

ELPS in Science

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Need / Data



Objectives for Today

Content Objective

- Review the principle components of the secondary science lesson titled "Cell Structure and Function"
- Provide insight on the implementation of ELPS within a core content lesson
- Explore a science lesson which affords multiple opportunities for a student to gain mastery in the essential knowledge and skills while supporting his/her English language development in listening, speaking, reading, and writing

Language Objective

- Identify and discuss the multiple opportunities students have to develop English language within the content
- Write how some of these practices can be implemented in your class





Why is this important?

- <u>State Requirement:</u> Chapter 74.4 requires **all** content teachers to support ELLs' **development of content and language** as they are an integral part of the required curriculum. The ELPS integrate and focus on skills that **support academic and language development** it is the responsibility of every classroom teacher to be familiar with and supportive of the implementation of the **ELPS** (Dec of 2007)
- Without appropriate linguistic support, students may experience difficulty understanding the grade-level English language used during content-based instruction.





Implementing the ELPS in Science

- Model Lesson: "Cell Structure and Function"
- Lesson Format: 5-E Lesson Model
- Focus: Identify support for academic and linguistic needs of ELLs
 - Different types of activities
 - Different types of materials
- Support based on proficiency levels of individual students
 - Use of native language
 - student-generated examples
 - Additional visuals
 - Adapted text





Language Proficiency of Students

- When planning instruction consider language proficiency of students (TELPAS) by language domain
 - Provide support for student understanding
 - Develop academic language
 - Opportunities to use language in all 4 domains
 - Activities may or may not incorporate all 4 domains







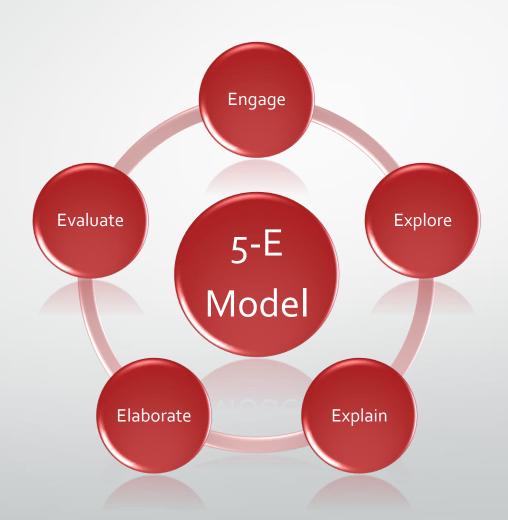
What is a 5-E Lesson?

- An instructional model that embodies a constructivist, inquiry-based learning approach by **engaging** students and allowing them to **explore** the concepts being introduced, discover **explanations** for the concepts they are learning. Student **elaborate** on what they have learned as they apply their knowledge to new situations. The 5E model affords many opportunities for **evaluation** of students' understanding of the concepts. (Orgill & Thomas, 2007)
- It is unique to the content and language development of students because it allows them to actively participate in their learning
- It may be taught over a series of days





5-E Model Components







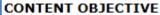
Identifying Objectives

Snapshot

Content Objective(s) – Taken from the TEKS; specific to this lesson; focuses on the learning outcome for this lesson

TEKS

Students are expected to differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole (TEKS 7.12D).



Students will identify, describe, and recognize the structure and function of cellular organelles in both plant and animal cells.

Language Objective(s) – Taken from the ELPS; specific to this lesson;
 connected to the content objective

ELPS

- Use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language (c2E).
- Narrate, describe, and explain with increasing specificity and detail to fulfill content area writing needs as more English is acquired (c5G).

LANGUAGE OBJECTIVE

Students will identify the structures and function of cell organelles and demonstrate understanding through the process of scientific investigation, group collaboration/communication, narration, and writing.

p. 4-17 Supplement





Identifying Objectives

• What is the difference between a content objective and a language objective?

CONTENT OBJECTIVE

Students will identify, describe, and recognize the structure and function of cellular organelles in both plant and animal cells.

LANGUAGE OBJECTIVE

Students will identify the structures and function of cell organelles and demonstrate understanding through the process of scientific investigation, group collaboration/communication, narration, and writing.



The content objective focuses on the learning outcome of the lesson's TEKS while the language objective aligns to the ELPS and focuses on the linguistic support necessary for students' understanding of content during the delivery of the lesson.





Identifying College and Career Readiness Standards (CCRS)

- Purpose of CCRS to identify and define the competencies and skills graduating high school students must possess in order to be successful in higher education and beyond
- An extension of the lesson's content and language objectives



College and Career Readiness Standards (CCRS)

VI. Biology

A. Structure and function of cells

Describe the structure and function of major sub-cellular organelles.



(Adopted by the Texas Higher Education Board or January 24, 2008)



TEKS for Technology Applications

- Use of technology students are required to use technology to communicate, analyze, create, explore, and evaluate information
- Students need technology skills to work, live, and contribute in an increasingly digital and global society

pp. 17-18







Response to Intervention (RtI)

- Purpose to meet the academic and behavioral needs of all students through a variety of services containing the following key elements:
 - High-quality instruction and scientific, research-based tiered interventions aligned with individual student needs
 - Frequent monitoring of student progress to make results-based academic and/or behavioral decisions
 - Application of student response data to important educational decisions (placement, intervention, curriculum, and instructional goals and methodologies)

Support for academic and behavioral needs of all students (examples):

- Grouping configurations
- Visuals
- Linguistically-accommodated activities





Making Connections



- Lesson's activities and materials are aligned to the individual needs of ELLs based on their level of language proficiency in listening, speaking, reading, and writing.
- As we go through the math lesson, make note of the integration of the ELPS, TELPAS proficiency level descriptors, CCRS, RtI Elements, and linguistic accommodations
- Integration is critical for students to <u>develop English proficiency</u> and acquire content area knowledge and skills simultaneously





Vocabulary and Level of Language Proficiency

- Consider each student's individual level of language proficiency
- Vocabulary lists are accommodated to meet students' linguistic and academic needs







Composing Vocabulary Lists(s)

- Academic Vocabulary academic terms connected specifically to the content area TEKS
- Essential Vocabulary terms that may be integrated within any content area lesson
- Vocabulary Instruction use research-validated practices for expanding students' vocabulary





Composing Vocabulary Lists(s)

- Academic Vocabulary academic terms connected specifically to the content area TEKS
- Essential Vocabulary terms that may be integrated within any content area lesson

Academic Vocabulary		Essential Vocabulary	
Cell membrane	Chloroplast	Compare	Role play
Cell wall	Vacuole	Contrast	Infer
Nucleus	Organelle	Demonstrate	Concept
Cytoplasm	Structures	Similarities	Logical
Mitochondrion	Functions	Differences Collaborative	Characteristics Attributes





Pre-Teaching Vocabulary

- Before the delivery of the lesson
- Engage portion of the lesson (linguistic accommodations/support)
 - Visuals
 - Manipulatives
 - Nonverbal cues
 - Kinesthetic activities





Engage

- Students are engaged by an object, event, or question
- Capture the students' interest for authentic student engagement
- Make connections to past and future activities
- Language helps students access prior knowledge and express interest, ask question, and make predictions about new concepts

ELPS that could be used: 1a; 1c; 2e; 3e; 3f

ENGAGE | The activities in this section capture the student's attention, stimulate their thinking and help them access prior knowledge.

> 1. As an introduction to cells, use the Plant Cell Structure and Animal Cell Structure visuals to introduce key vocabulary.

Whip Around:

Express prior knowledge stems:

An organism is made of _____. (cells 6.12D) Plants and animals that are made of more than one cell are termed (multicellular 6.12D)

2. Review plant cell parts and functions: Use a clear Pyrex dish (cell wall). Line the dish with round plastic beads (cell membrane). Fill the dish with hair gel (cytoplasm). Add one Styrofoam peanut (nucleus), several marbles (chloroplast), and one small rock (vacuole). Have students discuss each of the parts of the cell model with a partner and compare them to the parts of a plant cell.

Student Sentence Stems for Speaking:

This is a...

This is a and it has a ...

It's important to remember...





Engage

What types of linguistic supports did you identify?

ENGAGE The activities in this section capture the student's attention, stimulate their thinking and help them access prior knowledge.

> 1. As an introduction to cells, use the Plant Cell Structure and Animal Cell Structure visuals to introduce key vocabulary.

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Student Sentence Stems for Speaking:

This is a...

This is a and it has a ...

It's important to remember...

Linguistic Support:

- Visuals
- Sentence Stems (writing and speaking)
- Review of information
- Student discussion with partner





Building Background Knowledge

- some students may not have the background knowledge required for a lesson
- May need to provide supplemental materials to meet the language need without reducing or modifying the content
 - Adapted text
 - Native language (as appropriate)
 - Multimedia
 - Manipulatives

Engage

Possible Sentence Stems for "Engage" in Science				
I know	I want to know	makes me wonder		
I think	I wonder why	This happened before when		
It's probably because	Let's find out	This reminds me of		
My suggestion would be	This is similar to (different from)	What interests me is		
We might be able to solve this problem by	We can find out more about this by	The variety (lack of variety) might be due to		
This could happen because	Adding (Removing) would cause	This phenomenon could be the result of		





Building Background Knowledge

What background should teachers and students possess?

Teacher

- Be able to access and/or create visuals (of plant and animal cells) and a plant cell model
- Be knowledgeable of cell staining techniques
- Provide instructional strategies using concept maps such as a "fishbone"

Student

- Identify the basic structures of organisms
- Differentiate between prokaryotic and eukaryotic cells
- Understand the difference between multicellular and unicellular





Routines and Procedures for Language Development

- Student Participation kinesthetic activities, whole-class and group discussions, and independent work
- Students must be familiar with the routines and procedures involved in each of these settings
- Routines and Procedures
 - must be carefully taught, modeled, and established;
 - Create a classroom environment that is more efficient, positive, and productive;
 - allows the teacher to focus on meaningful instruction;
 - allows students to concentrate on key concepts





Language Development Activities

During EXPLORE portion of the lesson, students rotate through three workstations

- What are some examples of language development activities in the explore portion of the lesson?
- How are the ELPS implemented in this portion of the lesson?
- Facilitation for development –
 ask questions for further support
 of students' understanding

Explore



While rotating through stations, students will be able to:

- · compare and contrast the structures of plants and animals.
- demonstrate and understand the 3-dimensional aspect of cell structure.
- · identify the various parts of plant and animal cells.

Station 1:

Students will create a model of a plant or animal cell using selected materials.

For a complete list of materials, refer to the lesson plan.

Sentence Inference Stems for Writing:

- I can determine that ...
- From the model creation, I can...
- I know ____ because ...

Station 2:

Students will use a microscope to view the similarities and differences between a plant (onion) and animal (human cheek) cell. Students will draw a picture representing each cell, label the visible cell parts, and create a Venn diagram that illustrates the similarities and differences between the two types of cells.

Sentence Inference Stems for Writing:

- What are the characteristics of...?
- What will happen if . . . ?
- What can you infer from...?

Station 3:

Part I: Students will complete handout of "Jewel City Analogy" to provide them an example of cell structure analogy.

Part II: Students will create an analogy of the plant cell and cell parts using the campus floor plan (i.e. principal's office, janitor's closet, campus hallways, etc.).

Sentence Stems for Speaking:

- The analogy I can describe is ...
- ___ could be described as ___
 because ...
- I can draw a ____to represent ...

Sentence Stems for Writing:

- Which___ best describes ...
- Which characteristic is most ...
- What are the attributes of ...





Students explore objects and phenomena, often as part of a hands-on activity with guidance.

- Experience before introducing specificity of the lesson; allows for hands-on learning experience
- Language helps students to make observations, generalizations, and hypotheses about experiences with new concepts.

p. 6, 12-14 Lesson Plan

ELPS that can be used: 1a; 1c; 2d; 2e; 2h; 3e; 3i; 4f; 4j





Implementation of ELPS in Station 1

Station 1:

Students will create a model of a plant or animal cell using selected materials.

For a complete list of materials, refer to the lesson plan.

Sentence Inference Stems for Writing:

- I can determine that ...
- From the model creation, I can...
- I know ____ because ...

ELPS Implementation

Students will
create a model
of a plant or animal cell,
be provided with

sentence stems to write about cell structure and discuss with a partner as the complete their model.





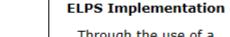
Implementation of ELPS in Station 2

Station 2:

Students will use a microscope to view the similarities and differences between a plant (onion) and animal (human cheek) cell. Students will draw a picture representing each cell, label the visible cell parts, and create a Venn diagram that illustrates the similarities and differences between the two types of cells.

Sentence Inference Stems for Writing:

- What are the characteristics of...?
- · What will happen if ...?
- What can you infer from...?



Through the use of a microscope, students will have an **additional visual** to confirm understanding of complex, academic vocabulary.

As a linguistic support for writing, students will draw a picture with labeled cell parts, create a Venn diagram, and be provided with sentence stems for writing.







Implementation of ELPS in Station 3

Station 3:

Part I: Students will complete handout of "Jewel City Analogy" to provide them an example of cell structure analogy.

Part II: Students will create an analogy of the plant cell and cell parts using the campus floor plan (i.e. principal's office, janitor's closet, campus hallways, etc.).

Sentence Stems for Speaking:

- · The analogy I can describe is ...
- ___ could be described as ___ because ...
- · I can draw a ____ to represent ..

Sentence Stems for Writing:

- Which___ best describes ...
- Which characteristic is most ...
- · What are the attributes of ...

ELPS Implementation

Students will be
reading an example
a cell analogy,
creating an analogy
of their own using
the campus floor
plan (familiar
context), and be
provided sentence
stems for speaking
and writing. As part
of this activity,
students can work
with partners.





Possible Sentence Stems for "Explore" in Science				
I noticed	I recorded	I predict		
My hypothesis is	The mass (density, weight, length) is	According to the data (graph, table), the average is		
One possibility is	is identical to	is probably a function of		
might have caused the changes in	I think best explains the increase (decrease) in	The diagram (graph, table) shows		
might contain because	One generalization could be	The volume (weight, mass) that should be reported is		
best explains the change in	From the data, we can infer			





Explain

- Students explain their understanding of concepts and processes with the facilitation of the instructor
- Students hear, apply, and understand the vocabulary associated with the subject being studied
- Language helps students use formal academic language to describe content area concepts
- * Teacher introduces explanations in a direct and formal manner

The key to this phase is to present concepts, processes, or skills

- briefly,
- ы simply,
- clearly, and
- → directly.





How are the ELPS being implemented in the "Explain" portion of the lesson?

What types of linguistic support are provided during the explain portion of the lesson?

Explain

EXPLAIN

Students are now involved in an analysis of their exploration. Their understanding is clarified and modified through reflective activities.

1. The students may now share with a partner how they labeled their floor plan explaining why they chose a particular part of the school to represent a part of a plant cell.

Sentence Stems from Reading for Speaking:

The best way to represent this concept is _____ because... The conclusions are logical because... My partner's explanation was organized/not organized clearly because...

2. Teachers and students will collaboratively complete a graphic organizer (fishbone) for cell organelles. Students will post their cell organelle visuals on the bulletin board. Fishbone Graphic Organizer

Sentence Stems for Listening:

Would you please repeat that? Which organelle is responsible for... The role of ____ is...





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Teachers and students will collaboratively complete a graphic organizer (fishbone) for cell organelles. Students will post their cell organelle visuals on the bulletin board.

Sentence Stems for Listening:

Would you please repeat that?
Which organelle is responsible for...
The role of _____ is...

- Student understanding clarified/modified through reflective activities
- Share with partner student explains his/her understanding of the content
- Sentence stems from reading
- Collaborative work to complete graphic organizer
- Posted visuals student-generated examples; environmental print





Explain

Possible Sentence Stems for "Explain" in Science				
represents	is an example of	The term means		
can most likely be found in	I can use the word (phrase) to describe	is found in both and		
is responsible for the decrease (increase) in	The data supports the hypothesis that	is most likely specialized for		
The characteristics (properties) of are	The label on the represents	The properties in can best be described as		
This type of pattern is called and can be observed in				





Elaborate

- Students participate in activities that allow students to apply concepts in contexts, and build on or extend understanding and skill.
- Students apply concepts in context and build on or extend their understanding and skill; students participate in reteach activities; students communicate their understanding of the content with others
- Language helps students apply, extend, and elaborate concepts using newly acquired academic language.

- Students may still have misconceptions
- Teachers provide opportunities for students to practice their learning in new contexts



ELPS that can be used: 1e; 2d; 3g; 4i; 5g



Elaborate

How are the ELPS implemented in the "Elaborate" portion of this lesson?

ELABORATE Time 15 Minutes

Students will create a drawing of a plant cell. The organelles in their creation should include the following organelles: cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole. The student should draw, label, and provide the function of each organelle.

Student Inference Stems for Writing:

The animation of ___ shows... ___ is not a characteristic of ... ___ is not an example of....





Elaborate

How are the ELPS implemented in the "Elaborate" portion of this lesson?

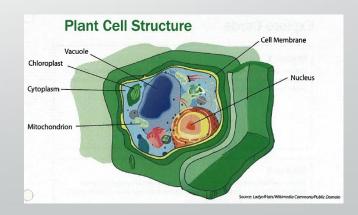
ELABORATE
Time
15 Minutes

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Student Inference Stems for Writing:

The animation of ___ shows... ___ is not a characteristic of ... is not an example of....

- Students create a drawing of a plant cell teacher can monitor and check for understanding
- Draw, label, and provide function student-generated examples (recall and internalize academic vocabulary)
- Inference stems support comprehension of content; expands ability to make connections







Elaborate

Possible Sentence Stems for "Elaborate" in Science				
We were able to	tells me	helps me		
Another example might be	We can use when	This can also be applied to		
My observations lead me to conclude that	The logical conclusion could be	These observations seemed to indicate		
The best explanation for the similarity (difference) is	The best way to describe in this situation is	best explains the increase (decrease) in		
How is an adaptation of	An increase (decrease) in results in	can be most		





- Students assess their knowledge, skills, and abilities
- Students assess their knowledge, skills and abilities; demonstrated in multiple measures (project based assessment, presentation, dialogue sharing, responding to a writing prompt; assists the teacher in designing future lessons
- Language helps assess current understanding and evaluate reasonableness of explanations.

Formal Assessments are

- data-driven,
- standardized in the manner they are administered and scored,
- grade-level or age specific, and
- measuring a student's level at a particular time of the year.

Informal Assessments are

- content and performance- driven, done at any time and more frequently,
- more student specific and interactive, and
- part of classroom instruction and do not have to be tests.



ELPS that can be used: 21; 3g; 4j; 4k; 5g



- Teachers use different forms of assessment to meet the academic and language needs of ELLs.
- Some alternate forms of evaluation may include:
 - Matching
 - Drawing a picture with labels using academic terms
 - Responding to questions by pointing

Note: Linguistic accommodations must be determined by individual student language proficiency levels. As a student's level of language proficiency increases, fewer linguistic accommodations will be necessary.







For this part of the lesson, students will create a Role, Audience, Format, Topic (RAFT) Activity.

RAFT Activity

Role	Audience	Format	Topic
Parts of a cell (animal cell)	Other parts of the cell	Letter	Roles and functions of each part of the cell
Parts of a cell (plant cell)	Other parts of the cell	Letter	Roles and functions of each part of the cell
Nucleus	Other parts of the cell	List	"Top ten reasons we need each other"
Create your own			

EVALUATE Students will create a Role, Audience, Format, Topic (RAFT) Writing Activity.



Using the RAFT handout as a guide, students will be able to show their understanding of the various parts of a cell by writing a letter to explain the roles and functions of each part of a cell; or by analyzing the top ten reasons the nucleus needs each organelle. Upon completion of the activity, student will share with the larger group the contents of their letter.





What linguistic support is provided for students in the "Evaluate" portion

- Multiple opportunities to use language before RAFT activity
- RAFT handout as guide
- Share out feel comfortable speaking out because of several opportunities to discuss content

EVALUATE Distribute one index card to each student. Tell students to review their Representative Government History Readings, the Representative Government Timeline Chart, and their Foundations of Representative Government Evaluation.

Show the PPT slide "Structured Conversation/Writing."

Writing

Ask students to use 7-10 minutes of silent writing time to explain how and why they evaluated the foundations of representative government on the report card. Ask students to use 3 vocabulary words and one sentence stem to explain their analysis. Students will write their analysis on their index cards.

At the end of silent writing time, ask students to pair up and share their writing with another student.

Speaking

Call on 2-3 students to share out their writing.

Listening

To close the lesson, SAY "Representative government grew over time in American history. From 1607 to the writing of the Constitution, representative government was established from the desire of the colonists to organize their government to meet the needs of the people who came together in a new land. We've examined how these foundations become pieces of the American Constitution."

Show the PPT slide "Content & Language Objectives."

Ask students to show thumbs up if they feel like they can meet the objectives on the slide.





Possible Sentence Stems for "Evaluate" in Science				
I learned	I understand how	As a result		
I still don't understand	In my opinion	We still need to know		
One question we should consider is	One thing I understand better is because	After considering I think because		
proves because	The most valid argument in favor of is	This conclusion may be unreliable (reliable) because		
The best explanation for the similarity (difference) is	The best explanation for the advantage (disadvantage) of is	Based on we should		





Recap of Lesson's Components

Recap of Lesson Components

Content Objective

 Identify, describe, and recognize the structure and function of cellular organelles in both plant and animal cells.

Language Objective

 Identify the structures and function of cell organelles and demonstrate understanding through the process of scientific investigation, group collaboration and communication, narration, and writing.

Language Supports

Listening:

- · Demonstrating tone and intonation
- Learn new languages in classroom interactions and instruction
- Use visual, contextual linguistic support to confirm and enhance understanding

Language Supports (continued) Reading:

- Develop sight vocabulary and language structures
- Use visual and contextual supports to read text

Speaking:

- Use new vocabulary in stories, descriptions, and classroom communication
- Speak using grade level content-area vocabulary in context
- Share in cooperative groups with use of sentence stems
- Narrate, describe, and explain

Writing:

- Write using newly-acquired vocabulary
- Narrate, describe, and explain in writing with use of sentence stems





How does this fit with Sheltered Instruction?

Sheltered Instruction Components

Lesson Preparation

Building Background

Comprehensible Input

Strategies

Interaction

Practice & Application

Lesson Delivery

Review and Assessment



How does this fit with Collaborative Strategic Reading (CSR)?

CSR Components

Preview
Read; Brainstorm;
Predict

Click & Clunk
Clunks & Fix-Up
Strategies

Get the Gist Main Idea

Wrap Up
Question & Review





WAC Components

Read

Think

Write





Curriculum Implications





Instruction

- Strategy
- Activity
- Potential Pitfalls



Assessment

- In class
- District
- State





Comments / Questions





References

- Lead4Ward <u>lead4ward.com</u>
- Region 13 ESC, ELPS Toolkit
- Texas Education Agency (TEA) <u>tea.texas.gov</u>
- TEA, Project Share/Epsilen Implementing the ELPS in Science





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