EVALUATE, EXTEND, AND TRANSFER CONTENT KNOWLEDGE

GIST (Generating Interactions Between Schemata and Texts)

What Is GIST?

GIST (Cunningham 1982) is an acronym for *Generating Interactions* between *Schemata* and *Texts*. This strategy was developed to help students learn to write organized and concise summaries of their reading.

Why Would I Use This Instructional Strategy?

Using this instructional strategy will assist readers and writers as they organize notes for class discussion, research, essay writing, and exam preparation.

How Does It Work?

1. For modeling of this strategy, find a short, expository/informational paragraph that details a concept, event, time period, description, problem, or sequential instructions.
2. Read the first sentence to the class, then ask students to work together to write a summary of the contents of the first sentence in fifteen words or less.
3. Write the group summary on the board. Then, read the second sentence of the paragraph and ask students to write a summary of the first two sentences in fifteen words or less.
4. Write the group summary on the board and read the next one or two sentences in the paragraph. Continue until the paragraph is read and then ask students to write a summary of the entire paragraph in fifteen words or less.
5. After modeling the strategy, ask students to apply the strategy to a chapter of their textbook, a research source, or an article they are currently reading. (See Appendix for GIST organizer form.)

Research/Origins

Cunningham, J. 1982. "Generating Interactions Between Schemata and Text." In J. Niles and L. Harris, eds., *New Inquiries in Reading Research and Instruction. Thirty-first Yearbook of the National Reading Conference*, pp. 42–47. Washington, DC: National Reading Conference.

References/Further Reading

Alvermann, D. E., and S. F. Phelps. 1994. *Content Reading and Literacy: Succeeding in Today's Diverse Classrooms.* Boston: Allyn and Bacon.

Homework

What Makes an Effective Homework Assignment?

For many students, the challenge of new or complex reading material as a homework assignment is not the most effective extension of learning you do in class. Many readers struggle with the text because they don't know how to read their textbooks using text supports. Others refuse to read because the material is difficult or boring to them. When this happens, teachers are left with the dilemma of figuring out what to do if only a handful of students have completed the homework. So, what is effective homework?

I believe effective homework extends the day's learning with independent practice or anticipates tomorrow's learning with work that represents a set for the content or instruction that will occur.

Extending Learning from Class

In a geography class, the teacher has spent two days teaching her students how to use text supports to help them read their textbooks. They have completed a Textbook Activity Guide (Davey 1986) on the chapter they have been studying and discussed ways the supports in the text help them predict, connect, and establish a purpose for reading through questioning. The Content Brainstorming graphic organizer shown here (see Figure) extends that strategy lesson by asking students to look at the next chapter to be read, examine the text supports, and use those supports to predict, connect, and question. More students will complete this kind of assignment because it does not require extensive reading of the text. Students are reading and noting titles, headings, subheadings, key vocabulary words, illustrations, and captions. They then use these to make predictions about what they anticipate learning in class tomorrow. Additionally, they develop three content questions they believe they will answer when they study this concept in class the next day.

Research/Origins

Allen, J. 2002. *On the Same Page: Shared Reading Beyond the Primary Grades.* Portland, ME: Stenhouse.

Davey, B. 1986. "Using Textbook Activity Guides to Help Students Learn from Textbooks." *Journal of Reading* 29: 489–494.

References/Further Reading

Allen, J. 2002. *On the Same Page: Shared Reading Beyond the Primary Grades.* Portland, ME: Stenhouse.

Chapter Title The Water Planet

Key Words		Headings	Subheadings
hydrosphere	tributary	The Geography of Water	The Hydrologic Cycle
hydrologic cycle	estuary	The Oceans	Marine geography
transpiration	water table	People + Water	Seawater + its characteristics
evapotranspiration	aquifer	Rivers + Lakes	

Picture Walk: What predictions can you make about content based on visuals?

Caption:	Caption:	Caption:
Venezuela's Angel Falls Mackenzie Delta Idaho dam	The Hydrologic Cycle	Groundwater

Connections and Questions

What predictions and connections could you make about what you will learn in the chapter based on above text supports?

What questions could you ask that would focus and guide your reading?

GIST

Read the first sentence and summarize contents in fifteen words or less.

Read second sentence and summarize first *two* sentences in fifteen words or less.

Continue until paragraph is read and then summarize the entire paragraph in fifteen words or less.

Paragraph Summary

GIST

As energy moves, heat is created.

Read the first sentence and summarize contents in fifteen words or less.

In HVAC, 2 laws of thermodynamics help one understand heat transfer and energy production.

Read second sentence and summarize first *two* sentences in fifteen words or less.

Energy can neither be created or destroyed. Heat cannot be made. Heat is converted energy.

Continue until paragraph is read and then summarize the entire paragraph in fifteen words or less.

Paragraph Summary

The First law of thermodynamics states that energy can neither be created nor destroyed. In HVAC, mechanical, electrical, and chemical energy is converted to create heat.

UNIT 7

Thermodynamics—The Study of Heat

OBJECTIVES

After completing this unit you will be able to:

- state the first and second laws of thermodynamics.
- compare and contrast the three basic methods of heat transfer.
- explain the factors that affect the rate heat transfers through various materials.
- explain the difference between heat energy and temperature.
- compare sensible heat to latent heat.
- calculate heat change.
- differentiate between saturated, superheated, and subcooled refrigerant.

7.1 INTRODUCTION

Almost everything we do in HVAC/R involves adding or moving thermal (heat) energy. For example, in heating we may be converting chemical energy, such as a natural gas flame, to thermal energy and distributing it through the building. In refrigeration and air conditioning we are removing heat from inside the refrigerator or house and sending it outside.

It is important to understand thermal transfer. The reason we have to heat or cool areas is because heat transfers through the walls. In the heating season it transfers out, and in the cooling season it transfers in. Put simply HVAC/R technicians work with thermal energy. In this unit, we cover thermodynamics and then look at heat transfer more deeply.

7.2 FIRST LAW OF THERMODYNAMICS

Thermodynamics is the branch of science dealing with heat and the movement of energy. There are four laws of thermodynamics that describe how heat and energy behave. Two of these are of particular interest in HVAC/R applications. The first law of thermodynamics states that "energy can neither be created nor destroyed." Heat cannot be "made," but other forms of energy can be converted to heat because different forms of energy can be converted from one form to another. Energy itself is defined as the ability to do work, and heat is the transfer of energy due to temperature difference. Other common forms of energy are: mechanical, electrical, and chemical, which may be converted easily from one form to another. The steam-driven turbine generator of a power plant is a device that converts heat energy into electrical energy. Chemical energy may be converted into electrical energy by the use of a battery. Electrical energy is converted into mechanical energy through the use of an electromagnetic coil to produce a push-pull motion or the use of an electric motor to create rotary motion. Electrical energy may be changed directly to heat energy by means of heating resistance wires such as in an electric toaster, grill, or furnace. In all of these transformations energy is neither created or destroyed, just changed from one form to another.

7.3 SECOND LAW OF THERMODYNAMICS

The second law of thermodynamics states that "to cause heat energy to travel, a temperature difference must be established and maintained." Heat energy travels downward on the intensity scale. Heat from a higher temperature (intensity) material will travel to a lower temperature (intensity) material, and this process will continue as long as the temperature difference exists. The rate of travel varies directly with the temperature difference. The higher the temperature difference, commonly called the delta temperature or ΔT, the greater the rate of heat travel. The lower the ΔT, the lower the rate of heat travel.

7.4 METHODS OF HEAT TRANSFER

There are three principal ways that heat is transferred:

1. Conduction.
2. Convection.
3. Radiation.

Most refrigeration systems utilize all three methods. These three methods of heat transfer are shown in Figure 7-1.