## Appendix C: Teaching Tips and Techniques

In this section, you will find information about some of the terms and structures used in designing the actual lessons. For information about the scientific vocabulary, please see the glossary.

The decision has been made to use the term “learners” instead of “youth” in this section, as these techniques work with adults as well.

| **Term** | Anticipation Guides (also sometimes called Anticipation Sets) |
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| **What it is** | Anticipation Guides are questions or checklists that learners complete prior to viewing or reading informational text. |
| **How it works** | Learners use their background knowledge to complete the Anticipation Guide prior to learning the information. This helps them to know what concepts they will encounter. It also helps learners to actively seek out and pay attention to the important ideas and major underlying concepts. After viewing or reading the informational text, learners go back and complete the same questions again. They are able to then compare their old knowledge with the knowledge gained as a result of the text. |
| **When to use it** | Use Anticipation Guides before and after viewing videos or reading informational text. Anticipation Guides are especially helpful for language learners who might otherwise be overwhelmed by the amount of information in a text or video. |

| **Term** | Claim-Evidence-Reasoning |
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| **What it is** | Claim-Evidence-Reasoning is a lesson format that is based on scientific writing, argumentation, and thinking. |
| **How it works** | Learners encounter a research question and are asked to take a stand on a possible answer. At this point, the claim functions partly like a prediction and partly like a hypothesis, to use the language of the traditional scientific method. Learners then set about gathering evidence, which may include evidence from their personal experiences, evidence from printed or digital materials, and/or evidence from hands-on investigations.<br><br>Once evidence has been gathered, students re-evaluate their initial claim. They have to decide which pieces of evidence are strongest and why. They also need to decide whether that evidence supports their initial claim, or if their initial claim needs to be revised. |
| **When to use it** | Use Claim-Evidence-Reasoning to support learners in developing scientific language and argument. Because the language mirrors the language in the Common Core State Standards, it can be used to support lessons in a variety of disciplines that require learners to identify and use evidence to support their thinking. |

| Term | Fishbowl Seminar |
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| **What it is** | An alternative to a whole class discussion, the Fishbowl Seminar allows small group interaction and among students while involving the entire class. |
| **How it works** | The class creates two circles, an inner circle and an outer circle. The inner circle should have 6-8 seats or fewer. The facilitator asks open-ended, higher-order thinking questions. Participants on the outer circle take notes on the participants speaking in the inner circle. They are not allowed to speak or answer any questions. Participants in the inner circle discuss openly about the higher-order thinking questions that the facilitator poses. Participants in the outer circle can tap the shoulder of a participant in the inside circle when they have a strong point to make. This is how the circles change and how everyone gets incorporated into the discussion. Circle sizes can be changed to meet the needs of the group, but make sure to have more people in the outer circle than the inner circle. It is recommended to have at least 3-4 participants in the inner circle. |
| **When to use it** | The Fishbowl Seminar can be used as a class discussion tool when participant evaluation is important or to better hear each individual participant's input in a large group discussion. |

| Term | Four Corners |
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| **What it is** | Four Corners is a formative technique for sharing out answers to a selected-response (multiple choice) question. |
| **How it works** | Learners are given a question along with several potential answers. The answers are displayed around the room, often in the corners. Learners move to the corner that matches their preferred response.<br><br>Learners are allowed to share their reasons for their choice. They are also allowed to change their minds and move to a new location.<br><br>A variation of Four Corners has students line up in front of their preferred choice. This creates a "human graph" which can be used to provide class data about misconceptions. |
| **When to use it** | Use Four Corners to determine what learners are thinking about key concepts and ideas in a quick, movement-based format. |

| Term | Formative Assessment Probes |
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| **What it is** | A formative assessment probe is a question posed to gain an understanding of where learners are in their thinking. Frequently, assessment probes feature possible responses that mirror common thinking patterns among learners. |
| **How it works** | Formative Assessment Probes can be checklists, selected response questions, sorts, or other tasks that require students to articulate and apply scientific concepts. They are not used for grades; rather, they provide the base for the direction of the instruction. Learners are encouraged to explain their thinking as they complete the tasks. |
| **When to use it** | Use Formative Assessment Probes throughout a unit cycle to track learners' understanding of key concepts. Probes are especially useful at the beginning of a lesson to uncover existing misconceptions and prepare learners for the activity. The same probe can then be used at the close of the lesson to determine if learners' thinking changed or grew as a result of their work. |

| Term | Frayer Model |
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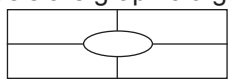
| **What it is** | Frayer models are graphic organizer tools for developing vocabulary. It looks like this:<br>  <br>In the center of the rectangle is an oval. The new vocabulary word is written in the oval. Around the oval, the rectangular sections are labeled “Definition,” “Characteristics,” “Examples,” and “Non-Examples.” Occasionally, “Picture” or “Facts” is used in place of “Characteristics.” |
| **How it works** | Learners write the new vocabulary word in the oval. Then, they complete the information in each of the rectangle sections. By having to go beyond the dictionary definition, learners develop a deeper connection to the vocabulary and a deeper understanding of the concepts. |
| **When to use it** | Frayer models can be used after new vocabulary has been introduced or as a pre-teaching tool. They are most effective once learners have had some experience with the vocabulary in context, as those experiences help learners to determine characteristics, examples, and non-examples. Frayer models can be done in class and/or as homework. |

| Term | Gallery Walk |
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| **What it is** | A Gallery Walk is a technique for sharing ideas that have been organized in a poster, 3D model, or other highly-visual format. A variation of the Gallery Walk is the Graffiti Wall. |
| **How it works** | Learners, often in groups, create posters or 3D models in response to a question. These models are displayed, either on walls or on tables. All learners then proceed in an orderly fashion around the room, paying close attention to the work of other groups. The debrief phase of the lesson usually asks learners to summarize what they noticed during the Gallery Walk.<br><br>Sometimes, learners use sticky notes to ask questions or leave feedback for the model’s creator(s). In the Graffiti Wall variation, learners leave feedback or add new information directly on the original model. |
| **When to use it** | Use a Gallery Walk when learners are ready to share ideas about concepts and need a movement break. |

| Term | Jigsaw (sometimes called “Numbered Heads Together”) |
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| **What it is** | A Gallery Walk is a technique for sharing ideas and work among groups |
| **How it works** | Each group is assigned a particular component of a larger task. Group members complete the assigned component and are then reshuffled into new groups. These groups are comprised of members from each of the original groups. Together, they put the “jigsaw” together to complete the entire task. |
| **When to use it** | Use a Jigsaw to support learners as they work through large, complex tasks. |

| Term | "KWL" |
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| **What it is** | "KWL" stands for "What I Know, What I Want to Know, and What I've Learned." KWLs are charts that learners use to track their understanding across a lesson. Variations include "TWD" (Think, Wonder, Learned) and "KWHL" (Know, Want to Know, How I Plan to Find Out, and Learned) |
| **How it works** | At the beginning of a lesson, learners complete the "K" section by listing out everything they believe to be true about a topic. Next, learners add their questions about the topic in the "W" section. The "W" section can also be used to list conflicting ideas that the class might have about a topic.<br><br>Once the "W" section is complete, learners begin researching the topic through the lesson activities. Students add their new or clarified knowledge to the "L" section at the end of the lesson. During the lesson debrief at the end, students compare their ideas in "K" to their understandings in "L." They also check to see which questions were answered and which remain as topics for future investigation. |
| **When to use it** | KWL charts can be used to see what students know (or think they know) when beginning a new topic of study. They are also useful when students are going to use print or digital materials to research a topic. |

| Term | Stay-Stray |
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| **What it is** | Stay-Stray is a technique used for sharing ideas among groups. It is similar to a Gallery Walk, but the focus is on conversation. |
| **How it works** | When it is time for groups to share their work, one group member is designated as the "speaker." The speaker stays at the group's assigned work space and is responsible for explaining the group's ideas. The other group members are designated as "strayers." Strayers are responsible for visiting the other groups and learning how they approached their work. After a few minutes, all group members return to their assigned work areas. Strayers share with their group members what they learned by visiting the other stations. The speaker shares any questions or new ideas that came up in conversation with strayers from other groups. |
| **When to use it** | Use Stay-Stray as a tool for promoting conversation among learners while sharing group work results. It is especially useful when learners have been sitting and need a movement break. |

| Term | Think Time |
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| What it is | Think Time is just what it says: time given to learners to think. “Think-Pair-Share,” “Think-Write-Pair-Share,” “Turn and Talk,” and “Wait Time” are all common variations of Think Time. |
| How it works | After asking a question, wait at least 5 seconds before collecting student responses. This is “Wait Time.” Think Time can be extended by having learners jot ideas down and/or share their responses with a partner (“Think-Pair-Share” or “Turn and Talk”) prior to sharing with the whole group.<br><br>Providing Think Time is important because it allows learners time to gather their thoughts and mentally practice their responses. It also allows learners to think more deeply about questions, opening up opportunities for richer discussion. Finally, it holds more learners accountable. All learners are more likely to think about the question when they know that “the answer” won’t be shared immediately. Using partner talk increases the accountability even more, as all learners then need to participate in the lesson. |
| When to use it | Every time a question is posed. |

| Term | Ticket Out the Door (also known as “Exit Ticket”) |
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| What it is | Ticket Out the Door is a quick (2-3 minute) task that learners complete at the very end of the lesson. |
| How it works | At the very end of a lesson, learners complete a quick task, no more than 2-3 minutes in length. Common tasks include application questions that learners answer based on the lesson, sketching activities, or reflective activities. Sometimes, Tickets Out the Door ask learners to write down areas of confusion.<br><br>Tickets Out the Door provide immediate, formative feedback for teachers to help plan for the next lesson. They allow teachers to see what learners have taken away from the lesson as well as what items are still confusing and need further clarification. |
| When to use it | Tickets Out the Door can be used when new material is introduced or learners encounter particularly difficult material in a unit. Use them any time more information is needed about learner progress. |