

Amplify Science Discourse Routines for Grades K-5

Discourse routines are short sequences of instruction that can be used repeatedly throughout a unit. Since discourse routines quickly become familiar, these routines maximize time efficiency by focusing students on ideas rather than on procedures. This makes discussing challenging concepts more comfortable and promotes student independence. Discussions that occur during discourse routines are also a rich opportunity for informal assessment of learning. Teachers should choose the routines that are best suited to their particular classes. To better meet students' needs in a given situation, teachers can also adjust these discourse routines to support student needs.

Summary of Discourse Routines built into Amplify Science K-5 Units

Each unit in grade 2-5 contains, on average, about three different discourse routines. K-1 units utilize Shared Listening as their primary discourse routine.

Name of Routine	Estimated time	Grouping	Recommended for
Shared Listening	10 minutes	partners	K-1: multiple uses, including engaging in explanations 2-5: Activating prior knowledge
Think-Pair-Share	5 minutes	partners	Activating prior knowledge
Think-Write (or Draw)-Pair-Share	15 minutes	partners	Activating prior knowledge
Anticipatory Chart	10-15 minutes	whole class	Activating prior knowledge
Evidence Circles	20-30 minutes	small groups	Engaging in Explanation and Argumentation
Debriefing Data	10-15 minutes	whole class	Engaging in Explanation and Argumentation
Building on Ideas	20 minutes	partners + small groups	Sharing Ideas and Reflecting on Learning
Roundtable Discussion	20 minutes	small groups	Sharing Ideas and Reflecting on Learning
Thought Swap	15-20 minutes	whole class	Sharing Ideas and Reflecting on Learning
Jigsaw Routine	30-40 minutes	small groups	Sharing Ideas and Reflecting on Learning
Science (or Engineering) Practices	5-10 minutes	whole class	Sharing Ideas and Reflecting on Learning

Science/Everyday Words	5-10 minutes	whole class	Developing Science Vocabulary
Word Relationships	15 minutes	small groups	Developing Science Vocabulary
Concept Mapping	15-20 minutes	partners	Developing Science Vocabulary

Description of Discourse Routines

Shared Listening

Purpose: Shared Listening is a routine that helps students talk and listen to one another. It facilitates the sharing of ideas among students and promotes active listening. Shared Listening is a routine that allows students to grapple with their understanding of concepts by talking and listening. This routine is beneficial because it allows everyone in the class to express ideas.

Description: Partners (designated A and B) talk to each other in response to a question provided by the teacher. One student talks for a designated length of time while the other student listens without interrupting. The listener then repeats to the speaker what the speaker said. At this time, speakers correct any misinformation or confirm that the listener remembered the main points accurately. Then, the teacher calls on a few listeners to tell the class, in their own words, what they heard their partners say. Students then switch roles for a new question.

Notes on Shared Listening for Kindergarten and Grade 1:

- Shared listening is the primary discourse routine used in all K-1 units to provide structured opportunities for students to think, share, and learn. Shared Listening helps young students learn to develop facility with communicating in the way that scientists do, through a combination of active listening and speaking.
- In each K-1 unit, there is a specific focus for the Shared Listening routine, which together are designed in a progression across the K-1 units. For example, the emphasis in early kindergarten is “listening to take turns” and builds to “listening for the purpose of building on the ideas of a partner” at the end of grade 1.

Think-Pair-Share

Purpose: Think-Pair-Share allows students to activate their prior knowledge, share ideas with peers, and practice speaking and listening skills. This routine is particularly effective for students who may feel reluctant to speak in front of a group, as it gives students a chance to practice their ideas in a one-on-one setting before sharing with the class.

Description: Individual students first think silently about a question posed by the teacher. Then, individuals share their thoughts with a partner. Finally, the teacher calls on a few students to share ideas with the class. Think-Pair-Share can be used with one or more questions.

Think-Write (or Draw)-Pair-Share

Purpose: Think-Write-Pair-Share is a routine that provides students extended time to think about an idea, retrieve information from memory, and record thinking before sharing with a partner. This routine is particularly effective when having students integrate ideas, think about new concepts, and practice writing in preparation for oral sharing. The opportunity to write after thinking, but before discussing, allows students to prepare their thoughts carefully and reflect on what they have been learning.

Description: Individual students first think silently about a question posed by the teacher. Next, they write (or draw) their thoughts on paper. Then, they share their ideas with a partner, using the writing (or drawing) as a scaffold to help them discuss and remember their ideas. Finally, the teacher calls on a few students to share their thinking with the class. Think-Write-Pair-Share can be used with one or more questions. As an optional extension, students may revise their ideas based on their conversations with their partners, if applicable.

Anticipatory Chart

Purpose: The Anticipatory Chart develops students' curiosity and helps them recall their prior knowledge about the topic of the book they are about to read or a topic they are about to investigate. Returning to the chart after a series of experiences enables students to see how much they have learned and to directly address common misconceptions. This routine also reinforces learning by giving students a chance to discuss, correct, and revise ideas.

Description: The teacher leads a class discussion in which students share what they know about a topic, and the teacher records these on a class chart. After students have learned more about the topic, the class revisits the list and students have a chance to connect what they have learned to what they already knew.

Evidence Circles

Purpose: Evidence Circles engage students in small-group, student-led discussions about a claim or claims. The goal of the Evidence Circle is to collaboratively construct an argument for a particular claim. Evidence Circles provide an opportunity for students to carefully consider evidence, to collaboratively reason through ideas, and to practice using the language of argumentation.

Description: Students are provided with one or two claims related to a topic they have been studying, as well as evidence that may support the claim or claims. This evidence may be provided to students, or students might gather evidence themselves by reviewing the investigations they have done and texts they have read. Students convene in groups of four for the purpose of discussing the claim(s) and evidence. Students take turns discussing the different pieces of evidence in terms of what the evidence means, why it is important, and how it supports a particular claim, using sentence frames to help guide their conversations. After the small-group discussions, the class discusses the claim(s) together. If students have been discussing more than one possible claim, the teacher leads the class in deciding which claim the class agrees is best supported by the evidence.

Debriefing Data

Purpose: The Debriefing Data routine is a series of questions that helps students talk about data they have gathered during an investigation. The questions the teacher asks are designed to probe for further thinking about evidence in order to make sense of and interpret findings. Students can also ask one another specific questions. This routine provides an efficient way for different groups of students to compare and reconcile the results they found for similar investigations. Students gain practice talking about evidence as they engage in this routine.

Description: The whole class discusses what they observed or investigated, with the teacher or students offering the following question sequence:

- *What did you find out?*
- *Did you notice any patterns in the data?*
- *What is your evidence?*

Then, the class is polled for agreement:

- *Did anyone observe the same thing?*
- *Did anyone observe anything different?*

OPTIONAL: To discuss possible uncontrolled variables relevant to the investigation, students can be asked the following questions:

- *What could explain how two groups doing the same investigation got different results?*
- *What do you think scientists do when they observe different results?*
- *How could we get more evidence?*

Questions specific to the content being discussed can be added when appropriate.

Building On Ideas

Purpose: This routine engages students in active listening and gives them practice building on the ideas of others. Students ask a question of a partner and then listen to and summarize what they hear. They then add their own ideas by respectfully agreeing or disagreeing and explaining why. Partners then share what they discussed with their group.

This helps students listen, summarize, and share information.

Description: Students in groups of four are given a question to which they respond. Teams of four divide into two groups of two. In each pair, one student asks the provided question, and the other student responds. The listener summarizes (orally, though an optional space is provided in the notebook for notes) what she heard. Then, the listener comments on the speaker's ideas and adds his own. Finally, the group of four comes together. Groups members take turns sharing what was learned from their partners. By the end of this routine, each student will have requested, provided, and reported information. The following sentence frames are provided to help students build on each others' ideas:

- *I heard you say...*
- *I agree because...*
- *I disagree because...*
- *Based on what you said, I think...*

Roundtable Discussion

Purpose: A Roundtable Discussion provides a structure for a small-group discussion that allows each student to take a turn as a leader. This routine promotes both listening and speaking skills, as well as allowing all students to practice leading a discussion. Students gain practice by using the language of science to discuss key ideas and have a chance to think about and process with peers the ideas they have been learning.

Description: Groups of four students discuss four questions related to a topic. Each group member is responsible for acting as a discussion leader for one question. For that question, the student poses the question, invites ideas from the other three group members, and asks questions as needed to ensure participation of all group members. Students are provided with follow-up questions in order to help them prompt discussion in the group. As an optional extension, the teacher may lead a debrief of the questions, with each discussion leader responsible for reporting on her group's ideas to the whole class.

Thought Swap

Purpose: A Thought Swap allows students to hear many different ideas from one another. This routine also permits extended discussion on a topic in which the whole class can participate at once. It is a good way to get students participating actively in a discussion. Think-Pair-Share and Shared Listening are routines that serve similar purposes.

Description: Students stand in two rows, facing one another. Each student standing across from another student become partners. Partners take turns talking and listening to each other in response to a prompt provided by the teacher. Students may sometimes use some physical evidence or artifact from the unit (such as a piece of writing) as part of the discussion prompt. Then, one of the lines takes one step to the right so each student has a

new partner. These new partners then discuss a new prompt.

Science (or Engineering) Practices

Purpose: The purpose of this routine is to make explicit the ways students do, talk, read, and write like scientists. Providing students with the opportunity to reflect in a metacognitive way about this is essential for them to understand the connection between what they are doing in class and the nature and practices of science and scientists.

Description: After an investigation or series of investigations, students reflect on how they are like scientists. The teacher guides the class discussion and records student ideas on a class chart. The teacher and students discuss the specific behaviors and practices that students do that are like those of the larger scientific community. The chart is posted in the room and referenced when appropriate.

Jigsaw Routine

Purpose: A jigsaw is a routine that provides students with an opportunity to explore a specific topic in depth while gaining a broader knowledge about other aspects of the same topic through interactions with their classmates. A jigsaw involves two kinds of groups—a base group consisting of three or four students and an expert group. In expert groups, students read and interact, becoming “experts” about a given topic. They bring their expertise back to their base group, where each student can share her expertise on a different but related text or topic.

Description: The Jigsaw routine involves the following sequence:

1. **Base groups review options:** Teacher assigns students to groups of three or four to review the different options related to a similar topic or task. Students discuss these options, and each student selects one topic or task to investigate further.
2. **Expert groups form:** Students join other students with the same topic or task in order to develop expertise on the topic. Their role is to understand the main points found in their research and to be prepared to present back to their base groups.
3. **Base groups reconvene:** Students share information from their expert groups. After all base-group members finish, groups moves on to the next task.

Science/Everyday Words

Purpose: This routine encourages students to use more specific terminology when talking and writing about science. It gives students a “hook” on which to hang their developing vocabularies—students use what they know from their everyday-language experience to connect to more academic language. The ongoing Science/Everyday Word chart allows students to make connections between what they know and what they are learning, and it promotes the use of scientific words as a way of speaking more precisely. It also raises students’ awareness of different ways of speaking and writing with different audiences.

Description. The class constructs an ongoing Science/Everyday Word chart that links scientific words with everyday words (such as *look* for *observe*). The teacher guides the addition of words to the chart by recording a scientific word with which students have had some experience in the unit. Students suggest everyday approximations of the scientific word, based on their emerging knowledge of the new concept. The teacher then leads a brief discussion about how the scientific word is similar to and different from the everyday approximations. The Science/Everyday Word chart is displayed and added to throughout the unit as a reference. As the class adds to the chart, the teacher guides the students in discussing why it is important to use scientific words when talking about and doing science.

Other notes:

- An important part of this routine is that the science word and the everyday word are not necessarily synonyms - and that’s important. Talking about the differences in meaning between the science word (like “observe”) and the everyday word (“see” or “notice”) is important in helping students understand what the scientific term means.
- Note: Not every word has an everyday equivalent (like “atom” or “ecosystem”). Not every unit word has to go on the chart - add what is useful and makes sense. This routine often works better for science practices words than for content words.

Word Relationships

Purpose: Word Relationships is an open-ended activity in which students gain practice using science vocabulary to discuss ideas they have been learning. This routine helps students increase their understanding of conceptual vocabulary and become more comfortable using the words. It also helps students recognize and reflect on relationships between words and deepen their science understanding. Another emphasis in the Word Relationships routine is the notion that scientists use specialized language and vocabulary to help them explain ideas.

Description: Groups of students are provided with a set (4-10) of key vocabulary words relevant to recent investigations and readings. Students work together to discuss ideas

they have been learning, using the words as they do so. Students create sentences by using several of the words. They might also answer questions using the words as a scaffold. Students make several sentences orally in their groups, then they (optionally) record 2-4 sentences in their notebooks. If time permits, students may choose one sentence to share with the class.

Concept Mapping

Purpose: The Concept Mapping routine supports students in thinking deeply about science concepts through interacting with words they've been learning. This routine allows students to communicate what they know about science words in their own way, to examine the relationships between the concepts they are learning, and to practice using scientific language in a low-stakes, scaffolded way.

Description: Pairs of students are provided with a set (3-7) of key vocabulary words relevant to recent investigations and readings. Students choose two word cards at a time and work together to discuss how words relate. They glue the cards on to a piece of paper, and can either (a) connect the two words together by drawing a line between them or (b) circle the two words together. When the words are connected, students write labels to show how the words are connected.

Examples:

