Deepen Your Knowledge About Argument Schemes

An *argument scheme* is like "a rule for fitting the parts of an argument together." *These "rules" are based on assumptions* that are usually implied—people typically don't say them explicitly when arguing with each other. But understanding the rules and the assumptions can help your students evaluate the strength of an argument, and clarify their reasoning. Asking students to speak plainly about their reasoning when they argue is a good way to familiarize them with the rules. It also helps make their reasoning apparent to others, which allows for open exchanges about how well arguments are constructed and justified.

There are dozens of argument schemes, but *Mars Generation One* focuses on four:

1. *Argument from Observation:* An argument that uses data from observation (or experimentation) as evidence; this is privileged in science
2. *Argument from Authority (or expert testimony):* An argument that uses an expert source of information as evidence
3. *Argument from Consequences:* An argument that uses the possible consequences of a decision (either positive or negative) as evidence
4. *Argument from Comparison (or analogy):* An argument that uses the example of one case as the basis for a claim about another case

How Does Being Familiar with Argument Schemes Help My Students?

Argument schemes are helpful because students often struggle to explain (or justify) their reasoning for how and why evidence supports a claim. While many students are able to make and identify *claims and evidence,* it is more challenging to explain their reasoning, or "the process of making clear how evidence supports a claim."

Students sometimes also find it hard to evaluate the quality of someone else's argument. What makes one argument better than another? What counts as good evidence? What counts as strong or weak reasoning from the evidence to the claim? Without understanding "how arguments work," it's difficult to answer those questions.

An Example: *Argument from Observation*

Argument schemes are usually described as "arguments from…" or "appeals to…." Below is an example of an *argument from observation:*

> *Helen and Bob are walking along a forest trail. Helen stops and points out some tracks that she sees on the trail and says, "A bear must have passed along this trail—these look like bear tracks."*

While it doesn't necessarily read like an "argument" in the conventional sense, Helen made a claim based on evidence. Her claim was that "a bear must have passed along this trail," and she based it on evidence (from her observation) that suggests "these look like bear tracks."

Argument schemes are defined by the type of evidence being used—Helen supported her claim with *evidence from observation,* so she made an argument from observation.

The "Rule" for an Argument from Observation

Based on her observation, Helen made an inference about the bear's presence. Absent that bear being on the trail at the same time she was, she couldn't know with 100% certainty that a bear

did pass along the trail. But she wouldn't be making an argument if it was known with 100% certainty—that would just be a statement of fact.

Below is the "rule" that makes Helen's—or anyone else who might make an argument from observation—inference plausible, despite the lack of complete certainty:

I. The Rule for Argument from Observation	Comments
Premise 1: Given that data represented as "Statement A" ("these look like bear tracks") is true in this situation.	This premise is about the specific situation that Helen is in. **It assumes the statement (her evidence) is true.**
Premise 2: "Statement B" ("a bear must have passed along this trail") is generally true when its sign—Statement A (above)—is true, in this kind of situation.	**This premise is the generalizable rule for all arguments from observation (not just Helen's):** a claim is true when the evidence that supports it is true, in specific situations.
Conclusion: Therefore, "Statement B" is true in this situation.	This is the logical conclusion of the rule: if Statement B is generally true when Statement is true in this situation, then Statement B is going to be true in this situation.

So What? (Check Your Assumptions.)

Helen's argument, just like any argument from observation, is based on an assumption: that her observation is true. If she was asked to explain the reasoning behind her argument, she might say something like, "Well, those are bear tracks. And since they're bear tracks, a bear must have passed this way." But her argument can be questioned: Are those *really* bear tracks? If they are not, then she does not have a strong argument from observation about a bear having passed on that trail.

What This Means for My Students

When evaluating arguments, there are six steps your students can follow:

1. *First: Remember that this is an argument:* someone is trying to persuade me (or I'm trying to persuade someone) that a claim they are making is correct. *But don't assume the argument is strong!*
2. Identify the claim that the argument is based on
3. Identify the evidence used to support the claim, and determine whether it is relevant and supports the claim
4. Identify what backing, if any, supports the evidence**
5. Based on that evidence, identify the argument scheme
6. Ask critical questions to check the assumptions that the argument is based on***

**You can learn more about backing in the "Deepen Your Knowledge About Backing" document.

***You can learn more about critical questions in the "Deepen Your Knowledge About Critical Questions" document.

Other Argument Schemes and Their "Rules"

II. The Rule for Argument from Authority	Comments
Premise 1: Person "E" says that Statement "A" is true (or false).	This premise is about the specific instance of an argument. **It assumes that Person "E" is in a position to know.**
Premise 2: Person "E" is an expert about the subject ("S") that Statement "A" falls within.	**This premise is the generalizable rule for all arguments from authority:** an expert is usually in a position to know whether a statement that falls under a certain subject is true or false.
Conclusion: Therefore, Statement "A" is true (or false).	This is the logical conclusion of the rule: Statement "A" is true when Person "E" is an expert in Subject "S" that the statement is in.

III. The Rule for Argument from Consequences	Comments
Premise 1: If "A" is brought about, then good (or bad) consequences will plausibly occur	This premise is about the specific instance of an argument. **It assumes that the consequences will occur if A happens.**
Conclusion: Therefore, "A" should (or should not) be brought about.	This is the logical conclusion of the rule: if the consequences will (or will not) occur, then "A" should (or should not) happen

IV. The Rule for Argument from Comparison	Comments
Similarity Premise: Generally, Case "C1" is similar to Case "C2"	This premise is about the case that an arguer wants to compare the current situation to. **It assumes that the two cases being compared are actually similar.**
Base Premise: "A" is true (or false) in Case "C1"	This is the specific statement or event in Case "C1" that an arguer wants to compare the specific statement or event in the current situation
Conclusion: Therefore, "A" is true (or false) in Case "C2"	This is the logical conclusion of the rule: If the two cases really are that similar, then "A" should be true (or false) in both.

MODELING & FORMATIVE ASSESSMENT

You should consider starting this activity with the whole class if you are just beginning to use argument schemes. Modeling your thinking processes—using the five steps above—for identifying claims and evidence using keywords and phrases will help your students see the connection between language and argument schemes. Otherwise, use this activity with smaller

groups who might need more guidance on how to distinguish among argument schemes.

Use the following evidence from the game to (1) identify argument schemes using keywords and phrases or (2) identify the sources of evidence and check on the assumptions of the argument scheme. Write or project the topic for argument and evidence (without the correct scheme) so that all students can see it. Option 2 is more advanced.

Topic for Argument
How should the colony spend its limited time and money resources? Most colonists feel that resources should be spent on only one of these three things: Conducting research; Maintaining equipment; or Investing in the community.
Evidence
#1: "One engineer observed our water pumps are clogged and working poorly." (Argument from observation)
#2: "As a consequence of doing more research, we'll be able to make the city safer for people." (Argument from consequence)
#3: "Ed Clensall is our maintenance authority. He says we need 30% more time to maintain our equipment." (Argument from authority)
#4: "According to our mechanics' observations, half of our filters have broken parts." (Argument from observation)

Option 1. Start by modeling how students might identify an argument scheme based on a claim and evidence. Below is an example:

> *The colonists are having a debate about how the colony should spend its limited resources. Most people are arguing for one of three things: conducting research; maintaining the colony's equipment; or investing in programs to build the community.*
>
> *Let me look at this first piece of evidence in the list, #1, to see what kind of an argument it might support. I see a few words that give me some clues. Let me start with "one engineer." Which one of the four types of arguments that I know about could this support? Well, an engineer is a person who has special skills, so maybe this evidence could support an argument from authority? I'll underline "one engineer" so that I can come back to it after looking at the rest of the evidence.*
>
> *But I also see the word "observed," and that makes me think that this piece of evidence could support an argument from observation. Okay, I'll underline that, too. Now, none of the other important words in this sentence—"water pumps, clogged, and working poorly" make me think of any of the argument schemes that I know about, so I think it's going to be one of those two argument schemes.*
>
> *So, I 'm thinking that this piece of evidence could support either an argument from authority or an argument from observation. Let me read it again: "One engineer observed our water pumps are clogged and working poorly." "One engineer" doesn't really sound like an authority, or expert, to me. But the rest of the sentence definitely sounds like an observation to me: the engineer observed that the water pumps are clogged and working poorly. I'm pretty sure that this is evidence that would support an argument from observation. So, based on this evidence, I'm going to claim that the colony should spend its resources on maintaining equipment.*

Have students do the same activity with the rest of the evidence, either in pairs/groups or as a class.

If students are struggling, remind them to remember (or refer to) the four argument schemes

and think about keywords that give some clues about what type of evidence it is.

Option 2. Model the same process you did in Option 1. But now go beyond identifying keywords with argument schemes to look at the assumptions of the argument scheme. For example:

> *Okay, so I want to claim that the colony should spend its resources on maintaining equipment. I know that others might feel differently, however, and that they might make different claims. Like me, they want to their argument to win! So, let me think about any assumptions that my argument is based on. I want to check to see if there's anything that I'm saying is true that I don't really have proof for.*
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> *I think the colony should spend its resources on maintaining equipment. My evidence for that is that one of the engineers observed that our water pumps are clogged and working poorly. So, I'm making an argument from observation. Something I know that is important in that kind of argument is that the observation should be true! I mean, the basic assumption of an argument from observation is that the observation is correct. What are some questions that I can ask to make sure? Well, one is "How certain is the engineer's observation?" Did she double-check? Another question I can ask is, "Did others also observe this?" If I can answer these questions, my argument will be even stronger.*

Have students do the same activity with the rest of the evidence, either in pairs/groups or as a class. Basic assumptions for each of the argument schemes are listed in the tables above.

If students are struggling, remind them to remember (or refer to) the four argument schemes and think about *the source* of the argument scheme—meaning, where does the evidence come from? Then they should think about the basic assumptions behind that type of evidence. For example, if they are making an argument from authority, then questions they should ask include: "Is this person really an expert?" and "Do other experts agree?"