

TRAILBLAZER ADVENTURER
INNOVATOR DEFENDER CHALLENGER
ADVENTURER TRAILBLAZER DEFENDER VISIONARY
VISIONARY ADVENTURER TRAILBLAZER CHALLENGER DEFENDER VISIONARY

Studying for Problem Solving Courses

Academic Learning Centre

201 Tier

204-480-1481

umanitoba.ca/student/academiclearning



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How to Study for Problem Solving Courses?

Exercise: Think of one skill or talent that you have developed in the course of your life.

(ex: piano, dance, sports, juggling, or playing chess).

Exercise: How did you develop that talent?



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How to Get Started?

Common mistakes include:

1. Spending too much time reviewing the textbook, notes, or previously solved problems.
2. Trying to solve problems without understanding concepts.



Preparation for Problem Solving

Review course outlines, textbooks, and notes in order to:

1. Develop a basic understanding of concepts
 - ex: What are the features of a five number summary?
 - ex: What are some fundamental principals of Chemical bonding?
2. Learn the required procedural knowledge
 - ex: What steps are required to calculate a 5 number summary?
 - ex: What steps are required to build a Lewis Structure?
3. Make decisions and choose practice problems for review
 - review the methods of previously solved sample problems
 - choose a variety of similar problems for further practice



Five Number Summaries:

1. What are the features of a five number summary?

(minimum, first quartile, median, third quartile, and maximum)

2. What are the steps required?

(110, 135, 133, 145, 120, 150, 166, 289, 100)

$$\frac{N + 1}{2}$$

1. Put you data in order
2. Identify the minimum and maximum
3. Identify the median
4. Find the quartiles

3. Look for some data sets so that you can practice creating a five number summary



Building Lewis Structures:

1. What are the conventions for building Lewis Structures?

(atoms, valence electrons, single bonds, double bonds, triple bonds)

2. What are the steps for drawing a Lewis Structure?

1. Count the valence electrons
2. Assemble the bonding framework
3. Place three non-bonding pairs of electrons on each outer atom (except H)
4. Assign remaining electrons to inner atoms
5. Optimize electron configurations
6. Identify equivalent or near-equivalent Lewis Structures

3. Can you draw the Lewis Structure for *diethylamine*?

acrylonitrile?



Finding Practice Problems

- Syllabus
- Textbook
- Bookstore
- Archived Exams
- Notes



How to Solve Problems

1. Do problems regularly and keep up with the course
2. Solve problems without looking at the answer key and attempt to simulate the exam environment
3. Do a variety of problems in order to learn how to apply methods to new situations
4. Identify knowledge gaps



Interleaving

Alternating between different types of problems

- improves test scores
- discriminate between ideas
- simulates testing environment



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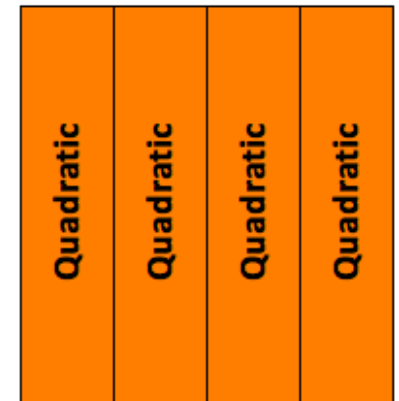
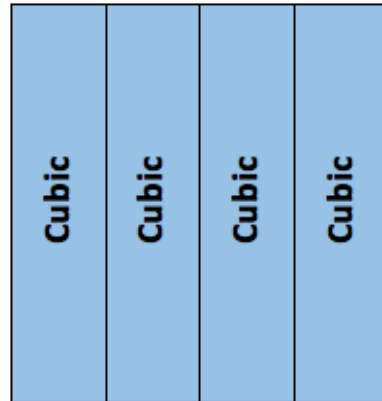
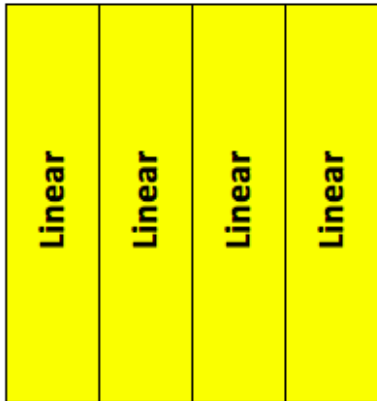
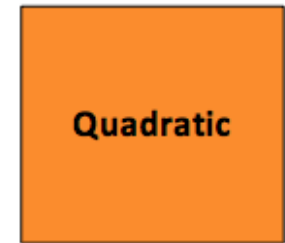
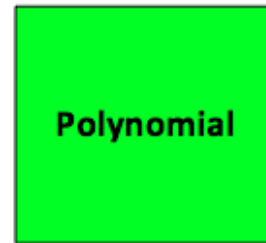
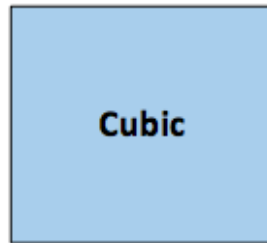
Rohrer, D. (2012). Interleaving helps students distinguish among similar concepts.

Educational Psychology Review, 24(3), 355-367. doi:10.1007/s10648-012-9201-3



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Blocked Practice



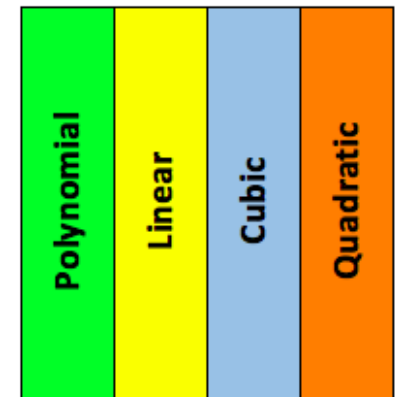
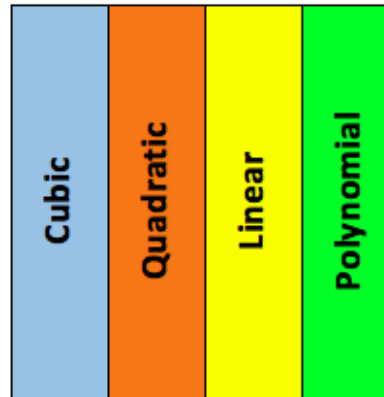
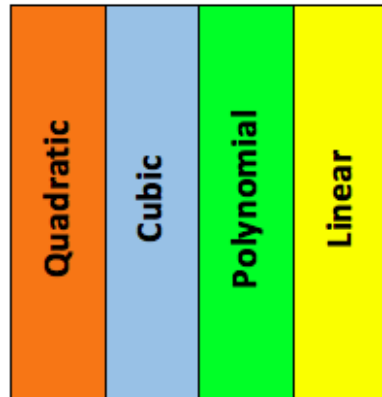
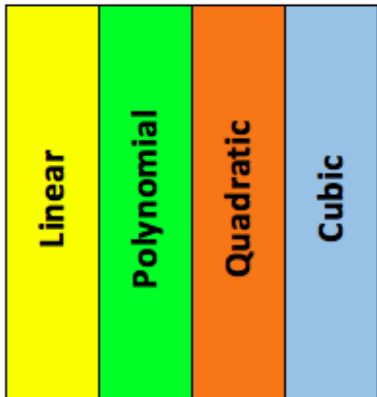
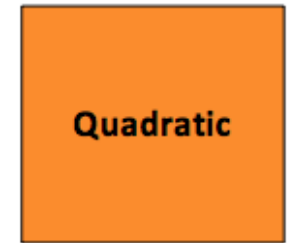
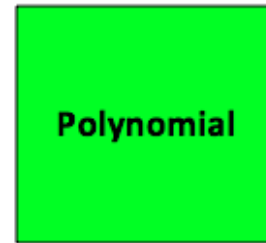
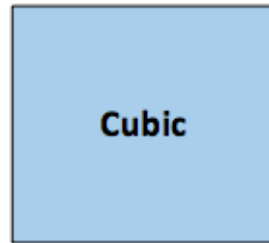
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Interleaved Practice



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Anticipate Difficult Problems

- Hidden information
 - Conversion of units
 - Reverse order of steps
 - Unnecessary information
 - Preliminary calculations required
-



Focused and Diffuse Thinking

Focused Thinking

- attentive and engaged
- analytical and detail oriented



Diffuse Thinking

- at rest and relaxed
- big picture solutions



Campus Resources

- Professors and Teaching Assistants
- Academic Learning Centre Tutors
- Help Centres

[Math \(412 Machray Hall\)](#)

[Computer Science \(E2-422A Engineering\)](#)

[Statistics \(311 Machray Hall\)](#)

[Physics \(114 Allen\)](#)

Chemistry (128 Parker)

-
- [Tutors on campus](#)



Formulate Specific Questions

Ex: I don't understand how to use the VSEPR model?

Ex: Can you explain Molecular Orbitals?

Ex: What am I doing wrong when it comes to problem 15.1.4?



Campus Resources

[Supplemental Instruction](#)

- interact on an informal basis
- ask questions about the course
- compare notes
- discuss course content
- solve practice problems
- develop new study strategies



Academic Learning Centre

We offer:

One to One tutoring

Workshops

Supplemental Instruction

[Website](#)



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Academic Learning Centre

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Fort Garry Reception Desk: 205 Tier (U1 First Year Centre)

Bannatyne Phone: 204-272-3190

Bannatyne Reception Desk: S211 Medical Services Building



References

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