



Content Enhancement Routines

SIM Content Enhancement Routines (CERs) are dynamic instructional tools that use powerful teaching devices and procedures to plan for and teach critical content in an understandable and easy-to-learn manner. Teachers engage students collaboratively to develop understanding in a way that maintains the integrity of the content while meeting both group and individual needs.

Components of CERs

CERs consist of three elements that help teachers focus on critical content, enhancement of that content, and a common instructional routine:

► Content

Teachers use CERs to plan for and teach critical content to academically diverse classes in ways that all students can understand and remember key information, and develop reasoning skills. In essence, we advocate teaching a little less content but teaching it better, allowing a focus on the most critical content.

► Enhancement

With CERs, teachers have access to visual devices or graphic organizers, and specially developed cognitive strategies, each tailored to enhance understanding of different content demands. Teachers actively engage students through interactive dialogue and collaborative co-construction of understanding; these interactions support problem-solving and critical thinking skills for all students.

► Routine

Each CER is developed using common instructional procedures that incorporate both explicit instruction and collaborative development of learning:

- » an advance organizer
- » a collaborative process developing student understanding using the graphic device and strategic steps
- » a post organizer

“SIM is the HOW to your WHAT and WHY.”

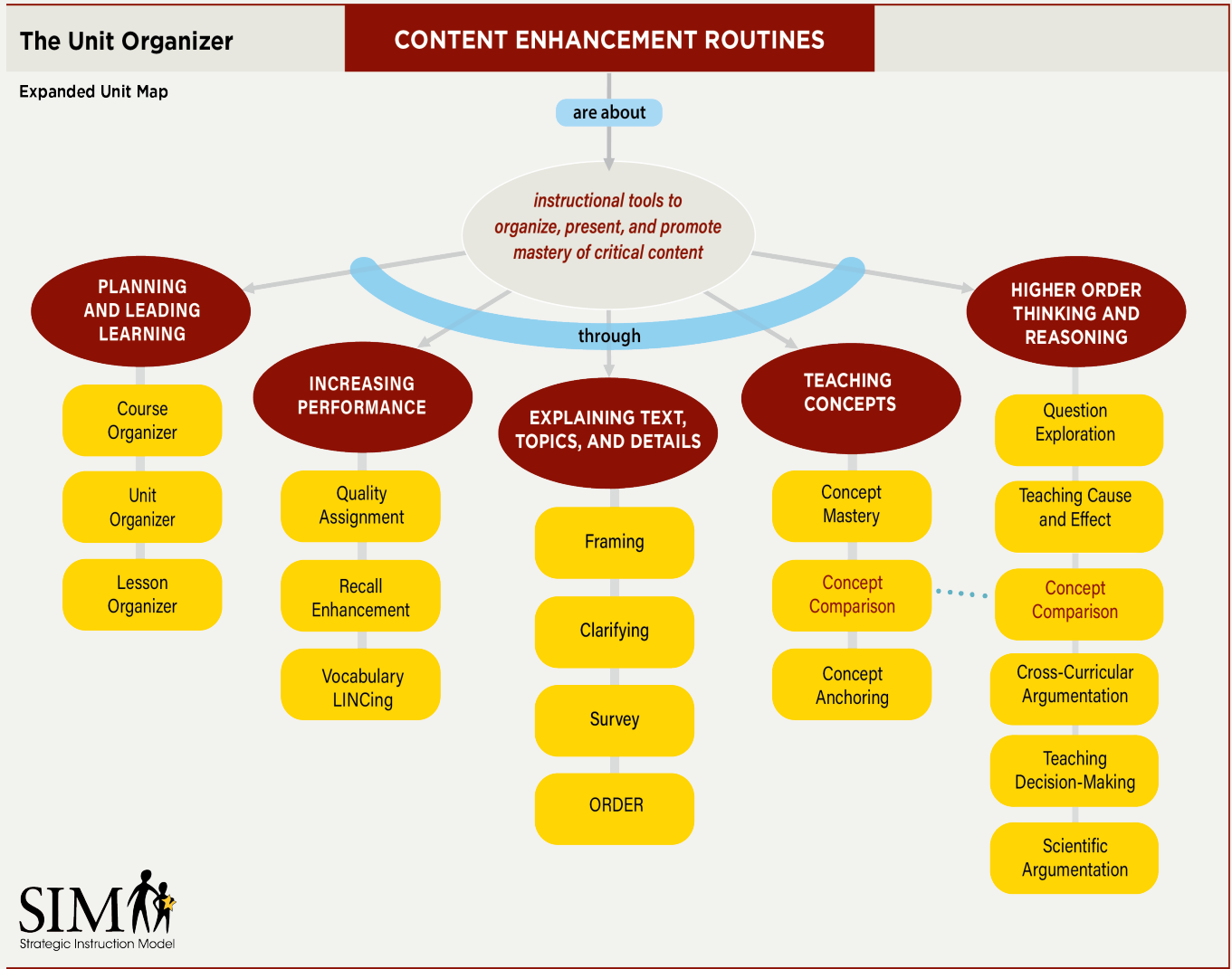


For in-depth descriptions of SIM instructional tools and interventions, please visit KUCRL's SIM website:

sim.ku.edu

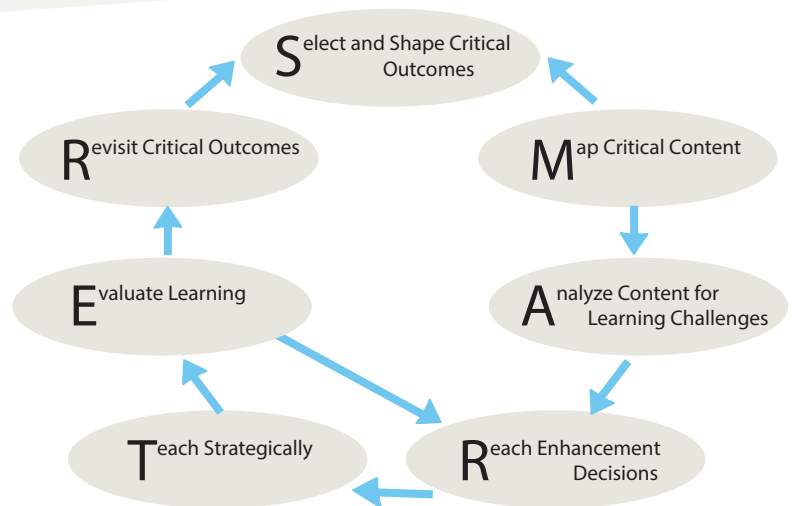
Overview of the Content Enhancement Routines

The sets of CERs are organized around five clusters of common teaching and learning goals as shown in the expanded map below (from the Unit Organizer Routine).



The SMARTER Instructional Cycle

The SMARTER Instructional Cycle guides the selection of CERs and supports teachers broadly in planning, teaching, and evaluating student learning of critical content.

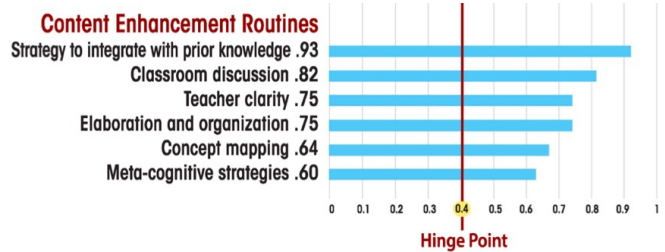


Why Content Enhancement Routines?

CERs are responsive to a range of student needs in content area classes. They were designed to provide instruction for all students, including those with learning challenges.

- ▶ **Explicit Instruction** is built into the instruction using advance and post organizers and guided learning. To do this, teachers inform students of the focus of the instruction, any learning supports that will be used, and expectations for student participation. Teachers remind students how to use visual devices (i.e., graphic organizers) and embedded strategies, and review the process and content of learning.
- ▶ Co-constructed **collaborative learning** is incorporated as understanding is developed by using the visual device and cognitive strategy. Students participate in conversations about critical questions, develop required background knowledge, analyze and answer questions, construct clear answers, and extend their knowledge in different ways. This collaborative learning may include inquiry learning and exploratory activities, including online learning as appropriate.
- ▶ Components of **universal design of learning** are used, including multiple means of representation, engagement, and comprehension. These include different ways of learning such as visual and verbal, clear statements and goals of learning, flexible options for all students, access to resources, and student participation in building and internalizing learning.

Hattie (2017) Effect Sizes* for Key Features of SIM Instructional Tools and Interventions



*Effect size is a quantitative measure of the magnitude of influence an experimental effect has on student outcomes. According to John Hattie, practices with effect sizes of $d > .40$ have a greater than average influence on achievement.

Evidence-Based

KUCRL conducted research in public schools, primarily in middle and high school settings. CERs were successfully field-tested in general education classrooms characterized by significant academic diversity and, in some cases, special education classrooms. Across settings, studies included students with learning challenges, students with low, average, and high course grades, and students with identified learning disabilities. Research demonstrated that consistent use of each routine is a key ingredient for instructional success. The researchers developed the CER guidebooks to support teacher access to the instructional principles and procedures found effective during the studies. Additional research on specific student populations studied are described on our website.



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Routines for Planning & Leading Learning

These Content Enhancement Routines help teachers think about and organize content, then present it in such a way that students can see the organization.



| The Course Organizer | | Student | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------|--------------|-------|------|--------|---------|-----------------|-----|-------------------------|-------------------|-----|---------------------------|-------------------|-----|------------------------------|------|----|---------|--|--|-----------------|--------------------|-----|--------------------------|-----------------|-----|-----------------|-----------|-----|
| Teacher(s) | | Course Dates | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 THIS COURSE: 8th Grade English improving reading, listening, writing, and speaking skills by examining and interpreting a variety of texts and genres. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 COURSE QUESTIONS: <ol style="list-style-type: none"> 1. What are the steps of the writing process? 2. How do you use the 6+1 Traits of Writing to improve writing? 3. What are important elements of expository and narrative writing? 4. How is narrative writing different from expository writing? 5. How do writers effectively revise and edit their work using technology? 6. How does a character analysis essay deepen a reader's understanding of a work of literature? 7. How can various uses of persuasive writing and speaking be applied in life situations? 8. How does an author choose important examples, evidence, and reasons for an argument to convince the audience being addressed? 9. What language and word choice can make an argument more convincing? 10. How does a speaker organize and deliver an effective speech? 11. How are genres of writing alike and different? 12. How can word choice, figurative language, and sound affect a poem and the reader? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 COURSE STANDARDS: <table border="1"> <thead> <tr> <th>What?</th> <th>How?</th> <th>Value?</th> </tr> </thead> <tbody> <tr> <td>Content</td> <td>Track/Reference</td> <td>10%</td> </tr> <tr> <td>Writing Process (Steps)</td> <td>Writer's Handbook</td> <td>10%</td> </tr> <tr> <td>Characteristics of Genres</td> <td>Genre-Genre Tools</td> <td>15%</td> </tr> <tr> <td>Language Skills & Strategies</td> <td>Text</td> <td>5%</td> </tr> <tr> <td>Process</td> <td></td> <td></td> </tr> <tr> <td>Writing Process</td> <td>Found & Adaptation</td> <td>20%</td> </tr> <tr> <td>Comprehension Strategies</td> <td>Track/Reference</td> <td>10%</td> </tr> <tr> <td>Speaking Skills</td> <td>Reference</td> <td>10%</td> </tr> </tbody> </table> | | | What? | How? | Value? | Content | Track/Reference | 10% | Writing Process (Steps) | Writer's Handbook | 10% | Characteristics of Genres | Genre-Genre Tools | 15% | Language Skills & Strategies | Text | 5% | Process | | | Writing Process | Found & Adaptation | 20% | Comprehension Strategies | Track/Reference | 10% | Speaking Skills | Reference | 10% |
| What? | How? | Value? | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Content | Track/Reference | 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Writing Process (Steps) | Writer's Handbook | 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Characteristics of Genres | Genre-Genre Tools | 15% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Language Skills & Strategies | Text | 5% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Process | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Writing Process | Found & Adaptation | 20% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Comprehension Strategies | Track/Reference | 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Speaking Skills | Reference | 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 COURSE PROGRESS GRAPH: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Formatted Assessment: _____ Summative Assessment: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Teachers use the **Course Organizer Routine** to plan courses around essential learning and critical concepts. At the start of the year, teachers introduce the course and class rituals, and they revisit them throughout the year to help students maintain focus on the big ideas and understand important relationships.

Students whose teachers used the **Course Organizer Routine** correctly answered significantly more “big idea” questions—twice as many—than students in the comparison condition. Additionally, teachers who used this routine spent considerably more time introducing major course ideas, concepts, themes and routines, and using innovative instructional practices than teachers in the comparison condition in a study in middle and high school science and social studies classrooms.

| The Animal Kingdom | | Interrelationships |
|---|--|------------------------------------|
| 1 UNIT OVERVIEW: Invertebrates | | NCET 901 Classroom Ecology |
| 2 UNIT MAP: | | |
| 3 UNIT QUESTIONS: <ol style="list-style-type: none"> 1. What are the basic differences among the major groups of vertebrates? 2. In what ways is life on land more difficult than life in water? 3. What is meant by cold blooded and warm blooded? 4. Which of the major groups of vertebrates is the most successful group? Why? | | |
| | | explanation comparison/contrast |

Teachers use the **Unit Organizer Routine** to plan units, introduce and maintain the big ideas in units, and show how units, critical information, and concepts are related.

In studies with students in secondary social studies and science classes, students whose teachers used the **Unit Organizer Routine** regularly scored an average of 15% higher on unit tests than students whose teachers used the routine only irregularly or not at all.

| Lesson Organizer | | UNIT or BACKGROUND | DATE | NAME |
|--|--|--|-------|------------|
| | | Causes of the Civil War | 11/21 | Ms. Mendez |
| 1 Relationships: compare / contrast | | Economic Differences self-questioning | | |
| 2 Lesson Map: | | | | |
| 3 Challenge Question: <ol style="list-style-type: none"> 1. What were the economic characteristics of the three sections? 2. How did the economic similarities and differences fuel the fires of war? | | 4 Tasks: <ol style="list-style-type: none"> 1. Find half of class, discuss to group the economic differences. 2. Second half of class, work in groups to answer the challenge question on page 313 of the text. | | |

Teachers use the **Lesson Organizer Routine** to plan lessons and then introduce and connect ideas to the unit and the course.

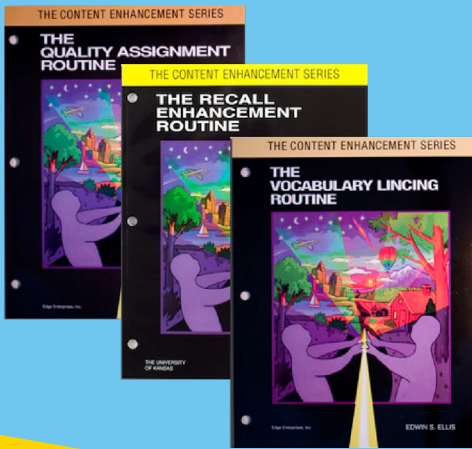
In studies with students in English Language Arts, social studies, and science classrooms in grades 10-12, students whose teachers used the **Lesson Organizer Routine** scored an average of 15% higher on unit tests than students whose teachers used the routine only irregularly or not at all.

Professional Learning

KUCRL is committed to finding solutions to educational challenges and placing our research findings into the hands of practitioners, students, and researchers in the field. Our expansive network of dedicated professionals — the SIM International Professional Development Network — shares our values and goals for delivering high-quality professional learning with a partnership approach to educators around the world. These experts offer professional development, instructional coaching, and technical assistance to establish the necessary infrastructure support for educators to implement evidence-based practices.

Routines for Increasing Performance

These Content Enhancement Routines help students complete work in the classroom.



| | | | | | |
|--|---|------------------------|---------|-----------|--|
| Subject | English | Date: Given 5/4 | Due 5/5 | Turned In | |
| Read | | Answer | Write | Other | |
| D: Define 5 vocab. wds., p. 67. Write meaningful sentence/s. | | | | | |
| O: Choose which 5 words | | | | | |
| G: 1. spell vocab. wds. correctly, 2 underline wds. Worth: 20 pts. | | | | | |
| S/R: Text; glossary | | | | | |
| Parts: 1. Pick wds 5 min. | # of study sessions: 2 | Actual Grade Received: | | | |
| 2. Define/step 45 min | Grade Goal: <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> F | | | | |
| 3. Check 10 min | Quality Goal: <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D | Other: _____ | | | |
| Goal: Use COPS | | | | | |

Teachers use the **Quality Assignment Routine** to plan, present, and engage students in quality assignments and then evaluate assignments with students.

Teachers who used the **Quality Assignment Routine** had significantly more planning behaviors, use of key presentation behaviors, and use of key evaluation procedures, all of which are research-identified characteristics of good assignments, than when they did not use this routine and than the comparison group. Both teachers and students were significantly more satisfied with assignments in a study with students in grades 6-8.

Recall Device Sheet

Format the Information Type of Information: List Pair Trio Definition Other

Classes of Fishes
Bone
Jawless
Cartilage

Analyze the Information & Select a Device
Type of Memory Device: Boxing

Create the Recall Device

Bone
Jawless
Cartilage

Tie it Together
My husband went fishing and caught a huge shark, a type of fish. He had a big jaw, and we could see his bones. I wanted to show him to all of my students, so I took him to class on a cart. He was too heavy for me to carry, I got the words "jaw" and "cart" by looking for the little words found in the three items in our list. Be sure to remember the longer words for each of these short words.

Organize Some Questions
What are the three classes of fishes?
Describe the three classes of fishes.
Compare and contrast the three classes of fishes.

Review Plan
Partners will study together on Sept. 15

Teachers use the **Recall Enhancement Routine** to show students how to create and use a range of mnemonic devices to remember information and study for tests. These include visual memory devices, keyword devices, and association, acronyms and rhymes.

Students whose teachers used the **Recall Enhancement Routine** had significantly higher overall posttest scores compared to pretest scores than students in the comparison group. Students in the experimental group created appropriate devices needed to recall information for 42% of the test items whereas those in the control group the number was 24.7% in 7th grade life science classrooms.

The LINCing Table

| | | | |
|---|--|---------------------|---|
| LINCing Term Carbon footprint Reminding Term | LINCing Story He left a huge footprint in his wake. | LINCing Picture | Definition Waste generated by a person during lifetime |
| LINCing Term Carbon dioxide Reminding Term die | LINCing Story His old car produced lots of pollution and it died. | LINCing Picture | Definition Chemical compound that causes global warming. |
| LINCing Term emission Reminding Term mission | LINCing Story His mission was to stop pollution. | LINCing Picture | Definition Pollution produced by something |
| LINCing Term Reminding Term | LINCing Story | LINCing Picture | Definition |

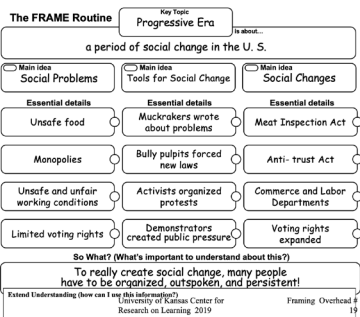
L = Label the parts of the story I = Identify an interesting word N = Use a LINCing Story C = Create a LINCing picture S = Share

Teachers use the **Vocabulary LINCing Routine** to facilitate student use of two powerful tools (an auditory memory device and a visual memory device) to help them learn and remember the meaning of complex terms.

Among both students with and without LD, students whose teachers used the **Vocabulary LINCing Routine** had significantly higher overall vocabulary test scores than when their teacher had not used the routine. Students improved their performance by 19% in a study with students in grade 9.

Routines for Explaining Text, Topics and Details

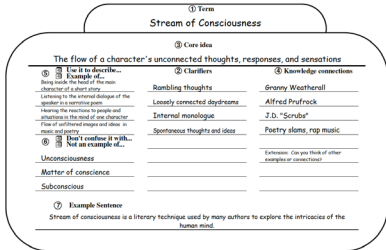
These Content Enhancement Routines help teachers and students explore text, topics, and details.



Teachers use the **Framing Routine** to transform abstract main ideas and key topics into a concrete representation that helps students think about and talk about the key topic and essential related information.

Average-achieving students, high-achieving students, and students with LD whose teachers used the **Framing Routine** had significantly higher overall scores on oral and written tests than students in the comparison condition across two studies conducted in ELA and social studies secondary classes. Students with LD in the experimental group wrote an average of 102 more words in their post-test product than students with LD in the comparison group, which was also more words than average achieving students in the comparison group.

The Clarifying Table



Teachers use the **Clarifying Routine** to focus on a topic and then explore related details and the topic's connection to critical concepts and ideas. This routine helps students master the meaning of targeted words and phrases.

All students, including English language learners and those with LD, whose teachers used the **Clarifying Routine** had significantly higher overall test scores than when the routine was not used. In studies with students in grades 4-6, students with high socioeconomic level improved by 14%; students with middle socioeconomic level improved by 30%, and students with low socioeconomic level improved by 20%.

TRIMS Learning Sheet

Unit: **Plate Tectonics**

Lesson: **Plate Tectonics**

1. The flow of magma from the mantle to the crust is called **convection**.

2. The movement of magma in the mantle is caused by **convection**.

3. The movement of magma in the mantle is caused by **convection**.

4. The movement of magma in the mantle is caused by **convection**.

5. The movement of magma in the mantle is caused by **convection**.

6. The movement of magma in the mantle is caused by **convection**.

7. The movement of magma in the mantle is caused by **convection**.

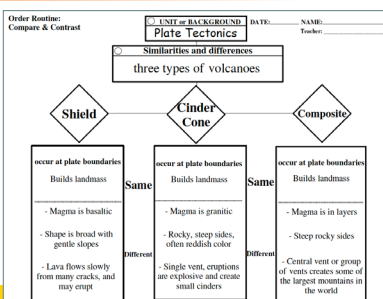
8. The movement of magma in the mantle is caused by **convection**.

9. The movement of magma in the mantle is caused by **convection**.

10. The movement of magma in the mantle is caused by **convection**.

Teachers use the **Survey Routine** to construct an overview of a reading assignment when students are having difficulty reading and sorting out information from inconsiderate text.

Students whose teachers taught them how to use the **Survey Routine** had significantly higher overall test scores than when it was not used. All students answered an average of 10% to 15% more test questions correctly in studies with students with LD and those with low, average, and high course grades in grades 7-12.

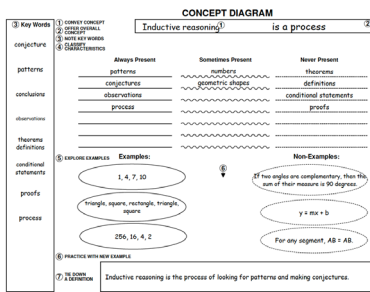
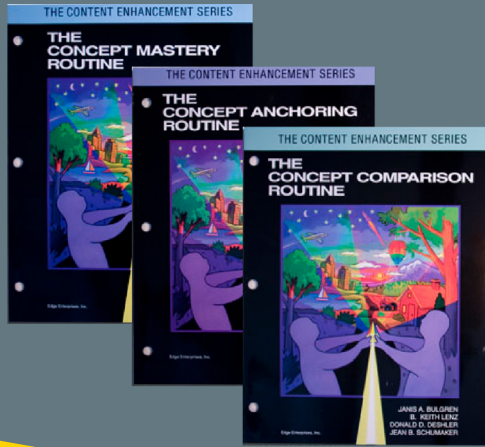


Teachers use the **ORDER Routine** to organize and make sense of information visually. Students think about what they have just learned or read, try to understand how it all fits together, look for any missing information or errors in their notes, and try to fit it all together to create their own graphic organizer.

Students with and without LD in grades 7 to 12 whose teachers taught them how to use the **ORDER Routine** had significantly higher test scores on recognizing the expository relationships among content in a reading passage and in creating appropriate graphic organizers for the content compared to when the routine was not used.

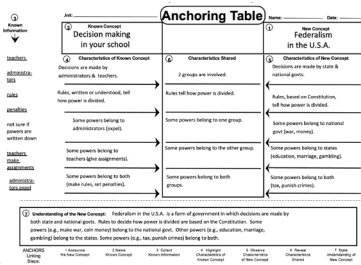
Routines for Teaching Concepts

These Content Enhancement Routines help teachers present complex concepts, so students gain a deep understanding and develop a shared vocabulary for talking about important information.



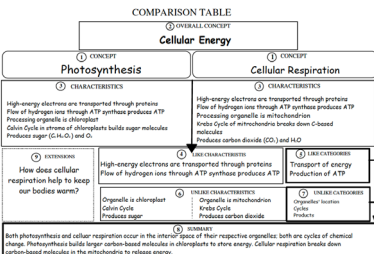
Teachers use the **Concept Mastery Routine** to identify characteristics of an example of a concept class that must be always, sometimes, and never present to fit in the concept class. New examples are explored to confirm understanding of a concept.

Among both students with and without LD, students whose teachers used the **Concept Mastery Routine** had significantly higher overall test scores after concept teaching and review on concept acquisition and regularly scheduled tests than during baseline. For regular classroom tests in grades 7-12, 97% of students without LD and 75% of students with LD scored at or above the common passing grade level.



Teachers use the **Concept Anchoring Routine** to introduce and anchor a new concept to a concept that is already familiar to students, that is, to learn by analogy.

Students whose teachers used the **Concept Anchoring Routine** had significantly higher overall test scores than students in the comparison condition. In the experimental condition, students with LD scored 25% higher, low-achieving students scored 27% higher, average-achieving students scored 19% higher, and high-achieving students scored 7% higher than these groups in the comparison condition in studies in secondary science and social studies classes.

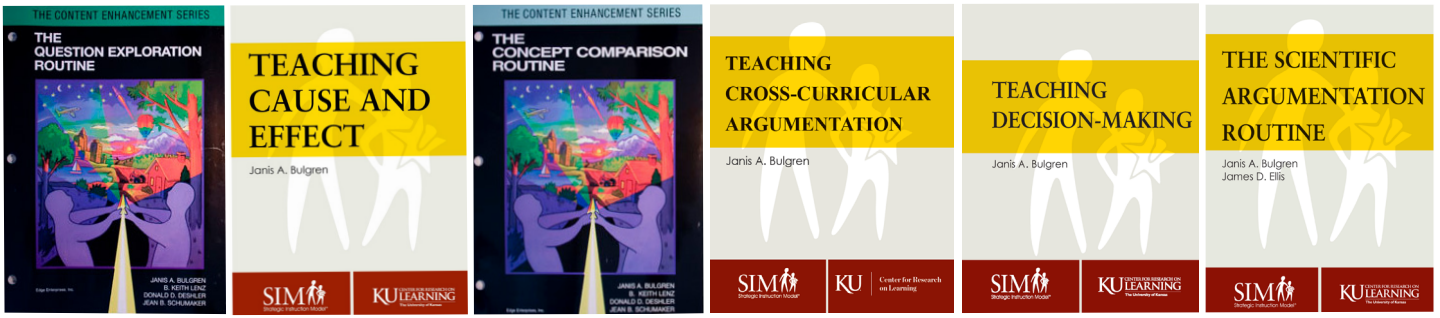


Teachers use the **Concept Comparison Routine** to help students compare and contrast key concepts by exploring characteristics of each concept and then distinguishing between the concepts that were similar and those that were different.

Students whose teachers used the **Concept Comparison Routine** had significantly higher overall test scores than students in the comparison condition. Students with LD in the experimental condition scored 14.64% higher and low-achieving students scored 23.72% higher than those in the comparison condition in studies with students in grades 7-12.

Routines for Higher Order Thinking and Reasoning

These Content Enhancement Routines help students engage in critical skills required by state standards.



Question Exploration Guide

What is the **Critical Question**? Why is conflict important in a narrative?

What are the **Key Details** or **Supporting Details**?
 Conflict: A struggle between two people or within a person
 Narrative: High Point: The part where a character faces and makes a big decision
 Resolution: The part where the reader sees the results of the decision

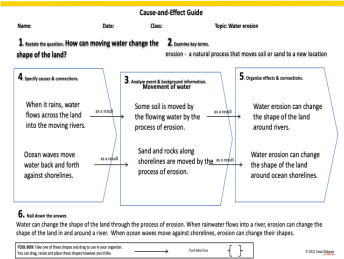
What are the **Supporting Questions** or **Strategies**?
 What is a conflict? A main character has conflict
 Why is conflict used? A story with an introduction, high point, and resolution
 Why is it important in the introduction? It grabs the reader's interest
 Why is it important at the high point? The part where the reader needs to know and understand the decision
 Why is it important at the resolution? The reader sees the results of the decision and learns the author's message

What is the **Learning Intent**?
 The conflict grabs the reader's interest and keeps them interested until they see the results of the main character's decision and learn the author's message.

What are the **Key Words**?
 Conflict: a struggle between two people or within a person
 Introduction: the part where the author sets the scene for the story
 High Point: the part where the reader needs to know and understand the decision
 Resolution: the part where the reader sees the results of the decision and learns the author's message

Teachers use the **Question Exploration Routine** to help students understand a "critical question" and to arrive at a main idea answer. Students learn to break apart a large question into smaller, more manageable questions, answer those questions, arrive at the main idea answer, apply the main idea to the subject area or related issue and generalize the idea.

Students whose teachers used the **Question Exploration Routine** had significantly higher overall test scores than students in the comparison condition across three studies conducted in ELA secondary classes, 7th grade science and social studies classes, and in secondary urban schools, grades 9-12. For ability to write essays, students in the experimental group improved their scores, with moderately large to very large effect sizes; those in the comparison group scored lower on the posttest than the pretest.



Teachers use the **Cause-and-Effect Routine** to help students engage in higher-order reasoning and to think critically about an event, action, idea, topic or procedure, important key terms necessary for understanding causes and effects, and to summarize understanding.

Students whose teachers used the **Cause-and-Effect Routine** had significantly higher test scores on knowledge of the cognitive strategy steps, use of the strategic procedures, and note-taking than students in the comparison condition. Significant correlations were found between both student knowledge of the strategy and note-taking, and their ability to apply cause-and-effect reasoning in a study in 7th and 8th grade science and social studies classrooms.

COMPARISON TABLE

Cellular Energy

| CONCEPT | CHARACTERISTICS |
|-----------------------------|---|
| Photosynthesis | <ul style="list-style-type: none"> High-energy electrons are transported through photosynthesis. Flow of hydrogen ions through ATP synthase produces ATP. Photosynthesis produces glucose and oxygen. Occurs in chloroplasts. Requires light energy. Produces glucose and oxygen. |
| Cellular Respiration | <ul style="list-style-type: none"> High-energy electrons are transported through photosynthesis. Flow of hydrogen ions through ATP synthase produces ATP. Cellular respiration produces carbon dioxide and water. Occurs in mitochondria. Requires oxygen. Produces carbon dioxide and water. |

Both photosynthesis and cellular respiration occur in the chloroplast of their respective organelles. Both are cycles of chemical change. Photosynthesis builds high-energy molecules to store energy. Cellular respiration breaks down high-energy molecules to release energy.

Teachers use the **Concept Comparison Routine** to enhance students' understanding of the similarities and differences between concepts by identifying critical characteristics of each concept, identifying the larger categories to which each belongs, then summarizing, generalizing, and extending understanding.

Students whose teachers used the **Concept Comparison Routine** had significantly higher overall test scores than students in the comparison condition with medium to large effect sizes. Students with LD in the experimental condition scored 14.64% higher and the low-achieving students scored 23.72% higher than those in the comparison condition in studies with students in grades 7-12.

Cross-Curricular Argumentation Guide A

1. Clarify the claim with any qualifiers and key terms. Some changes caused by heating or cooling can be reversed and some cannot.
 Reversed - changed back to original form.

2. Analyze the reasoning.
 1. When butter, chocolate and ice are heated, they go back to their original form.
 2. When an egg is cooked, paper is burned, or bread is toasted they do not return to their original form when they are cooled.

3. Make a judgment about quality of evidence reasoning, and other arguments.
 The evidence is good because we can give examples of changes caused by heating that can be reversed. We can also give examples of changes caused by heating that cannot be reversed.

Teachers use the **Cross-Curricular Argumentation Routine** to guide students to evaluate whether a claim is supported by evidence and reasoning, consider counterarguments, and make a decision to accept or reject the claim.

The use of argumentation is supported by two routines—the **Scientific Argumentation Routine (SAR)** and the **Cross Curricular Argumentation Routine (CCAR)**. Students whose teachers used the SAR had significantly higher overall test scores than students in the comparison condition with large effect sizes. Differences between mean pretest and posttest scores were 50% larger in the 7th grade experimental group, and almost twice as large for the 8th and 9th grade students compared to students in the comparison condition. Research data from the SAR provided support for the development of the CCAR; research is ongoing across different content areas.

Decision-Making Guide

Name: _____ Date: _____ Class: _____ Topic: _____

1. Identify the issue.
 Term Limits for Congress

2. Identify the options.
 A. Special interest groups might have more influence on Congress.
 B. Term limits would mean more frequent elections and more frequent changes in leadership.

3. Identify the reasons for each option.
 A. Special interest groups might have more influence on Congress.
 B. Term limits would mean more frequent elections and more frequent changes in leadership.

4. Identify the reasons for each option.
 A. Special interest groups might have more influence on Congress.
 B. Term limits would mean more frequent elections and more frequent changes in leadership.

Teachers use the **Scientific Argumentation Routine** to help students think critically about a science claim, decide on the strength of the evidence, and explain the reasoning to accept or reject the claim.

Students whose teachers used the **Decision-Making Routine** had significantly higher overall posttest scores than pretest scores—almost twice as large as scores in the comparison group. Data also suggested that students in 7th and 8th grade science and social studies experimental classes could transfer use of the strategy to a different content area in which the teacher had not used the routine in that classroom.