the topic. I can ask questions to help us think about it.

Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Research & Inquiry	<p>I found it hard to find reliable sources of information.</p> <p>I found it hard to think of research questions.</p>	<p>I found some good information from my sources.</p> <p>I asked some good questions to help us think about the system</p>	<p>I found a lot of reliable sources. I could connect ideas between them.</p> <p>I asked big questions which made the group really think hard.</p>
Action Plan for Improvement	Action:		

CCSS.5.NBT.B.5 1. Perform operations with multi-digit whole numbers and with decimals to hundredths.

Fluently multiply multi-digit whole numbers using the standard algorithm.

(Equivalent to MAT.1.05.02.017)

Illustrative Guidebook Section 1: *(Note: The teacher can change the numbers in this problem so that each group of students has its own unique problem)*

The Water Savers Challenge

One sunny day, some friends were excited about a new sustainability project at their school. Their teacher had an important announcement:

"Our school will make a guidebook called *The Ultimate Water Savers Handbook!* This book will help families learn how to save water and take care of our planet. You will be the authors, and we'll start with a challenge about your own homes!"

The teacher explained, "First, you'll work out how much water your family uses in one week. Then, you'll see how small changes can save a lot of water. Let's try an example first."

The Challenge: Let's Practice!

Ali's family uses water for these activities each week:

- **Showering:** 245 liters
- **Washing dishes:** 180 liters
- **Laundry:** 312 liters
- **Cooking:** 95 liters

"If Ali's family uses 15% less water for each activity, how much water can they save in a week?"

The friends got excited. "Can we be the investigators?" asked Sara.

The teacher smiled and said, "Of course! Let's break it into steps."

Step 1: Investigate and Calculate

"Imagine helping Ali's family. Here's what to do:"

1. Find 15% of the water used for each activity.
2. Subtract that amount to see the new water use for each activity.
3. Add up the water saved from all activities to find the total savings.

"Now, most importantly, let's make it personal. Compare Ali's family's water use to your own family's," the teacher said.

Step 2: Be the Water Detective

The friends got timers, notebooks, and tools to track their families' water use. Each person had a special job:

- **Time Keeper:** Measured how long family members spent showering and washing dishes.
- **Data Collector:** Noted how often the washing machine was used and how much water it used.
- **Chef's Assistant:** Checked how much water was used for cooking and cleaning.

At the end of the week, they shared their findings. They compared their water use to Ali's family and noticed some big differences. "Wow, my family uses more water for dishes because we wash by hand!" said one friend.

Step 3: Create and Share

With their notes ready, the teacher gave the next task:

"Now, write the *Water Savers Handbook*. Here's what to include:"

1. **Tips for Families:** Ideas like taking shorter showers or using water-saving appliances.
2. **Infographics and Charts:** Show how much water small changes can save.
3. **Your Reflections:** Write what surprised you and how your family's habits affect water use.

The friends used math, science, and creativity to make a colorful guidebook. It was filled with charts, reflections, and smart tips.

The teacher was proud. "You're not just students—you're leaders helping others save water and care for our world!"

Answer: *(Draw all relevant diagrams and show all your work!)*



CCSS.5.NBT.B.6

Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

(Equivalent to MAT.1.05.02.022)

Illustrative Guidebook Section 2: *(Note: The teacher can change the numbers in this problem so that each group of students has its own unique problem)*

The Local Park Water Challenge

The friends were excited to take their water-saving project to the next level. Their teacher gave them a new task:

“Now, let’s investigate how much water the Local Park uses. This park uses 7,560 liters of water each month. The water is spread evenly across 28 zones. Can you find out how much water each zone uses? After that, think of ways to save water at the park and at home.”

The students were ready to solve the challenge by following these steps:

Step 1: Divide and Conquer

- Find how much water each zone uses. To do this, divide the total (7,560 liters) by 28 zones.

Step 2: Illustrate and Explain

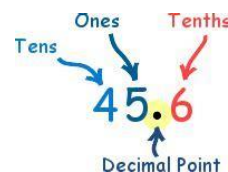
- Show how you solved the problem with:
 - Equations (writing out the division).
 - Rectangular arrays (drawing a grid to show the water divided into zones).
 - Area models (using a visual way to divide the total water).

Step 3: Connect and Reflect

- Think of one way to save water at home from what you learned before.
- Explain how this idea can also work at the park.

The friends were excited to solve the math and share ideas for making the park—and their community—better at saving water!

Answer: *(Draw all relevant diagrams and show all your work!)*



CCSS.5.NBT.B.7

Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

(Equivalent to MAT.1.05.06.006)

Illustrative Guidebook Section 3: *(Note: The teacher can change the numbers in this problem so that each group of students has its own unique problem)*

The Water-Saving Experiment

The students wanted to learn more ways to save water for their guidebook. The teacher began with a big question:

"Do you think small changes in your daily habits can save water? Let's test it! Start by investigating at home and then explore how simple tools can help save even more."

Step 1: Investigate at Home

- Over two weeks, track how much water your family uses to wash dishes.
- Use a timer to measure water usage for Week 1 and Week 2.
- In Week 2, try new strategies, like washing dishes faster or using less water.
- Compare the two weeks: Did you save water in Week 2? What changes helped?

Step 2: Explore Water-Saving Methods

The teacher shared this data and explained:

"Here's how much water was saved each day using two simple methods: low-flow showerheads and fixing leaks. Look at the numbers to see how well these methods work!"

Day	Low-Flow Showerhead (liters)	Fixing Leaks (liters)
Monday	2.35	1.15
Tuesday	2.50	1.20
Wednesday	2.45	1.30
Thursday	2.60	1.25
Friday	2.55	1.40

Step 3: Analyze Daily Savings

- Add the water saved by both methods for each day to find the total daily savings.

Step 4: Calculate Weekly Savings

1. Find the total amount of water saved in the week for each method (low-flow showerheads and fixing leaks).
2. Add the totals for both methods to find the overall weekly savings.

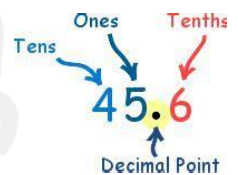
Guidebook Contribution

Create a chapter called *"Saving Water at Home and Beyond"* with these sections:

1. Investigation Results: Share what you learned in your two-week dishwashing experiment. What strategies helped save water?
2. Data Insights: Use the provided numbers to explain how tools like low-flow showerheads and fixing leaks can reduce water use.
3. Tips and Reflections: Add practical tips, colorful charts, and personal thoughts to inspire families to save water at home.

By combining math, science, and creativity, the students worked hard to encourage others to protect our precious water resources!

Answer: *(Draw all relevant diagrams and show all your work!)*



Illustrative Guidebook Section 4 For Advanced Students Only
(Advanced students should complete all the problems above and this extension problem)

CCSS.5.NF.B.3 Apply and extend previous understandings of multiplication and division.

Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
(Equivalent to MAT.1.05.02.018)

The Rainwater Distribution Challenge:

The students, now eager to make a bigger impact, gathered for their next challenge. Their teacher handed them the data and posed a question:
"You've done great work so far! Now, imagine you've collected 84 liters of rainwater over 7 days to help water the school garden. Your mission is to distribute it into smaller containers while exploring different possibilities and sharing your discoveries creatively."

Step 1: Daily Average Collection

- Calculate the average amount of rainwater collected each day by dividing the total water (84 liters) by the number of days (7).

Step 2: Fill Containers

- If each container can hold 3 liters of water, how many containers can be filled completely, and how much water will be left over?

Step 3: Explore Variations in Container Sizes

1. Different Capacity (5 liters): How many containers can be filled completely, and how much water will be left over if the containers hold 5 liters each?
2. Alternative Capacity (4 liters): How does the solution change if each container holds 4 liters?

Extension Activity: Design a Rainwater Allocation Strategy

Challenge, Let's Sharpen Our Skills to Be Ready! Develop a Rainwater Allocation Strategy for the school garden and propose creative solutions for efficient water use.

1. Garden Mapping:

- Create a simple map or diagram of the school garden, marking sections where water is needed (e.g., flowerbeds, vegetable patches, or shaded areas).

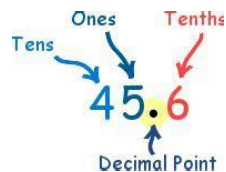
2. Rainwater Distribution Plan:

- Calculate how much rainwater each section should receive based on its needs using proportional division (e.g., flowerbeds get 40%, vegetables get 30%, etc.).

3. Visual Representation:

- Present your allocation strategy using a chart, graph, or infographic to illustrate your distribution plan and creative ideas.

Answer: *(Draw all relevant diagrams and show all your work!)*



Thinking about my learning:

1) Collaboration, Communication & Contribution

Description: I discuss well in my group and help organize our tasks.

2) Problem-solving & Critical thinking

Description: I can see problems, find solutions, and change as needed.

Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Collaboration, Communication & Contribution	I only spoke a little about the project.	I gave some ideas to the group and helped to come to decisions.	I gave many original ideas and I helped organize our work.
Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Problem-solving Critical Thinking	I found it hard to solve the problems. My teammates made all the decisions.	I could see some of the problems and I tried to think of ways to fix them. Sometimes, I need help for making decisions.	I thought about different and original solutions and shared them with my team.
Action Plan for Improvement	Action:		

Milestone Two: (For All Students)

Reflection on Work:

I need to reflect on our completed project on A Quest to Conserve Water: Math with Decimals and Fractions. I will think about the project we worked on and what we did well. What were the best parts of our work? I'll give examples of things we're proud of and why they were successful. I'll also think about areas where we can improve and explain how our planning and teamwork helped make our project strong. What part of the project am I most proud of, and why?

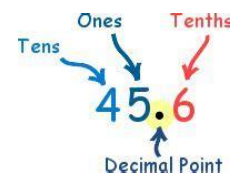
Demonstrating Closed Gaps:

I'll think about challenges we faced or areas where we needed to learn more. How did I work to improve during the project? I'll give specific examples of strategies I used, like trying new methods or asking for help. I'll also explain how fixing these gaps helped make our project better.

Reflection on Learning:

I'll reflect on what I learned during this project. What new skills or ideas did we gain? How has this project helped me or us understand the topic better? I'll also think about new learning goals for the future and why they are important.

Answers:



Milestone 2: Presentation and Reflection

What will be my role in the presentation:

What have I learned:

How does the project connect to the real world:

Thinking about my learning

1) Presentation Skills: I can present well to my classmates			
Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Presentation Skills	I find it hard to talk in front of people.	I find it easy to talk to the class and they could understand me.	I find it very easy, and I feel confident talking to the class.
	I find it hard to explain what I learnt.	I find it easy to say something about what I learnt, and how I solved problems in the work.	I find it very easy to describe how we fixed problems and what I learnt.
2) Innovation: We used new and original ideas and our presentation was creative			
Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Innovation	We needed ideas to make our presentation more original.	I thought we had some new and original ideas.	We had very creative ideas.
		We had some new and interesting ways to do our presentation.	We presented our ideas in a really exciting and different way.
3) Content/Topic Mastery: I understand and can explain this topic.			
Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Content/Topic Mastery	I only know a few simple things about this topic.	I understood most of what the class said on the topic.	I feel like I understand everything on this topic and I can explain it to people.
	I found it hard to understand the ideas that were said	I need some things explaining more.	
4) Application of Knowledge/Skills: I connect what I've learned to real-world situations.			
Select your level:	<input type="checkbox"/> Beginning	<input type="checkbox"/> Developing	<input type="checkbox"/> Acquired
Application of Knowledge/Skills	I found it hard to understand how this will work outside the classroom.	I can think of some examples of how this will work outside the classroom.	I feel like I have really good ideas about how this will help people outside the classroom.
		I need some help to think of more ideas.	
Action Plan for Improvement	Action:		

My Final Reflection

What did I learn and how did I improve?

What was good about my project?

What can I make better in my project?

What other skills have I improved?
What skills do I still need to work on (e.g. time management, confidence, etc.)?

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What have I learned doing the project?

Did I achieve my role? Am I proud of the work I did?

Write a thank you note to yourself