

# Bridging with the Higher Order Thinking and Reasoning (HOTR) Routines

by Janis Bulgren, Ph.D. Research Professor, Emerita

## WHAT IS BRIDGING?

Similar to a bridge over a river that easily connects two pieces of land, “bridging” also involves making easy connections from other Content Enhancement Routines (CERs) to the **Higher Order Thinking and Reasoning Routines (HOTR)**. HOTR routines respond to thinking and reasoning demands in today’s world.

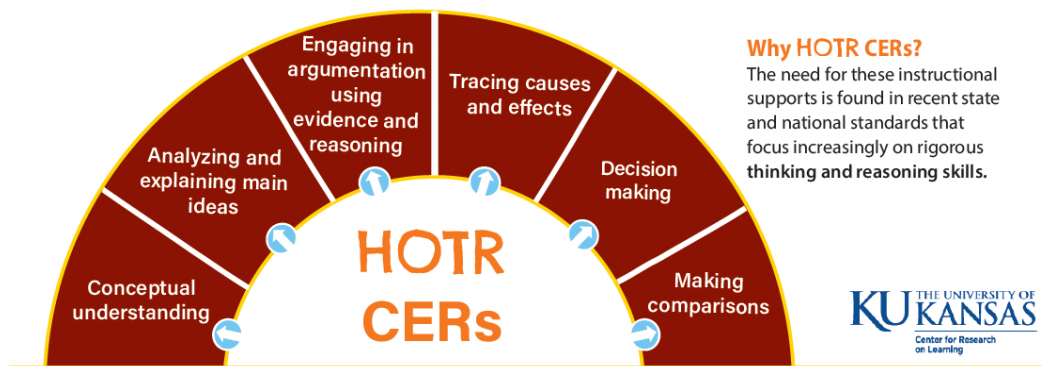


## WHY is Higher Order Thinking and Reasoning important?

We all use reasoning—or ask others to use reasoning—every day. However, sometimes we don’t have all the tools we need to answer those questions, that is, a way to make connections and identify the exact type of reasoning needed. For example, we can use HOTR to make connections and understand what type of reasoning is asked for in the following questions:

- “Why did that happen?” is asking about **causes**.
- “Why is that one better than the other?” is asking about **comparisons**.
- “Can you prove that?” is asking about **evidence and reasoning in an argument**.
- “What point are you making?” is asking about a concise **main idea**.
- “You need to choose” is asking about making a **decision**.

Figure 1. Why HOTR CERs Arch



HOTRs provide ways to respond to questions that require answering a critically important question, comparing and contrasting two or more things, finding the causes and effects of different happenings, making a decision, or agreeing or disagreeing with a claim someone makes, *and* explaining your own evidence and reasoning (see Figure 1).

1. *Identifying and explaining MAIN IDEAS & THEMES (Question Exploration Routine)*
2. *Identifying CAUSES AND EFFECTS (Cause and Effect Routine)*
3. *Engaging in COMARE AND CONTRAST (Concept Comparison Routine)*
4. *Choosing an Option (Decision Making Routine)*
5. *Analyzing a claim with its evidence and reasoning (Cross-Curricular Argumentation & Scientific Argumentation Routines)*

# Bridging with the Higher Order Thinking and Reasoning (HOTR) Routines

by Janis Bulgren, Ph.D. Research Professor, Emerita

## HOW do Higher Order Thinking and Reasoning routines fit with other CERs?

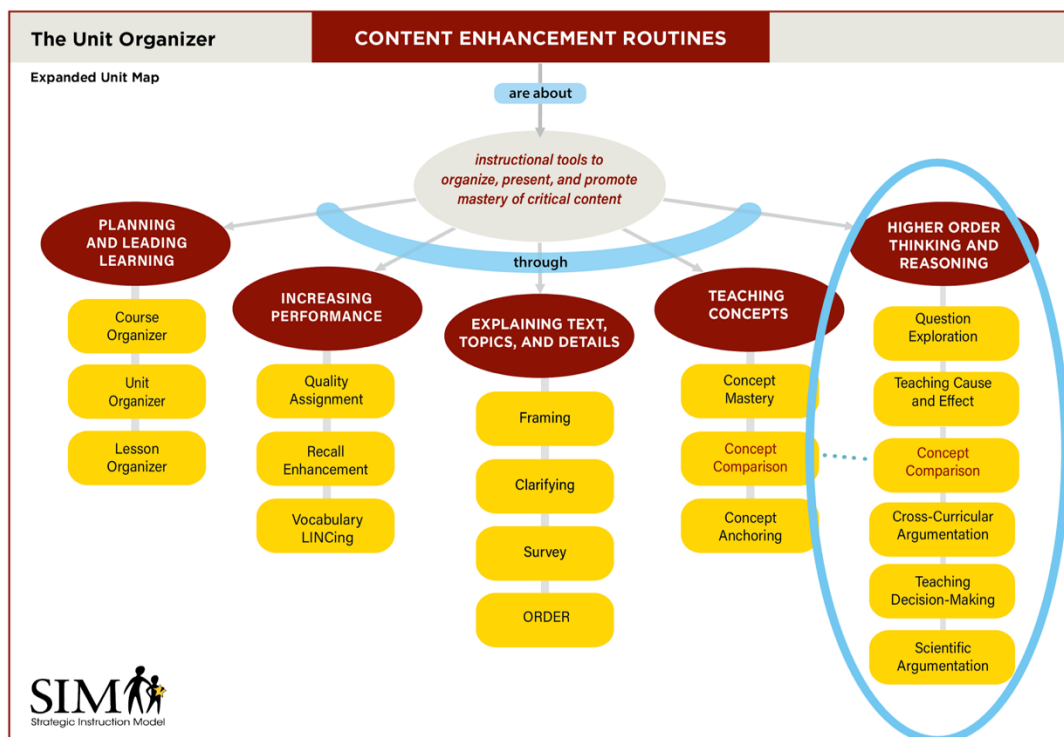
Some CER routines help students and teachers organize information and explore topics, details, or concepts. These include Planning and Leading (e.g., the *Unit Organizer Routine*), Increasing Performance, Explaining Text Topic and Details (e.g., the *Framing Routine*), and Teaching Concepts (e.g., the *Concept Mastery Routine*).

After introducing other Content Enhancement Routines (CERs), they can show students how to “bridge” into HOTRs. Information from previously used CERs raises other critical questions that require bridging into answering critical questions, comparing and contrasting, tracing causes and effects, making decisions, and analyzing claims and arguments.

## WHERE do we start? Get the BIG PICTURE of all CERs.

We start with the Big Picture: Understand the roles of different CER clusters in learning and teaching—and where the HOTR routines fit. See Figure 2.

Figure 2. SIM Content Enhancement Routine Clusters



The **Planning and Leading** cluster provides an overview of content and structure of courses, units and lessons that may be used in planning, instruction and review.

The **Increasing Performance** cluster helps students complete work in the classroom.

The **Explaining Text, Topic and Details** helps organize information around a topic and its details.

The **Teaching Concepts** cluster is used to explore a single concept, to learn concepts by analogies and to compare and contrast two or more concepts.

# Bridging with the Higher Order Thinking and Reasoning (HOTR) Routines

by Janis Bulgren, Ph.D. Research Professor, Emerita

## **WHY IS BRIDGING IMPORTANT?**

Bridging promotes EFFICIENT and EFFECTIVE teaching and learning that is RESPONSIVE to rigorous learning challenges across STANDARDS and may be used ACROSS CURRICULA.

### **EFFICIENT**

BRIDGING from one CER to many CERs:

- **Avoids “One-and-Done”**, that is, teaching only one or limited numbers of CERs.
- **Uses similar teaching and learning procedures and devices as other CERs:**
  - Visual devices or graphic organizers
  - Guiding steps on each device that comprise cognitive strategic reasoning support
  - A common instructional procedure incorporating explicit instruction and collaboration (referred to as Cue-Do-Review)
- **Promotes Generalization and Transfer.** When graphic devices, guiding steps, or Cue-Do-Review procedures are used frequently and by teachers across several classes, students can begin to use those thinking skills and patterns on different areas, subjects and the real world.

### **EFFECTIVE**

Research-based HOTR routines have been field-tested in inclusive general education classrooms containing students with a wide range of with diverse learning needs, including high, average or low achievement levels and those with learning disabilities and other IEPs (see reference section).

### **RESPONSIVE to STANDARDS**

Thinking and reasoning skills addressed by HOTR routines are critical for success in school, preparation for college and careers, and competitiveness in today’s global economy (Jacobs, 2008). The need for these instructional supports is found in recent state (CCSS, 2010) and national standards (NCSS, 2013) that stress higher order thinking and reasoning skills, as well as national legislation such as the Individuals with Disabilities Education Act (2010) and the Elementary and Secondary Education Act (U.S. Department of Education, 2010) that urge that all students be taught in general education classrooms as much as possible.

### **WIDE USAGE ACROSS CURRICULA**

Research on HOTR routines has been conducted in public schools, primarily in middle and high school settings. Content areas included science, history and social studies, and English Language Arts. An extensive body of peer-reviewed research is available as well as other articles highlighting examples of their use (see reference section).

## WHERE do we start?

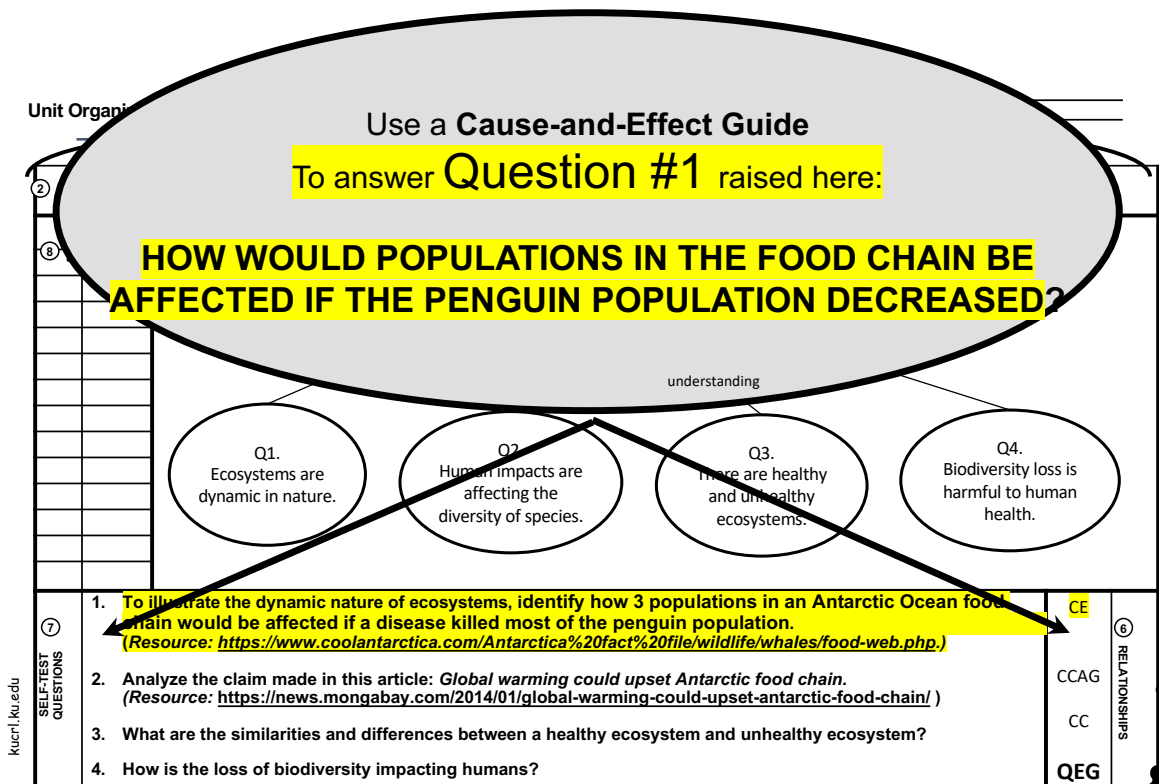
Start with other CERs that teachers and students already know as represented by the clusters shown in Figure 2 such as the Unit Organizer, the Frame and Concept Mastery.

### PLANNING and LEADING using the *Unit Organizer Routine*.

The Unit Organizer is often used to introduce a complete unit comprised of HOTR devices and routines. It is an advance organizer and reminder of the structure of the unit, and the critical questions in the unit, course, or lessons.

1. Highlight the Critical Questions from Section 7. Engage students in paraphrasing the questions. Guide students to focus on reasoning associated with comparisons, questions and answers, causes and effects, decisions to be made, or statements of a claim (argument).
2. Identify Types of Reasoning from Section 6. Return to students' paraphrase of the question. Guide students to transfer the type of reasoning identified in the question to Section 6 using the abbreviations of the associated HOTR routine (CC, CE, QEG, DM, CCAR, SAG) in Section 6.

Note: Similar usage can be developed with the Course and Lesson Organizers.



# Bridging with the Higher Order Thinking and Reasoning (HOTR) Routines

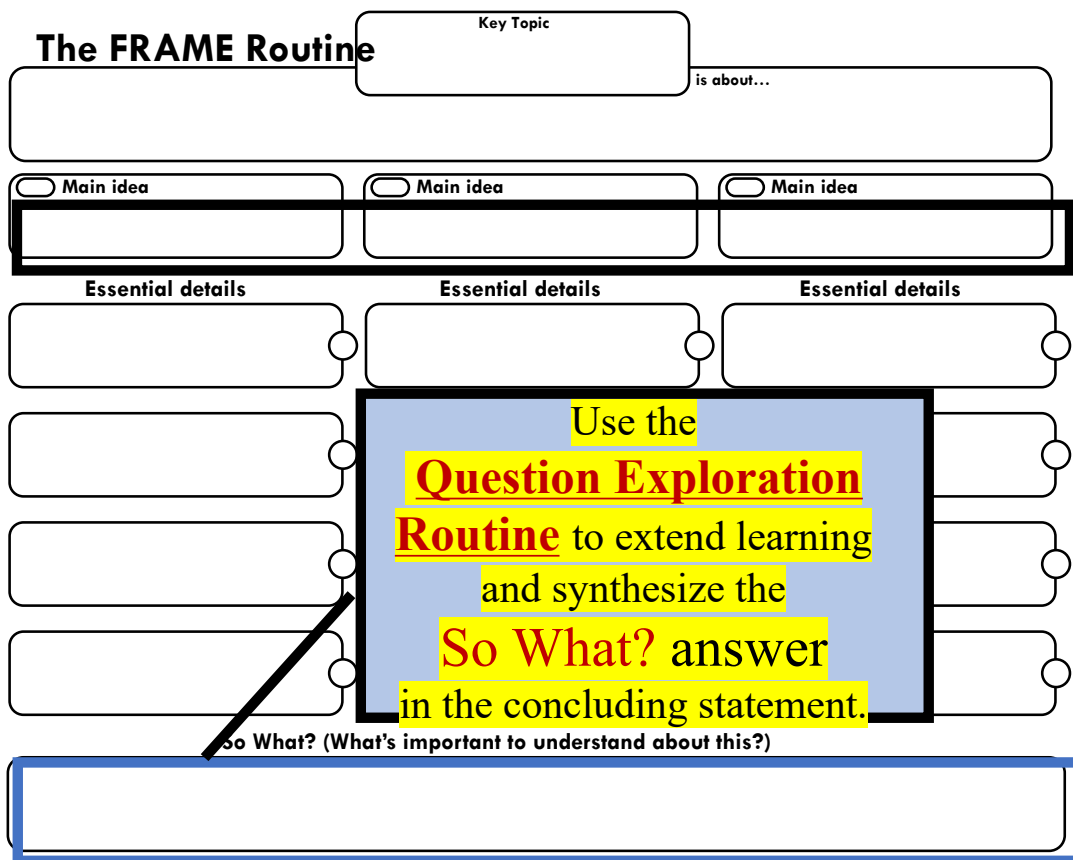
by Janis Bulgren, Ph.D. Research Professor, Emerita

## EXPLAINING TEXT, TOPICS & DETAILS TO INCREASE PERFORMANCE using the *Framing Routine*.

Routines in this cluster are useful to organize Information around a topic and its details, as with the *Framing Routine*. This can recommend HOTRs that will be suggested based on parts of a routine such as those in the Frame:

1. Focus on **main idea**.
2. Focus on **essential details**.
3. Focus on **“so what?”**
4. Focus on **“what’s important?”**

*Note: Similar usage can be developed with other routines in this cluster.*



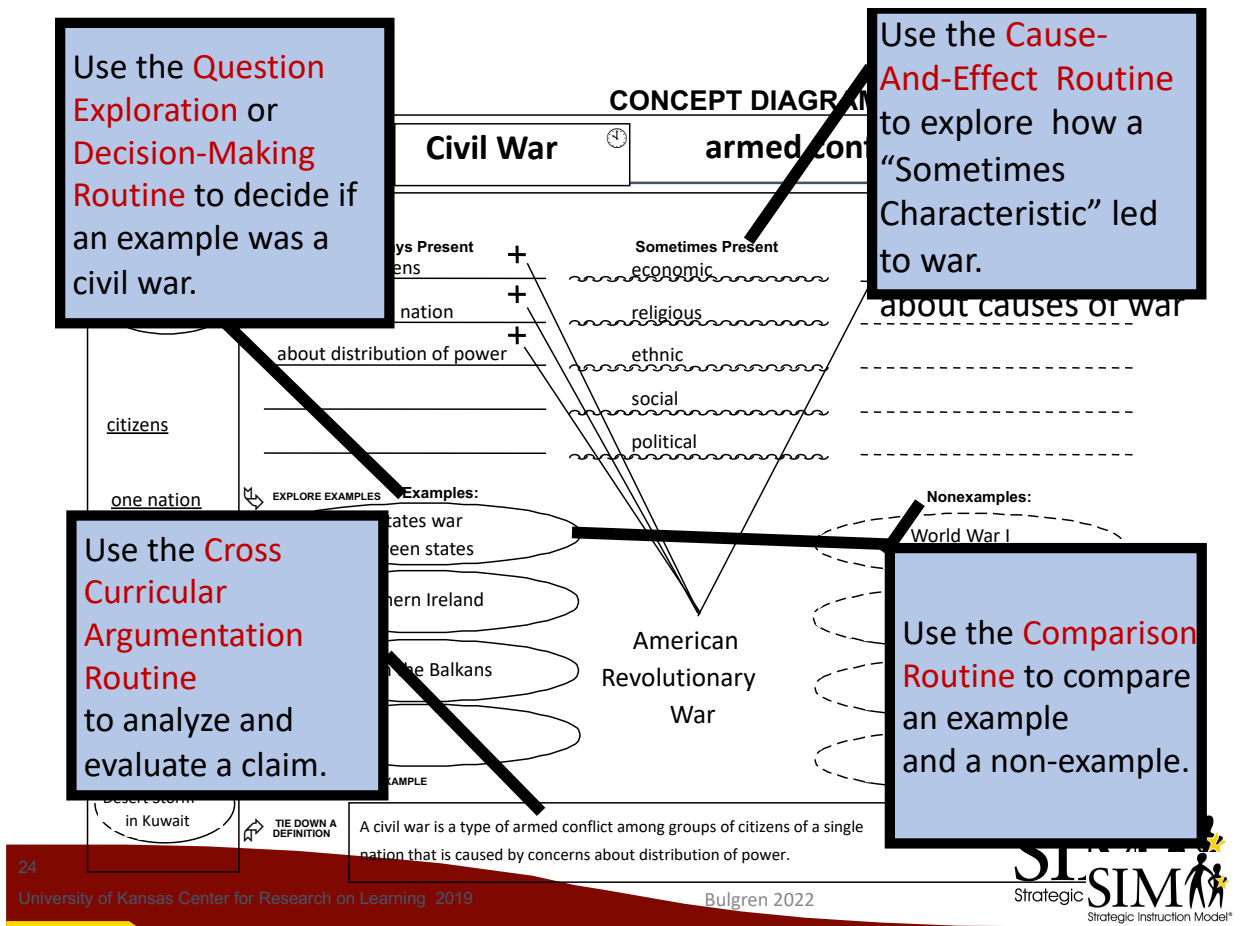
© Janis Bulgren 2022

## TEACHING CONCEPTs from the Concept Cluster with the *Concept Mastery Routine*.

The cluster often suggests extending teaching and learning by bridging into use of the HOTR routines suggested by different parts of the Concept Mastery graphic device.

1. Focus on **explaining main ideas**.
2. Focus on **causes or effects**.
3. Focus on a **claim** made in a concluding statement or summary.
4. Focus on the **examples and non-examples**.

Note: Similar usage can be developed with the *Concept Anchoring and Comparison routines*.



# Bridging with the Higher Order Thinking and Reasoning (HOTR) Routines

by Janis Bulgren, Ph.D. Research Professor, Emerita

## References:

- Bulgren, J. A., Ellis, J. D., & Marquis, J. G. (2014). The use and effectiveness of an Argumentation and Evaluation Intervention in science classes. *Journal of Science Education and Technology*, 23 (1), 82–97.
- Bulgren, J.A., Marquis, J.G., Deshler, D.D., Lenz, B.K., & Schumaker, J.B. (2013). The use and effectiveness of a question exploration routine in secondary-level English language arts classrooms. *Learning Disabilities: Research and Practice*, 28(4), 156-169.
- Bulgren, J.A., Marquis, J.G., Lenz, B.K., Deshler, D.D., & Schumaker, J.B. (2011). The effectiveness of a question exploration routine for enhancing the content learning of students. *Journal of Educational Psychology*, 103(3), 578-593.
- Jacobs, V. A. (2008). Adolescent literacy: Putting the crisis in context. *Harvard Educational Review*, 78(1), 7–39. <https://doi.org/10.17763/haer.78.1.c577751kq7803857>;
- Common Core State Standards (CCSS) Initiative, 2010
- Next Generation Science Standards (NGSS), 2013
- National Curriculum Standards for Social Studies (NCSS), 2013
- Bulgren, J.A., Lenz, B.K., Schumaker, J.B., Deshler, D.D., & Marquis, J. (2002). The use and effectiveness of a comparison routine in diverse secondary content classrooms. *Journal of Educational Psychology*, 94(2), 356-371.

## Articles or Chapters with HOTR Examples:

- D. Minarik. May 2023. *Using the Decision-Making Routine for IEP and Post-Secondary Goal Development*. <https://sim.ku.edu/sim-forum>
- C. Wisniewski. April 2023. *Higher Order Thinking and Reasoning (HOTR) Routines Support Rigor*. <https://sim.ku.edu/sim-forum>
- Bulgren, J., Minarik, D., & Washburn, J. (2024). Higher order thinking and reasoning through primary source document analysis. In S. Waring (Ed.), *Teaching with primary sources for cultural understanding, civic mindedness, and democracy* (pp. 47-63). Teachers College Press.

## Other Relevant Publications:

1. Anderson, L. W., & Krathwohl, D. R. (2001). *A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom’s Taxonomy of Educational Objectives: Complete Edition*. New York: Longman.
2. Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How People Learn: Brain, Mind, Experience, and School*. Washington DC: National Academy Press.
3. *Cognition and Instruction: Twenty-five Years of Progress*. (2013). United Kingdom: Taylor & Francis.

## WHERE can I find more information about HOTR routines?

Visit the **HOTR website**: <https://sim.ku.edu/hotr-routines>

The KUCRL HOTR Cadre meets periodically to discuss all things HOTR and periodically hosts free webinars for active SIM Professional Developers. We hope to do more events like this in the future, so be on the lookout in the Upcoming Events section of *StrateNotes* and online.