Mentors Formative Lesson Observation Resource (M-FLOR)

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Name of Mentor: Mr. Hatem	**Cycle: 3**
School: Al QUDRA	**Class: 11 General**
Period: 2	**Date: 16/04/2026**

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

Lesson Topic: Chemical Reactions and Equations

Learning Objectives:

- Define a chemical reaction and identify its components (reactants and products)
- Understand and interpret chemical equations as representations of chemical changes.

Introduction & Engagement: The lesson will begin with a digital simulation (such as PhET) to provide a visual representation of a chemical reaction at the molecular level. Students will observe the breaking and forming of bonds to define what constitutes a chemical change.

Direct Instruction: We will transition to identifying reactants and products. I will use an interactive presentation to model how to translate a word reaction into a symbolic chemical equation, such as:

$$2H_2 + O_2 \rightarrow 2H_2O$$

Guided Practice: Students will work in tiered groups based on their current progress levels.

- Group A (Support): Identifying reactants and products in simple provided equations.
- Group B (Standard): Writing equations from word descriptions of simple reactions.
- Group C (Extension): Analyzing more complex reactions and identifying the physical states of the substances involved.

Plenary & Assessment: The lesson will conclude with a digital exit ticket (e.g., Microsoft Forms or Quizizz) to assess the students' ability to define a chemical reaction and recognize the parts of an equation before the next session.

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

- Use of Technology.
- Differentiating teaching strategies to support the needs of different students.

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
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?**

Zayed and Mansoor are using their tablets to access a PhET simulation on chemical reactions.

You are using an interactive whiteboard to drag and drop reactants and products while explaining the law of conservation of mass.

Students are scanning a QR code to participate in a real-time check for understanding using a digital quiz.</td><td>**Areas of strength:**

The simulation effectively visualized abstract concepts for students like Sultan, who struggle with 2D textbook diagrams.

Seamless transition between the presentation and the interactive quiz maintained lesson momentum.</td></tr>
<tr><td>**Areas needing further development:**

Ensure that students like Rashid, who finished the digital task quickly, have an extension activity ready so they remain focused on the learning objective.</td></tr>
</table>

<table>
<tr><td colspan="2">Observation Category 2
Differentiating teaching strategies to support the needs of different students: using differentiation strategies to cater to the needs of different individuals and groups in the class (content, process, product)</td></tr>
<tr><td rowspan="2">**What is happening during the lesson?**

You have organized the class into three tiered groups based on prior assessment data.

Ahmed is in the "Support" group, working with physical molecular models to build reactants, while Saif is in the "Extension" group, balancing complex equations from word problems.

You are circulating, spending targeted time with Omar's group to clarify the "learning words" like "reactants" and "yields".</td><td>**Areas of strength:**

The use of physical models for the support group provided a tactile "process" differentiation that helped clarify the symbolic equations.

The tasks were well-pitched, allowing all students to achieve the objective of defining a chemical reaction regardless of their starting point.</td></tr>
<tr><td>**Areas needing further development:**

Consider using "no-hands up" questioning during the plenary to ensure differentiation is also applied to how you check for understanding across all ability levels.</td></tr>
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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?

Me: I was particularly pleased with how the students engaged with the digital simulation to define chemical reactions. Seeing Zayed and Mansoor successfully manipulate the molecules on their tablets to see the "reactants" transform into "products" was a highlight for me.

Can you tell me your thinking behind that?

Chemistry can be very abstract. My thinking was that by using technology to visualize the breaking of bonds, I could bridge the gap between the symbolic equation on the board and the physical reality of the reaction. It allowed students to see that matter isn't lost, just rearranged.

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

The smoothness came from the differentiation strategy I planned during the "Before the Lesson" phase. I grouped the students by their current progress levels so that Ahmed didn't feel overwhelmed while Saif didn't feel bored. By providing the "Support" group with physical models and the "Extension" group with complex word problems, every student had a task that was "just right" for their level.

Can you give me more detail?

Of course. To keep the groups focused, I displayed a countdown timer on the interactive whiteboard and assigned specific roles—such as "Data Recorder" and "Equipment Manager"—to ensure everyone in Omar's group was actively participating in the inquiry process.

Can you give me one or two examples of that?

For example, in the "Extension" group, I challenged Saif to not only balance the equation but also to predict the physical state (solid, liquid, or gas) of the products based on the reaction type. Meanwhile, for Sultan, I provided a simplified checklist that helped him identify the "learning words" like yields and reactants within the equation.

What else did you do that you were pleased with?

I was happy with the classroom presence and the rapport I maintained with the boys. Even when Zayed had a technical issue with his tablet, we handled it quickly without losing the momentum of the lesson, which kept the environment positive and focused on the chemistry.

Signed: ...Hatem... **Date:** ...16-4-26...

(Mentor)

Signed: .... **Date:** ...16/4/26...

(Intern)

STEP 4: Intern's Reflection on the Experience

Describe

The lesson focused on the foundational concepts of chemical reactions, specifically defining reactions and identifying reactants and products within chemical equations for Grade 11 General students at Al Qudra School. The instructional design integrated digital simulations and tiered group activities. Students first visualized bond-breaking using a PhET simulation, then translated these sub-microscopic changes into symbolic equations. Differentiated tasks allowed students to use physical molecular models or analyze complex word problems based on their readiness levels. A digital exit ticket was utilized to provide immediate assessment data.

Evaluation

The lesson successfully utilized technology to visualize abstract molecular changes, enabling students to clearly define the transition from reactants to products. The differentiation strategy also effectively engaged diverse ability levels, ensuring students were appropriately challenged. However, managing "fast finishers" presented a pacing challenge, as some students experienced downtime after completing their digital tasks. Furthermore, translating the physical manipulation of molecular models into deep conceptual understanding required significant teacher intervention to maintain a focused learning environment.

Analysis

The success of the digital simulations is supported by Avargil et al. (2018) in their work, Understanding chemical representations and literacy, which highlights that students often struggle to connect the symbolic level of equations with the sub-microscopic level of atoms without explicit visual bridging. The need for sustained teacher intervention during the physical modeling activity aligns with Abrahams (2017) in Minds-on practical work for effective science, which posits that practical work must transcend mere physical manipulation to involve active cognitive engagement with the underlying scientific principles.

The differentiation strategy was informed by the principles of visible learning. As Hattie and Clarke (2018) discuss in Chapter 3 of Visible learning: Teaching and learning frameworks, establishing clear learning objectives and success criteria is essential for structuring effective tiered tasks. The use of a digital exit ticket functioned as a metacognitive tool. According to Tanner (2012) in Promoting metacognition in science students, allowing students to monitor their own understanding is critical for self-regulation. This is further reinforced by the Education Endowment Foundation's Metacognition and self-regulated learning: Guidance report and summary poster, which emphasize teaching students to plan, monitor, and evaluate their own learning. Finally, the structured scaffolding of the inquiry tasks was supported by Harrison (2014) in SAILS: Strategies for assessment of inquiry learning in science, which emphasizes meeting students at their current level of understanding to build confidence and competence.

Plan for the Future

Moving forward, I will develop robust extension activities for fast finishers that require them to apply their knowledge to new contexts, utilizing metacognitive prompts to explain their reasoning as recommended by the Education Endowment Foundation (n.d.). I will incorporate "no-hands up" questioning to consistently check for understanding across all groups and maintain high engagement. I will explicitly model the thinking process used to balance equations to help students internalize self-regulation strategies, applying the frameworks outlined by Tanner (2012). Finally, I will ensure all practical activities include specific reflective questions that link physical observations back to core chemical principles, guaranteeing the "minds-on" approach advocated by Abrahams (2017).

References

Abrahams, I. (2017). *Minds-on practical work for effective science.*

Avargil, S., et al. (2018). *Understanding chemical representations and literacy.*

Education Endowment Foundation (EEF). (n.d.). *Metacognition and self-regulated learning.*

Harrison, C. (2014). *Strategies for assessment of inquiry learning in science (SAILS).*

Hattie, J., & Clarke, S. (2018). *Visible learning: Teaching and learning frameworks.*

Tanner, K. D. (2012). *Promoting metacognition in science students.*