

Mentors Formative Lesson Observation Resource (M-FLOR)

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Name of Mentor: Mr. Hatem	Cycle: 3
School: Al QUDRA	Class: 11 ADV
Period: 2	Date: 25/02/2026

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

Lesson Topic: Strengths of Acids and Bases

Learning Objectives:

- Explain the difference between a strong acid and a weak acid in terms of dissociation.
- Calculate the acid dissociation constant K_a using equilibrium concentrations.

Collaborative Problem Setup (Group - 5 mins): Students work in pairs to set up an ICE (Initial, Change, Equilibrium) table for a given weak acid (e.g., Ethanoic acid). The goal is to derive the equilibrium expression collaboratively before solving it.

Independent Calculation (Individual - 5 mins): Students transition to independent work to calculate the final K_a value using the concentrations established in their group work.

Metacognitive Plenary (Plenary - 5 mins): The lesson concludes with a whole-class review. Students are asked to reflect on why the K_a value of their weak acid is small, linking the mathematical calculation back to the conceptual definition of partial dissociation.

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

- Balance between plenary, group and individual modes of learning
- Promoting independent learning

Abdulrahman will be teaching the first 10 minutes.

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.

Observation Category 1 Balance between plenary, group and individual modes of learning: establishing an appropriate balance between plenary, group and individual modes of learning during the lesson with clear purposes for each mode of learning	
What is happening during the lesson? You successfully divided the remaining 15 minutes into three distinct phases. First, students are placed in pairs. Hamdan and Ali work collaboratively to set up the equilibrium expression for ethanoic acid CH_3COOH . The room is appropriately noisy with academic discussion. At the 7-minute mark, you signal a transition. Students are instructed to work in silence to calculate the K_a for a new substance, hydrofluoric acid HF on their own. Finally, you bring the class back together for a 3-minute plenary to summarize that the acid with the higher K_a value is the stronger weak acid.	Areas of strength: The transitions between the modes of learning were sharp and well-managed, ensuring no instructional time was lost. The sequence was logical: using peer support (group mode) to tackle the initial difficult setup before requiring individual accountability. Areas needing further development: During the plenary phase, you could randomly select an individual student, like Salem, to explain his final answer to the whole class, rather than you summarizing the concept yourself.

Observation Category 2 Promoting independent learning: using strategies for promoting independent learning such as promoting metacognition, assessment for learning, dialogic teaching, inquiry learning, problem-based learning	
What is happening during the lesson? During the individual work phase, Mansour gets stuck trying to solve the quadratic equation derived from his equilibrium concentrations. Instead of just giving him the answer, you use a dialogic teaching strategy, asking, "What assumption do we usually make when K_a is a very small number?" This prompt allows Mansour to independently realize he can ignore the $-x$ in the denominator, simplifying his calculation. You use the independent task as an 'assessment for learning' check, actively reviewing students' papers as they work.	Areas of strength: Excellent use of metacognitive questioning to guide students out of a mathematical roadblock, shifting the cognitive load back onto the student. The independent task was pitched at the right level of difficulty to accurately assess learning before the lesson concluded. Areas needing further development: Consider providing a visual self-assessment checklist (e.g., 1. Write equation, 2. Set up ICE table, 3. Write K_a expression) on the board so students can self-monitor their problem-solving steps more independently before asking for help.

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?
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 really pleased with how the final 15 minutes broke down. I felt I achieved a strong balance between the different modes of learning—moving from the group problem-solving task straight into the individual K_a calculation, and then finishing with the whole-class plenary wrap-up.

Can you tell me your thinking behind that?

My thinking was that calculating the acid dissociation constant can be mathematically intimidating. By starting them in pairs, they had peer scaffolding to set up the initial equilibrium expressions. This lowered their anxiety so that when I transitioned them to the individual mode of learning, they had the confidence to tackle the math on their own.

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

To make it smooth, I set a strict 7-minute timer and gave them a very clear purpose for that collaborative time. My thinking was that without a tight deadline, they might drift off-topic, but knowing they had to work independently right after kept them focused on deriving the K_a for ethanoic acid.

Can you give me more detail?

During the 7 minutes, I instructed the pairs to divide the work initially: one student wrote out the dissociation equation, while the other set up the fraction for the K_a expression. Then they had to agree on the ICE table values before solving it together.

Can you give me one or two examples of that?

Sure. I was watching Hamdan and Ali. Hamdan was getting confused about what goes in the denominator of the K_a expression, but Ali quickly explained that water is omitted because it's a pure liquid. By the time I asked them to work independently on the hydrofluoric acid HF problem, Hamdan was able to set his expression up perfectly without my help.

What else did you do that you were pleased with?

I was pleased with the final 3-minute plenary. Using those last few minutes to bring everyone back together and explicitly summarize the core concept—that a larger K_a indicates a stronger weak acid—ensured that we clearly met the learning objective before the bell rang. It provided a clean, unified ending to the lesson.

Signed: *Inatemo*

(Mentor)

Date: *26.02.26*

Signed: *[Signature]*

(Intern)

Date: *26.02.26*

STEP 4: Intern's Reflection on the Experience

Describe

The observation focused on the final 15 minutes of a Grade 11 Advanced Chemistry lesson centered on the strengths of acids and bases. The primary learning objectives were to distinguish between strong and weak acids and to calculate the acid dissociation constant K_a .

To achieve this, I implemented a structured transition through three modes of learning. First, I facilitated a 7-minute group work phase where students collaborated in pairs to derive the K_a equilibrium expression for ethanoic acid. Next, students transitioned to a 5-minute independent task to calculate the K_a for a different substance, hydrofluoric acid.

During this independent phase, I circulated the room to monitor progress. When one student, Mansour, struggled to solve the resulting quadratic equation, I used dialogic questioning—asking him what mathematical assumption we make for very small K_a values—rather than simply providing the answer. Finally, I concluded the lesson with a 3-minute whole-class plenary to summarize that a larger K_a value indicates a stronger weak acid.

Evaluation

A significant success of this lesson segment was the deliberate balance between collaborative and independent learning modes. Allowing students to tackle the initial, conceptually difficult setup of the ICE table and equilibrium expression with peer scaffolding noticeably lowered their anxiety. Consequently, when it was time for independent application, they demonstrated higher confidence. Another success was the use of dialogic questioning with Mansour, which successfully prompted him to think metacognitively and solve the mathematical roadblock independently. A primary challenge, however, occurred during the final plenary. Because time was running short, the wrap-up became highly teacher-directed; I summarized the core concept myself rather than calling on a student to articulate the final conclusion, thereby missing an opportunity to assess whole-class mastery.

Analysis

The successful progression from group collaboration to independent practice aligns closely with the framework of moving students from "surface learning" to "deep learning". By allowing students to consolidate their foundational understanding of the equilibrium setup with a peer first, they were better prepared for the heavier cognitive demands of independent problem-solving. Furthermore, using targeted questioning with Mansour was a deliberate strategy to promote metacognition, acting as an embedded "assessment for learning" that shifted the cognitive load back to the student. This embodies the core "Visible Learning" principle of a teacher understanding their impact and adjusting instruction to make student thinking visible.

However, upon analyzing the lesson's broader impact, the K_a calculations remained highly abstract. Stuckey et al. (2013) emphasize that science education must connect to individual, societal, or vocational dimensions to be truly relevant and motivating for students. The mathematical tasks in this segment were strictly academically relevant, missing a vital connection to a broader societal issue or "big idea". Grounding the abstract math in a real-world UAE context could have elevated the lesson from procedural practice to meaningful scientific literacy.

Plan for the Future

In light of this reflection, I will make the following notes to guide my growth as a teacher:

- I must prioritize time management so that lesson closures allow students to articulate their learning, making their conceptual understanding visible to me and their peers.
- I will strive to anchor complex chemical calculations in relevant societal or vocational contexts—such as local industries or environmental applications—to increase student motivation and make the science curriculum more meaningful.
- I will continue to refine my dialogic questioning techniques to foster independent learning, ultimately helping students transfer these problem-solving skills to novel, unfamiliar contexts outside the classroom.

References

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- Fisher, D., Frey, N., & Hattie, J. (2018). *Visible Learning for Science, Grades K-12: What Works Best to Optimize Student Learning*. Corwin.
- Mitchell, I. (n.d.). *Using big ideas to enhance teaching and student learning*.
- Stuckey, M., Hofstein, A., Mamlok-Naaman, R., & Eilks, I. (2013). *The meaning of 'relevance' in science education and its implications for the science curriculum*. *Studies in Science Education*, 49(1), 1–34.