

What's a 5E?

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Time Frame 3 hours

Essential Question(s)

How does the 5E lesson model align with authentic instruction?

Summary

This professional development session focuses on increasing teachers' understanding of authentic science instruction and building their capacity to adapt lessons to more effectively implement authentic instructional practices. Participants will first assume the role of students to engage with an authentic 5E lesson, and then identify, analyze, and apply components of authenticity in 5E lessons and activities to modify an existing lesson to make it authentic.

Learning Goals

- Participants will review the 5E instructional model by participating in and analyzing a LEARN lesson.
- Participants will be able to maximize authentic instruction by modifying existing 5E lessons for use in their classrooms with their students.

Attachments

- 5E Learning Approach Rubric—What's a 5E.docx
- 5E Learning Approach Rubric—What's a 5E.pdf
- Card Sort—What's a 5E.docx
- Card Sort—What's a 5E.pdf
- Case Evaluation and Scoring Form—What's a 5E.docx
- Case Evaluation and Scoring Form—What's a 5E.pdf
- Case Preparation Notes (Student Handout)—What's a 5E.docx
- Case Preparation Notes (Student Handout)—What's a 5E.pdf
- Case Preparation Notes (Teacher's Guide)—What's a 5E.docx
- Case Preparation Notes (Teacher's Guide)—What's a 5E.pdf
- Cornell Notes—What's a 5E.docx
- Cornell Notes—What's a 5E.pdf
- Debate Structure Guide—What's a 5E.docx
- Debate Structure Guide—What's a 5E.pdf
- Lesson Slides—What's a 5E.pptx
- Research Resources—What's a 5E.docx
- Research Resources—What's a 5E.pdf
- Research and Data Organizer—What's a 5E.docx
- Research and Data Organizer—What's a 5E.pdf
- Strategy Harvest—What's a 5E.docx
- Strategy Harvest—What's a 5E.pdf
- What's a GMO Lesson Handout—What's a 5E.pdf

Materials

- Presentation Slides (attached)
- 5E Learning Approach Rubric (attached; one per participant)
- Card sort (attached; one per group)
- Cornell Notes handout (attached; one per participant)
- Research Resources (attached)
- Research and Data Organizer (attached; one per participant)
- Case Evaluation Rubric Handout (attached; one per participant)
- Case Evaluation and Scoring Form (attached; one per participant)
- Case Preparation Notes (Student Handout) (attached; one per participant)
- Case Preparation Notes (Teacher's Guide) (attached; one per participant)
- Strategy Harvest handout (attached; one per participant)
- "What's a GMO?" LEARN Lesson (linked)
- "What's a GMO?" LEARN lesson handout (attached; one per participant)
- Jimmy Kimmel's "What's a GMO?" video (linked and embedded)
- Chart paper or similar
- Sticky notes (one per participant)
- Debate Structure Guide (optional)
- Playing Cards (one Ace, King, Queen, or Jack per participant)
- Table tents, signs, or similar (one per group)
- Flipgrid and Padlet website access
- A selection of grade and content appropriate lessons (optional)

Engage

Presenter's Note: Preparation

Before beginning the activity, prepare one set of the attached **Card Sort** cards for each group. Print on card stock, if possible for durability, then cut out, and keep each set separate.

Use the attached **Presentation Slides** to guide participants through the session. To begin, read aloud the learning objectives on **slide 3**: *Review the 5E instructional model by participating in and analyzing a LEARN lesson. Maximize authentic instruction by practicing how to modify existing 5E lessons for potential use in your classroom.*

Sort participants into small groups. Pass out one set of the prepared **Card Sort** activity cards to each group. Introduce these cards as separate parts of the same authentic science lesson. Invite participants to follow the directions on **slide 5**. Following the Card Sort strategy, participants should order the cards into the sequence in which the lesson should be taught. Participants should then group the corresponding "E" phases (bolded) and phase descriptors (italicized) with the appropriate lesson step. Ultimately, participants should finish with a five-step lesson in chronological order, with each step of the lesson connected with one bolded "E" phase card and one italicized phase descriptor apiece.

As a whole group, discuss how each group sorted their cards. Ask for volunteers to share out strategies and methods, and discuss as a group the thought processes used. Be sure not to reveal the correct order for the card sort.

Explore

Presenter's Note: Preparation

Before moving to this phase, create table tents, signs, or similar ways to indicate four different groups based on playing cards: Aces, Kings, Queens, and Jacks. On chart paper or a whiteboard space, draw a line labeled "good" on one end and "bad" on the other (see the example on slide 9). Additionally, create a Flipgrid page for this activity. Insert the link for the Flipgrid page on slide 14.

To explore the 5E model, invite participants to take part in the What's a GMO? lesson. To begin, move to **slide 7** and read the lesson's essential questions: *Is everything that is legally acceptable always ethically acceptable? What is a genetically modified organism (GMO) and how are they produced? What are the ethical dilemmas surrounding GMOs and their use?*

Click the video link in **slide 8** (or use the embedded version below) to watch Jimmy Kimmel's "What's a GMO?"

Embedded video

https://www.youtube.com/watch?v=EzEr23XJwFY

Move to **slide 9**. Following the Sticky Bars strategy, pass out a sticky note to each participant. Ask participants if they believe GMOs are a good thing or a bad thing. Ask them to write the reasoning for their belief and post the sticky note on the good/bad line. Once all notes have been placed, the line should represent a distribution graph of all participants' beliefs. Facilitate a brief discussion based on the information written on the notes.

Presenter's Note: Shortening the Debate

Depending on the amount of time you have with participants, the following debate activity may be abbreviated as necessary. This will allow you to model what students would do without taking the time to do the entire debate.

Next, invite participants to begin researching for a debate. Review the attached **Debate Structure Guide** if necessary, or see the debate protocol on **slide 10.** For this activity, the debate consists of three phases: opening statements (1 minute per side), rebuttal (1 minute per side), and cross-examination (2–3 minutes per side).

Create four groups by handing out an equal number of ace, king, queen, and jack face cards. Ask participants to move to the table with the sign or table tent matching their cards. These groupings represent four debate groups with unique positions:

1. Aces: Genetically Modified Animals (Affirmative)
2. Kings: Genetically Modified Crops (Affirmative)
3. Queens: Genetically Modified Crops (Negative)
4. Jacks: Genetically Modified Animals (Negative)

Hand out a copy of the attached **Cornell Notes** to each participant, and digitally distribute the attached **Research Resources** via email, the link on **slide 11**, or similar. Using the Cornell Notes strategy, ask participants to complete the Cornell Notes, referencing the Research Resources. Participants may also do independent research. Note to participants as they work that the Cornell Notes strategy can incorporate more specific questions to guide instruction in different ways for students.

After participants have finished researching, note to the class that this activity is an optional and abridged version of the activity's original Explore phase, which incorporates the Gallery Walk strategy. Consider handing out the attached **Research and Data Organizer** to those who might want to use the "What's a GMO?" lesson in their own classrooms.

Move to **slide 12.** Hand out a copy of the attached **Case Evaluation Rubric Handout, Case Evaluation and Scoring Form,** and **Case Preparation Notes (Student Handout)** to each participant. Consider also handing out the attached **Case Preparation Notes (Teacher's Guide)** for reference. Have groups begin the Case Preparation Notes handout by filling in their position and affirmative/negative status. Invite participants to assign jobs to group members to prepare for the debates (for example, a spokesperson, timekeeper, scribe, etc.). Then, referencing their Cornell Notes and the Case Evaluation Rubric Handout, have participants work in their groups to complete the Case Preparation Notes handout.

Once groups are ready, facilitate two sets of debates. Move to **slide 13** and ask the Ace and Jack groups to begin. Review debate etiquette: participants cannot interrupt each other, and must stop when the buzzer sounds. Timekeepers can give their spokesperson a warning signal 30 seconds before time is up, and can count down 5 seconds to time up. As the ace and jack groups debate, ask the king and queen groups to complete the Case Evaluation and Scoring Form individually.

Begin with the aces (affirmative) group for opening statements (1 minute per side) before the jacks group's opening statements. Continue through, rebuttal (1 minute per side), and end with cross-examination (2-3 minutes per side).

Once the debate is over, repeat the process with the kings (affirmative) and queens (negative) groups. While they debate, the ace and jack groups should complete Case Evaluation and Scoring Forms.

Move to **slide 14**. Ask participants to use the prepared Flipgrid link on the slide to self-evaluate by creating two short Flipgrid videos, following the directions on the slide. Then, participants should respond to one of their peers' posts.

Explain

Presenter's Note: Preparation

Set up an additional Flipgrid page for this phase, and update the link on **slide 18.**

Move to **slide 16**. Discuss with participants the Inform, Verify, Practice vs. 5E table, and discuss how the 5E lesson model aligns well with Piaget's Learning Theory where traditional IVP does not.

Then, revisit the Card Sort activity. Ask participants if they completed the lesson in the order they sorted the cards. Briefly discuss participants' expectations, and whether the sample lesson met or subverted those expectations.

Hand out a copy of the attached **What's a GMO Lesson Handout** and **5E Learning Approach Rubric.** Move to **slide 17.** Invite participants to evaluate the GMO lesson, referencing the Learning Approach Rubric. Ask participants to create a Flipgrid response to answer the following question: Did you find any areas of the lesson that did not meet the rubric's standards? Why did you mark those areas low? What can you take away from this to inform your classroom practices? Then, participants should respond to one of their peers' posts.

Extend

Move to **slide 19** and group participants by grade level. Invite groups to think about an existing lesson, and how they would modify that lesson to fit the 5E format. If necessary, provide a selection of grade- and content-appropriate sample lessons for participants to work with.

Move to **slide 20.** Provide protected work time for the participants to modify an existing lesson that is not already in a 5E format. For accountability purposes, tell participants that they will be posting the results of their work time on Padlet.

Presenter's Note: Advanced Notice

If this activity is part of ongoing professional development, it may be productive to request that participants bring their own lesson for the Extend work time. If this is not the case, be sure to provide a selection of grade- and content-appropriate lessons (e.g., based on their curriculum map) for teachers to modify.

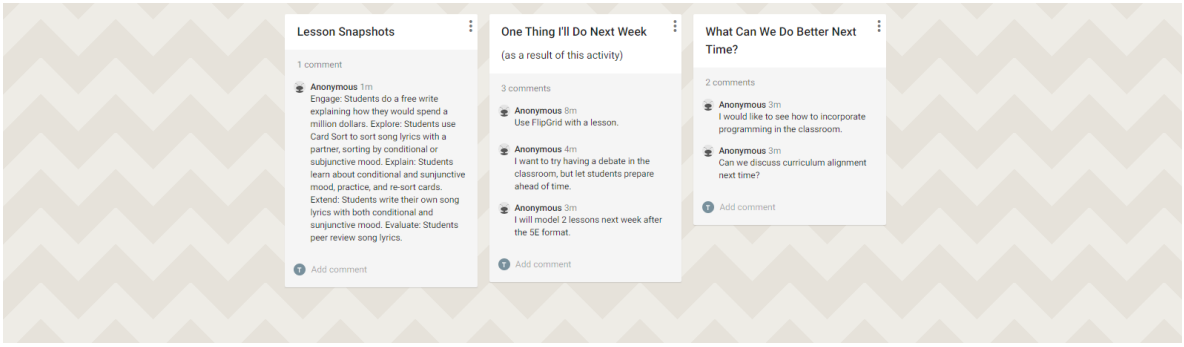
When participants finish, pass out a copy of the attached **Strategy Harvest** handout. Using the Strategy Harvest learning strategy, ask participants to take a moment and reflect on the strategies used in this activity, and how they might incorporate these strategies into their classroom.

Evaluate

Presenter's Note: Preparation

Prior to this phase, create a Padlet board. On this board, create column for participants to post feedback, with the columns labeled "Lesson Snapshots," "One Thing I'll Do Next Week," and "What Can We Do Better Next Time?" Insert a link to your Padlet board on **slide 22.** Be sure to enable comments on your board.

Invite participants to post their feedback on Padlet by posting at least once in each of the three columns.



Example of Padlet Columns with Sample Responses

Sample Responses: Padlet

Responses in the "Lesson Snapshots" column should consist of five sentences, one for each phase of a lesson; one such response could be, "Engage: Students do a free write explaining how they would spend a million dollars. Explore: Students use Card Sort to sort song lyrics with a partner, sorting by conditional or subjunctive mood. Explain: Students learn about conditional and subjunctive mood, practice, and re-sort cards. Extend: Students write their own song lyrics with both conditional and subjunctive mood. Evaluate: Students peer review song lyrics." See the "Snapshots" phase of any 5E lesson in the LEARN repository for examples. Responses in the "One Thing I'll Do Next Week" column might include incorporating Padlet or Flipgrid, using debates in the classroom, modeling more lessons with 5E, etc. Responses in the "What Can We Do Better Next Time?" column might include suggestions for the next activity or personal development session, such as "I would like to see how to incorporate programming in the classroom," or "Can we discuss curriculum alignment next time?"

Optional: Additional Feedback

Consider also providing an optional survey to gauge participants' experiences with this activity.

Follow-up Activities

Depending on the context in which this activity is facilitated, follow-up activities might include:

- Lesson implementation
- Modification of additional lessons
- Self-reflection and whole-group debrief of the experience

Research Rationale

Authentic lessons allow opportunities for collaboration, which leads to the exploration of multiple perspectives and various points of view to be heard during a lesson. "Authentic learning environments need to provide collaborative learning where, for example, more able partners can assist with scaffolding and coaching, and where teachers provide appropriate learning support" (Herrington, J., 2014; e.g., Collins et al., 1989; Greenfield, 1984). Herrington, J. et al., describe the four components in an authentic lesson as 1.) students should seek to solve a real-life problem to which they would attach emotional commitment as well as a cognitive interest; 2.) the problem should be sufficiently open-ended so that there are a variety of strategies for its solution; 3.) the problem-solving strategies and "solutions" developed should encourage students to change their actions, beliefs, or attitudes; and 4.) the problem should have a real audience beyond the classroom. Authentic tasks are more worthy of the investment of time and effort in higher education than decontextualized exercises and tasks (Herrington & Herrington, 2006). It is unreasonable to expect students to develop necessary 21st-century skills in a traditional classroom because, typically, lessons designed in these environments do not create opportunities for students to practice high levels of critical thinking, collaboration, or problem-solving, nor do they allow practice in connecting new information to experiences outside the classroom setting. By using instructional strategies that promote authentic and inquiry-based teaching, students can gain more autonomy and meet high expectations for learning. When comparing traditional teaching approaches, such as note-taking with lectures or book work, to more active learning, such as the use of LEARN instructional strategies within a 5E lesson, the lessons that promote active learning have been shown to increase student achievement on assessments as much as 55% (Freeman et al., 2014). The 5E instructional model provides a research-based learning cycle lesson format in five phases (Engagement, Exploration, Explanation, Extension, and Evaluation). These phases allow students to engage in learning new content through meaningful learning experiences. These meaningful learning experiences provide opportunities for students to construct knowledge through exploration, and they support higher-order thinking through discourse, discussion, and explanations; these experiences also deepen understanding through extension and elaboration of learning, and assessing understanding through relevant and meaningful evaluations.

Resources

- Flipgrid. (n.d.). Empower Every Voice. Flipgrid. https://info.flipgrid.com/
- Jimmy Kimmel Live. (2014, October 9). What's a GMO?. YouTube. https://www.youtube.com/watch?v=EzEr23XJwFY&feature=youtu.be
- K20 Center. (n.d.). Card sort. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f506976b
- K20 Center. (n.d.). Cornell notes. Strategies. https://learn.k20center.ou.edu/strategy/424cdc46cbbf68e0b9de3007cb0064eb
- K20 Center. (n.d.). Gallery walk/Carousel. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505a54d
- K20 Center. (n.d.). Lessons. https://learn.k20center.ou.edu/lessons
- K20 Center. (n.d.). Sticky bars. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505ee0f
- K20 Center. (n.d.). Strategy harvest. Strategies. https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5062662
- K20 Center. (n.d.). What's a GMO? Lessons. https://learn.k20center.ou.edu/lesson/c6bfdf1bdae28bf55e9d679bc10277df
- Padlet (n.d.). Padlet. https://padlet.com/