

Grades 9-12

SCIENCE

Framework for FORMATIVE/CLASSROOM Instruction and Assessment Productive Domains of **Speaking and Writing**

The Pennsylvania English Learner (EL) Overlays assist educators in developing instructional units, lessons, or activities that are meaningful and comprehensible for English learners, and are aligned with Pennsylvania's *EL Differentiation Protocol*.

The EL Overlays illustrate the dynamic process of adapting instruction and assessment based on the English language proficiency of students. These are models that exemplify adaptations for select instructional contexts and provide resources to extend this process to other instructional units. Key features of the Overlays are Model Performance Indicators (MPIs) which differentiate and scaffold instruction per ELP level by adjusting the language function and instructional support.

The EL Overlays are organized by: 1) content area, 2) grade cluster, and 3) language domain (productive/productive).

Each **Productive** Overlay contains:

Page 1: Introduction

Page 2: Example Speaking Differentiation with Model Performance Indicators (MPIs)

Page 3: Example Writing Differentiation with Model Performance Indicators (MPIs)

Page 4: Productive Performance Indicator (PI) Builder

Page 5: Differentiation Template

Speaking Differentiation with Model Performance Indicators (MPIs)

ELD Standard 4: English learners communicate information, ideas, and concepts necessary for academic success in Science.

Content Standard(s): 3.1.10.C1 Explain the mechanisms of biological evolution.

Concepts: Differential survival and reproduction of organisms in a population that have advantageous heritable traits leads to an increase in future generations having the desired trait(s)

Competencies: Investigate and communicate data describing how changes in environmental conditions can affect the distribution of traits in a population and cause increases in the numbers of some species, the emergence of new species, and the extinction of other species.

Key Use of Academic Language (KUALA): Students at all levels of English proficiency will produce **EXPLANATIONS**.

Academic Language Components

Discourse		Sentence		Word
Experiment Write-up (problem; hypothesis; materials; procedure; observations/data; conclusion)		I hypothesize that ___ made them ___ That wasn't caused by ___ because ___ Several factors contributed to the outcome. Namely, ___ ___ was a result of ___ The ___ led to ___		Extinction Heritage Species Allele
ELP Level 1 Entering MPI	ELP Level 2 Emerging MPI	ELP Level 3 Developing MPI	ELP Level 4 Expanding MPI	ELP Level 5 Bridging MPI
Discuss how natural selection can impact a population in a small group with visual or multimedia supports	Discuss how natural selection can impact a population in a small group with a teacher-created outline	Discuss how natural selection can impact a population in a small group with class notes	Discuss how natural selection can impact a population with a partner and class notes	Discuss how natural selection can impact a population with class notes

Writing Differentiation with Model Performance Indicators (MPIs)

ELD Standard 4: English learners communicate information, ideas, and concepts necessary for academic success in Science.

Content Standard(s): 4.7.10.C.1. Explain factors that could lead to a species' increase or decrease.

Concepts: Natural selection is the result of four factors:

- the potential for a species to increase in number
- the genetic variation of individuals in a species due to mutation and sexual reproduction
- competition for an environment's limited supply of the resources
- the increase in number of those organisms that are better able to survive and reproduce in that environment.

Competencies: Use models to explain how the process of natural selection is the result of four factors.

Key Use of Academic Language (KUALA): Students at all levels of English proficiency will produce **RECOUNTS**.

Academic Language Components

Discourse		Sentence		Word
Scientific Model (graphical representation of steps; labels)		____ was a result of ____ The ____ led to ____, which resulted in ____ The change resulted in ____ It combines with ____ to produce ____		Generic Mutation Reproduce Survive
ELP Level 1 Entering MPI	ELP Level 2 Emerging MPI	ELP Level 3 Developing MPI	ELP Level 4 Expanding MPI	ELP Level 5 Bridging MPI
Label a simple diagram of how the flow of energy within an ecosystem changes when one element is removed with small group	Take notes on a graphic organizer summarizing how the flow of energy within an ecosystem changes when one element is removed using phrase wall support and a partner	Write a short essay summarizing how the flow of energy within an ecosystem changes when one element is removed with template support (e.g., descriptors of the roles of each organism)	Produce a research report explaining how the flow of energy within an ecosystem changes when one element is removed with partner support (i.e., as it relates to the food web)	Produce a research report explaining how the flow of energy within an ecosystem changes when one element is removed with peer edit (i.e., as it relates to the food web)

Building Productive Performance Indicators (PIs) to differentiate and scaffold instruction per ELP level by adjusting the **language function** and **instructional support**.

1) **Language Function** how students will process language during a Productive activity to demonstrate attainment of the ELD and content standard.

The language of RECOUNTS		The language of EXPLANATIONS		The language of ARGUMENTS		The language of DISCUSSIONS	
Arrange	Name	Apply	Identify	Compare	Express	Answer	Initiate
Brainstorm	Order	Chart	Illustrate	Compose	Extract	Ask	Participate in
Categorize	Paraphrase	Classify	Interpret	Confirm	Interpret	Associate	Present
Compose	Reenact	Compare	Narrate	Connect	Justify	Compare	Recommend
Construct	Repeat	Compose	Note	Construct	Negotiate	Confirm	Reflect on
Copy	Replicate	Contrast	Organize	Critique	Respond to	Converse	Request
Cross check	Restate	Define	Present	Defend	Restate	Discuss	Respond to
Draw	Retell	Describe	Role play	Define	Suggest	Edit	Revise
Find	Rewrite	Develop	Show	Elaborate		Give	Use
Follow	Select	Express	Summarize			Indicate	
directions	Sequence	Follow	Tell				
Label	Share	directions	Trace				
List	State	Generalize					
Locate	Take notes						
Make							

2) **Content Stem** - Selected focus of grade-level curricular lesson/activity for all students which remains consistent across all ELP levels:

3) **Instructional Support** - Scaffolds to accompany explicit instruction with multiple opportunities for student response and feedback decreasing in degree from ELP level 1 to level 5.

ELA Sensory Supports	ELA Graphic Supports	ELA Interactive Supports
Acting/Reader's Theater Audio Books Felt/Magnetic Figures Illustrations/Photographs Manipulatives Pantomime Read Alouds Realia Role Play Songs/Chants Total Physical Response (TPR) Videos	Cloze Paragraphs/Sentences Gallery Walk Graphic Organizer Illustrated Word/Phrase Banks or Walls Information Chunking Rubrics Study Guides/Guided Notes Written Objectives	Bilingual/Picture Dictionaries Internet/Software Programs Jigsaw Activities Pairs/Triads/Small Groups Teacher Modeling/Monitoring Use of L1

Differentiation Template

ELD Standard 4: English learners communicate information, ideas, and concepts necessary for academic success in Science.

Content Standard(s):

Concepts:

Competencies:

Key Use of Academic Language (KUALA): Students at all levels of English proficiency will produce_____.

Academic Language Components

Discourse		Sentence		Word	
ELP Level-specific PIs	ELP Level 1 Entering	ELP Level 2 Emerging	ELP Level 3 Developing	ELP Level 4 Expanding	ELP Level 5 Bridging
Include: 1) Language Function 2) Content Stem (consist across all levels) 3) Instructional Support(s) <i>Language functions and instructional supports can be selected from Page 4, or supplied by the educator.</i>					