CTL Instructional Strategies

multiple methods to engage, teach, and assess

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Using These Cards

There are three sections in this deck. Each section houses active learning strategies categorized by key components of Universal Design for Learning (UDL). As you plan courses and lessons it is recommended you include multiple methods to **engage**, **teach**, and **assess** learners. Each card provides a description (the **What?**), the purpose (the **Why?**), procedure (the **How?**), and supporting research for the strategies. And each strategy can be applied across all content and discipline areas.

Strategies are often considered scaffolds that support learning. Faculty who use scaffolds slowly take them away with intent to build independent learners. However, research shows that when strategies begin to disappear, so does the learners' academic achievement, confidence, and excitement for learning. Therefore, when implementing these strategies, it is important to teach the **What?** (or high-end overview that defines the strategy); the **Why?** (describes the rationale for doing the strategy); and the **How?** (lists the steps or process of the strategy). This transparency supports learners in choosing when, why, and how to use them independently.

UDL Framework

Engagement

This section includes strategies designed to promote purposeful, motivated, interested, and emotionally charged learners by activating the **affective** networks of the brain. It provides multiple means of engagement that speak to learners' needs, interests, and autonomy. This supports the development of self-efficacy and persistence.

Representation

This section includes instructional strategies designed to promote resourceful, knowledgeable learners by activating the **recognition** networks of the brain. It provides multiple means of representation that meet the educational and cultural experiences learners bring.

Action & Expression

This section includes instructional strategies designed to promote goal-directed learners by activating the **strategic** networks of the brain. It provides multiple means for knowledgeable expression without barriers for learners.

Engagement Index

Representation Index

Action & Expression Index

1. Naïve Task

Purpose:

Engaging & Surfacing Background Knowledge

Naïve Tasks spark learner curiosity by asking them to discuss a fairly complex issue before learning about it. Naïve Tasks are designed to:

- Pique learners' curiosity and excitement;
- Get learners thinking, before they know much of anything about a particular topic;
- Capture learners' attention;
- Promote risk taking and challenge assumptions; and
- Surface background knowledge.

Procedure:

1. Present learners with a real problem that requires content knowledge or skills you have not yet taught.
2. Ask the learners to make a decision about the problem (to predict a result).
3. Have learners reflect on and discuss their reasoning.
4. Share the correct answer.
5. Then teach the content (via readings, a video, and/or mini lecture).

Supporting Research:

- Gooblar, D. (2019). Is It Ever OK to Lecture?. *The Chronicle of Higher Education*.
- Roberson, B., & Franchini, B. (2014). Effective task design for the TBL classroom. *Journal on Excellence in College Teaching*, *25*.
- The Chronicle of Higher Education Staff. (2018). How one teaching expert activates students' curiosity. Retrieved from https://www.chronicle.com/article/How-One-Teaching-Expert/243609
- The Power of the 'Naïve Task'. (2018). Retrieved from https://csupd.csu.domains/tips/the-power-of-the-naive-task/

Notes:

2. Guided Notes

Purpose:
Active Learning

Guided Notes support learners by providing a framework for note taking. Guided notes are designed to:

- Increase note taking;
- Show learners the process of thinking and taking notes like an expert;
- Teach learners how to separate main points from extraneous materials, making it easier to focus on the material when studying for an exam; and
- Allow learners to actively attend to the content being taught rather than extensively writing.

Procedure:

1. Create an outline of the lecture, video, or reading content you plan to share.
2. Strategically identify and omit important information from the outline.
3. While listening, viewing, or reading ask learners to fill in the guided notes.

Supporting Research:

- Konrad, M., Joseph, L. M., & Eveleigh, E. (2009). A meta-analytic review of guided notes. *Education and Treatment of Children*, 421-444.
- Major, C. H., Harris, M. S., & Zakrajsek, T. (2016). Teaching for learning: 101 intentionally designed educational activities to put students on the path to success. New York: Routledge, Taylor & Francis Group.
- Narjaikaew, P., Emarat, N., & Cowie, B. (2009). The effect of guided note taking during lectures on Thai university students' understanding of electromagnetism. *Research in Science & Technological Education*, *27*(1), 75-94.

Notes:

3. Clickers

Purpose:

Active Learning & Assessing

Clickers are a classroom response system with a set of hardware and software that facilitate teaching activities. Clickers are designed to:

- Increase learner involvement;
- Engage large classes;
- Assess prior knowledge and identify misconceptions;
- Generate discussions;
- Improve learning through retrieval practices;
- Practice types of exam questions; and
- Facilitate critical thinking skills.

Procedure:

1. At intentional points (approx. every 10 minutes) throughout a lecture, stop to ask questions.
    - **Assess prior knowledge**: Ask questions about upcoming content.
    - **Review content**: Ask questions that reflect previously taught content.
    - **Stimulate discussion**: Ask conceptual or procedural questions.
2. Learners use their clickers to submit their answers.
3. Automatically collect and display the responses.
4. Ask learners to share their rationales for their answer selection(s) with a peer – then re-poll.
5. Provide immediate feedback based on learners' final responses.

Supporting Research:

- Caldwell, J. E. (2007). Clickers in the large classroom: Current research and best-practice tips. *CBE—Life Sciences Education*, *6*(1), 9-20.
- FitzPatrick, K. A., Finn, K. E., & Campisi, J. (2011). Effect of personal response systems on student perception and academic performance in courses in a health sciences curriculum. *Advances in Physiology Education*, *35*(3), 280-289.
- Graeff, E. C., Vail, M., Maldonado, A., Lund, M., Galante, S., & Tataronis, G. (2011). Click it: assessment of classroom response systems in physician assistant education. *Journal of allied health*, *40*(1), 1E-5E.
- Levesque, A. A. (2011). Using clickers to facilitate development of problem-solving skills. *CBE—Life Sciences Education*, *10*(4), 406-417.
- Yourstone, S. A., Kraye, H. S., & Albaum, G. (2008). Classroom questioning with immediate electronic response: Do clickers improve learning?. *Decision Sciences Journal of Innovative Education*, *6*(1), 75-88.

Notes:

4. Roleplay

Purpose:

Active Learning & Assessing

Learners act out scenarios that reflect the content being taught. Roleplays are designed to:

- Deepen learners' understanding of course concepts as visual, spatial, linguistic, emotional, and bodily modalities are stimulated;
- Allow for multiple perspectives and encourage critical thinking;
- Assess learner understanding; and
- Ignite the cerebrum and limbic system to support the acquisition of spoken language and emotional control.

Procedure:

1. Ask learners to form groups.
2. Present the scenario and allow time for discussion of the content.
3. Assign or ask learners to assume certain roles to play in the scenario.
4. Discuss the norms for role playing.
5. Monitor, facilitate, and provide feedback as learners work through the role play.
6. Debrief the activity with a discussion that explores the application of learned concepts in a real-life context.

Supporting Research:

- Major, C. H., Barkley, E. F., & Cross, K. P. (2005). Collaborative Learning Techniques: A Handbook for College Faculty.
- Gregory, G. H., & Chapman, C. (2012). *Differentiated instructional strategies: One size doesn't fit all*. Corwin press.
- Gregory, G. H., & Herndon, L. E. (Eds.). (2010). *Differentiated instructional strategies for the block schedule*. Corwin Press.
- Heyward, P. (2010). Emotional Engagement Through Drama: Strategies to Assist Learning through Role-Play. *International Journal of Teaching and Learning in Higher Education*, *22*(2), 197-204.
- Jensen, E. (2007). Brain-compatible Strategies (2nd ed.) Victoria, Australia: Hawker Brownlow Education.
- Russell, C., & Shepherd, J. (2010). Online role-play environments for higher education. *British Journal of Educational Technology*, *41*(6), 992-1002.
- Sousa, D. A., & Pilecki, T. (2013). *From STEM to STEAM: Using brain-compatible strategies to integrate the arts*. Corwin Press.
- Sturges, D., Maurer, T. W., & Cole, O. (2009). Understanding protein synthesis: a role-play approach in large undergraduate human anatomy and physiology classes. *Advances in Physiology Education, 33*(2), 103-110.

Notes:

5. Think-Pair-Share

Purpose:

Active Learning & Information Processing

Think-Pair-Share (TPS) is where learners work individually and in pairs to solve a problem or answer a question. Think-Pair-Shares are designed to:

- Increase class participation and improve the quality of learner contributions;
- Process information and remember what is learned;
- Challenge assumptions, address misconceptions, and start conversations;
- Check for understanding; and
- Probe learners to think about the topic ahead.

Procedure:

1. Pose a question or discussion topic to the class.
    - Ex. How did you arrive to your answer?
    - Ex. Why are the other answer options incorrect?
2. Give the learners a few minutes to think about their response.
3. Ask learners to pair with a peer to share/discuss their responses.
4. Call on both volunteers and non-volunteers to respond to the entire class.
5. Highlight the accurate points and correct any incorrect responses.

VARIATIONS

- “Think-Write-Pair-Share“: Learners can write their responses down before pairing.
- "Think-Pair-Square“: Learners can compare their paired answers with another pair instead of the whole class.

Supporting Research:

- Adler, S. A., Altoff, P., Marri, A. R., McFarland, M. A., & McGrew, C. (2010). National curriculum standards for social studies: A framework for teaching, learning, and assessment.
- Allen, R. (2008). *Green light classrooms: Teaching techniques that accelerate learning*. Corwin Press.
- Barkley, EF, et.al. (2005). Collaborative Learning Techniques: A Handbook for College Faculty.
- Major, C. H., Barkley, E. F., & Cross, K. P. (2005). Collaborative Learning Techniques: A Handbook for College Faculty.
- Sousa, D. A., & Pilecki, T. (2013). *From STEM to STEAM: Using brain-compatible strategies to integrate the arts*. Corwin Press.

Notes:

6. Dual Journal Entry

Purpose:

Information Processing

Dual Journal Entries provide learners a framework for pairing content notes and their processing of the content. This writing-to-learn activity is designed to:

- Identify areas of understanding and misconceptions;
- Develop deeper understanding of course material;
- Retain and organize concepts and ideas; and
- Provide detailed feedback on how learners read as well as their reactions to what is read.

Procedure:

1. Using scratch paper, learners divide the paper in half, lengthwise.
2. While reading, learners should copy a few lines (3-5) from the text (in the left column) that resonates with them.
3. In the right-column, learners should explain why they chose that selection and how they reacted to the content (surprised, dis/agree, questions).

EXTENSION

- In pairs, have learners share and explore the concepts and ideas marked by each partner.

Supporting Research:

- Angelo, T. A., & Cross, K. P. (2012). *Classroom assessment techniques*. Jossey Bass Wiley.
- Berthoff, A. E., & Stephens, J. (1988). *Forming, thinking, writing*. Boynton/Cook Pub.
- Dean, C. B., Pitler, H., Hubbell, E., & Stone, B. (n.d.). *Classroom Instruction that Works: Research-Based Strategies for Increasing Student Achievement. Second Edition*.
- Sousa, D. A. (2016). *How the special needs brain learns*. Corwin Press.
- Wolfe, P., Wolfe, P., & Nevills, P. (2004). *Building the reading brain, PreK-3*. Corwin Press.

Notes:

7. Stop & Wait Time

Purpose:

Engaging & Participating

Learners need at least three seconds to comprehend a question, consider the information, formulate an answer, and begin to respond. On average, a teacher allows less than one second. Stop & Wait Time encourages instructors to pause during their instruction. Stop & Wait Time is designed to:

- Promote higher-level and longer responses from learners;
- Increase engagement as learners have time to process their thinking and consider their response before being called on;
- Promote greater sense of calm and well-being; and
- Maintain learners' focus.

Procedure:

1. Call for everyone's attention.
2. Wait a few extra seconds (about five) until that time when you *really* could hear a pin drop.
3. Say your instructions or ask a question calmly and clearly.
4. Stop and wait again to provide processing time before moving on or asking for a response.

ALTERNATIVES

- If you find yourself spending a lot of time on PowerPoints, lecturing, or writing on the whiteboard, add a reminder in your notes to periodically stop writing or lecturing, turn towards your audience, and wait (either for learners to catch up or ask questions).
- **Think Time**: After asking a question, wait at least 7 seconds before calling on someone to answer.

Supporting Research:

- Gonzalez, J. (2017, March 04). A 5-Second Solution for a Talkative Class. Retrieved from https://www.cultofpedagogy.com/5-second-solution/
- Naz, A., Khan, W., Khan, Q., Daraz, U., & Mujtaba, B. G. (2013). Teacher's questioning effects on students communication in classroom performance. *context*, *4*(7).
- Rowe, M. B. (1986). Wait time: slowing down may be a way of speeding up!. *Journal of teacher education*, *37*(1), 43-50.
- Ruhl, K. L., Hughes, C. A., & Schloss, P. J. (1987). Using the pause procedure to enhance lecture recall. *Teacher education and special education*, *10*(1), 14-18.
- Stahl, R. J. (1994). *Using" think-time" and" wait-time" skillfully in the classroom*. ERIC Clearinghouse.

Notes:

8. Open Questions

Purpose:

Active Learning

Open Questions are questions that ask learners to explore broad ideas and have multiple respectable answers. Open Questions are designed to:

- Invite risk-taking and creativity in problem solving;
- Have the greatest potential for expanding learners' intellectual and affective horizons;
- Promote intellectual stimulation; and
- Probe responses that explain, state relationships, evaluate an idea, and/or applies a concept.

Procedure:

1. Write, or script your main questions prior to class.
2. Ask open-ended questions that have multiple answers:
    - "What did you observe?",
    - "What do you think happened?",
    - "How do we know?", and
    - "How does this compare to...?".
3. Give learners time to construct their responses.
4. Accept all contributions as opportunities to build upon, reinforce, probe, or adjust and clarify.

Supporting Research:

- Brookfield, S. D., & Preskill, S. (2012). *Discussion as a way of teaching: Tools and techniques for democratic classrooms*. John Wiley & Sons.
- Mintzes, J. J., & Leonard, W. H. (2006). *Handbook of college science teaching*. Arlington, Va: NSTA Press.
- Nelly, C. (2019). Using Open-Ended Questions in the Classroom. http://info.teachstone.com/blog/open-ended-questions-in-the-classroom.

Notes:

9. Stir the Classroom

Purpose:

Active Learning, Engaging, & Integrating

Stir the Classroom uses a question and answer collaboration with rotating learners. Stir the Classroom is designed to:

- Promote learner interaction in varied groups and with different colleagues;
- Increase movement, active participation, and peer support;
- Promote the sharing of ideas from a variety of sources; and
- Increase appreciation for peer contributions.

Procedure:

1. Ask a question.
2. Have learners respond among themselves in groups of four.
3. Number off individuals within each cluster 1 to 4.
4. At a signal, all of the number ones move from their cluster to another cluster.
5. The number ones bring and share information from their homegroup and learn information from the new group.
6. Repeat the pattern with new prompts for the new groups and send different numbered students to join alternative clusters.

ALTERNATIVELY

- Conduct the strategy with clusters seated at tables.
- Note: Benefits wane after 3-4 rounds.

Supporting Research:

- Billmeyer, R. (2010). *Strategies to engage the mind of the learner: Building strategic learners*. Hawker Brownlow Education.
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

10. Four Corners

Purpose:

Active Learning & Assessing

Four Corners is an approach that asks learners to make a decision about a problem or question. Each of the four corners of the room represents different responses. Learners move to the corner that best aligns with their thinking to defend their selection. Four Corners is designed to:

- Promote learning through movement and discussion; and
- Promote listening, verbal communication, cooperation, critical thinking, and decision-making.

Procedure:

1. Ask a complicated or controversial question.
2. In each of the four corners of the room, post an answer option and have learners gather in the corner that best represents their answer.
3. Each corner group then discusses their rationale for selecting their shared response and has a spokesman share out the rationale. While listening, any learner can move to another corner at any time.
4. After all groups have shared, ask learners to reflect on changes in their thinking.

ALTERNATIVE

- **A-B-C-D:** As test prep, place A, B, C, or D in each corner. Ask a multiple-choice question and have learners move to the answer of their choice. Continue steps 4-6.

Supporting Research:

- Four Corners. (n.d.). Retrieved from https://www.theteachertoolkit.com/index.php/tool/four-corners
- Guillaume, A. M., Yopp, R. H., & Yopp, H. K. (2007). *50 strategies for active teaching: Engaging K-12 learners in the classroom*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Notes:

11. Text to Speech

Purpose:

Reading Comprehension & Accessibility

Text to Speech relies on computer programs to turn written text into audible speech. Text to Speech is designed to:

- Offer accessibility and pleasant experiences for all learners, regardless of disability; and
- Support deeper comprehension of a text using a visual and an auditory modality.

Procedure:

TIPS

- ReadSpeaker Text Aid reads text aloud and converts text to a portable audio file. It is embedded within Canvas.
- To provide TextAid for your learners:
  - Create a module or use existing one.
  - Click the "+" button to add an item.
  - Select External Tool from the dropdown menu.
  - Select ReadSpeaker TextAid.
  - Click Add Item to add it to the module.
  - Publish the tool by clicking the gray icon.
- For learners to use ReadSpeaker:
  - Click on the page/speaker icon in the lower left corner of the page
  - Use this space to play, stop, and select volume.

Supporting Research:

- Oregon State University (2019). ReadSpeaker: Use ReadSpeaker and ReadSpeaker TextAid in Canvas. Retrieved from: https://oregonstate.teamdynamix.com/TDClient/1935/Portal/KB/ArticleDet?ID=69905.
- Sasaki, D. (2020). Accessibility within Canvas. Retrieved from: https://community.canvaslms.com/docs/DOC-2061-accessibility-within-canvas.

Notes:

12. Fist to Five

Purpose:

Activating & Engaging

Fist to Five is a qualitative rating scale. Fist to Five is designed to:

- Help learners express their opinions;
- Support learners in expressing their level of confidence and comprehension; and
- Assist learners in expressing their level of readiness for concept application.

Procedure:

1. Explain what the show of fingers represent (a visual is helpful).
    - **Fist**: I don't understand. I need more assistance.
    - **1 finger**: I still need to discuss certain parts of the assignment.
    - **2 fingers**: I am comfortable with the assignment but would like more details.
    - **3 fingers**: I do not completely understand, but I feel comfortable to start.
    - **4 fingers**: I feel like I have a good handle on most of the assignment.
    - **5 fingers**: I completely understand what to do.

ALTERNATIVE

Use the rating scale to monitor the learning objectives. Learners rate how they feel about each objective.

Supporting Research:

- Guillaume, A. M., Yopp, R. H., & Yopp, H. K. (2007). *50 strategies for active teaching: Engaging K-12 learners in the classroom*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.
- What is Fist to Five Strategy? (n.d.). Retrieved from https://k12teacherstaffdevelopment.com/tlb/what-is-fist-to-five-strategy/

Notes:

13. SQ3R

Purpose:

Engaging & Comprehending

AKA: Active Recall or the 3R (read-recite-review) strategy. SQ3R stands for survey-question-read-recall-review. SQ3R is designed to:

- Prompt learners to read as they are more likely to read if they have homework for, will be tested on, or will have to speak about the text;
- Reinforce reading comprehension; and
- Support retrieval practices.

Procedure:

1. Ask learners to first **scan** the reading to get a sense of what it's about and how it's organized. Note the text features, conclusion, and summaries.
2. Based on what was observed, have learners ask **questions** and make predictions.
3. **Review** the purpose for reading.
4. **Read** with purpose while paraphrasing what is found (most effectively in written notes).
5. **Review** the main points of the reading.

Supporting Research:

- McDaniel, M. A., Howard, D. C., & Einstein, G. O. (2009). The read-recite-review study strategy: Effective and portable. *Psychological Science*, *20*(4), 516-522.
- Roediger III, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological science*, *17*(3), 249-255.

Notes:

14. CLOSE Reading

Purpose:

Engaging, Clarifying, & Connecting

CLOSE Reading has learners choose and reflect on meaningful passages from the text. CLOSE Reading is designed to:

- Support learners' comprehension of a text;
- Promote close observation of text features, references, and content shared;
- Prompt learners to interpret their observations through inductive reasoning and personal connections; and
- Ensure learners complete the readings.

Procedure:

1. Ask learners to select a quote or short passage from one of the readings that they found interesting and/or useful.
2. Have the learners write the selected passage in full.
3. Next, learners should rewrite the quote in their own words.
4. Finally, ask the learners to write a 1-2 paragraph reflection on why they selected that quote. Have them address how it applies to the course content, informs their thinking, and/or prompts them to ask new questions.

Supporting Research:

- Kain, P. (1998). How to Do a Close Reading. Retrieved from https://writingcenter.fas.harvard.edu/pages/how-do-close-reading
- McLaughlin, M., & Overturf, B. J. (2013). *The common core: Teaching students in grades 6-12 to meet the reading standards*. International Reading Assoc..

Notes:

15. Viewing/Listening Wrappers

Purpose:

Self-Regulated Learning & Metacognition

A wrapper is an activity that surrounds an existing assignment or activity and encourages metacognition. Wrappers are designed to:

- Provide short, low stress, no/low stakes reflective approaches;
- Promote metacognition and executive functioning skills;
- Improve the learning process and outcomes; and
- Prepare learners for deeper conversations.

Procedure:

While viewing (readings, videos) or listening (podcasts, lectures) have learners respond to some combination of the following:

- What was the most useful or valuable thing you learned? What was the most important or central concept? What idea or fact surprised you? What stands out in your mind? What helped or hindered your understanding? What comparisons and connections can you make between what you experienced and your prior learning, perceptions, existing framework of knowledge, or other courses? Explain how the material reinforced, challenged, or modified your attitudes, emotions, values, or beliefs.

Supporting Research:

- Kalman, C. S. (Ed.). (2017). *Successful science and engineering teaching in colleges and universities*. IAP.
- Lang, J. M. (2012). Metacognition and student learning. *The chronicle of higher education*.
- Lovett, M. C. (2013). Make exams worth more than the grade. *Using reflection and metacognition to improve student learning: Across the disciplines, across the academy*, 18-52.
- Nilson, L. B. (2016). *Teaching at its best: A research-based resource for college instructors*. John Wiley & Sons.
- Schell, J. (2012, October 10). How one professor motivated students to read before a flipped class, and measured their effort. Retrieved from https://peerinstruction.wordpress.com/2012/09/04/how-one-professor-motivated-students-to-read-before-a-flipped-class-and-measured-their-effort/
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64-70.

Notes:

16. Lecture Wrappers

Purpose:

Self-Regulated Learning & Metacognition

A wrapper is an activity that surrounds an existing assignment or activity and encourages metacognition. Wrappers are designed to:

- Provide short, low stress, no/low stakes reflective approaches;
- Promote metacognition and executive functioning skills;
- Improve the learning process and outcomes; and
- Prepare learners for deeper conversations.

Procedure:

1. Provide a 10-20 minute mini-lecture.
2. While pausing, have the learners write down all the important points they recall. They can also list any questions they have.
3. Pair the learners to compare, fill in, and fine-tune their free-recall notes, as well as each other's questions.

TIPS

- Not all wrappers need to be graded – especially those done in class. If graded at a glance they can be CR/NC.
- Learners may write their responses on notecards, discussion boards, in a wiki, or as a blog post.

Supporting Research:

- Bonwell, C. C., & Eison, J. A. (1991). *Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports*. ERIC Clearinghouse on Higher Education, The George Washington University, One Dupont Circle, Suite 630, Washington, DC 20036-1183.
- Kalman, C. S. (Ed.). (2017). *Successful science and engineering teaching in colleges and universities*. IAP.
- Lang, J. M. (2012). Metacognition and student learning. *The chronicle of higher education*.
- Lovett, M. C. (2013). Make exams worth more than the grade. *Using reflection and metacognition to improve student learning: Across the disciplines, across the academy*, 18-52.
- Nilson, L. B. (2016). *Teaching at its best: A research-based resource for college instructors*. John Wiley & Sons.
- Schell, J. (2012, October 10). How one professor motivated students to read before a flipped class, and measured their effort. Retrieved from https://peerinstruction.wordpress.com/2012/09/04/how-one-professor-motivated-students-to-read-before-a-flipped-class-and-measured-their-effort/
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64-70.

Notes:

17. Punctuated Lectures

Purpose:

Reflection & Metacognition

Punctuated Lectures pause to prompt learners' metacognition. Punctuated lectures are designed to:

- Build learners' metacognition skills;
- Better acquaint instructors with learners' processing styles and pitfalls;
- Improve listening skills;
- Increase attentiveness during lectures; and
- Increase responsibility for learning.

Procedure:

1. After approx. 10 minutes of **listening** to a lecture, **stop** and ask learners to reflect on what they were doing. Have them **write** in response to one or more of the following:
   a) How fully were you concentrating on the lecture during the past few minutes? If you got distracted, how did you get your attention back?
   b) What were you doing to make connections between new information and information you already know?
   c) What do you expect to come next in the lecture and why?
2. Provide **feedback** as they share with a partner or with the whole class.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Bransford, J., Donovan, S., & Pellegrino, J. W. (1999). *How people learn: Bridging research and practice*. National Academies Press.
- Giesen, J. (2014). NIU Faculty Development and Instructional Design Center Blog. Retrieved from https://facdevblog.niu.edu/metacognition

Notes:

18. Assignment Wrappers

Purpose:

Self-Regulated Learning & Metacognition

A wrapper is an activity that surrounds an existing assignment or activity and encourages metacognition. Wrappers are designed to:

- Provide short, low stress, no/low stakes reflective approaches;
- Promote metacognition and executive functioning skills;
- Improve the learning process and outcomes; and
- Prepare learners for deeper conversations.

Procedure:

1. Provide reflective questions after learners complete an assignment. Ask them to compare their prior perceptions and actual performance.
    - Describe the research (or writing) process you went through, including the steps, strategies and problems you encountered – how did you overcome them? Identify your goals and strategies for your revision. How will you do a better job on a similar assignment next time?
    - Explain the value of this assignment to you. What knowledge did you gain? What skills did you gain or improve? When do you think this knowledge or these skills will be useful in future?
    - What advice on this assignment do you have for the learners who will take this course next? How should they best prepare? What strategies do you recommend? What problems and pitfalls can you warn them about? What are they likely to gain from doing the assignment?

Supporting Research:

- Bonwell, C. C., & Eison, J. A. (1991). *Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports*. ERIC Clearinghouse on Higher Education, The George Washington University, One Dupont Circle, Suite 630, Washington, DC 20036-1183.
- Kalman, C. S. (Ed.). (2017). *Successful science and engineering teaching in colleges and universities*. IAP.
- Lang, J. M. (2012). Metacognition and student learning. *The chronicle of higher education*.
- Lovett, M. C. (2013). Make exams worth more than the grade. *Using reflection and metacognition to improve student learning: Across the disciplines, across the academy*, 18-52.
- Nilson, L. B. (2016). *Teaching at its best: A research-based resource for college instructors*. John Wiley & Sons.
- Schell, J. (2012). How one professor motivated students to read before a flipped class, and measured their effort. Retrieved from https://peerinstruction.wordpress.com/2012/09/04/how-one-professor-motivated-students-to-read-before-a-flipped-class-and-measured-their-effort/
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64-70.

Notes:

19. Exam Wrappers

Purpose:

Self-Regulated Learning & Metacognition

A wrapper is an activity that surrounds an existing assignment or activity and encourages metacognition. Wrappers are designed to:

- Provide short, low stress, no/low stakes reflective approaches;
- Promote metacognition and executive functioning skills;
- Improve the learning process and outcomes; and
- Prepare learners for deeper conversations.

Procedure:

1. When learners receive a graded exam, they are provided exam reflection space.
2. Learners are asked to report on their study strategies, analyze their errors, and review their perceptions as they studied for the exam.
3. The learners then identify new study approaches as needed.
4. Before the next exam, the reflections are returned so learners can consider what they might change in their study strategies.

ALTERNATIVES

- For each problem solved incorrectly or not at all, learners write an error analysis or a description of the correct strategy and solve the same or a similar problem.
- This approach can be used as a meta-assignment for learning activities.

Supporting Research:

- Bonwell, C. C., & Eison, J. A. (1991). *Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports*. ERIC Clearinghouse on Higher Education, The George Washington University, One Dupont Circle, Suite 630, Washington, DC 20036-1183.
- Kalman, C. S. (Ed.). (2017). *Successful science and engineering teaching in colleges and universities*. IAP.
- Lang, J. M. (2012). Metacognition and student learning. *The chronicle of higher education*.
- Lovett, M. C. (2013). Make exams worth more than the grade. *Using reflection and metacognition to improve student learning: Across the disciplines, across the academy*, 18-52.
- Nilson, L. B. (2016). *Teaching at its best: A research-based resource for college instructors*. John Wiley & Sons.
- Schell, J. (2012). How one professor motivated students to read before a flipped class, and measured their effort. Retrieved from https://peerinstruction.wordpress.com/2012/09/04/how-one-professor-motivated-students-to-read-before-a-flipped-class-and-measured-their-effort/
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64-70.

Notes:

20. Weekly/Unit/ Module Wrapper

Purpose:

Self-Regulated Learning & Metacognition

A wrapper is an activity that surrounds an existing assignment or activity and encourages metacognition. Wrappers are designed to:

- Provide short, low stress, no/low stakes reflective approaches;
- Promote metacognition and executive functioning skills;
- Improve the learning process and outcomes; and
- Prepare learners for deeper conversations.

Procedure:

1. At the end of a unit, large chunk of content, or at the end of a module, ask learners to reflect on their individual and collective learning.
    - In what ways have we met our learning objectives?
    - What remaining questions do we have?
    - How might we synthesize the texts?
    - What connections did you make?

TIPS

- Not all wrappers need to be graded – especially those done in class. If graded at a glance they can be CR/NC.

Supporting Research:

- Bonwell, C. C., & Eison, J. A. (1991). *Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports*. ERIC Clearinghouse on Higher Education, The George Washington University, One Dupont Circle, Suite 630, Washington, DC 20036-1183.
- Kalman, C. S. (Ed.). (2017). *Successful science and engineering teaching in colleges and universities*. IAP.
- Lang, J. M. (2012). Metacognition and student learning. *The chronicle of higher education*.
- Lovett, M. C. (2013). Make exams worth more than the grade. *Using reflection and metacognition to improve student learning: Across the disciplines, across the academy*, 18-52.
- Nilson, L. B. (2016). *Teaching at its best: A research-based resource for college instructors*. John Wiley & Sons.
- Schell, J. (2012). How one professor motivated students to read before a flipped class, and measured their effort. Retrieved from https://peerinstruction.wordpress.com/2012/09/04/how-one-professor-motivated-students-to-read-before-a-flipped-class-and-measured-their-effort/
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64-70.

Notes:

21. Chunking Content

Purpose:

Information Processing

Chunking refers to an approach for making efficient use of short-term memory by grouping information. Smaller chunks of information are easier to commit to memory and facilitate comprehension and retrieval of information. Chunking is designed to:

- Reduce cognitive load as the learner processes information; and
- Make large amounts of information easier to remember.

Procedure:

1. Break larger amounts of information into smaller units, chunks, or lesson segments.
2. Group information into manageable units.
3. Identify similarities or patterns.
4. Organize the information – and when possible, illustrate with a graphic organizer.

Supporting Research:

- Chase, W. G., & Ericsson, K. A. (1982). Skill and working memory. *The psychology of learning and motivation*, *16*, 1-58.
- Chase, W. G., & Simon, H. A. (1973). The mind's eye in chess. In *Visual information processing* (pp. 215-281). Academic Press.
- Chunking Strategy. (2020). Retrieved from https://thepeakperformancecenter.com/educational-learning/thinking/chunking/chunking-as-a-learning-strategy/

Notes:

22. Improved PPT Slides

Purpose:

Informing

PowerPoint Slides can be improved to improve content clarity and keep learners engaged. PowerPoint slides are designed to:

- Communicate ideas more powerfully than words alone;
- Support memory with the use of images/visuals; and
- Facilitate note-taking.

Procedure:

TIPS

- Learners prefer white backgrounds with dark text.
- Separate slide decks into chunked subtopics.
- Avoid full sentences and paragraphs on slides.
- Keep text precise with bullet points and outlines.
- Utilize simple, direct visuals to supplement material.
- Graphic Organizers or illustrations are helpful summary slides to combine concepts or processes.
- Avoid slides with multiple or overlapping images.
- Embed questions within the slides to highlight ideas.
- Be explicit "Need to Know" versus "Nice to Know".
- Teach beyond the information presented on the screen – allow the narrative to engage the learner.
- Allow learners to later review the slides.
- Intersperse activity within your lecture.

Supporting Research:

- Allen, R., & Scozzi, N. (2011). *Sparking student synapses, grades 9–12: Think critically and accelerate learning*. Corwin Press.
- Allen, R. (2008). *Green light classrooms: Teaching techniques that accelerate learning*. Corwin Press.
- Jensen, E. (2004). *Brain compatible strategies*. San Diego, CA: Brain Store.
- Lai, Y. S., Tsai, H. H., & Yu, P. T. (2011). Integrating annotations into a dual-slide PowerPoint presentation for classroom learning. *Journal of Educational Technology & Society, 14*(2), 43-57.
- Wall, E. S., & Posamentier, A. S. (2006). *What successful math teachers do, grades prek-5: 47 research-based strategies for the standards-based classroom*. Corwin Press.

Notes:

23. Flipped Classroom

Purpose:

Engaging & Informing

In a flipped classroom, content of the course is introduced and/or taught asynchronously (before class) so that more active learning can take place during face-to-face instruction. Flipped Classrooms are designed to:

- Support learner-centered pedagogy;
- Provide active learning experiences;
- Promote self-paced learning;
- Initiate exploration of topics in a deeper manner;
- Prompt learner preparation; and
- Promote self-assessment.

Procedure:

1. Identify the lesson you want to flip.
2. Outline key learning outcomes and a lesson plan.
3. Teach content online (via video lecture, audio clip) ensuring it contains all the key elements.
4. Engage learners with the content through various online activities (discussion board, online quiz, short writing assignment) before class.
5. During class, engage learners in the application of the content while you provide support and answer questions.

TIP

- Review and extend but do not reteach what was taught online prior to class.

Supporting Research:

- Abeysekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research. *Higher Education Research & Development, 34*(1), 1-14.
- Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International society for technology in education.
- Chen, F., Lui, A. M., & Martinelli, S. M. (2017). A systematic review of the effectiveness of flipped classrooms in medical education. *Medical education, 51*(6), 585-597.
- Dunn, J. (2016). The 6-step guide to flipping your classroom. Retrieved from https://medium.com/@jdunns4/the-6-step-guide-to-flipping-your-classroom-d721878f85c1
- Flipping the Classroom: Center for Teaching Innovation. (2017). Retrieved from https://teaching.cornell.edu/teaching-resources/designing-your-course/flipping-classroom

Notes:

24. Asynchronous Video Lectures

Purpose:

Informing

Video Lectures are lesson recordings posted online for learners to view. Video Lectures are designed to:

- Enhance class discussions (front-load);
- Deliver content to enrich understanding (lecture);
- Teach learners how something works (tutorial);
- Model a step-by-step guide or process (demonstration);
- Provide learners access to content anytime, anywhere;
- Customize the pace of instruction for learners; and
- Be available to review difficult content if needed.

Procedure:

TIPS

- Chunk longer lectures into 5-12 minute videos to organize topics and align with attention spans.
- Create more informal videos with a personal tone.
- Images/Animation + narration is better than text + narration for retention and learning.
- Hold learners accountable for viewing the videos in Canvas before or in place of class.
- Assign a Wrapper or video guide.
- Reserve class for activities and discussion. Reference, but do not repeat, what was in the video.

OSU SUPPORT RESOURCES

- Center for Teaching and Learning
- Academic Technology
- Faculty Media Center

Supporting Research:

- Bodie, G. D., Powers, W. G., & Fitch-Hauser, M. (2006). Chunking, priming and active learning: Toward an innovative and blended approach to teaching communication-related skills. *Interactive learning environments*, *14*(2), 119-135.
- Hodges, R., Simpson, M. L., & Stahl, N. A. (2012). *Teaching study strategies in developmental education: Readings on theory, research, and best practice.* Boston: Bedford/St. Martin's.
- Linder, K. E. (2016). *The blended course design workbook: A practical guide.* Stylus Publishing, LLC.
- Martin, D. C., & Blanc, R. (2001). Video-based supplemental instruction (VSI). *Journal of Developmental Education*, *24*(3), 12.
- Waters, J. K. (2011). Lecture capture: Lights! Camera! Action. *Campus Technology*, *24*(10), 22-28.

Notes:

25. Synchronous Video Class Time

Purpose:

Engaging & Communicating

Video Class Time simulates face-to-face interactions through video platforms. Video Class Time is designed to:

- Provide presence through facial expressions, social cues, and intonation;
- Use real-time communication to increase interactivity and improve class community;
- Reduce psychological distance and isolation; and
- Enhance instruction in online modalities.

Procedure:

TIPS

- Have an agenda. Tell learners what to expect via email beforehand.
- Do a quick social check-in at the start of class.
- Use Zoom Discussion Tools: polling, audio, thumbs up/thumbs down, raise hand or chat.
- Use Zoom Collaboration Tools: Randomly select learners to breakout rooms. Circulate among the rooms. Assign specific roles to group members. Have learners use the whiteboard to create, record, and report their ideas.
- Use Visual Supports: slides, images, and webcams to stimulate interest.

Supporting Research:

- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. John Wiley & Sons.
- Brown, B., Schroeder, M., & Eaton, S. E. (2016). Designing Synchronous Online Interactions and Discussions. *Online Submission*.
- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. John Wiley & Sons.
- Gooblar, D. (2018, November 05). The 'Holy Grail' of Class Discussion. Retrieved from https://www.chronicle.com/article/The-Holy-Grail-of-Class/245009
- How to Hold a Better Class Discussion. (2019). Retrieved from https://www.chronicle.com/interactives/20190523-ClassDiscussion
- Kelly, R. (2016). Build Community, Extend Learning with Online Synchronous Sessions. Retrieved June 12, 2020, from https://www.facultyfocus.com/articles/online-education/build-community-extend-learning-online-synchronous-sessions/
- Lemov, D. (2010). *Teach like a champion: 49 techniques that put students on the path to college (K-12)*. John Wiley & Sons.
- Takeuchi, A. P. Preciado, B, & J. Lock (2016). *Proceedings of the IDEAS: Designing for Innovation*, pp. 51 – 60. Calgary, Canada: University of Calgary.

Notes:

26. Podcasts

Purpose:

Informing

Podcasts are audio-only recordings of content that learners can listen to. Podcasts are designed to:

- Provide flexibility (times and locations) for listening;
- Free up class time for discussions and synthesis;
- Increase learner confidence to participate in class discussions;
- Broaden learners' understanding of the course; and
- Help keep learners engaged with the content delivery.

Procedure:

TIPS

- Listen to a variety of podcasts to experience different genres and production approaches.
- Provide a Wrapper or other supplemental activity for learners to complete while listening.
    - Questions to answer while listening
    - Questions to answer after listening (to be posted to a Discussion Board)
    - Guided notes
- Use podcasts to share interviews with different colleagues or experts from the field.

OSU SUPPORT RESOURCES

- Center for Teaching and Learning
- Academic Technology
- Faculty Media Center

Supporting Research:

- Kelly, R. (2013). Using Podcasts to Address Concepts Students Find Difficult. Retrieved from https://www.facultyfocus.com/articles/teaching-with-technology-articles/using-podcasts-to-address-concepts-students-find-difficult/
- Linder, K. E. (2016). *The blended course design workbook: A practical guide*. Stylus Publishing, LLC.

Notes:

27. Just-in-Time Teaching (JiTT)

Purpose:

Engaging, Clarifying, & Informing

JiTT solicits ideas that learners are confused about and addresses those concepts in class. JiTT is designed to:

- Focus on pre-class material;
- Reduce attrition and improve learner preparation;
- Promote thinking habits by emphasizing corrective feedback;
- Respond to the misconceptions revealed by learners' electronic responses to questions; and
- Identify learners' strengths, weaknesses, and learning styles to maximize efficacy in the classroom.

Procedure:

1. Using Canvas, post conceptual questions that address a topic of interest. Ideally, this question(s) should have multiple correct answers.
2. Ask learners to respond before attending class.
3. Before class (Just-in-Time), review the responses.
4. Choose learner responses that represent different viewpoints (whether the reasoning is correct or not).
5. Make slides of these question/answer relationships and discuss them during class.
6. Highlight important parts, reinforce correct information, and provide feedback on incorrect reasoning.

Supporting Research:

- Marrs, K., Novak, G. (2004). Just-in-Time teaching in biology: Creating an active learner classroom using the internet. Cell Biology Education, 3(1): 49–61.
- Simkins, S. (2009). Just-In-Time Teaching. Retrieved from https://jittdl.physics.iupui.edu/jitt/
- Sullivan, C. S., Middendorf, J., & Camp, M. E. (2008). Engrained study habits and the challenge of warm-ups in just-in-time teaching. The National Teaching and Learning Forum, 17 (4), 5-8.

Notes:

28. Team-based Learning (TBL)

Purpose:

Cooperative & Active Learning

TBL uses groups to complete assignments and establish consensus. TBL is designed to:

- Converge diverse thinking to make a single, collective decision;
- Increase achievement and productivity;
- Hold learners accountable to self and others;
- Promote collaboration, contribution, and interpersonal relationships; and
- Increase peer feedback and reflection.

Procedure:

1. **Preparation:** Learners complete pre-class readings or assignments. At class, they complete an Individual Readiness Assurance Test (iRAT) with lower-leveled, multiple choice questions. Once passed, they join their team to complete a Team Readiness Assurance Test (tRAT).
2. **Application:** Teams use the reading/quiz content to make decisions on significant problems (case studies, realistic data). The teacher compares the team responses and provides feedback.
3. **Assessment:** After practicing, the groups are given problems to solve for a grade.
4. **Anonymous Peer Evaluation**: Peer evaluations can be performed 1/3-1/2 way through the term to improve teams. Peer evaluation at the end of the course can provide credit towards participation.

Supporting Research:

- Huggins, C. M., & Stamatel, J. P. (2015). An exploratory study comparing the effectiveness of lecturing versus team-based learning. *Teaching Sociology*, *43*(3), 227-235.
- Michaelsen, L. K., Knight, A. B., & Fink, L. D. (2004). Team-based learning: A transformative use of small groups in college teaching.
- Ravindranath, D., Gay, T. L., & Riba, M. B. (2010). Trainees as teachers in team-based learning. *Academic Psychiatry*, *34*(4), 294-297.
- What is Team-Based Learning? A quick guide for busy faculty members. (2020). Retrieved from https://ciel.viu.ca/teaching-learning-pedagogy/engaging-your-students/learning-through-groups-teams/what-team-based-learning-quick-guide-busy-faculty-members

Notes:

29. Problem-based Learning (PBL)

Purpose:

Cooperative & Active Learning

Groups of learners tackle real-world problems that they define and then present out their findings. PBL is designed to:

- Create space to solve complex, multifaceted, and realistic problems;
- Promote learner research outside class on learner-identified issues;
- Enhance long-term knowledge retention;
- Appeal to learners who struggle to grasp abstract concepts;
- Develop transferable skills; and
- Improve teamwork and interpersonal skills.

Procedure:

1. Define the learning outcomes of a project and establish ground rules for team collaboration.
2. Teams identify, define, and analyze a real-world problem.
3. Teams determine what they know, need to know, and where to find the data (databases, interviews).
4. Teams divide the work and conduct research.
5. Learners continuously meet to share their findings and conduct additional research.
6. After merging their ideas, teams write up or orally present their best solution (think research fair).
7. Use rubrics to determine clear communication of: the problem, background, research methods, solutions (feasible and research-based), and resources. Also consider self and peer assessments.

Supporting Research:

- Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of problem-based learning: A meta-analysis. Learning and instruction, 13(5), 533-568.
- Gijbels, D., Dochy, F., Van den Bossche, P., & Segers, M. (2005). Effects of problem-based learning: A meta-analysis from the angle of assessment. *Review of educational research*, *75*(1), 27-61..
- Nilson, L. B. (2016). *Teaching at its best: A research-based resource for college instructors*. John Wiley & Sons.
- Problem-Based Learning: Center for Teaching Innovation. (2020). Retrieved from https://teaching.cornell.edu/teaching-resources/engaging-students/problem-based-learning

Notes:

30. Case-Based Learning (CBL)

Purpose:

Collaborative & Active Learning

CBL contextualizes problems in realistic situations and encourages multiple forms of assessment. CBL is designed to:

- Promote application of learner knowledge to real-world scenarios;
- Promote higher levels of cognition;
- Utilize collaborative learning;
- Encourage learners' self-reflection and critical reflection; and
- Promote scientific inquiry.

Procedure:

1. Present a disciplinary problem(s) in a realistic situation.
    - Think: genetic illness, spread of disease, client defense, business success or failure, business plan, hiring or evaluation protocols, managing a fourth grade class,
    - The case can be presented to individuals, small groups or the whole class. Diverse but stable teams are preferred for a richer learning experience.
2. Ask learners to apply their course knowledge to devise one or more solutions or resolutions to the problem.
3. Provide guidance and interrupt strategically.
4. Consider multiple ways to assess learners. Ask groups to report back their solutions using a product that best communicates their ideas.

Supporting Research:

- Herreid, C. F. (1994). Case Studies in Science--A Novel Method of Science Education. *Journal of College Science Teaching*, *23*(4), 221-29.
- Jonassen, D. H., & Hernandez-Serrano, J. (2002). Case-based reasoning and instructional design: Using stories to support problem solving. *Educational Technology Research and Development*, *50*(2), 65-77.
- Lee, V. S. (2012). What is inquiry-guided learning?. *New directions for teaching and learning*, *2012*(129), 5-14.
- Thistlethwaite, J. E., Davies, D., Ekeocha, S., Kidd, J. M., MacDougall, C., Matthews, P., ... & Clay, D. (2012). The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. *Medical teacher*, *34*(6), e421-e444.
- Williams, B. (2005). Case based learning—a review of the literature: is there scope for this educational paradigm in prehospital education?. *Emergency Medicine Journal*, *22*(8), 577-581.
- Zak, P. (2013). How Stories Change the Brain. Retrieved from https://greatergood.berkeley.edu/article/item/how_stories_change_brain

Notes:

31. Service Learning Project (SLP)

Purpose:

Active Learning, Reflecting, & Civic Responsibility

Service Learning melds community needs and course content into projects. Service Learning is designed to:

- Provide deeper understanding of content through performed community service;
- Enhance a sense of civic responsibility and reduce stereotypes;
- Promotes affective and cognitive reflection; and
- Supports a greater sense of personal efficacy, personal identity, spiritual growth, and moral development.

Procedure:

1. **Preparation/Planning**: Identify and align the learning goals of the course (think affective, ethical, or social objectives) to the broader community needs. Plan service activities. Learners choose from two or more options. Teach the knowledge and skills they will need to be successful. Learners then implement the plan using the key theoretical, methodological and applied issues at hand.
2. **Service/Learning**: Ensure fluid communication, needs, and liability issues are addressed.
3. **Reflection/Application**: Encourage critical thought about experience and applying theory to a broader social context.
4. **Presentation**: Offer flexible and authentic approaches to demonstrate learning (teach a lesson, launch a marketing campaign, field research projects). Learner, instructor, and community partner can all contribute towards course grade.

Supporting Research:

- Service learning. (2012). Retrieved from https://www.washington.edu/teaching/topics/engaging-students-in-learning/service-learning/
- Service-Learning Project Steps: Chandler-Gilbert Community College. (2014). Retrieved from https://www.cgc.edu/Students/studentlife/slearning/faculty/Pages/S-LProjectSteps.aspx

Notes:

32. Socratic Seminar

Purpose:

Synthesis & Communication

Socratic Seminars are discussions among learners to interrogate the complexities of an idea or text. Socratic Seminars are designed to:

- Connect classroom activities to learners' personal experiences;
- Promotes rational thinking;
- Engage learners emotionally to make learning active;
- Teach the importance of collaborative inquiry; and
- Promote synthesis and evaluation.

Procedure:

1. Prior to the seminar, provide discussion prompts and interaction guidelines/norms.
2. Begin with one planned question to open the dialogue but the succeeding questions should be based on the answers the learners provide.
3. In response to your initial question, a learner takes a position, stance, or point of view.
4. Follow up questions from you or other learners should raise a weakness of or exception to that position (be the devil's advocate).
5. Anyone can provide a defense or a qualification of the original position in response to the inquiry.
6. During the seminar, facilitate conversations that draw out all learners ideas and varied perspectives. Encourage debate and consensus.
7. After the seminar, reflect on and discuss contributions and what was learned.

Supporting Research:

- Holden, J., & Schmit, J. S. (2002). *Inquiry and the Literary Text: Constructing Discussions in the English Classroom. Classroom Practices in Teaching English*. National Council of Teachers of English, 1111 W. Kenyon Road, Urbana, IL 61801-1096
- Grandmont, M. (2018). Crafting and conducting a successful socratic seminar. Retrieved from: https://ncte.org/blog/2017/12/crafting-conducting-successful-socratic-seminar/
- Overholser, J. C. (1992). Socrates in the classroom. College Teaching, 40 (1), 14-19.
- Socratic Seminars - ReadWriteThink. (2020). Retrieved from: http://www.readwritethink.org/professional-development/strategy-guides/socratic-seminars-30600.html
- Tredway, L. (1995, September). Socratic seminars: engaging students in intellectual discourse. *Educational Leadership*, *53*(1), 26+. Retrieved from: https://link-gale-com.ezproxy.proxy.library.oregonstate.edu/apps/doc/A17533233/AONE?u=s8405248&sid=AONE&xid=59e83c2e

Notes:

33. Virtual Fieldtrips

Purpose:

Experiential Learning & Engagement

Virtual Fieldtrips use online resources to simulate live fieldtrips. Virtual Fieldtrips are designed to:

- Remove the barriers of time, cost and location;
- Provide access to places important to the discipline of study to make content more relevant;
- Imitate three-dimensional reality;
- Improve learners' critical-thinking skills;
- Enable learners to experience an event more than once;
- Create authentic, experiential experiences; and
- Support the brain in remembering ideas through first hand experiences.

Procedure:

1. Identify destinations consistent with the learning objectives and needs/interests of the learners.
2. Script an introductory statement, include: the URL, the importance of the destination to the field of study, and a map.
3. Provide a general focus of what the learner needs to achieve. Include a guided tour with details on what to look for, collect or observe.
4. Encourage learners to gather souvenirs, pictures, photos, journal entries, and other memories/interesting findings from their trip.
5. Learners share their journey. A discussion board, wiki, blog or voice-thread are all mechanisms for this sharing activity.

Supporting Research:

- Fogarty, R. J. (Ed.). (2009). *Brain-compatible classrooms*. Corwin Press.
- Gregory, G. H., & Herndon, L. E. (Eds.). (2010). *Differentiated instructional strategies for the block schedule*. Corwin Press.
- Raines, D. (2012). Virtual Field Trips: An Online Learning Experience: Online Learning Consortium, Inc. Retrieved from https://secure.onlinelearningconsortium.org/effective_practices/virtual-field-trips-online-learning-experience

Notes:

34. Fishbowl

Purpose:

Information Processing: Discussing, Constructing, & Critical Listening

Fishbowls are structured discussions where part of the class actively participates in a discussion while the remaining learners listen and take notes.

A Fishbowl is designed to:

- Provide think time about a topic before participating in a whole-class discussion;
- Provide structure for in-depth discussions; and
- Develop critical listening skills.

Procedure:

1. Ask a small group of learners (3-5) to sit in a circle in the center of the room while the remaining learners stand outside the circle around them.
2. Give the learners the following guidelines: 1) Only inner circles will speak. 2) Outer learners will observe and take notes (on content and group processes).
3. Provide the inner circle a prompt, question, or task for discussion.
4. Debrief with all learners, addressing the content issues that arose and the group processes.

Supporting Research:

- Major, C. H., Barkley, E. F., & Cross, K. P. (2005). Collaborative Learning Techniques: A Handbook for College Faculty.
- Miller, R. L., & Benz, J. J. (2008). Techniques for encouraging peer collaboration: Online threaded discussion or fishbowl interaction. *Journal of Instructional Psychology*, *35*(1).
- White, K. R. (1974). T-groups revisited: Self-concept change and the" fish-bowling" technique. *Small Group Behavior*, *5*(4), 473-485.

Notes:

35. Jigsaw to Learn

Purpose:

Information Processing: Teaching Others & Learning

Jigsaws have learners split into groups to learn specific content then mix to teach their peers what they learned. Jigsaws are designed to:

- Promote collaborative work as each individual is an “expert” with only one piece of the puzzle. All learners are required to make the puzzle whole;
- Teach multiple topics simultaneously during the same class session;
- Deepen learning as learners work with other “experts” and explain material to “novices”; and
- Motivate learners to accept responsibility for their own/collective learning.

Procedure:

1. Cluster learners into “Jigsaw Groups” of 5 (if 5 topics are to be studied).
2. Count off learners in each Jigsaw Group 1 to 5.
3. Have all the number 1s, 2s, 3s, and so on move into “Expert Groups” of like numbers.
4. In the Expert groups, members read their assigned material (which differs for each group). They converse about its meaning, and determine what ideas they will teach and how (i.e. illustrations, graphs, charts).
5. Expert group members return to their Jigsaw group, in which they serve as the ONLY expert (of their topic).
6. Each "expert" teaches the material to the other members and leads the discussion.
7. Have the class reflect on the group discoveries in a debriefing session.

TIPS

- Provide prompts for expert-group conversations.

Supporting Research:

- Aronson, E. (2000). The Jigsaw Classroom. Retrieved from https://www.jigsaw.org/
- Doymus, K. (2008). Teaching chemical equilibrium with the jigsaw technique. *Research in science Education*, *38*(2), 249-260.
- Major, C. H., Harris, M. S., & Zakrajsek, T. (2016). *Teaching for learning: 101 intentionally designed educational activities to put students on the path to success*. New York: Routledge, Taylor & Francis Group.
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

36. Group Roles

Purpose:

Cooperative Learning

Group Roles assigns group members particular tasks to be in charge of for collaborative projects. Group roles are designed to:

- Support the development of cooperative learning;
- Support the creation of a culturally responsive classroom;
- Ensure individual accountability; and
- Teach social and cognitive skills as learners discuss ideas.

Procedure:

1. Create cooperative learning groups.
2. For each group member, assign one of the following roles:
   - **Facilitator** – ensures that the group stays on task.
   - **Scribe** – takes notes and writes down anything the group has to submit in writing.
   - **Time Keeper** – tells the group when half the time is over and when there is one minute remaining.
   - **Reporter** – gives an oral presentation to the class regarding results of the groups' work.
   - **Materials Manager** – passes out and collects any materials or resources that the group needs to complete the task.
   - **Process Observer** – provides feedback to the group on how well they followed the class norms.

Supporting Research:

- Algozzine, B., Campbell, P., & Wang, A. (Eds.). (2009). *63 Tactics for Teaching Diverse Learners, Grades 6-12*. Corwin Press.
- Allen, R., & Currie, J. (2012). *U-turn teaching: Strategies to accelerate learning and transform middle school achievement*. Corwin Press.
- Costa, A. L. (2008). *The school as a home for the mind: Creating mindful curriculum, instruction, and dialogue*. Corwin press.
- Gregory, G. H., & Chapman, C. (2012). *Differentiated instructional strategies: One size doesn't fit all*. Corwin press.
- Tileston, D. W. (2011). *Closing the RTI gap: Why poverty and culture count*. Bloomington, IN: Solution Tree Press.

Notes:

37. Mnemonics

Purpose:

Active Learning

Mnemonics are catchy phrases or patterns that assist in remembering something. Mnemonics are designed to:

- Help learners learn new, large, and oftentimes unrelated chunks of material;
- Assist in retrieving information from memory with accuracy;
- Increase recall in sequential order; and
- Improve learning.

Procedure:

1. Discuss the topic to be learned.
2. Pre-select a mnemonic strategy (acronym, acrostic, chain, keyword, rhyme, or phrase).
   - **Acronym**: A word created using the first letter of each word. (ROY G BIV for color spectrum)
   - **Acrostic**: Sentence in which the first letter of each word connects with the intended-to-be recalled information. (Every Good Boy Does Fine for music scales)
   - **Chaining**: Intertwine items to be remembered into a story.
   - **Keyword**: Associate two items using imagery.
   - **Rhymes and Phrases**: Catchy phrase or jingle.(I before E, except after C).
3. Model the strategy and assist learners until they use it independently.
4. Allow learners the opportunity to practice orally and provide corrective feedback.

Supporting Research:

- Kolencik, P. L., & Hillwig, S. A. (2011). *Encouraging metacognition: Supporting learners through metacognitive teaching strategies*. New York, NY: Lang, Peter New York.
- Laing, G. K. (2010). An empirical test of mnemonic devices to improve learning in elementary accounting. *Journal of Education for Business*, *85*(6), 349-358.
- Ronis, D. L. (2007). *Brain-compatible mathematics*. Thousand Oaks, CA: Corwin Press.
- Sousa, D. A. (2012). *How the brain learns*. Thousand Oaks, CA: SAGE.
- Sprenger, M. (2010). *Brain-based teaching in the digital age*. ASCD.

Notes:

38. Think Aloud

Purpose:

Modeling Cognition & Metacognition

Think Alouds makes thinking transparent for others to learn from. Think Alouds are designed to:

- Explicitly model the thinking processes of an expert;
- Make transparent how a mind actively responds to thinking through trouble spots and constructing meaning while engaged in a process (lab work, reading, mapping ideas);
- Model how to monitor one's thinking to reveal shortcomings; and
- Teach new vocabulary and processes.

Procedure:

1. Select a task that contains points of difficulty.
2. While completing the task, orally think aloud by sharing your thoughts, questions, emotions, and applications of strategies.
3. Use talk to:
    - **Plan** – focus your attention, set your learning goals, decide which strategies to use, when, and how.
    - **Monitor your thinking** – ask yourself, are things making sense? Am I going to fast? Do I have a clear understanding of what I am doing?
    - **Evaluate your thinking** – ask yourself, am I done? What worked? What would I do differently?
4. Have learners practice thinking aloud in pairs.
    - Pair talk through solving problems and guide each other through the process.
5. Have learners practice independently and transfer their thinking skills to other lessons.

Supporting Research:

- Davey, B. (1983). Think aloud: Modeling the cognitive processes of reading comprehension. *Journal of reading*, *27*(1), 44-47.
- Hartman, H. J. (Ed.). (2001). *Metacognition in learning and instruction: Theory, research and practice* (Vol. 19). Springer Science & Business Media.
- Kolencik, P. L., & Hillwig, S. A. (2011). *Encouraging metacognition: Supporting learners through metacognitive teaching strategies*. New York, NY: Lang, Peter New York.
- Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational psychology review*, *7*(4), 351-371.
- Whimbey, A., Lochhead, J., & Narode, R. (2013). *Problem solving & comprehension*. Routledge.

Notes:

39. Escape Rooms

Purpose:

Creativity, Problem-solving, & Teamwork

Escape rooms have groups of people "locked" in a room where they have to gather clues, complete puzzles, and solve mysteries to escape, all before time runs out. Escape Room teaching activities are designed to:

- Provide a collaborative learning experience;
- Engage real-world thinking;
- Encourage transfer of knowledge; and
- Recall and apply concepts.

Procedure:

1. Provide a narrative that interests the learners for escaping a room. The plot and problems should be relevant to course content.
2. Find or create a problem-set (use multiple-choice, numeric, one-word, or true-false questions).
3. Create sub-groups of 3-4 problems that become the clues to open one lock at a time – there should be multiple locks that need to be opened to escape.

TIPS

- Have something for the learners to "unlock" – physical locks, Google forms, or other online platforms all work great.
- Pull problems from old assignments.
- Set a time limit with a penalty for not completing on time, or have the learners finish outside of class.
- In-class: Station problems (clues) throughout the room and design the escape route to match the physical space.
- Online: Google Forms and Top Hat both work great!

Supporting Research:

- Everfi. (2020). 4 Escape Room Ideas for Classrooms. Retrieved from https://everfi.com/insights/blog/4-escape-room-ideas-for-classrooms/
- J. (2020). Make Any Worksheet Into an Escape Room in the Classroom. Retrieved from https://teacheveryday.com/escape-room-in-the-classroom/
- Ridgway, N. (2020). Digital Escape Rooms in your Classroom. Retrieved from https://www.classtime.com/blog/digital-escape-rooms/
- WeAreTeachers Staff (2019). So You Want to Build a Classroom Escape Room... Retrieved from https://www.weareteachers.com/build-a-classroom-escape-room-lesson/

Notes:

40. Roleplay

Purpose:

Active Learning & Self-Assessment

Roleplays have learners act out scenarios to engage with course content. Roleplays are designed to:

- Deepens learners' understanding of course concepts especially when visual, spatial, linguistic, and bodily modalities are stimulated;
- Allows for multiple perspectives and encourages critical thinking;
- Help learners remember new content and make emotional connections to the content;
- Ignite the cerebrum and limbic system to support the acquisition of spoken language and emotional control; and
- Immerse learners in situations that support understanding and memory of new content in the body and the brain.

Procedure:

1. Ask learners to form groups.
2. Present the scenario and allow time for discussion.
3. Assign or ask learners to assume certain roles.
4. Discuss the norms for role playing.
5. Inform learners of the parameters that will signify the end of the activity.
6. Learners improvise the script, using a realistic approach.
7. Monitor, facilitate, and provide feedback as learners work through the role play.
8. Debrief the activity with a discussion that explores the application of learned concepts.

Supporting Research:

- Allen, R., & Scozzi, N. (2011). *Sparking student synapses, grades 9–12: Think critically and accelerate learning*. Corwin Press.
- Gregory, G. H., & Chapman, C. (2012). *Differentiated instructional strategies: One size doesn't fit all*. Corwin press.
- Jensen, E. (2007). Brain-compatible Strategies (2nd ed.) Victoria, Australia: Hawker Brownlow Education.
- Kraus, R. (2008). You must participate: Violating research ethical principles through role place. College Teaching, 56 (3), 131-136.
- Sousa, D. A., & Pilecki, T. (2013). *From STEM to STEAM: Using brain-compatible strategies to integrate the arts*. Corwin Press.

Notes:

41. Assumption Wall

Purpose:

Active Learning, Information Processing: Exploring & Discovering

Assumption Walls aid in surfacing, exploring, articulating and confronting assumptions about sensitive concepts. Assumption Walls are designed to:

- Encourage active interest;
- Surface assumptions related to a challenge or sensitive topic; and
- Explore and inquire about varied perspectives surrounding subjects, concepts, and ideas.

Procedure:

1. Prior to teaching a sensitive topic, invite learners to list their assumptions.
2. Have learners choose one that most informs their behavior to write on a sentence strip in 8-12 words.
3. In groups of 4-12, post assumptions on wall space nearest them.
4. Review class norms for engaging in difficult dialogue.
5. Model inquiry using the following stems in an approachable voice:
    - I am curious about the assumption _____.
    - Whose is it?
    - Help me understand what are some reasons you value that highly.
        - What data informs your thinking? What might be alternative interpretations to that data? Which aspects of the assumptions are generalizable or situational?
6. Provide learners a copy of the stems to use as they inquire about the posted assumptions in round-robin fashion.

Supporting Research:

- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/
- Wabisabi Learning. The Real Purpose of Inquiry-Based Learning and Why It Matters. https://wabisabilearning.com/blogs/inquiry/inquiry-based-learning-purpose.

Notes:

42. Gots & Wants

Purpose:

Classroom Assessment Technique (CAT)

Gots & Wants has learners provide anonymous feedback to the instructors. Gots & Wants is designed to:

- Summarize and capture learners' collective experiences;
- Identify further learning interests and needs; and
- Influence teaching adjustments.

Procedure:

1. Individuals write one "got" per sticky note.
    1. A "got" might be a new idea, a received compliment, something learned, a teaching approach that supported their learning, or a positive response to working with a colleague.
2. Individuals write one "want" per sticky note.
    - A "want" might be a comment about the process (go faster or slower), a request for information, or a comment about materials.
3. As the class adjourns, learners place their sticky notes on charts labeled "gots" or "wants."
4. After class, categorize the "gots" and "wants." Use this information to adjust your practices. Communicate your responses to their gots and wants at the start of the next class.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Field Tested Learning Assessment Guide (n.d.). Classroom Assessment Techniques (CATs) - Overview. Retrieved from: http://archive.wceruw.org/cl1/flag/cat/cat.htm
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

43. 3-2-1

Purpose:

Classroom Assessment Technique (CAT)

3-2-1 is a debriefing tool to reflect on conceptual knowledge and future application. 3-2-1 is designed to:

- Summarize and capture learners' learning;
- Identify further learning interests and needs; and
- Influence teaching adjustments.

Procedure:

1. At the end of class time, unit, and/or module ask learners to independently list:
   - 3 – new facts or ideas they learned
   - 2 – ways they plan to implement or apply their new learning
   - 1 – idea that either needs clarification or that they would like to know more about
2. Collect the CAT to inform your teaching and to clarify, correct, or elaborate in a follow-up.

ALTERNATIVES

- Have learners post to a discussion board.
- In a synchronous (live) online class, learners can write on a white-board.
- Use a shared (open for anonymous responses) google document to collect responses.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Martin, M. B. (1999). Classroom assessment techniques designed for technology. Middle Tennessee State University. Retrieved from: https://files.eric.ed.gov/fulltext/ED436119.pdf.
- Simpson-Beck, V. (2011), *Assessing classroom assessment techniques*. Active Learning in Higher Education, 12: 125-132.

Notes:

44. Brain Dump

Purpose:

Classroom Assessment Technique (CAT)

A Brain Dump is simply the act of retrieving and dumping all the contents of your brain onto paper. Brain Dumps are designed to:

- Summarize and capture learning;
- Influence close reading and/or listening;
- Practice retrieval of information;
- Influence teaching adjustments; and
- Support learners in reinforcing and/or assessing the extent to which they understand the material.

Procedure:

1. Without resources, have learners write down everything they remember from the class lecture, video, and/or readings.
2. After 5-10 minutes, collect their recollections.
3. Return the Brain Dumps to their authors at the beginning of the next test or quiz.

TIPS

- Brain Dumps can be done throughout a lesson. Stop periodically to write about what was just taught.

ALTERNATIVE

- Have learners post their ideas to a discussion board.
- Flipgrid One is free and supports digital Brain Dumps. Encourage learners to watch other videos to see what their peers remembered that they didn't.
- In Zoom, learners can write their collective ideas in a Breakout Room on a whiteboard.
- Use a shared (open for anonymous responses) Google document to collect responses.

Supporting Research:

- Arnold, K. M., & McDermott, K. B. (2013). Free recall enhances subsequent learning. *Psychonomic bulletin & review*, *20*(3), 507-513.
- Karpicke, J. D., & Blunt, J. R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. *Science*, *331*(6018), 772-775.
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

45. Minute Paper

Purpose:

Classroom Assessment Technique (CAT)

Minute Papers have a focused question that can be answered within a minute (or two). Responses to these inquiries should be quick and based on student opinion. Minute Papers are designed to:

- Summarize and capture learning;
- Identify further learning interests and needs;
- Influence teaching adjustments; and
- Support learners in reinforcing and/or assessing the extent to which they understand the material.

Procedure:

1. At the end of class time, unit, and/or module ask learners to independently respond to:
    - "What was the most important thing you learned?"
    - "What important question remains unanswered?“
2. Provide learners 1-2 minutes to write their responses on scratch paper and submit them.
3. Collect the CAT to inform your teaching and to clarify, correct, or elaborate in a follow-up.

ALTERNATIVE

- Have learners post to a discussion board.
- In a synchronous (live) online class, learners can write on a whiteboard.
- Use a shared (open for anonymous responses) Google document to collect responses.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Panitz, T., & Panitz, P. (1999). Assessing Students and Yourself Using the One Minute Paper and Observing Students Working Cooperatively.
- Stead, D. (2005). Active Learning in Higher Education, 6(2): 118-131.

Notes:

46. Muddiest Point (MP)

Purpose:

Classroom Assessment Technique (CAT)

MP is one of the simplest CATs to assess where students are having difficulties. MP is designed to:

- Identify which concepts are not yet learned;
- Provides space for struggling learners to safely share their concerns; and
- Influence teaching adjustments.

Procedure:

1. Determine what you would like feedback on (entire class session, video, an assigned reading, specific topic/content).
2. At the end of class time, unit, and/or module ask learners to independently respond to:
   - What point of the ___ remains unclear (or muddy) to you?
3. Allow learners to respond (~5 min) and submit.
4. Collect the CAT to inform your teaching and to clarify, correct, or elaborate in a follow-up.

ALTERNATIVES

- **Group MP**: Share MPs in table groups and agree on one to share out.
- In a synchronous (live) online class, learners can write on a whiteboard.
- Use a shared (open for anonymous responses) Google document to collect responses.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Martin, M. B. (1999). Classroom Assessment Techniques Designed for Technology.
- Nilson, L. B. (2010). *Teaching at its best: A research-based resource for college instructors* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Simpson-Beck. V (2011). Active Learning in Higher Education, 12: 125-132.

Notes:

47. Most Important Point (MIP)

Purpose:

Classroom Assessment Technique (CAT)

MiP is a CAT to assess what aspect of the learning experience was believed to be the most important.

MiP is designed to:

- Identify which concepts are most valued by learners (MiP); and
- Influence teaching adjustments.

Procedure:

1. Determine what you would like feedback on (entire class session, video, an assigned reading, specific topic/content).
2. At the end of class time, unit, and/or module ask learners to independently respond to:
   - What was the most important point you took away from the _____?
3. Allow learners to respond (~5 min) and submit.
4. Collect the CAT to inform your teaching and to clarify, correct, or elaborate in a follow-up.

ALTERNATIVES

- **Group MIP**: Share MIPs in table groups and agree on one to share out.
- In a synchronous (live) online class, learners can write on a whiteboard.
- Use a shared (open for anonymous responses) Google document to collect responses.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Field Tested Learning Assessment Guide (n.d.). Classroom Assessment Techniques (CATs) - Overview. Retrieved from: http://archive.wceruw.org/cl1/flag/cat/cat.htm
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

48. Mix-Freeze-Pair

Purpose:

Information Processing, Active Learning, Organizing & Integrating

By repeatedly mixing around the room and forming pairs with different partners, learners are interacting with various colleagues. Mix-Freeze-Pair is designed to:

- Organize and integrate information;
- Summarize key points of concepts, ideas, or processes;
- Check for understanding;
- Clarify ideas;
- Stimulate new perceptions and combinations of thought; and
- Get learners moving.

Procedure:

1. Ask learners to walk around the room.
2. At the signal, they should freeze and pair with the person closest to them.
3. Each pair shares information.
    - Ex. summary of what they learned; new ideas and concepts about a topic; a list of new vocabulary words they learned;
4. Repeat the process until learners have multiple opportunities to share their thinking/learning and hear different perspectives.

ALTERNATIVE

- Add music while members are milling around. When the music stops they find their closest partner.

Supporting Research:

- Buehl, Doug. (2001). Classroom strategies for interactive learning. Newark, DE: International Reading Association.
- Lewis, A., & Thompson, A. (2010). Quick Summarizing Strategies to Use in the Classroom. Retrieved from: https://www.readingrockets.org/content/pdfs/summarizing_Strategies.pdf.
- Marzano. R., Pickering, D., Pollock, J. (2004). Classroom instruction that works: Research-based strategies for increasing student achievement. ASCD
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

49. Paraphrase Passport

Purpose:

Recall, Active Listening, Information Processing & Assessing

Paraphrase Passport is a discussion protocol where learners must paraphrase what was previously said before they can contribute to the discussion.

Paraphrase Passport is designed to:

- Support learners in reinforcing and/or assessing the extent to which they understand the material;
- Deepen active listening and paraphrasing skills;
- Support memory through retrieval practices; and
- Review, reinforce, and extend thinking through the exchange of ideas with others.

Procedure:

1. At the end of class time, unit, topic and/or module ask learners to list (for 3 minutes) any new concept, idea, terminology, or skill they learned.
2. In small groups, one person makes an initiating statement.
3. The group pauses for 5 seconds.
4. The next group member (anyone) paraphrases the previous statement before inquiring or adding related ideas.
5. Repeat the pattern as time permits.
6. To close, the group constructs a summarizing paraphrase of the full conversation.
7. Have the group reflect on the benefits of actively listening and being listened to.

Supporting Research:

- Buehl, Doug. (2001). Classroom strategies for interactive learning. Newark, DE: International Reading Association.
- Lewis, A., & Thompson, A. (2010). Quick Summarizing Strategies to Use in the Classroom. Retrieved from: https://www.readingrockets.org/content/pdfs/summarizing_Strategies.pdf.
- Marzano. R., Pickering, D., Pollock, J. (2004). Classroom instruction that works: Research-based strategies for increasing student achievement. ASCD
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

50. Carousel Brainstorm

Purpose:

Activating, Engaging & Assessing

Carousel Brainstorms is a cooperative learning activity focused around movement, conversation, and reflection. Carousel Brainstorming is designed to:

- Promote creative thinking; and
- Surface collective background knowledge or retrieval of new knowledge.

Procedure:

1. Post different (but related) topics or questions on chart paper around the room.
2. Cluster learners into groups of three to five.
3. Each group stands before a chart with a colored marker that is different than the other groups.
4. Group members call out ideas, which are recorded on the charts.
5. At a given point, each group moves clockwise to the next chart, reviews what was written and adds ideas with their different colored pen.
6. Learners take a gallery walk to read all posted ideas.
7. Bring everyone together to discuss and summarize ideas and questions.

ALTERNATIVE

- This activity can be done before and/or after learning takes place to track what they learned. Learners can add on to the original chart paper with their new learning.

Supporting Research:

- Flowers, N. (2000). The Human Rights Education Handbook: Effective Practices for Learning, Action, and Change. University of Minnesota.
- Lipton, L, & Wellman, B. Bruce Wellman. (1998). Patterns and Practices in the Learning-Focused Classroom. Guilford, VT: Pathways Publishing.
- Thinking Collaborative. (2020). Strategies. Retrieved from: https://www.thinkingcollaborative.com/strategies/

Notes:

51. Text Transformation

Purpose:

Active Learning, Information Processing, Retrieval, & Assessing

Text Transformation has learners synthesize concepts by reimagining the reading in a new style. Text Transformation is designed to:

- Improve critical thinking skills;
- Develop advanced reading skills;
- Develop creative writing skills; and
- Process and transfer new knowledge.

Procedure:

1. After reading a text (assigned or self selected) ask learners to transform the information in the text into a different genre:
    1. A newspaper article
    2. Flyer or advertisement
    3. Diary entry
    4. Business Proposal
    5. Comic strip
    6. Lab Manual
    7. Image
    8. Graphic Organizer
    9. Other

Supporting Research:

- Buehl, Doug. (2001). Classroom strategies for interactive learning. Newark, DE: International Reading Association.
- Lewis, A., & Thompson, A. (2010). Quick Summarizing Strategies to Use in the Classroom. Retrieved from: https://www.readingrockets.org/content/pdfs/summarizing_Strategies.pdf.
- Marzano. R., Pickering, D., Pollock, J. (2004). Classroom instruction that works: Research-based strategies for increasing student achievement. ASCD

Notes:

52. RAFT

Purpose:

Writing to Learn & Assessing

RAFT encourages leaners to attend to Role, Audience, Format, and Topic in their writing. RAFT is designed to:

- Assist learners in uncovering their own voice when writing about content they are studying;
- Encourage learners to write creatively, to consider a topic from multiple perspectives, and to write for different audiences; and
- Provides structure for learning how to write within the discipline.

Procedure:

- Provide learners a chart from which they build the structure for their writing. Be intentional about the options you provide – they should help learners meet the learning objectives, be relevant options, and push them to think critically about the content.
- Learners select the: **Role** (from whose point of view), **Audience** (the specific reader), **Form** (format), and **Topic** (subject/ content specific) for their writing.

Role	Audience	Format	Topic
• reporter • novelist • MD • plant • panelist • ranger • pilot • teacher • cell wall	• advertiser • 1st year student • candidate • character • expert • historian • lawyer • brain	• blog • letter • report • contract • speech • script • poem • email • poster	• inspire tourists to explore ancient Egypt • women's suffrage • effects of fertilizer • safety in the lab • contraceptives • civic responsibility • Lyme disease • autonomous vehicle

Supporting Research:

- Al-Smadi, O. M. (2019). The Potential of RAFT Strategy for Improving Jordanian EFL Students' Creative Writing. *Lublin Studies in Modern Languages and Literature*, *43*(4), 105-113.
- Dean, D. (2006). *Strategic writing: The writing process and beyond in the secondary English classroom*. Urbana, IL: National Council of Teachers of English.
- Santa, C., Havens, L., & Valdes, B. (2004). *Project CRISS: Creating Independence through Student-owned Strategies*. Dubuque, IA: Kendall Hunt.

Notes:

53. Cube It

Purpose:

Collaborative & Active Learning, Recall

Cube It provides learners structure to discuss concepts and their application.

Cube It is designed to:

- Promote recall of new concepts learned from readings, assignments, or class time;
- Foster collaborative discussions; and
- Explore different perspectives and creative thinking.

Procedure:

1. Ask learners to fold a piece of paper into 6 sections (in half/long ways, then in thirds). Number each 1-6.
2. In groups, one person will roll a dice to determine which question will be answered first. The six question topics are...
    - Describe it
    - Analyze it
    - Apply it
    - Take a Stand
    - Reinvent it
    - Choose a different perspective
3. The group discusses the question and answer.
4. Moving clockwise, the next person roles the dice to determine the next question to be answered.
5. Continue this process until time runs out.

Supporting Research:

- Frey, N., Fisher, D., & Everlove, S. (2009). *Productive group work: How to engage students, build teamwork, and promote understanding*. ASCD.

Notes:

54. What's the Principle?

Purpose:

Classroom Assessment Technique (CAT)

What's the Principle is a CAT that matches underlying principles with examples. What's the Principle? is designed to:

- Assesses learners' ability to match the appropriate principle(s) to given problems;
- Differentiate between closely associated course concepts;
- Exemplify the types of problems that can be solved with particular principles; and
- Strengthen memory through retrieval.

Procedure:

1. Identify the basic principles that you cover in your course.
2. Find/create sample problems or examples that illustrate each of these principles. Each example should illustrate only one principle.
3. Create a "What's the Principle?" form that includes a listing of the relevant principles and the examples you found/created so that the learners will match the examples to those principles.
4. Analyze the data, tally correct and incorrect answers, and note patterns. Follow up with the class about the results.
    - Tabulate responses, note patterns, ask learners to justify their choices.
    - E-mail learners individually if appropriate with additional resources.
    - Post results in an announcement or discussion board.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Teaching and Learning Services. Teaching elements: What's the principle? Rochester Institute of Technology. Retrieved from: https://www.rit.edu/academicaffairs/tls/

Notes:

55. Graphic Organizers

Purpose:

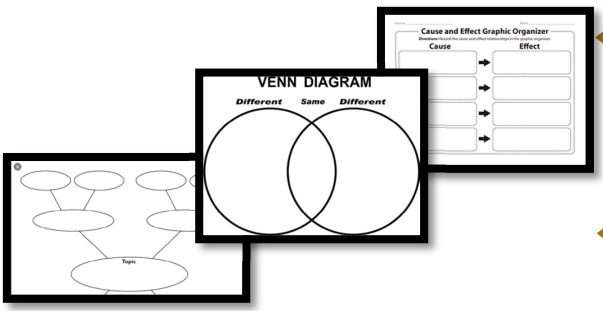
Active Learning & Synthesis

Graphic Organizers help learners create and articulate connections between concepts. Graphic Organizers are designed to:

- Address both the left and the right hemispheres of human brains;
- Are visual, spatial, mathematical, and logical tools that enable learners to organize information; and
- Help learners synthesize and recognize major themes, ideas, and interrelationships;
- Make abstract ideas and thinking more visible and concrete.

Procedure:

1. Select (or design) a graphic organizer that aligns with the learning goal.
2. Ask learners to apply the information they deconstructed in order to make meaning or develop unique insights.



Supporting Research:

- Carter, M. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement.
- *Cell Biology Education*, 3: 49-71.
- Coggins, D. (2014). *English learners in the mathematics classroom*. Corwin Press.
- Fogarty, R. J. (Ed.). (2009). *Brain-compatible classrooms*. Corwin Press.
- Gregory, G. H. (2013). *Differentiated Instructional Strategies Professional Learning Guide: One Size Doesn't Fit All*. Corwin Press.
- Marrs, K., Novak, G. (2004). Just-in-Time teaching in biology: Creating an active learner classroom using the internet. Cell Biology Education, 3(1): 49–61.
- Simkins, S., et. Al. (2009). Just-In-Time Teaching. Retrieved from https://jittdl.physics.iupui.edu/jitt/

Notes:

56. Exam Autopsy

Purpose:

Self-Regulated Learning & Metacognition

Exam Autopsies support learners in reflecting on their exam performance and underlying study habits. Exam Autopsies are designed to:

- Support learners as they increase their scores on subsequent exams;
- Support learners as they distinguish between insufficient knowledge and careless mistakes;
- Support learners as they identify errors in their test-taking strategies; and
- Support learners as they adjust their study and review techniques.

Procedure:

1. Ask learners to examine the questions they missed and why.

Question Profile			Reason Answer Was Incorrect			
Question Missed	Points Lost	Type of Question	Carelessness	Unfamiliar Material	Misinterpreted Question	Did Not Finish

2. Ask learners to reflect on their study habits.
   - How many hours per week did you study?
   - What were your study methods— re-read lecture slides, highlight notes, re-watch the lecture capture, read the textbook?
   - Did you engage with study groups, online videos, or any other method?
   - How much sleep did you get the night before?
   - Did you experience test anxiety?
   - Did you change answers during the exam?
3. Based on their results, help learners pinpoint specific tactics to use either in preparation for the test.

Supporting Research:

- Academic Success Center, Iowa State University. (2011) Exam Prep: Test Autopsy. Retrieved from: https://www.asc.dso.iastate.edu/sites/default/files/resources/handouts/Exam%20Prep/Exam%20Prep--Test%20Autopsy.pdf
- Achacoso, M. V. (2004). Post-test analysis: A tool for developing students' metacognitive awareness and self-regulation. *New directions for teaching and learning*, *2004*(100), 115-119.
- Longman, D. G., & Atkinson, R. H. (1999). *College learning and study skills*. Wadsworth Publishing Company.
- Student Affairs, Fresno State. Exam Autopsy. Retrieved from: http://www.fresnostate.edu/studentaffairs/lrc/supportnet/documents/examautopsy2.pdf

Notes:

57. Send-a-Problem

Purpose:

Classroom Assessment Technique (CAT)

Send-a-Problem is a CAT where groups of learners write questions but solve the questions written by others. Send-a-Problem helps to:

- Promote critical thinking;
- Provide access to a diversity of thinking; and
- Aids memory.

Procedure:

1. Divide learners into small groups.
2. Provide each group with a topic on which to write a review or critical thinking question.
3. Each group writes a question on the front of a notecard. Labeling the question side with a "Q".
4. The group then determines the best answer and writes it on the back of the notecard – labeled "A".
5. Questions are then passed (or tossed) around.
6. Without looking at the answer, the second group discusses and formulates their best answer.
7. Group two adds their answer on the “A” side.
8. Questions can be passed to multiple groups.
9. At the end collect the cards and debrief the answers.

VARIATION

Pre-written questions can be provided.

Supporting Research:

- Angelo, T., & Cross, P. K. (1993). Classroom assessment techniques: A handbook for college teachers (2nd ed.). Jossey-Bass Publishers.
- Barkley, E. F. et al. (2004). Collaborative Learning Techniques: A Handbook for College Faculty. Jossey Bass.
- But, I. C. P. (2005). Cohabitation has not always been considered a worthy objective. *Beyond Method: Philosophical Conversations in Healthcare Research and Scholarship*, *4*, 259.
- Millis, B. J., & Cottell Jr, P. G. (1997). *Cooperative Learning for Higher Education Faculty. Series on Higher Education*. Oryx Press, PO Box 33889, Phoenix, AZ 85067-3889.

Notes:

58. Wikis

Purpose:

Building Knowledge & Collaborative Writing

Wikis are webpages where teams of learners create, edit, and publish information. Wikis are designed to:

- Encourage group participation;
- Provide a space for learners to pool knowledge;
- Promote higher-level reasoning;
- Develop learners' technology skills;
- Act as an artifact of learning; and
- Empower learners to take control of their learning.

Procedure:

- Outline clear expectations for the learners' role(s) in the development of the wiki and what the end product should look like.
- Develop a grading rubric or assessment plan.
- Closely monitor the Wiki as it is being developed. Provide incremental stages and feedback.

TIPS

- Any Canvas page can be set to give learners editing privileges, allowing it to act as a Wiki.
    - Within the course click: Settings – More Options – Select "Teachers and Students" from the drop down menu – Update Course Details
- Providing roles for learners can ease the stress of collaborative work.
- Be prepared to offer technical support or know and share the resources on campus with your learners.
- Strongly encourage hyperlinking and citations.

Supporting Research:

- Biasutti, M., & Heba, E. D. (2012). Using Wiki in teacher education: Impact on knowledge management processes and student satisfaction. *Computers & Education*, *59*(3), 861-872.
- Hadjerrouit, S. (2014). Wiki as a collaborative writing tool in teacher education: Evaluation and suggestions for effective use. *Computers in Human Behavior*, *32*, 301-312.
- Kurt, S. (2020, February 06). Wikis in Education: How Wikis are Being Used in the Classroom. Retrieved from https://educationaltechnology.net/wikis-in-education/
- Zheng, B., Niiya, M., & Warschauer, M. (2015). Wikis and collaborative learning in higher education. *Technology, Pedagogy and Education*, *24*(3), 357-374.

Notes:

59. Portfolios

Purpose:

Experiential Learning, Critical Thinking & Metacognition

Portfolios are collections of artifacts and reflections that document the evolution of learning. Portfolios are designed to:

- Allow learners to directly demonstrate what they've learned beyond traditional academic systems;
- Document and celebrate a comprehensive profile of a learner's progress and growth;
- Provide samples of learner's work during the term;
- Promote reflection and metacognition; and
- Establish and refine short-term and long-term goals.

Procedure:

1. Throughout the term, ask learners to collect artifacts (samples) of their learning.
    - Samples may be best work or the revision history (evolution) of work (writing samples, explanations of mathematical steps, journal articles, lab reports, projects, badges)
2. For each artifact, learners write a reflective narrative (explaining what the artifact is, how it relates to the course content, connections they made, their learning process, relevancy to their future careers).

TIPS

- Portfolios can be collected and shared as a PDF or electronically (via Canvas or Google Sites).
- Provide clear expectations and a flexible rubric.
- Have regular check-ins to provide feedback on the evolution of the portfolio.

Supporting Research:

- Clemson University. (n.d.). The what, why, and how of ePortfolios. Retrieved from https://www.clemson.edu/academics/programs/eportfolio/information.html
- Ferns, S., & Comfort, J. (2014). Eportfolios as evidence of standards and outcomes in work-integrated learning. *Asia-Pacific Journal of Cooperative Education, 15(3)*, 269–280. Retrieved from https://files.eric.ed.gov/fulltext/EJ1113655.pdf
- Lorenzo, G., & Ittelson, J. (2005). An overview of e-portfolios. *EDUCAUSE Learning Initiative*. Retrieved from http://www.educause.edu/ir/library/pdf/ELI3001.pdf
- Miller, R., & Morgaine, W. (2009). The benefits of e-portfolios for students and faculty in their own words. *Peer Review, 11(1), 8–12*. Retrieved from https://www.aacu.org/publications-research/periodicals/benefits-e-portfolios-students-and-faculty-their-own-words
- Reese, M., & Levy, R. (2009, February). Assessing the future: E-portfolio trends, uses, and options in higher education. *EDUCAUSE Center for Applied Research, 2009(4).* Retrieved from https://jscholarship.library.jhu.edu/bitstream/handle/1774.2/33329/ECAR-RB_Eportfolios.pdf?sequence=1&isAllowed=y
- Suskie, L. (2004). Assessing student learning: A common sense guide. Bolton, MA.
- Zubrizaretta, J, (2004). *The Learning Portfolio: Reflective Practice for Improving Student Learning.* 1st edition. Jossey-Bass.

Notes:

60. Rubrics

Purpose:

Active Communication & Assessment Expectations

Rubrics outline the criteria for assessment and provide structure for feedback. Rubrics are designed to:

- Clarify expectations and intentions;
- Provide learners the opportunity to self-assess;
- Provide teachers feedback to improve future assignments;
- Save teachers grading time;
- Create a common ground for teachers and learners; and
- Promote consistent grading.

Procedure:

1. Define the purpose of the assessment.
2. Choose a rubric type (analytic or holistic) and the type of feedback (formative or summative) you will provide.
3. Determine your criteria. Perform a task analysis of the knowledge and skills required for the task.
    - On average, 4-8 criteria are created.
4. Create your performance levels. Consider how many rating scale points should you use?
5. Write descriptors for each level of your rubric. Describe observable and measurable behavior, use parallel language across the scale, and indicate the degree to which the standards are met.

ALTERNATIVE

- Use specification grading that defines what satisfactory work looks like. Then use a two-level grading structure (pass/fail, did/not do, satisfactory/unsatisfactory, or similar) as your rubric.

Supporting Research:

- Creating a Rubric: An Online Tutorial for Faculty. (n.d.). Retrieved from http://www.ucdenver.edu/faculty_staff/faculty/center-for-faculty-development/Documents/Tutorials/Rubrics/index.htm
- Donlan, K. (2014). The Usefulness of Rubrics. *Essai*, 12(15): 1-5.
- Nelson, L. (2015). Specifications Grading: Restoring rigor, motivating students, and saving faculty time. *Stylus Publishing*.
- Reddy, Y. M., & Andrade, H. (2010). A review of rubric use in higher education. *Assessment & evaluation in higher education*, *35*(4), 435-448.

Notes:

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