Argue in Science, Grades 4-5: Introduction

Significance of Key Language Use

Argue is increasingly becoming part of the science curriculum, and by extension, directly impacts multilingual learners. In upper elementary school, scientific argumentation is surrounded by language with students processing, sharing, co-constructing, and challenging ideas. Students come to realize that the kind of discourse that generates scientific talk around argument begins with questions that do not necessarily have an established answer, but that they can be part of a scientific community evaluating potential conclusions.

Contributions of Multilingual Learners

As students enter this developmental phase, language and content expectations intermingle as students engage in argumentation in science and STEM. During these years, multilingual learners begin to challenge scientific explanations and cite evidence in their home language or in English. In addition, students identify and use evidence from visual, digital, and text sources to critique scientific solutions posed by their peers.

Multilingual learners’ linguistic and cultural experiences must be met with instructional congruence (Lee & Fraud, 2001), where educators match students’ assets with disciplinary practices to make science accessible, meaningful, and relevant. In that way, students are able to collaborate with peers knowing that their ideas, languages, and cultures are valued. In addition, to better promote classroom equity, scientific content language must be made explicit while inviting students to share their own awareness or questions about the content.

All educators are encouraged to work collaboratively to engage multilingual learners by

- Asking multilingual learners to apply their culturally informed reasoning to their scientific exploration
- Facilitating peer-to-peer interaction to formulate explanations for scientific phenomena
- Having students apply real-life experiences, observations, and perspectives to shape argument
- Modeling for students how to use data, models, and evidence in constructing or co-constructing arguments
- Making connections among home, community, and school resources to gather evidence for claims
**Definition of Argue in Science:** the critique of scientific explanations or solutions by citing relevant evidence about the natural and designed worlds

<table>
<thead>
<tr>
<th>Common Concepts and Disciplinary Practices Derived from Academic Achievement Standards</th>
<th>Associated Language Features</th>
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</thead>
</table>
| • Evaluation of methods and tools for collecting data to use as evidence  
• Critique of proposed procedures, explanations, or models by citing relevant evidence and posing specific questions  
• Use of data to evaluate claims about cause and effect  
• Determination of the merit of a solution to a problem by making a claim and citing relevant evidence about how it meets the criteria and constraints of the problem | **Organizing the Argument**  
• Statements of position/point of view or claims  
• Language choices based on purpose (persuasive, logical, emotive, interpretive)  
• Cohesion in connecting claims to evidence or evaluating evidence  
• Restatement of position/point of view or claims, summary of points, or conclusion  

**Strengthening the Argument**  
• Details related to type, quantity, qualities in noun groups (*toxic conditions, accurate measurements*)  
• Complex sentences to combine and link claims and evidence (*when, until, because, based on the evidence, therefore, according to...*)  
• Qualifiers and modals (*could, must, should, might*) to convey level of certainty  
• Passive voice, technical word choices, and abstract nouns representing information/ideas to formalize argument |

**WIDA ELD Standard 4 – Language of Science.** English language learners communicate information, ideas and concepts necessary for academic success in the content area of science.

**WIDA LANGUAGE EXPECTATIONS**

**RECEPTIVE (Listening and Reading/Viewing)**  
**ELD.Sci.4-5.Arg.Rec:** Interpret arguments based on the clarity of claims and evidence.

**PRODUCTIVE (Speaking and Writing)**  
**ELD.Sci.4-5.Arg.Prod:** Construct cohesive arguments with strong claims and detailed descriptions of evidence.
## RECEPTIVE (Listening and Reading/Viewing)

**ELD.Sci.4-5.Arg.Rec:** Interpret arguments based on the clarity of claims and evidence.

- Comprehend information presented in a diagram or data display that supports a scientific argument
- Comprehend a scientific argument expressed through a combination of words and diagrams or graphical displays
- Follow the line of reasoning in oral arguments
- Identify claims and evidence in a scientific argument
- Select relevant information in a text (oral or written), model, or data set to support a scientific argument
- Identify key information and related details (e.g., evidence and claims) in a scientific argument
- Compare the evidence used in two arguments on the same topic
- Compare data sets to identify similarities and differences in scientific arguments

## PRODUCTIVE (Speaking and Writing)

**ELD.Sci.4-5.Arg.Prod:** Construct cohesive arguments with strong claims and detailed descriptions of evidence.

- Analyze different arguments on the same topic
- Construct an argument with evidence to support a claim
- Describe evidence (e.g., data presented in a graph or table) in support of a claim
- Describe relationships among claim, evidence, and reasoning in a scientific argument
- Critique claims, evidence, and reasoning in an argument
- Explain how information presented in a diagram or data display supports a scientific argument
- Summarize key information (claims and supporting evidence) in a scientific argument
# WIDA Proficiency Level Descriptors for Receptive Language

**Listening and Reading/Viewing, Grades 4-5**

As they work towards meeting WIDA English Language Development Standards and WIDA Language Expectations, with instructional support, multilingual learners will process...

<table>
<thead>
<tr>
<th>Discourse Dimension</th>
<th>End of Level 1 Entering</th>
<th>End of Level 2 Emerging</th>
<th>End of Level 3 Developing</th>
<th>End of Level 4 Expanding</th>
<th>End of Level 5 Bridging</th>
<th>Level 6 Reaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of language relationships among ideas</td>
<td>Discourse with a series of extended sentences</td>
<td>Discourse with extended series containing multiple components and subcomponents</td>
<td>Connected discourse, with emerging coherence and cohesion</td>
<td>Connected discourse, organized to heighten coherence and cohesion</td>
<td>Connected discourse that varies in length and order of phrases and clauses</td>
<td>Connected discourse, with many embedded phrases and clauses, that varies in length and order</td>
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<tr>
<td></td>
<td>Related ideas about concrete and new topics</td>
<td>An expanded idea about topics and their subcomponents</td>
<td>Multiple, related ideas with a balance of concrete and new topics and their subcomponents</td>
<td>Multiple, related ideas that extend concrete topics and experiences to abstract themes</td>
<td>Multiple cohesive and organized ideas about complex topics, including varied perspectives</td>
<td></td>
</tr>
<tr>
<td>Sentence Dimension</td>
<td>Simple and compound phrases and sentences (with variation in placement of subject, verb, adjective, adverb)</td>
<td>Simple and compound sentences, using basic connectives, expanded with emerging variation</td>
<td>A series of compound and some complex sentences (e.g., occasionally beginning with phrases or subordinate clauses)</td>
<td>An emerging variety of sentence lengths and parts of speech</td>
<td>A range of sentence structures with varying complexity, some use of sophisticated connectives to link ideas, events, or reasons</td>
<td></td>
</tr>
<tr>
<td>Variety of language forms and conventions</td>
<td>A developing range of language patterns used in social and instructional situations or across content areas</td>
<td>A range of language choices that vary according to social setting (e.g., playground, classroom, or community)</td>
<td>A range of language choices that vary according to social setting and purpose (e.g., persuading, entertaining)</td>
<td>A range of language choices that vary according to task (e.g., facilitating a science experiment), purpose, social setting, and who’s involved</td>
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<tr>
<td>Language choices characteristic of context</td>
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<td></td>
<td></td>
<td></td>
<td>A wider range of sentence structures with varying complexity, sophisticated connectives to link or combine ideas, events, or reasons</td>
<td></td>
</tr>
<tr>
<td>Word/Phrase Dimension</td>
<td>General language; close cognates</td>
<td>General language; a few specific words/phrases appearing across content areas; close cognates and basic morphemes (e.g., roots, prefixes, suffixes)</td>
<td>Some specific language; a range of morphemes (e.g., roots, prefixes, suffixes)</td>
<td>Most specific language; some technical words/phrases; a wider range of morphemes</td>
<td>Most specific language and many technical words/phrases</td>
<td></td>
</tr>
<tr>
<td>Range of vocabulary</td>
<td>Everyday language expanded with added details (e.g., simple contractions, simple possessives, multiple adjectives, adverbs, and prepositional phrases)</td>
<td>Language using more precise or subtle ways to say relatively simple things including idioms and common collocations (e.g., words/phrases that co-occur)</td>
<td>Language using more precise or subtle ways to say relatively simple things including connotative meanings (e.g., words with cultural or emotional associations)</td>
<td>Language using more precise or subtle ways to say relatively simple things including connotative meanings (e.g., words with cultural or emotional associations)</td>
<td>Many technical words/phrases</td>
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</tr>
<tr>
<td>Specificity of language to context</td>
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<td></td>
<td></td>
<td>Precisely selected language essential to understanding new concepts, using multiple meanings and descriptive, poetic, and figurative language to clarify contextual details</td>
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</table>
## WIDA Proficiency Level Descriptors for Productive Language Speaking and Writing, Grades 4-5

As they work towards meeting WIDA English Language Development Standards and WIDA Language Expectations, with instructional support, multilingual learners will produce...

<table>
<thead>
<tr>
<th>Level</th>
<th>Discourse Dimension</th>
<th>Sentence Dimension</th>
<th>Word/Phrase Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of Level 1 Entering</td>
<td>• Discourse lengthened with prepositional phrases; emerging connection of ideas</td>
<td>• Simple sentences with some embedded phrases and dependent clauses</td>
<td>• General, high frequency oral vocabulary with some irregular words (easy to understand in context); close cognates</td>
</tr>
<tr>
<td>End of Level 2 Emerging</td>
<td>• Extended discourse that expands related ideas on the same topic</td>
<td>• Variable control of effective language choices, including connectives and cohesive devices, with some language repeated from models</td>
<td>• General language; close cognates</td>
</tr>
<tr>
<td>End of Level 3 Developing</td>
<td>• Language choices that convey evidence of adjustment for topic and genre</td>
<td>• Developing control in making effective language choices, including connectors and cohesive devices, using original language beyond models</td>
<td>• Language expanded with added details (e.g., multiple adjectives, adverbs, and prepositional phrases)</td>
</tr>
<tr>
<td>End of Level 4 Expanding</td>
<td>• Extended discourse that expands related ideas on the same topic</td>
<td>• Developing control in making effective language choices, including connectors and cohesive devices, using original language beyond models</td>
<td>• General language; a few specific words/phrases (i.e., appearing across content areas); close cognates and basic morphemes (e.g., roots, prefixes, suffixes)</td>
</tr>
<tr>
<td>End of Level 5 Bridging</td>
<td>• Language choices that convey evidence of adjustment for topic and genre</td>
<td>• A series of compound and some complex sentences (e.g., occasionally beginning with phrases or subordinate clauses)</td>
<td>• Some specific language; a range of morphemes (e.g., roots, prefixes, suffixes)</td>
</tr>
<tr>
<td>Level 6 Reaching</td>
<td>• Connected discourse that varies in length and order of phrases and clauses</td>
<td>• Effective, controlled language choices, including connectors and cohesive devices</td>
<td>• Most specific language; some technical words/phrases; a wider range of morphemes</td>
</tr>
</tbody>
</table>

### Discourse Dimension
- Amount of language
- Degree of adjustment by genre/topic/task, audience, and format

### Sentence Dimension
- Variety of language forms and conventions in expression
- Fluency of sustained, focused expression

### Word/Phrase Dimension
- Range of vocabulary common to age group
- Specificity of language to context

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