

تم تحميل هذا الملف من موقع المناهج الإماراتية



دليل الطالب التعلم القائم على المشاريع والتقييم منهج ريفيل

موقع المناهج ← المناهج الإماراتية ← الصف السابع ← رياضيات ← الفصل الثاني ← كتب للطالب ← الملف

تاريخ إضافة الملف على موقع المناهج: 14:54:00 2025-02-11

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
رياضيات:

التواصل الاجتماعي بحسب الصف السابع



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف السابع والمادة رياضيات في الفصل الثاني

عرض بوربوينت الدرس السادس جمع التعابير الخطية من الوحدة الخامسة التعابير

1

عرض بوربوينت الدرس الثامن تحليل التعابير الخطية إلى عوامل من الوحدة الخامسة التعابير

2

عرض بوربوينت الدرس الخامس تبسيط التعابير الجبرية من الوحدة الخامسة التعابير

3

عرض بوربوينت الدرس الرابع خاصية التوزيع من الوحدة الخامسة التعابير

4

عرض بوربوينت الدرس الثالث خواص العمليات من الوحدة الخامسة التعابير

5



UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

Student Guidebook

Project Based Learning and Assessment

Name:

Grade, Stream, Section:

Subject: Mathematics

Table of Contents

1	Introduction
2	Brief Description of the Project
3	Project Overview; Roles and Responsibilities
4	Milestone One and Two

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

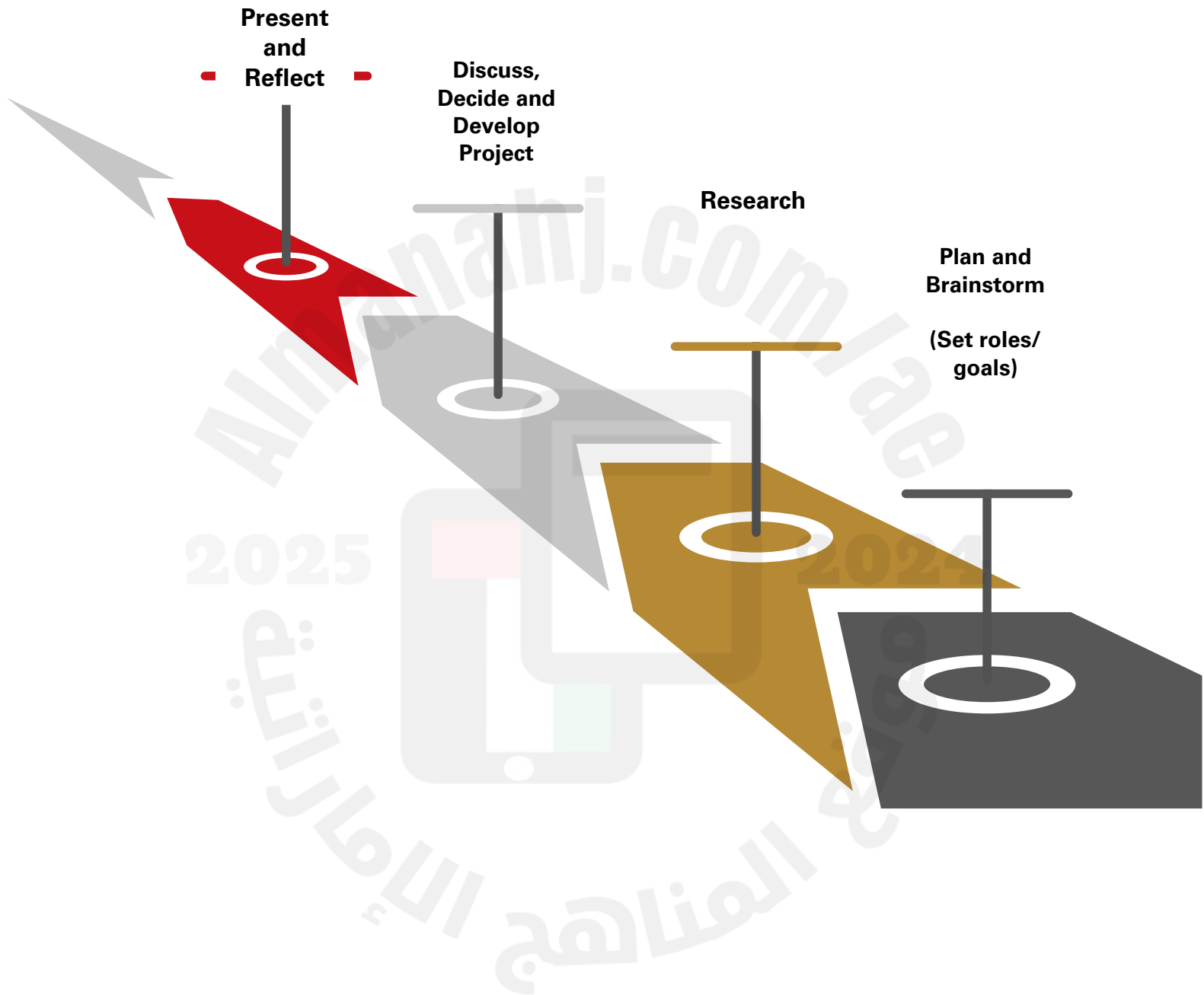
My project is about:

My project is about exploring the importance of algebraic expressions and equations through a scientific context involving the design and operation of the Emirates Mars Mission. I will research how mathematical expressions and equations are applied in real-world scenarios such as determining data transmission rates, optimizing energy consumption, scheduling mission timelines, and ensuring the successful return of the Hope Probe to the UAE.

We will produce:

An illustrative guidebook (using tools like paper, graphs, tables, posters, and digital tools) that includes all our investigations. The final product (illustrative guidebook) must answer the project essential question to propose solutions that are related to the UAE. For this project, the essential question is: How can we build upon the success of the Emirates Mars Mission to support an expedition beyond Mars, using algebraic expressions and equations? 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

Roles and Responsibilities

My Group Project Roles and Responsibilities

Subject		Mathematics
Project Title	Beyond the Emirates Mars Mission with the Help of Algebraic Expressions and Equations.	
Project Objective	We will understand and apply algebraic expressions and equations to explore and optimize the Emirates Mars Mission.	
Essential Question	How can we build upon the success of the Emirates Mars Mission to support an expedition beyond Mars, using algebraic expressions and equations?	
Steps for Success		
We will be evaluated on:		
<ul style="list-style-type: none">• Research and inquiry• Collaboration, communication, and contribution• Self-regulation and engagement• Problem-solving and critical thinking• Content Mastery:<ul style="list-style-type: none">○ Mathematical accuracy○ Mathematical vocabulary○ Clear and logical explanation of all mathematical solutions.○ Clear and logical explanation of Algebraic Expressions and their verification.• Presentation skills• Innovation and enterprise• Application of knowledge		
Materials We Might Need		
The following are suggested materials to choose from:		
<ol style="list-style-type: none">1. Graph Paper2. Colored Pencils3. Reference Material		

Roles and Responsibilities

NAME OF STUDENTS	ROLES AND RESPONSIBILITIES

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?**

2025

2024

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><u>Action:</u></p>		

Milestone One – Guidebook Introduction

Research and Planning:

As I am working on creating my guidebook, I always remember to keep the main question in mind: **How can we build upon the success of the Emirates Mars Mission to support an expedition beyond Mars, using algebraic expressions and equations?**



I will write about my research and the resources I use, like books, websites, or videos, and explain what I learn about algebraic expressions, equations, space exploration, and the Hope Probe mission. We will share ideas as a group and come up with solutions to the challenges presented in our tasks. Then, we will create a timeline to make sure we finish the problems on the next pages before the project is due: _____.

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 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.

Remember, collaboration and effective communication are key to our group's success, just like in the real-world teams that manage space missions!

Answers:

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	<p>Action:</p>		

Guidebook Sections

CCSS 7.EE.1: Expressions

Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

(Equivalent to MAT.2.02.02.010)

Illustrative Guidebook Section 1:

Welcome aboard, future space explorer! You have just been recruited as a *junior data technician* for the *Emirates Mars Mission's Hope Probe team*. Your mission is critical: **help manage and optimize the data being sent from Mars back to Jupiter**. The scientists are counting on you to use your math skills to ensure smooth communication across millions of miles of space.



You'll start by researching the distance between Earth and Mars and the cost of spacecraft fuel. As you think about these calculations, you'll begin to see how much goes into planning even a single space mission—costs, distances, and resources must all be carefully balanced. Now, imagine this:

How many fuel tanks would be needed to make it all the way to Jupiter?

This question will guide your exploration of the fuel requirements for such a long journey.

But that's not all. You'll also consider how the data will be transmitted back to Earth over the vast distance. Just as precise calculations are essential for estimating the fuel needed, similar mathematical thinking is used to analyze how efficiently spacecraft can communicate over such great distances. Good luck!

Investigation and Creativity: The Hope Probe transmits scientific data back to Earth at a rate represented by the expression $4x + 8$ megabytes per second, where x is the number of active data channels.

- 1.1 If the number of active data channels increases by 3, use the properties of operations to expand and simplify the new expression for the data transmission rate.
- 1.2 Another spacecraft sends data at a rate given by the expression $2(3x + 5)$ megabytes per second. Simplify this expression and determine which spacecraft transmits data faster when $x = 2$.
- 1.3 **Creativity (Guidebook findings 1):** Draw a physical model to represent the data transmission rates of the Hope Probe and the spacecraft to Jupiter. You can use items like blocks, beads, or Lego pieces to symbolize the terms in the algebraic expressions. Using your model, explain to your colleagues which spacecraft transmits data faster.

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



CCSS 7.EE.2 Re-writing Expressions

Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

(Equivalent to MAT.3.08.01.014)

Illustrative Guidebook Section 2:

You receive a fascinating assignment from your work manager. “I need you to explore how mathematical expressions are used in real-world technology,” “just like they were crucial to the success of the Hope Probe mission to Mars.” Your first mission is clear:

find three examples of how math is used in technology or engineering.

2.1 The Hope Probe uses a solar panel system to generate energy, which can be modelled by the expression $5(2z + 6)$ *kilowatt-hours per sol (a Martian day)*, where z represents the number of optimal sunlight hours. Rewrite this expression in two different forms. Explain how each form can provide different insights into the energy production of the solar panels.

2.2 The energy consumption of the spacecraft is given by:

$$E = 5(2z + 1) - 7(a + 4) - \frac{2a}{3}$$

- where z is defined in Problem (2.1)
- a is the angle between the solar panel system and the sunlight.

The programming technician of the spacecraft said that the computer uses a programming language that requires all mathematical expressions to be in their simplest expanded form for accurate computations. How are you going to solve this issue and input the expression into the computer system?

2.3 **Creativity (Guidebook findings 2):** Your work manager asked you to explore how mathematical expressions are used in real-world technology, just like they are crucial in the Hope Probe mission.

- Look around your community or school and find three examples where mathematical expressions are used in technology or engineering.
- Document each example by taking pictures or drawing diagrams.
- Identify the mathematical expressions or formulas that might be used in each case.
- Showcasing your findings and explain how understanding mathematical expressions contributes to the effectiveness and innovation of technology in your daily life.

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



CCSS 7.EE.4: Constructing Simple Equations

Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities.

(Equivalent to MAT.3.08.01.013)

Illustrative Guidebook Section 3:

You are about to dive into space exploration! Your mission now is to help estimate how much fuel the Hope spacecraft would need for a trip to Jupiter. The journey will take years, and every detail must be calculated precisely. You start by researching the **distance between Earth and other planets** and the **cost of spacecraft fuel**. You soon realize how much goes into planning even a single space mission—costs, distances, and resources all must be carefully balanced. As you think about the calculations, you wonder how this information could help improve **UAE's future space missions**. Could your research lead to more efficient ways to use fuel?

The Hope Probe is preparing to return to Earth from Mars. The distance between Mars and Earth at the time of departure is 300 million kilometers.

3.1 The amount of fuel required for any journey is modelled by the equation:

$$F = 10d + 500$$

where:

- F is the total fuel needed in kilograms.
- d is the distance to Earth in million kilometers.

Calculate the total amount of fuel F needed for the probe to return to Earth.

3.2 The Hope Probe currently has 3500 kilograms of fuel remaining.

- Determine whether the probe has enough fuel to make the return trip.
- If there is enough fuel, calculate how much fuel will be left after the journey.
- If there is not enough fuel, propose a solution using your knowledge from previous problems to optimize the probe's systems and conserve fuel for a safe return.

3.3 **Creativity (Guidebook findings 3):** Search for the distance between Earth and Jupiter and the average cost of spacecraft fuel. Use the same fuel equation in Problem (3.1) to estimate the fuel and cost required to make a trip to Jupiter using the Hope spacecraft. How can your research in this project improve the UAE future space trips?



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



Extension Investigation and Creativity for Advanced Students Only
(Advanced students should complete all the problems above and this extension problem)

The Hope Probe must adjust its orbit to collect data from different regions of Mars. To ensure mission success, several factors must be considered:

1. **Data Transmission Rate:** (from Problem 1)

$$D = 4x + 8$$

where:

- D is the data transmission rate in megabytes per second.
- x is the number of active data channels.

2. **Energy Consumption and Fuel Impact:** (from Problem 2), we know that increasing the number of active data channels affects energy consumption, which in turn impacts fuel availability for orbital adjustments.

3. **Fuel Consumption for Orbital Adjustments:** (from Problem 3)

$$F = 50n + 200$$

where:

- F is the total fuel consumed in kilograms.
- n is the number of orbital adjustments made per month.

4.1 The mission control team needs to perform the final data upload before the Hope Probe begins its return journey. What is the number of active data channels x needed to achieve the required data transmission rate of 60 megabytes per second.

4.2 With the fuel allocation set for the return trip, the team must determine how many orbital adjustments the Hope Probe can perform during its journey back to the UAE. Calculate the number of orbital adjustments n the probe can make with the initial fuel allocation of 500 kilograms.

4.3 The mission team is considering increasing the number of active data channels by 2 to enhance data collection. This change will reduce the fuel available for orbital adjustments by 50 kilograms per month.

- Calculate the new number of active data channels x_2
- Determine the new data transmission rate D_2
- Calculate the adjusted fuel allocation F_2
- Find the new number of orbital adjustments n_2
- **Investigate:** Is increasing the data channels beneficial? Consider the trade-off between improved data transmission and reduced orbital adjustments based on your calculations.

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	<p>I found it hard to solve the problems.</p> <p>My teammates made all the decisions.</p>	<p>I could see some of the problems and I tried to think of ways to fix them.</p> <p>Sometimes, I need help for making decisions.</p>	<p>I thought about different and original solutions and shared them with my team.</p>
Action Plan for Improvement	Action:		

Milestone Two: (For All Students)

Reflection on Work:

I need to reflect on our completed project on Algebraic Expressions and the Emirates Mars Mission. 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 learnt:

➤ 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 need some help to think of more ideas.	I feel like I have really good ideas about how this will help people outside the classroom.
Action Plan for Improvement	<u>Action:</u>		

My Final Reflection

What did I learn and how did I improve?

<p>What was good about my project?</p>		<p>What can I make better in my project?</p>
<p>What other skills have I improved? What skills do I still need to work on (e.g. time management, confidence, etc.)?</p>		<p>What have I learnt doing the project?</p>
<p>Did I achieve my role? Am I proud of the work I did?</p>		<p>Write a thank you note to yourself.</p>