

# SD School Chemistry

## Teacher's Guide



Welcome to Standard Deviants School Chemistry! We've developed our educational package to integrate you, your students, the video components and the supplements into an effective learning method. Here's a quick overview of how Standard Deviants School is structured.

The series is a fun, fast-paced way to teach important concepts of chemistry. Each program is 25 minutes long and is broken up into main and sub-sections, as shown in the program guide. Standard Deviants School delivers information in a clear, concise, example-filled manner that teaches from the perspective of a learner. The supplemental materials allow students a quick and effective way to keep notes and monitor their progress.

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This program contains the following items, available as MS Word & PDF files on the CD-ROM:

**Teacher's Guide:** Overview of the course, plus helpful tips for using the programs.

**Program Guide:** Outline of the entire video series.

**QuikNotes:** List of major terms, formulas, equations, and concepts for the program.

**QuikCheck:** Worksheet suitable as either in-class exercise, homework or as a quiz; includes answer key.

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### Presentation Tips

Few teachers can choose the AV equipment they use or the amount of students they have in a class, but there are a few steps teachers can take to enhance the viewing process.

- Place television at the center of the longest wall in the room.
- Keep a limit of 5 rows of 5 chairs if possible. Further rows to the sides or rear make it difficult to see the program on an average-sized television. If you are using a video projector, adjust accordingly.
- Position chairs in the outside rows at an angle for optimum viewing, as theater seating is angled around a stage.
- Leave the classroom lights on during the viewing.
- Close window blinds, doors, and other sources of outside light to help reduce glare.

### Tips for Teachers

It's important to keep in mind that a video is not a replacement for a teacher. Just like any other classroom tool, used effectively, videos attract students' attention, demonstrate difficult concepts and work well as a change of pace. Used incorrectly, however, they can turn off student interest and disrupt the flow of the class. A few tips while using the video in your classroom:

#### PRE-VIEWING

- Preview the video before presenting it to the class.
- Go over the QuikNotes with your students and make them aware of the main points they should be looking for in the program and the key concepts they need to learn.
- Explain to students that watching videos in a classroom setting is an active viewing experience, not a passive viewing experience. Active viewing involves absorbing information, thinking critically, asking questions, making connections to previous sections, and making predictions of upcoming sections.

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### VIEWING

- Require students to jot down their own notes on their QuikNotes sheet.
- Require students to underline key terms and definitions as they appear in the program.
- Pause the video after each section and check students' comprehension. Review main ideas, recycle vocabulary, solve problems and pose questions.
- Keep the students' learning active and encourage them to discuss topics in between each section.
- Students learn at different speeds. Don't hesitate to rewind and view a section again.

### POST-VIEWING

- Review the material covered in the program IMMEDIATELY after watching it. Studies show that within 24 hours, people forget 80% of what they've learned unless they practice and apply their new knowledge.
- Have students define terms, explain concepts, summarize the program or practice the material, either with the accompanying QuikCheck or activities or your own design.
- Have students evaluate the program and supplements. What topics did they think were too difficult? Too easy? Did sections contain too many examples or too few? Do the QuikChecks accurately test student comprehension or not?
- Then challenge students to step into the role of the teacher and come up with their own explanations, examples, and questions.

Good luck and good teaching from the Standard Deviants!

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## Program 1: The Basics

### QuikNotes



**Matter** is anything that takes up space and has mass.

Matter comes in three states: **solid**, **liquid**, and **gas**.

A **change of state** is when matter moves from one state to another.

**Physical properties** are the properties we can measure without changing the identity of the matter. Physical properties include, but are not limited to: temperature, height, weight, consistency, odor, boiling point, freezing point, evaporation, and hardness.

**Chemical properties** refer to the way matter acts during chemical reactions. You can only find chemical properties through experimentation. The ability to rust, give off radiation, and burn are all chemical properties.

**Homogeneous matter** has the same physical and chemical properties throughout. Homogeneous matter of one compound is also called a **substance**. Homogeneous matter can also be a solution. An example is NaCl (salt) and water.

**Heterogeneous matter** is a mixture of substances. A heterogeneous mixture does not have the same composition throughout. A heterogeneous mixture can also be called a **solution**.

**Elements** are the building blocks that contain only one kind of atom. There are three categories of elements: **nonmetals**, **metals**, and **metalloids**.

A **compound** is a substance consisting of two or more elements combined in fixed proportions.

A **molecule** is a single unit of a compound.

**SI units** are the International System of Units adopted by most countries, which are used for measurements and calculations in chemistry.

### Student Notes

# SD School Chemistry

## Program 1: The Basics

### QuikNotes



**Precision** measures the reproducibility of a result.

**Accuracy** refers to how close our measurement is to the theoretical true value.

**Significant digits** are the digits on either side of the decimal point that seem reasonably certain.

24 has 2 significant digits

38,562 has 5 significant digits

1.004 has 4 significant digits

0.000201 has 3 significant digits

For **addition** and **subtraction** problems, give the result in as many decimal places as the number in the problem with the fewest decimal places.

For **multiplication** and **division** problems, round off the result so it has the same number of significant figures as the number in the problem with the fewest significant figures.

**Scientific notation** uses powers of ten to express really big or really small numbers. For example

35,200 can be written as  $3.52 \times 10^4$

0.0000072 can be written as  $7.2 \times 10^{-6}$

The **unit factor method** is used to convert from one unit of measurement to another.

Example:

$$7.92 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}}$$

$$7.92 \text{ mi} = 1,274,600.448 \text{ inches} \\ \text{or } 1.27 \times 10^6 \text{ inches}$$

### Student Notes