

**AMS 105  
APPLIED CHEMISTRY  
PRÉCIS  
SELF-STUDY LEARNING INSTRUCTION  
Part A**



**DEPARTMENT OF APPLIED MILITARY SCIENCE  
ROYAL MILITARY COLLEGE OF CANADA**

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# INTRODUCTION

This chemistry self-study package contains 6 chapters and follows the AMS 105 Applied Chemistry précis. This package should be completed in 3-4 days.

At the beginning of each chapter a list of learning objectives can be found which will help guide you in your studies. For each chapter you will be required to read the appropriate section in the AMS 105 précis. There are also online video links to help further explain the material. At the end of certain sections there are self quizzes that you should complete. These self quizzes are found in the AMS 105 précis. You should also verify your answers in the AMS 105 précis after completing the self-quiz to ensure that you understand the material.

As an additional resource you can refer to the following textbook:

OpenStax, Chemistry. OpenStax CNX. Jun 20, 2016 <http://cnx.org/contents/85abf193-2bd2-4908-8563-90b8a7ac8df6@9.311>

This textbook can be found at openBC campus at the following link <https://opentextbc.ca/chemistry/>. Specific sections of this textbook are referred to when applicable. This provides you additional explanations and practice questions. Answers to the additional practice problems are provided at the end of the given textbook section. The use of this online textbook is optional but provides additional resources if you need more help with a specific topic.

At the end of the self-study package you will be required to write a threshold knowledge test (TKT) and successfully pass this test to ensure that you have the necessary background knowledge before starting the in-class portion of the course.

## CHAPTER 0 – NUMBERS IN SCIENCE

### 0.0 Learning Objectives

- Understand accuracy and precision. (§ 0.1)
- Understand how experimental data is corrected. Understand and explain systematic errors and random errors. Understand uncertainty and be able to express a measurement with its uncertainty. (§ 0.2)
- Define significant figures and be able to identify the number of significant figures in a given number. Understand how to round numbers. Be able to apply the rules of significant figures to mathematical operations (i.e. addition, subtraction, multiplication and division). Understand natural numbers and defined ratios. (§ 0.3)
- Be able to express a number in scientific notation. Perform operations using scientific notation. (§ 0.4)
- Understand the International System of Units and know what SI units are used. Know the prefixes used to express different magnitudes. (§ 0.5)
- Know how to apply conversion factors to convert units. Be able to convert between degrees Celsius and Kelvin for temperature measurements. (§ 0.6)
- Know how to rearrange equations to solve for a given variable. (§ 0.7)
- Understand problem solving strategies. (§ 0.8)

## 0.1 Types of Numbers

<b>Required Reading</b>	Chapter 0.1 in AMS 105 Précis
<b>Videos</b>	Accuracy and precision <a href="https://www.youtube.com/watch?v=5APhVxCEPFs">https://www.youtube.com/watch?v=5APhVxCEPFs</a> (Video Length 9:28)
<b>Exercises</b>	N/A

## 0.2 Errors in Measurement

<b>Required Reading</b>	Chapter 0.2 in AMS 105 Précis
<b>Videos</b>	Random errors, systematic errors and uncertainty <a href="https://www.youtube.com/watch?v=2zCU6X2DEmI">https://www.youtube.com/watch?v=2zCU6X2DEmI</a> (Video Length 5:05)
<b>Exercises</b>	Self Quiz 0.2.3

### 0.3 Significant Figures

<b>Required Reading</b>	Chapter 0.3 in AMS 105 Précis
<b>Videos</b>	<ol style="list-style-type: none"><li>1. Significant figures <a href="https://www.youtube.com/watch?v=VAuslY-Uuf4">https://www.youtube.com/watch?v=VAuslY-Uuf4</a> (Video Length 7:44)</li><li>2. Zeros in significant figures <a href="https://www.youtube.com/watch?v=7b60RZqut0U">https://www.youtube.com/watch?v=7b60RZqut0U</a> (Video Length 7:36)</li><li>3. More examples of zeros in significant figures <a href="https://www.youtube.com/watch?v=ExETL3liRSw">https://www.youtube.com/watch?v=ExETL3liRSw</a> (Video Length 8:09)</li><li>4. Significant figures in addition and subtraction <a href="https://www.youtube.com/watch?v=2eXC6s9X6Wc">https://www.youtube.com/watch?v=2eXC6s9X6Wc</a> (Video Length 4:42)</li><li>5. Significant figures in multiplication and division <a href="https://www.youtube.com/watch?v=o5BmoMDJLRY">https://www.youtube.com/watch?v=o5BmoMDJLRY</a> (Video Length 4:30)</li></ol>
<b>Exercises</b>	N/A

### 0.4 Scientific Notation

<b>Required Reading</b>	Chapter 0.4 in AMS 105 Précis
<b>Videos</b>	<ol style="list-style-type: none"><li>1. Scientific notation <a href="https://www.youtube.com/watch?v=Dme-G4rc6NI">https://www.youtube.com/watch?v=Dme-G4rc6NI</a> (Video Length 13:55)</li><li>2. Addition and subtraction with scientific notation <a href="https://www.youtube.com/watch?v=PYTp75sryWA">https://www.youtube.com/watch?v=PYTp75sryWA</a> (Video Length 7:11)</li></ol>

	3. Multiplication and division with scientific notation <a href="https://www.youtube.com/watch?v=ciFOlirz4Js">https://www.youtube.com/watch?v=ciFOlirz4Js</a> (Video Length 5:29)
<b>Exercises</b>	N/A

## 0.5 International System of Units

<b>Required Reading</b>	Chapter 0.5 in AMS 105 Précis
<b>Videos</b>	International System of Units <a href="https://www.youtube.com/watch?v=oAtDAoqdExw">https://www.youtube.com/watch?v=oAtDAoqdExw</a> (Video Length 4:16)
<b>Exercises</b>	N/A

## 0.6 Units

<b>Required Reading</b>	Chapter 0.6 in AMS 105 Précis
<b>Videos</b>	1. How to use conversion factors <a href="https://www.youtube.com/watch?v=7N0IRJLwpPI">https://www.youtube.com/watch?v=7N0IRJLwpPI</a> (Video Length 12:45)  2. Converting temperature units <a href="https://www.youtube.com/watch?v=FjdscyVksBA">https://www.youtube.com/watch?v=FjdscyVksBA</a> (Video Length 5:10)
<b>Exercises</b>	Self Quiz 0.6.1

## 0.7 Manipulating Equations

<b>Required Reading</b>	Chapter 0.7 in AMS 105 Précis
<b>Videos</b>	Rearranging equations <a href="https://www.youtube.com/watch?v= WWgc3ABSj4">https://www.youtube.com/watch?v= WWgc3ABSj4</a> (Video Length 6:46)
<b>Exercises</b>	N/A

## 0.8 Problem Solving Strategies

<b>Required Reading</b>	Chapter 0.8 in AMS 105 Précis
<b>Videos</b>	N/A
<b>Exercises</b>	N/A

## 0.9 Additional Resources and Practice Questions

Read *Chemistry* Sections 1.4, 1.5 and 1.6 and complete exercises 4 and 6 (from section 1.4), exercises 2, 4, 6, 8, 10 and 12 (from section 1.5) and exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 37, 39, 41 and 43 (from section 1.6).

## **CHAPTER 1 – MATTER AND TRANSFORMATIONS**

### **1.0 Learning Objectives**

- Define basic chemistry terms. (§ 1.1)
- Understand elements and how to represent them, as well as chemical reactions and states of matter. (§ 1.2 and § 1.3)
- Explain matter and both its physical and chemical transformations. (§ 1.4)
- Understand the scientific method and bias. (§ 1.5)



## 1.1 Definitions

<b>Required Reading</b>	Chapter 1.1 in AMS 105 Précis
<b>Videos</b>	1. Classification of matter <a href="https://www.youtube.com/watch?v=pWZlICXw3Ng">https://www.youtube.com/watch?v=pWZlICXw3Ng</a> (Video Length 9:46)  2. Homogenous versus heterogenous mixtures <a href="https://www.youtube.com/watch?v=el-tmv4DLEk">https://www.youtube.com/watch?v=el-tmv4DLEk</a> (Video Length 5:49)
<b>Exercises</b>	Self Quiz 1.1

## 1.2 Elements

<b>Required Reading</b>	Chapter 1.2 in AMS 105 Précis
<b>Videos</b>	Explaining elements <a href="https://www.youtube.com/watch?v=L1lBnH4y6-M">https://www.youtube.com/watch?v=L1lBnH4y6-M</a> (Video Length 6:42)
<b>Exercises</b>	N/A

### 1.3 Representing Elements

<b>Required Reading</b>	Chapter 1.3 in AMS 105 Précis
<b>Videos</b>	<p>1. Explaining chemical formulae and practice problems <a href="https://www.youtube.com/watch?v=fVnVXlgAyKs">https://www.youtube.com/watch?v=fVnVXlgAyKs</a> (Video Length 7:26)</p> <p>2. Explaining chemical reactions <a href="https://www.youtube.com/watch?v=HXAoUFjIX5s">https://www.youtube.com/watch?v=HXAoUFjIX5s</a> (Video Length 2:47)</p> <p>3. Explaining states of matter <a href="https://www.youtube.com/watch?v=rb4cs9Xlso0">https://www.youtube.com/watch?v=rb4cs9Xlso0</a> (Video Length 3:36)</p>
<b>Exercises</b>	Self Quiz 1.3.1

### 1.4 Transformations of Matter

<b>Required Reading</b>	Chapter 1.4 in AMS 105 Précis
<b>Videos</b>	<p>Explaining physical and chemical changes <a href="https://www.youtube.com/watch?v=yIJ2qnUOowQ">https://www.youtube.com/watch?v=yIJ2qnUOowQ</a> (Video length 2:35)</p>
<b>Exercises</b>	Self Quiz 1.4.2

## 1.5 The Scientific Method

<b>Required Reading</b>	Chapter 1.5 in AMS 105 Précis
<b>Videos</b>	1. Explaining the scientific method <a href="https://www.khanacademy.org/science/high-school-biology/hs-biology-foundations/hs-biology-and-the-scientific-method/v/the-scientific-method">https://www.khanacademy.org/science/high-school-biology/hs-biology-foundations/hs-biology-and-the-scientific-method/v/the-scientific-method</a> (Video length 11:48)  2. Understanding bias <a href="https://www.youtube.com/watch?v=F382yooccA8">https://www.youtube.com/watch?v=F382yooccA8</a> (Video length 4:14)
<b>Exercises</b>	N/A

## 1.6 Additional Resources and Practice Questions

Read *Chemistry* Sections 1.1, 1.2 and 1.3 and complete exercises 4, 6, 8 and 10 (from section 1.2) and exercise 2 (from section 1.3).

## CHAPTER 2 – ATOMIC THEORY

### 2.0 Learning Objectives

- Describe Dalton's atomic theory. (§ 2.1)
- Describe the structure of an atom and nucleus, as well as its subatomic particles. (§ 2.2)
- Describe Bohr's atomic theory and electron orbits. Understand energy level diagrams and quantized energy. (§ 2.3)
- Understand and be able to describe orbitals, including their electron capacity and filling order. (§ 2.4)
- Understand and be able to write the electronic configuration of an atom. (§ 2.5)
- Recognize Schrödinger's atomic model. Describe the quantum model of the atom and how it describes orbitals. (§ 2.6)
- Describe the movement of electrons in an atom (excited versus ground state) and understand quantized energy. (§ 2.7)
- Recognize the electromagnetic spectrum. Explain the characteristics of light, including speed, wavelength, particle characteristics, light absorption and emission. Given the formula, convert between energy and wavelength. (§ 2.8)

## 2.1 Dalton's Atomic Theory

<b>Required Reading</b>	Chapter 2.1 in AMS 105 Précis
<b>Videos</b>	Dalton's Atomic Theory <a href="https://www.youtube.com/watch?v=nRcJ8ZI76kY">https://www.youtube.com/watch?v=nRcJ8ZI76kY</a> (Video Length 4:41)
<b>Exercises</b>	N/A

## 2.2 Discovery of Subatomic Particles and the Nucleus

<b>Required Reading</b>	Chapter 2.2 in AMS 105 Précis
<b>Videos</b>	Subatomic particles <a href="https://www.youtube.com/watch?v=P-wDdFyeLpM">https://www.youtube.com/watch?v=P-wDdFyeLpM</a> (Video Length 4:13)
<b>Exercises</b>	N/A

## 2.3 Bohr's Atomic Theory

<b>Required Reading</b>	Chapter 2.3 in AMS 105 Précis
<b>Videos</b>	Bohr's Atomic Model <a href="https://www.youtube.com/watch?v=T22Wnecx5F0">https://www.youtube.com/watch?v=T22Wnecx5F0</a> (Video Length 6:04)
<b>Exercises</b>	N/A

## 2.4 Orbitals

<b>Required Reading</b>	Chapter 2.4 in AMS 105 Précis
<b>Videos</b>	1. Orbitals <a href="https://www.youtube.com/watch?v=kXfaQEkWTFM">https://www.youtube.com/watch?v=kXfaQEkWTFM</a> (Video Length 9:35)  2. How to fill orbitals <a href="https://www.youtube.com/watch?v=NIwcDnFjj98">https://www.youtube.com/watch?v=NIwcDnFjj98</a> (Video Length 10:18)
<b>Exercises</b>	N/A

## 2.5 Electronic Configuration

<b>Required Reading</b>	Chapter 2.5 in AMS 105 Précis
<b>Videos</b>	Electronic Configuration <a href="https://www.youtube.com/watch?v=NIwcDnFjj98">https://www.youtube.com/watch?v=NIwcDnFjj98</a> (Video Length 10:18)
<b>Exercises</b>	N/A

## 2.6 Schrödinger Atomic Model

<b>Required Reading</b>	Chapter 2.6 in AMS 105 Précis
<b>Videos</b>	Schrödinger's Atomic Model <a href="https://www.youtube.com/watch?v=BMlvWz-7GmU">https://www.youtube.com/watch?v=BMlvWz-7GmU</a> (Video Length 7:17)
<b>Exercises</b>	N/A

## 2.7 Ground and Excited State Atoms

<b>Required Reading</b>	Chapter 2.7 in AMS 105 Précis
<b>Videos</b>	Ground versus excited state <a href="https://www.youtube.com/watch?v=SZ4IDPDzqJ8">https://www.youtube.com/watch?v=SZ4IDPDzqJ8</a> (Video Length 5:36)
<b>Exercises</b>	Self Quiz 2.7

## 2.8 Electromagnetic Spectrum

<b>Required Reading</b>	Chapter 2.8 in AMS 105 Précis
<b>Videos</b>	1. Electromagnetic spectrum <a href="https://www.youtube.com/watch?v=m4t7gTmBK3g">https://www.youtube.com/watch?v=m4t7gTmBK3g</a> (Video Length 2:12)  2. How to calculate energy from wavelength <a href="https://www.youtube.com/watch?v=01dtCMBcPd8">https://www.youtube.com/watch?v=01dtCMBcPd8</a> (Video Length 4:42)  3. How to calculate wavelength from energy <a href="https://www.youtube.com/watch?v=MsQ2GlefY58">https://www.youtube.com/watch?v=MsQ2GlefY58</a> (Video Length 2:32)  4. Absorption and emission spectra <a href="https://www.youtube.com/watch?v=1uPyq63aRvg&amp;t=202s">https://www.youtube.com/watch?v=1uPyq63aRvg&amp;t=202s</a> (Video Length 5:17)
<b>Exercises</b>	N/A

## 2.9 Additional Resources

Read *Chemistry* Sections, 2.1, 6.1, and 6.2.

## **CHAPTER 3 – PROPERTIES OF AN ATOM**

### **3.0 Learning Objectives**

- Explain atomic number, mass number and amu. (§ 3.1)
- Explain the A, Z, X notation for describing an element. Describe the subatomic particles: protons, electrons and neutrons. (§ 3.2)
- Explain and understand valence electrons. (§ 3.3)
- Explain isotopes. (§ 3.4)
- Understand natural abundance and how atomic mass is calculated based on isotopes and/or subatomic particles. Be able to calculate atomic mass. (§ 3.5)
- Explain why ion forms and be able to calculate the charge of an ion. (§ 3.6)
- Understand oxidation states. (§ 3.7)
- Explain radioactivity and half-life. (§ 3.8)

### 3.1 Properties of an Atom

<b>Required Reading</b>	Chapter 3.1 in AMS 105 Précis
<b>Videos</b>	Atomic number and mass number <a href="https://www.youtube.com/watch?v=dRfrvpVdKGM">https://www.youtube.com/watch?v=dRfrvpVdKGM</a> (Video Length 6:26)
<b>Exercises</b>	Self Quiz 3.1

### 3.2 Representing Elements

<b>Required Reading</b>	Chapter 3.2 in AMS 105 Précis
<b>Videos</b>	A, Z, X notation <a href="https://www.youtube.com/watch?v=BYiu0klWd30">https://www.youtube.com/watch?v=BYiu0klWd30</a> (Video Length 7:31)
<b>Exercises</b>	Self Quiz 3.2

### 3.3 Valence Shell

<b>Required Reading</b>	Chapter 3.3 in AMS 105 Précis
<b>Videos</b>	Valence Electrons <a href="https://www.youtube.com/watch?v=FPk2ziB9iX0">https://www.youtube.com/watch?v=FPk2ziB9iX0</a> (Video Length 11:32)
<b>Exercises</b>	Self Quiz 3.2

### 3.4 Isotopes

<b>Required Reading</b>	Chapter 3.4 in AMS 105 Précis
<b>Videos</b>	Isotopes <a href="https://www.youtube.com/watch?v=EboWeWmh5Pg&amp;t=29s">https://www.youtube.com/watch?v=EboWeWmh5Pg&amp;t=29s</a> (Video Length 7:55)
<b>Exercises</b>	N/A

### 3.5 Average Mass

<b>Required Reading</b>	Chapter 3.5 in AMS 105 Précis
<b>Videos</b>	Average mass calculation <a href="https://www.youtube.com/watch?v=7fYpEnxhKQk">https://www.youtube.com/watch?v=7fYpEnxhKQk</a> (Video Length 13:18)
<b>Exercises</b>	Self Quiz 3.4-3.5

### 3.6 Ions

<b>Required Reading</b>	Chapter 3.6 in AMS 105 Précis
<b>Videos</b>	Explaining ions <a href="https://www.youtube.com/watch?v=WWc3k2723IM">https://www.youtube.com/watch?v=WWc3k2723IM</a> (Video Length 6:51)
<b>Exercises</b>	Self Quiz 3.6

### 3.7 Oxidation State

<b>Required Reading</b>	Chapter 3.7 in AMS 105 Précis
<b>Videos</b>	Oxidation numbers <a href="https://www.youtube.com/watch?v=xtosS-CC43c">https://www.youtube.com/watch?v=xtosS-CC43c</a> (Video Length 4:58)
<b>Exercises</b>	N/A

### 3.8 Radioactivity

<b>Required Reading</b>	Chapter 3.8 in AMS 105 Précis
<b>Videos</b>	1. Radioactivity <a href="https://www.youtube.com/watch?v=dY10s71rv80">https://www.youtube.com/watch?v=dY10s71rv80</a> (Video Length 3:31)  2. Half-life <a href="https://www.youtube.com/watch?v=opjJ-3Tkfyg">https://www.youtube.com/watch?v=opjJ-3Tkfyg</a> (Video Length 5:52)
<b>Exercises</b>	N/A

### 3.9 Additional Resources and Practice Questions

Read *Chemistry* Section 2.3 and complete exercises 2, 8, 10 and 14 (from section 2.3).

## **CHAPTER 4 – PERIODIC TABLE OF THE ELEMENTS**

### **4.0 Learning Objectives**

- Describe the development of the periodic table. (§ 4.1)
- Describe the modern periodic table. (§ 4.2)
- Describe periodicity. (§ 4.3)
- Understand the significance of the rows and columns of the periodic table and how to apply this information. (§ 4.4)
- Understand the periodic blocks of the periodic table. (§ 4.5)
- Determine the complete and short form electronic configuration with and without periodic blocks. (§ 4.6)
- Explain and apply the octet rule. (§ 4.7)
- Explain the stability of noble gases. (§ 4.8)
- Describe and utilize the trends in atomic radius and ionization energy. (§ 4.9)

## 4.1 Developing the Periodic Table

<b>Required Reading</b>	Chapter 4.1 in AMS 105 Précis
<b>Videos</b>	Mendeleev and the periodic table <a href="https://www.youtube.com/watch?v=fPnwBITSmgU">https://www.youtube.com/watch?v=fPnwBITSmgU</a> (Video Length 4:24)
<b>Exercises</b>	N/A

## 4.2 The Modern Periodic Table

<b>Required Reading</b>	Chapter 4.2 in AMS 105 Précis
<b>Videos</b>	The periodic table <a href="https://www.youtube.com/watch?v=fLSfgNxoVGk">https://www.youtube.com/watch?v=fLSfgNxoVGk</a> (Video Length 9:28)
<b>Exercises</b>	N/A

## 4.3 Periodicity

<b>Required Reading</b>	Chapter 4.3 in AMS 105 Précis
<b>Videos</b>	Periodicity <a href="https://www.youtube.com/watch?v=w121xB75toc">https://www.youtube.com/watch?v=w121xB75toc</a> (Video Length 3:51)
<b>Exercises</b>	N/A

## 4.4 Rows and Columns

<b>Required Reading</b>	Chapter 4.4 in AMS 105 Précis
<b>Videos</b>	Explanation of rows and columns of the periodic table <a href="https://www.youtube.com/watch?v=7dArEbmbXSo">https://www.youtube.com/watch?v=7dArEbmbXSo</a> (Video Length 2:37)
<b>Exercises</b>	Self Quiz 4.4

## 4.5 Periodic Blocks

<b>Required Reading</b>	Chapter 4.5 in AMS 105 Précis
<b>Videos</b>	1. Using periodic blocks to write electronic configuration <a href="https://www.youtube.com/watch?v=ououF9nHUhk">https://www.youtube.com/watch?v=ououF9nHUhk</a> (Video Length 4:51)  2. More on periodic blocks <a href="https://www.youtube.com/watch?v=hJ0WwAGSjlc">https://www.youtube.com/watch?v=hJ0WwAGSjlc</a> (Video Length 4:27)
<b>Exercises</b>	N/A

## 4.6 Determining the Electronic Configuration

<b>Required Reading</b>	Chapter 4.6 in AMS 105 Précis
<b>Videos</b>	1. Complete and short form electronic configuration <a href="https://www.youtube.com/watch?v=iFN9agJVea4">https://www.youtube.com/watch?v=iFN9agJVea4</a> (Video Length 7:22)  2. Additional examples <a href="https://www.youtube.com/watch?v=qD22IP6CPks">https://www.youtube.com/watch?v=qD22IP6CPks</a> (Video Length 4:29)
<b>Exercises</b>	Self Quiz 4.6

## 4.7 Octet Rule

<b>Required Reading</b>	Chapter 4.7 in AMS 105 Précis
<b>Videos</b>	Octet rule <a href="https://www.youtube.com/watch?v=4OKy782ePKM">https://www.youtube.com/watch?v=4OKy782ePKM</a> (Video Length 3:20)
<b>Exercises</b>	N/A

## 4.8 Noble Gases and Compounds

<b>Required Reading</b>	Chapter 4.8 in AMS 105 Précis
<b>Videos</b>	1. Noble gases <a href="https://www.youtube.com/watch?v=qNaBMvJXdJ4">https://www.youtube.com/watch?v=qNaBMvJXdJ4</a> (Video Length 4:11)  2. Formation of compounds <a href="https://www.youtube.com/watch?v=6Ecr7m-0E0E">https://www.youtube.com/watch?v=6Ecr7m-0E0E</a> (Video Length 4:45)
<b>Exercises</b>	N/A

## 4.9 Trends in the Periodic Table

<b>Required Reading</b>	Chapter 4.9 in AMS 105 Précis
<b>Videos</b>	Atomic radius and ionization energy <a href="https://www.youtube.com/watch?v=Mmti4kKDcqA">https://www.youtube.com/watch?v=Mmti4kKDcqA</a> (Video Length 9:32)
<b>Exercises</b>	N/A

## 4.9 Additional Resources and Practice Questions

Read *Chemistry* Sections 6.4 and 6.5 and complete exercises 4 and 10 (from section 6.4) and exercises 1 and 3 (from section 6.5).

## **CHAPTER 5 – STATES OF MATTER AND GASES**

### **5.0 Learning Objectives**

- Define kinetic energy. (§ 5.1)
- Describe the connection between kinetic energy and states of matter. (§ 5.2)
- Predict the variation of volume, pressure and temperature when changes occur in these variables and the effect on a gas. Define an ideal gas and be able to use the ideal gas law to calculate pressure, volume, temperature or number of moles of a gas. (§ 5.3)

## 5.1 Kinetic Energy

<b>Required Reading</b>	Chapter 5.1 in AMS 105 Précis
<b>Videos</b>	Kinetic energy <a href="https://www.youtube.com/watch?v=BSWI_Zj-CZs">https://www.youtube.com/watch?v=BSWI_Zj-CZs</a> (Video Length 6:06)
<b>Exercises</b>	N/A

## 5.2 States of Matter

<b>Required Reading</b>	Chapter 5.2 in AMS 105 Précis
<b>Videos</b>	Explaining different states of matter in terms of energy <a href="https://www.youtube.com/watch?v=EZHmUTmJtF8">https://www.youtube.com/watch?v=EZHmUTmJtF8</a> (Video Length 9:32)
<b>Exercises</b>	N/A

## 5.3 Gases

<b>Required Reading</b>	Chapter 5.3 in AMS 105 Précis
<b>Videos</b>	<ol style="list-style-type: none"><li>1. Pressure <a href="https://www.youtube.com/watch?v=zvh9uv2Hxx4">https://www.youtube.com/watch?v=zvh9uv2Hxx4</a> (Video Length 12:25)</li><li>2. Principles of ideal gas law <a href="https://www.youtube.com/watch?v=fIMdIMACyN4">https://www.youtube.com/watch?v=fIMdIMACyN4</a> (Video Length 9:58)</li><li>3. Ideal gas law and its variables explained <a href="https://www.youtube.com/watch?v=WhP6zJbSxec">https://www.youtube.com/watch?v=WhP6zJbSxec</a> (Video Length 6:17)</li><li>4. Ideal gas law examples <a href="https://www.youtube.com/watch?v=TqLlfHBFY08">https://www.youtube.com/watch?v=TqLlfHBFY08</a> (Video Length 10:52)</li><li>5. Relationship between pressure and volume <a href="https://www.youtube.com/watch?v=ZoGtVVu3ymQ">https://www.youtube.com/watch?v=ZoGtVVu3ymQ</a> (Video Length 5:41)</li><li>6. Relationship between pressure and temperature <a href="https://www.youtube.com/watch?v=RszgZH_2A9k">https://www.youtube.com/watch?v=RszgZH_2A9k</a> (Video Length 13:26)</li><li>7. Initial and final states <a href="https://www.youtube.com/watch?v=UKUmYU6Q1cA">https://www.youtube.com/watch?v=UKUmYU6Q1cA</a> (Video Length 7:09)</li></ol>
<b>Exercises</b>	Self Quiz 5.4.3A and Self Quiz 5.4.3B

## 5.4 Additional Resources and Practice Questions

Read *Chemistry* Sections 9.1 and 9.2 and complete exercises 10, 12, 14, and 16 (from section 9.2)..