



Apr 14th, 9:00 AM - 10:00 AM

## How Chemistry Students Learn in an Inquiry-Based Classroom

Kayla Mahoney

*Illinois Wesleyan University*

Leah Nillas, Faculty Advisor

*Illinois Wesleyan University*

Follow this and additional works at: <http://digitalcommons.iwu.edu/jwprc>

---

Mahoney, Kayla and Nillas, Faculty Advisor, Leah, "How Chemistry Students Learn in an Inquiry-Based Classroom" (2012). *John Wesley Powell Student Research Conference*. 26.  
<http://digitalcommons.iwu.edu/jwprc/2012/ESposters/26>

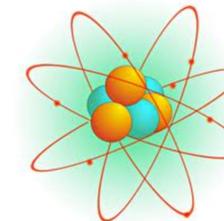
This Event is brought to you for free and open access by The Ames Library, the Andrew W. Mellon Center for Curricular and Faculty Development, the Office of the Provost and the Office of the President. It has been accepted for inclusion in Digital Commons @ IWU by the faculty at Illinois Wesleyan University. For more information, please contact [digitalcommons@iwu.edu](mailto:digitalcommons@iwu.edu).

©Copyright is owned by the author of this document.

# Inquiry-Based Learning in the Chemistry Classroom

Kayla Mahoney and Leah A. Nillas\*

*Educational Studies, Illinois Wesleyan University*



## Research Question

How do chemistry students learn in an inquiry-based classroom?

## Literature Review

- Research studies and literature reviews focused on the definition of inquiry-based learning, inquiry-based learning in action, and how to implement an inquiry-based classroom.
- Inquiry-based classrooms featured in the studies allowed students to confront problems, generate and test ideas for themselves, and apply them to new problem situations.
- Students make better connections and become more engaged in the material in that it becomes more meaningful when they are able to pose the questions. More time can be spent in the classroom exploring concepts and developing skills.

## Methodology

- The study took place at an urban high school in Central Illinois. Participants were sophomores and juniors in three general-level chemistry classes.
- Six inquiry-based lessons were implemented over the course of 4 weeks
- Teacher reflection journals, lesson plans, and student work were collected.
- Data was analyzed using Marchewicz and Wink's (2011) Active Model of Inquiry Framework.

## Elements of the Active Model of Inquiry

<u>Framework Elements</u>	<u>Code</u>
Observing	E1: Make observations when designing investigations
Defining the problem	E2: Define the context of what you will be investigating
Forming the question	E3: What specifically are you investigating?
Investigating the known	E4: What prior knowledge can be used?
Articulating Expectation	E5: What do you expect to happen?
Carrying out the study	E6: Follow your procedure that you came up with
Examining the results	E7: What did you find?
Reflecting on the findings	E8: What is significant in your findings?
Communicating with others	E9: Collaborate with the class on your findings

**Table 1.** The elements of the active model of inquiry were used to analyze data

## Inquiry-Based Lessons

<u>Lesson Plan</u>	<u>Framework Elements</u>
LP1: Name That Atom	E1, E3, E4, E6, E9
LP2: Isotopes Simulation	E1, E2, E4, E6
LP3: Tape Inquiry	E1, E2, E3, E4, E6, E7, E8, E9
LP4: Matter Inquiry	E1, E2, E3, E4, E5, E6, E7, E8, E9
LP5: Ions Simulation	E1, E2, E3, E4, E6, E7, E8, E9
LP6: Separating Mixture	E1, E2, E3, E4, E5, E6, E7, E8, E9

**Table 2.** The elements of the active model of inquiry were incorporated into all six inquiry-based lessons

## Results and Data Analysis

- Inquiry-based learning renders students thinking towards higher-order and critical thinking skills.
- Questions asked by students were directed towards higher-order thinking skills.
- Students were more engaged in inquiry-based activities and remained on task.
- Inquiry-based activities involved students to verbally communicate their findings and investigations as part of the learning process.
- Students designed and implemented inquiry-based investigations to arrive to their own conclusions.

## Conclusion

- Chemistry students learn in an inquiry-based classroom by formulating questions, developing investigations, and analyzing results.
- Findings supported Marshall and Horton's (2011) research outcomes which stated that students were more frequently involved in a higher cognitive thinking level when participating in inquiry-based activities.
- For future research, it is important to implement more inquiry-based lessons over a longer period of time.