01: Introduction to SAT Chemistry

SAT Chemistry

- Covers first year, college-prep, high school chemistry.

Multiple Choice SAT Exam

- 1 hour; No calculators—only a periodic table; 85 questions.

- Tips:
  - Move on when you get stuck…you're not expected to know everything!
  - Only guess if you can eliminate 2 or more choices. You're deducted ¼ point for every wrong answer.
  - Get used to working without a calculator.
  - Scan all the choices before choosing your answer.
  - Try to rephrase things into terms you're more comfortable with.
  - Beware of absolutes—there are very few things in chemistry that are absolute!

"CE" Questions

The SAT Chemistry exam has a unique type of question that asks if two statements are true or false.

If both statements are true, and the second one is the correct explanation for the first one, then you are also to bubble in the "CE" bubble (for "correct explanation").

General Problem-Solving Strategy

Step 1: Identify what's being given.
Step 2: Clarify what's being asked.
If necessary, rephrase the question.
Step 3: Select a strategy
Trial & error, search, deductive reasoning, knowledge-based, working backwards.
Step 4: Solve using the strategy.
Step 5: Review the answer.

Example:
Name the following organic molecules: $CH_3CH_2CH_3CH_3$ with a CH_3 branch

Step	Description	Information
1	Identify what's given	Drawing of the structure
2	Identify what's asked	Name of the structure
3	Strategy: Knowledge based	To name single-bond organic molecules: Count the longest chain of carbon and use the corresponding prefix with "-ane" Name each side branch and include the name with the carbon number on the main chain (number from the side closest to the side-branch).
4	Apply the strategy	Count the longest carbon chain: 4 Prefix for that number: but- Side-chain name: methyl on carbon # 2 Final name: 2-methyl butane
5	Review the solution	Work backwards. "2-methyl" means a CH_3 group on the second carbon. "butane" means 4 carbons in the longest chain with all single bonds.

KUDOS Method

Use the **KUDOS method** for solving **word problems**.

K = Known
U = Unknown
D = Definition
O = Output
S = Substantiation

- **K (Known)**
  - Use units to indentify information.
  - Write information symbolically.
  - Look for implied information.
  - Write out chemical equations.

- **U (Unknown)**
  - What is the problem looking for?
  - Write information symbolically.

- **D (Definition)**
  - Find equalities to convert.
  - Choose & Re-arrange equations.
  - Look for missing information in other places.
  - If you cannot find enough information, re-evaluate your plan.

- **O (Output)**
  - Plug in values to the equations (use constants as needed).
  - Check unit cancellation & perform the calculation.

- **S (Substantiation)**
  - Check validity of your answer.
  - Check units.
  - Check significant figures.

Example:
What is the partial pressure of H_2 if the total pressure is 1.75 atm & the partial pressure of H_2O is 0.22 atm?

Step	Source Information	Write Down
K	total pressure is 1.75 atm	$P_{total} = 1.75$ atm
	pressure of H_2O is 0.22 atm	$P_{H2O} = 0.22$ atm
U	What is the partial pressure of H_2	$P_{H2} = ?$ atm
D	Dalton's Law of Partial Pressure	$P_{total} = P_{H2} + P_{H2O}$ So $P_{H2} = P_{total} - P_{H2O}$
O	Output of the equation	$P_{H2} = P_{total} - P_{H2O}$ $P_{H2} = 1.75$ atm $- 0.22$ atm $P_{H2} = 1.53$ atm
S	Substantiation	1.53 atm is reasonable for a P_{total} of 1.75 atm. "atm" is the pressure unit given in the problem. 2 decimal places given → 2 in answer

How to Use This Cheat Sheet: These are the keys related this topic. Try to read through it carefully twice then rewrite it out on a blank sheet of paper. Review it again before the exam.