Mentors Formative Lesson Observation Resource (M-FLOR)

Name of Intern: Abdulrahman Albabakri	**ID: 025302**
Name of Mentor: Mr. Hatem	**Cycle: 3**
School: Al QUDRA	**Class: 11 General**
Period: 4	**Date: 07/05/2026**

Brief description of the lesson topic, learning objectives, and planned activities

Lesson Topic: Classifying Chemical Reactions - Single-Replacement Reactions

Learning Objectives:

- **Identify** a single-replacement reaction from a given set of chemical equations.
- **Predict** the product formed from reactants.
- Write a balanced chemical equation representing the reaction.

Introduction & Hook (10 mins): The lesson will begin with an interactive digital simulation (such as PhET) displayed on the smartboard, illustrating a single-replacement reaction (e.g., an active metal reacting with a metal nitrate solution). Students will observe the "swapping" of elements ($A+BC \rightarrow AC+B$) and will be asked to formulate their own definitions of the process before I formalize the concept.

Main Collaborative Task (25 mins): Students will work in small groups using classroom tablets or laptops to access an interactive digital worksheet. They will collaborate to classify a mixed set of equations, specifically isolating single-replacement reactions. They will then use an online periodic table and activity series chart to predict products and practice balancing the equations. I will circulate to guide their reasoning and prompt deeper discussions.

Plenary & Assessment (10 mins): The lesson will conclude with a digital exit ticket using a real-time polling application (e.g., Quizizz or Kahoot). This will independently assess each student's ability to identify, predict, and balance a single-replacement reaction, providing immediate data on objective mastery.

As per the M-FLOR guidance, we have selected two specific categories for this observation:

- Classroom interactions
- Use of technology

DURING THE LESSON

STEP 2: Lesson Observation

Conduct the lesson observation. Based on the categories you selected, describe what you observe, record questions, and note comments using the grid below.

<table>
<tr><td colspan="2">Observation Category 1
Classroom interactions: engaging in formative dialogue with students clarifying progress, strengths and challenges in their learning and how they can build on their current understandings and skills; incorporating students' ideas in classroom dialogue; distributing interaction opportunities across a wide range of students in the class participate in plenary and groupwork phases of the lesson</td></tr>
<tr><td rowspan="2">What is happening during the lesson?

During the opening digital simulation, you asked the class to describe the visual "swapping" of elements. When Majid intuitively suggested that the active metal "kicks out" the weaker one, you effectively incorporated his ideas in the classroom dialogue by linking his phrasing to the formal concept of the activity series.

Throughout the main task, you circulated well, engaging in formative dialogue with students—specifically clarifying Tariq and Mansoor's challenges in using the online activity series chart to predict products. During the plenary, you distributed interaction opportunities across a wide range of students in the class, making sure to call on quieter students like Khalifa and Hamdan.</td><td>Areas of strength:

You were highly successful at incorporating students' ideas in classroom dialogue, which validated their thought processes and built their confidence.

Furthermore, your commitment to distributing interaction opportunities ensured that the whole class participated in the plenary and groupwork phases of the lesson, rather than just the most vocal students.</td></tr>
<tr><td>Areas needing further development:

While your teacher-to-student interactions are excellent, keep a closer eye on the peer-to-peer dynamics within the groups.

In Zayed and Omar's group, Zayed dominated the discussion and the decision-making process, leaving Omar with few opportunities to contribute.

Consider assigning specific roles within the groups (e.g., "Predictor," "Balancer," "Chart Checker") to ensure more equitable interactions.</td></tr>
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<table>
<tr><td colspan="2">Observation Category 2
Use of technology: appropriate use and integration of ICT, digital tools, and other teaching resources and equipment</td></tr>
<tr><td rowspan="2">What is happening during the lesson?

You opened the lesson using the smartboard to display an interactive PhET simulation of a single-replacement reaction ($A+BC \rightarrow AC+B$) During the 25-minute collaborative task, students used classroom tablets to access a digital worksheet alongside an online periodic table and activity series.

Finally, you concluded the lesson using Kahoot as a real-time polling application for the exit ticket.</td><td>Areas of strength:

You demonstrated highly appropriate use and integration of ICT, digital tools, and other teaching resources and equipment.

The opening simulation successfully made the abstract concept of elements "swapping" visible and concrete.

The digital exit ticket was executed flawlessly, providing you with immediate, actionable data on which students achieved the objective and which need further support.</td></tr>
<tr><td>Areas needing further development:

While the digital tools enhanced the learning, they occasionally caused pacing issues and distractions.

During the transition to the main task, a few students (like Sultan and Saeed) navigated away from the digital worksheet to explore other tablet features.

To tighten classroom management, implement a "screens down" or "tablets flat" routine whenever you are delivering whole-class instructions or clarifying a misconception.</td></tr>
</table>

AFTER THE LESSON

STEP 3: Post-Lesson Observation Interview

Suggested questions **to ask your Intern** after the lesson observation:

1. What were some of the things **you** did in the lesson that you were pleased with?
2. Can you tell me **your thinking** behind that? (e.g., putting them into groups then ... asking that group or that pupil to give a demonstration)
3. I really liked how the group work went. How did **you** make it go so smoothly? What was your thinking?
4. Can you give me more detail?
5. Can you give me one or two examples of that?
6. What do you mean by...?
7. Do you mean .... Have I understood you right?
8. What else did **you** do that you were pleased with?

General comments and questions:

Mr. Hatem: What were some of the things you did in the lesson that you were pleased with?

Abdulrahman: I was really pleased with how the students responded to the PhET simulation at the beginning of the lesson. It seemed to make the abstract concept of elements swapping much more concrete. I was also very happy that I was able to distribute interaction opportunities across a wide range of students, specifically bringing quieter students like Khalifa and Hamdan into the plenary discussion.

Mr. Hatem: Can you tell me your thinking behind that? (e.g., using the digital simulation before formalizing the definition)

Abdulrahman: My thinking was that if they could visually observe the active metal replacing the weaker one in the solution first, they would understand the mechanics of a single-replacement reaction intuitively. I wanted to incorporate students' ideas in the classroom dialogue so they could construct their own meaning before I introduced the formal formula ($A+BC \rightarrow AC+B$)

Mr. Hatem: I really liked how the group work went. How did you make it go so smoothly? What was your thinking?

Abdulrahman: Thank you. My thinking was to leverage the classroom tablets to keep them engaged, but also to circulate constantly to facilitate their interactions. I wanted to ensure the appropriate use and integration of ICT by having them actively use the online activity series chart to predict the products, rather than just guessing or waiting for me to give them the answer

Mr. Hatem: Can you give me more detail?

Abdulrahman: Sure. When I noticed that some students were just trying to match the equations visually without understanding why a reaction happens, I engaged in formative dialogue with them. I guided them to look at the digital activity series on their screens to see which metal was more reactive and to clarify their challenges in real-time

Mr. Hatem: Can you give me one or two examples of that?

Abdulrahman: For instance, Tariq and Mansoor were struggling to predict the product when a less active metal was introduced into the equation. I asked them to locate both metals on the digital chart. Once they saw the single metal was lower on the activity series, they realized no reaction would occur. I also utilized Majid's idea when he intuitively said the stronger metal "kicks out" the weaker one. I validated his phrasing and explicitly linked it to the formal concept of the activity series.

Mr. Hatem: What do you mean by "formative dialogue"?

Abdulrahman: By formative dialogue, I mean having purposeful conversations with the students while they are working to clarify their progress, strengths, and challenges in their learning. It is about using our interactions as an ongoing assessment, so I can provide immediate feedback and help them build on their current understandings and skills.

Mr. Hatem: Do you mean you are using these conversations to adjust your teaching and support them in real-time, rather than waiting for the final assessment? Have I understood you right?

Abdulrahman: Exactly. It allows me to step in immediately if they misinterpret the online chart or if someone like Zayed is dominating the peer-to-peer discussion, rather than finding out at the end of the lesson that Omar didn't get a chance to contribute or understand the concept.

Mr. Hatem: What else did you do that you were pleased with?

Abdulrahman: I was very pleased with the digital exit ticket using Kahoot. It was a highly effective way to use technology for summative assessment. It provided me with instant, actionable data on whether each student could successfully identify, predict, and balance a single-replacement reaction, confirming that the specific learning objectives were met.

Signed: Hatem .... **Date:** 7-5-26

(Mentor)

Signed: [signature] .... **Date:** 7/5/26

(Intern)

STEP 4: Intern's Reflection on the Experience

Describe

The 45-minute Grade 11 Chemistry lesson focused on classifying single-replacement reactions, predicting their products, and writing balanced chemical equations. The instruction commenced with an interactive PhET digital simulation displayed on the smartboard, allowing students to visually observe an active metal replacing a weaker metal in a nitrate solution. Students then transitioned into collaborative groups, utilizing classroom tablets to access a digital worksheet alongside an online activity series chart. During this 25-minute phase, students worked together to classify mixed equations, predict products based on metal reactivity, and balance the reactions. The lesson concluded with a digital exit ticket using a real-time polling application to independently assess each student's mastery of the learning objectives.

Evaluation

A major success of the lesson was the use of the digital simulation, which effectively made abstract chemical swapping mechanics visible and concrete for the students. Additionally, classroom interactions were a strong point; distributing questions to quieter students like Khalifa and Hamdan ensured broader participation. Actively incorporating student language into the formal dialogue—such as validating Majid's intuitive observation that the stronger metal "kicks out" the weaker one—helped build student confidence.

However, the integration of technology introduced distinct challenges. Unintended distractions occurred when students, specifically Sultan and Saeed, navigated away from the digital worksheet to explore other tablet features. Furthermore, peer-to-peer interactions were uneven in some groups; for example, Zayed dominated the discussion and decision-making process, which severely limited Omar's opportunity to contribute to the task.

Analysis

The effectiveness of the opening simulation is deeply rooted in the principles of minds-on practical work. Meaningful science learning requires activities to explicitly serve as a bridge between the domain of observable objects and events and the domain of abstract scientific ideas (Abrahams, 2017). By allowing the students to visually witness the elemental swapping before introducing the formal algebraic equation, the activity successfully linked their observations to the underlying theoretical chemistry concepts (Abrahams, 2017). Additionally, validating Majid's analogy and using formative dialogue aligns with the understanding that the most important single factor influencing learning is ascertaining what the learner already knows and teaching accordingly to prevent cognitive disconnects (Hattie & Clarke, 2018). Utilizing purposeful pupil-teacher and pupil-pupil talk is also critical for building knowledge and understanding of both cognitive and metacognitive strategies (Quigley et al., 2018).

The challenges observed during the lesson highlight the complexities of managing digital inquiry and collaborative learning. The technological distractions experienced by Sultan and Saeed emphasize that students do not automatically self-regulate; teachers must explicitly teach pupils how to organize and effectively manage their learning independently (Quigley et al., 2018). Furthermore, the uneven group dynamics between Zayed and Omar demonstrate a common hurdle in inquiry-based science education (IBSE) (Finlayson, n.d.; Harrison, 2014). While collaborative tasks are essential for developing scientific reasoning and forming coherent arguments, students often lack the necessary self-regulatory skills to manage group participation equitably (Finlayson, n.d.; Harrison, 2014). This indicates a need to explicitly foster metacognitive awareness within the classroom culture, encouraging students to actively monitor their own learning behaviors and social contexts during problem-solving (Avargil et al., 2018; Tanner, 2012).

Plan for the Future

To refine my pedagogical practice, I must establish stricter technology routines to mitigate distractions and manage cognitive load. Implementing a "screens down" or "tablets flat" policy during whole-class instructions will ensure students remain focused. To address the uneven peer-to-peer interactions, I will assign specific, rotating roles within the collaborative groups (e.g., "Predictor," "Balancer," and "Chart Checker") to enforce equitable participation and accountability.

Finally, I plan to integrate explicit metacognitive reflection prompts into my lesson closures, requiring students not only to assess their chemical knowledge but also to evaluate how effectively they collaborated and managed their resources (Tanner, 2012).

References

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