Spaced Retrieval Practice in Introductory Chemistry Courses

Queen's Chemistry Education Research (QCER) Team

Welcome!

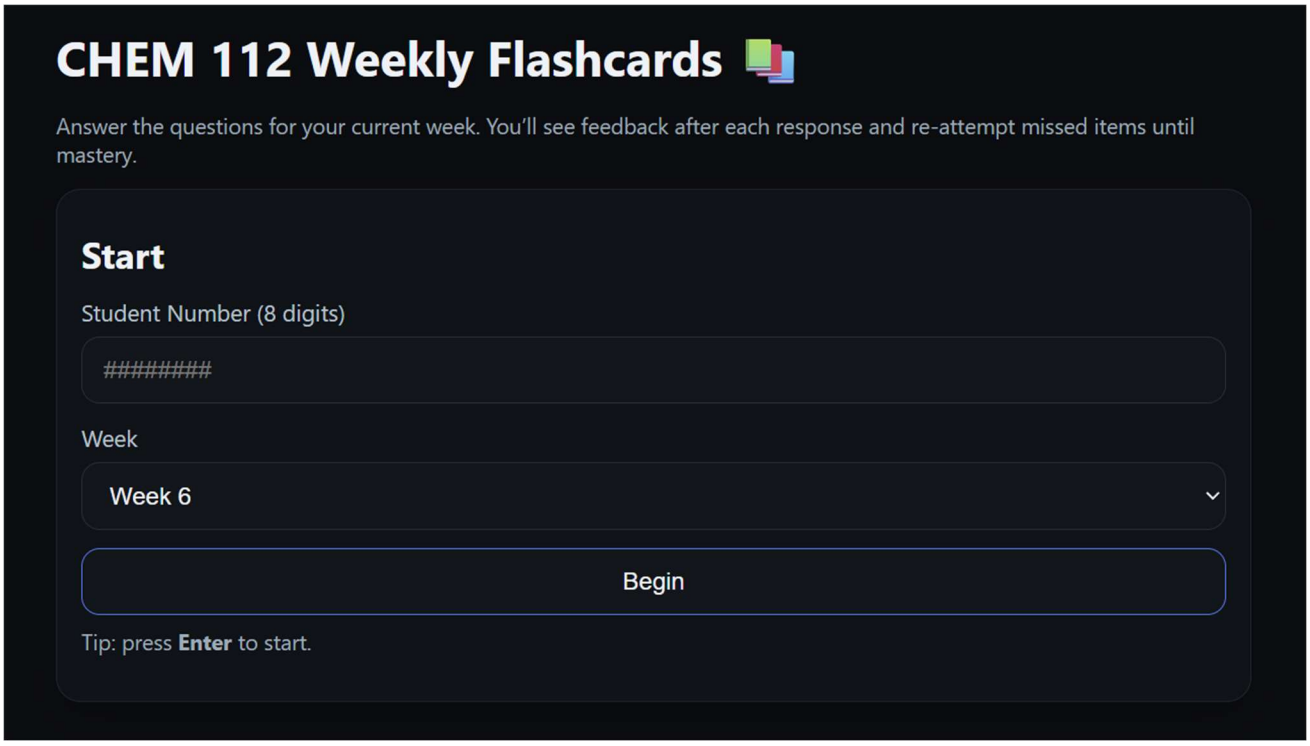
This short activity is designed to help you strengthen your understanding of foundational chemistry concepts through quick, focused practice sessions.

Your participation not only supports your own learning but also contributes to ongoing research by the Queen's Chemistry Education Research (QCER) Team, who are exploring better ways to help students succeed in chemistry.

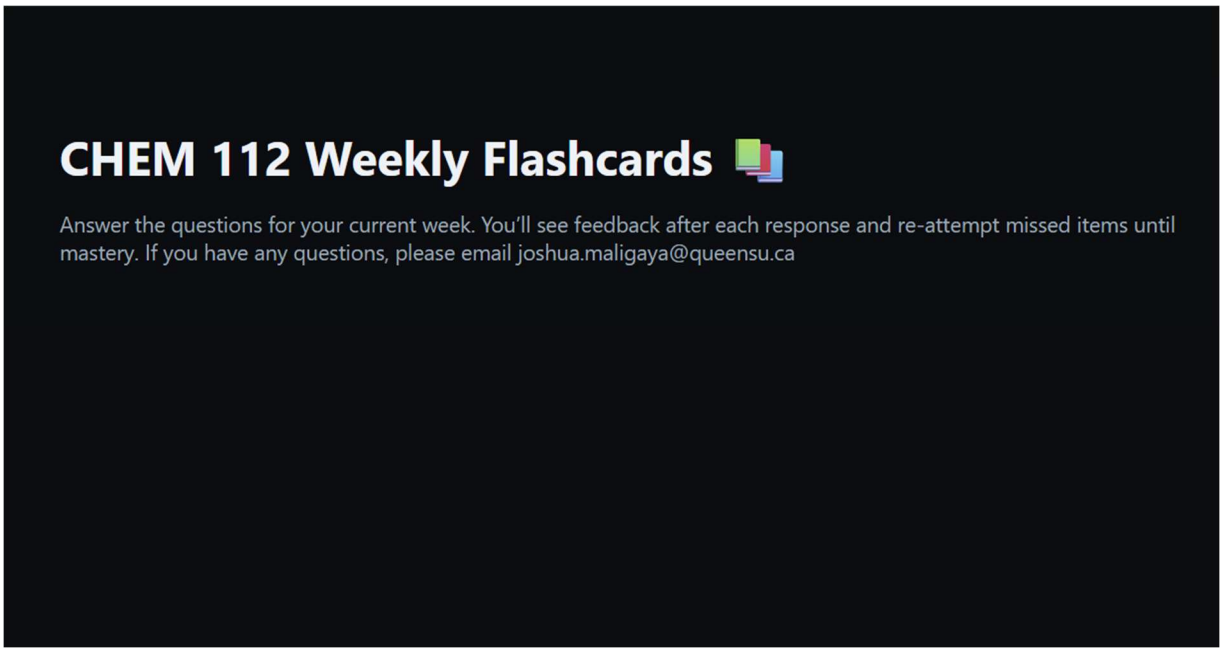
How Your Flashcard Session Will Work

- **Step 1: Start the session**

You'll begin by entering your student number and selecting the current week of study. Once you have done that, you can click "Begin" to start.

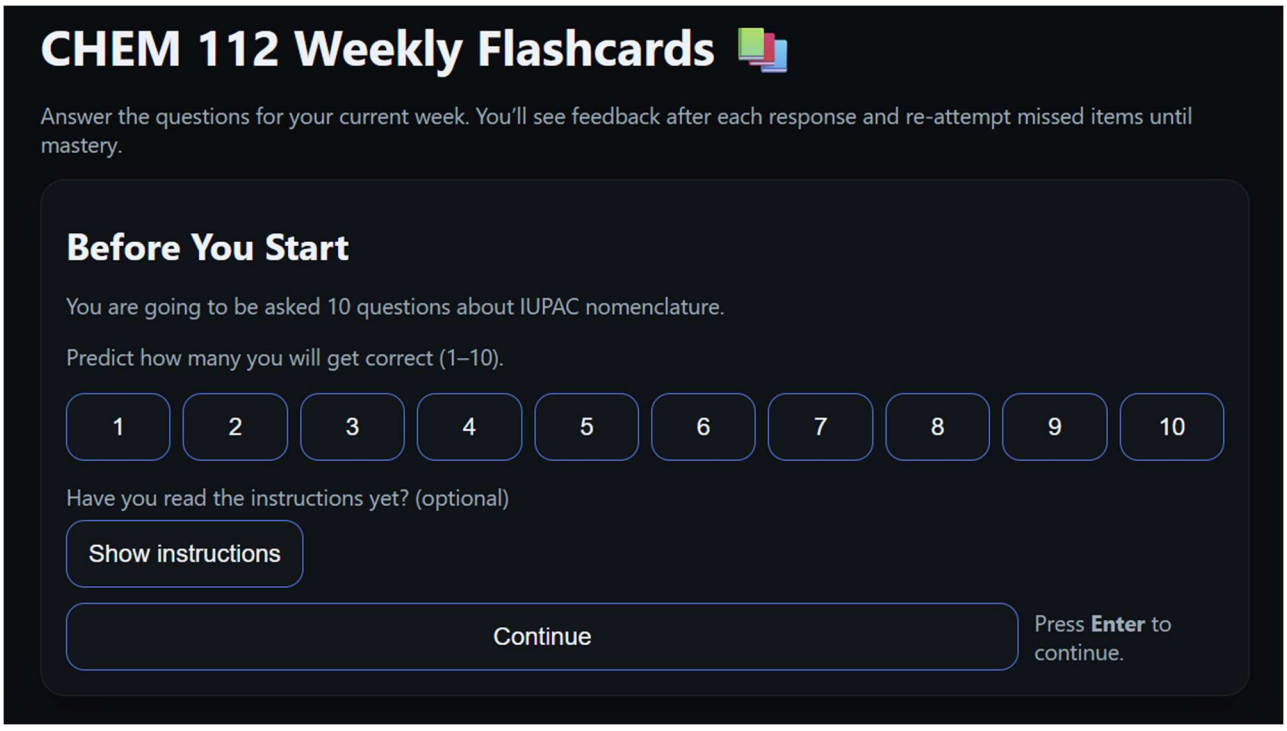


You might see a blank page. This is due to slow internet connection, please wait for the Start Dialogue to show.



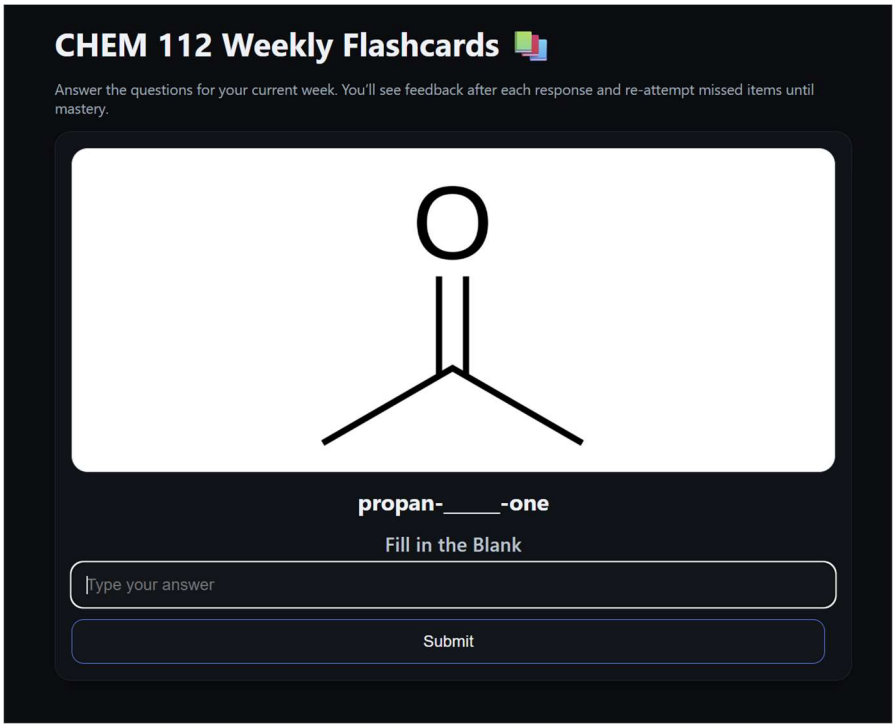
- **Step 2: Prediction question**

You'll be asked to predict how many questions you think you'll get correct. This helps you reflect on your confidence and awareness of your own learning.



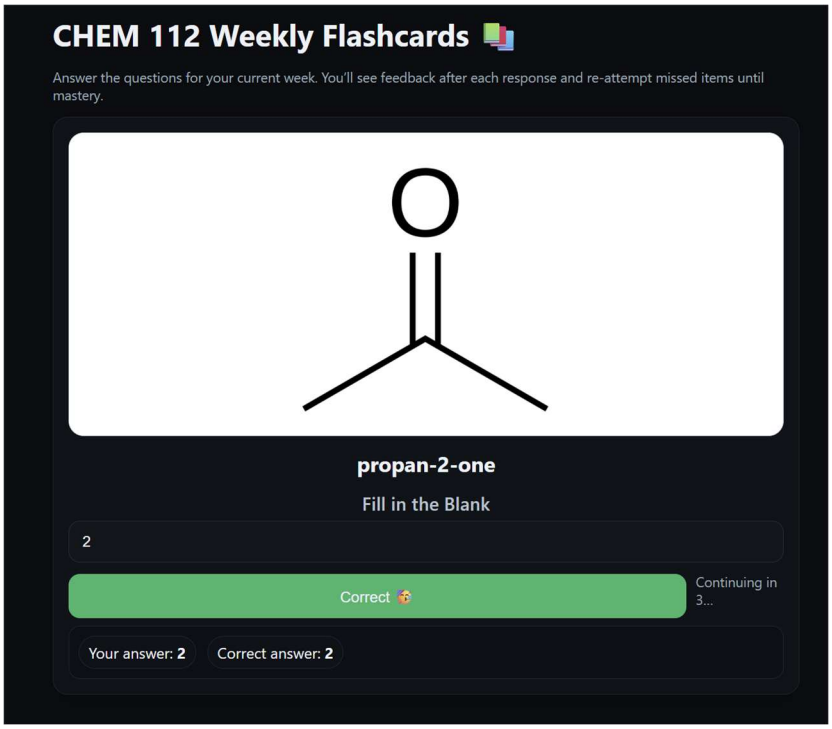
- **Step 3: Answer the questions**

You'll see a variety of IUPAC naming questions where you can type in your answer. Press Enter or click Submit when you feel confident!



- **Step 4: Feedback**

After submitting, you'll see right away whether your answer was correct. Try to recall why it's right (or where you went wrong). After 5 seconds, the next question will pop up.

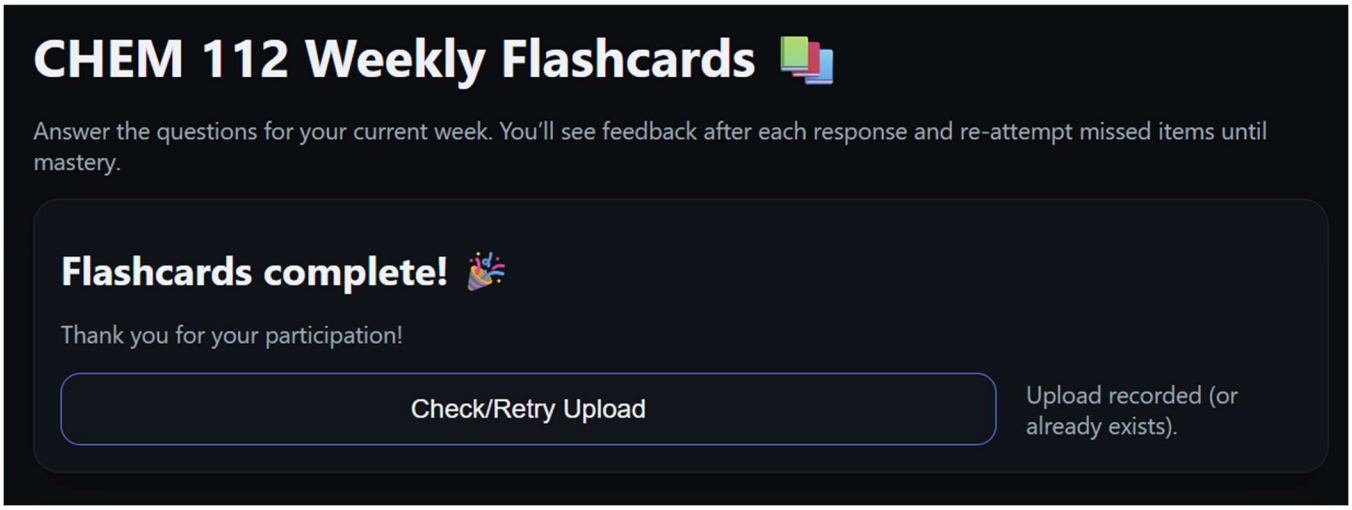


- **Step 5: Reattempts (if any)**

The questions that were answered incorrectly on your first attempt will reappear later. It is in your best interest to try and give the correct answer, as it will loop until you have “mastered” that question.

- **Step 6: Completion screen**

When you’ve completed all your flashcards, you’ll see a final message that says “Flashcards Complete!”



After completing your flashcards session, your responses are automatically uploaded to a secure server. If the message says that an upload error occurred, it is most likely due to a poor internet connection. You can click the Check/Retry upload button to verify that the upload has worked and will be brought to a final thank you screen.

No personal data will be collected, as the research team is focused on your response time and accuracy of your responses. Don’t worry, these practice sessions are not for marks, they are meant purely for your benefit!

If you encounter any issues, please contact Josh Maligaya (joshua.maligaya@queensu.ca) for assistance.

Thank You for Participating!

Your participation helps us better understand how students learn chemistry, and how we can make that learning more engaging and effective for everyone.

Even a few short review sessions like this can make a big difference in long-term learning. We encourage you to continue using spaced retrieval throughout the term; it’s one of the most powerful (and research-backed) ways to retain what you’ve learned.

For the Curious: What Is Spaced Retrieval Practice?

Spaced Retrieval Practice combines two key learning strategies:

- Retrieval practice: Actively recalling information from memory strengthens it and helps you spot what you truly understand.
- Spacing effect: Reviewing information after short breaks (instead of cramming) helps your brain build durable, long-term memories.

When used together, they create *effortful retrieval*, which is a challenge that leads to real, lasting learning. Research shows that students who use spaced retrieval practice remember more, feel more confident, and perform better on later assessments.

🧠 TL;DR: The more often you recall information (not just reread it), and the more you space out that practice, the stronger and longer lasting your learning becomes.