

Grades 9-12

SCIENCE

Framework for FORMATIVE/CLASSROOM Instruction and Assessment Receptive Domains of **Listening and Reading**

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 EL 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 (receptive/productive).

Each **Receptive** Overlay contains:

Page 1: Introduction

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

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

Page 4: Receptive Performance Indicator (PI) Builder

Page 5: Differentiation Template

Listening 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.A5 Relate life processes to sub-cellular and cellular structures to their functions

Concepts: Mitosis is the process in which individual cells multiply, which allows multicellular organisms to grow. Both daughter cells receive identical genetic information from the original parent cell.

Competencies: Use a model to explain how mitotic cell division results in daughter cells with identical patterns of genetic materials essential for growth and repair of multicellular organisms.

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

Academic Language Components

| Discourse | | Sentence | | Word | |
|--|---|--|--|--|--|
| Scientific Model (graphical representation of steps; labels) | | First, ___ and second, ___ finally___ After ... the next step is/was to___ In the first stage/phase, ___ The transition between stages __ and __ can be described as___ | | Mitosis Nuclear division Diploid | |
| EL Level 1 Entering MPI | EL Level 2 Emerging MPI | EL Level 3 Developing MPI | EL Level 4 Expanding MPI | EL Level 5 Bridging MPI | |
| Listen to a description of the process of mitotic cell division with visual support and label a model with word bank | Listen to a description of the process of mitotic cell division with visual support and label a model | Explain how the mitotic cell division process results in daughter cells using a cell model using a sequence chart | Explain how the mitotic cell division process results in daughter cells using a cell model using a partially completed graphic organizer | Explain how the mitotic cell division process results in daughter cells using a cell model using a graphic organizer | |

Reading 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.B3 Describe the role of DNA in protein synthesis as it relates to gene expression.

Concepts:

- In sexual reproduction, specialized cell division, meiosis, occurs resulting in the production of sex cells (sperm and egg cells).
- Offspring inherit 23 chromosomes from each parent resulting in 46 total chromosomes.

Competencies: Use a model to explain the role of cellular division and the mechanisms in meiosis for transmitting genetic information from parents to offspring.

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

Academic Language Components

| Discourse | | Sentence | | Word |
|---|--|---|--|--|
| Scientific Model (graphical representation of steps; labels) | | We can interpret ____ as __ Given the evidence, we can deduce that ____ ____ can be differentiated from ____ based on ____ After a thorough analysis of the evidence, we conclude that ____ ____ is related to ____ insofar as ____ ____ and ____ are connected by ____ . This is important because ____ | | DNA Double helix Enzyme Cytosine Guanine Nucleotide Replication |
| EL Level 1 Entering MPI | EL Level 2 Emerging MPI | EL Level 3 Developing MPI | EL Level 4 Expanding MPI | EL Level 5 Bridging MPI |
| Select traits related to patterns of inheritance (e.g., blond vs. black hair, short tails vs. long tails) with visual support | Identify the different parts of a DNA molecule on a diagram with a partner | Describe the role of protein synthesis in cell reproduction using poster support | Draw conclusions about the impact of breeding using guided notes (e.g., dog, fruit, flower breeding) | Analyze genetic mutations and the how the DNA sequence may or may not affect phenotype using illustrations/photographs |

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

1) **Language Function** how students will process language during a receptive 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 EL levels:

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

Academic Language Components

| | Discourse | | Sentence | | Word | |
|--|---------------------|---------------------|-----------------------|----------------------|---------------------|--|
| | | | | | | |
| | EL Level 1 Entering | EL Level 2 Emerging | EL Level 3 Developing | EL Level 4 Expanding | EL 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> | | | | | | |