**Field Review Draft of the California Teaching Performance Assessment**

**Task 1: Principles of Content-Specific and Developmentally Appropriate Pedagogy for Single Subject - Science**

In Task 1: Principles of Content-Specific and Developmentally Appropriate Pedagogy includes four scenarios. You will complete each scenario. Use the chart below for an overview of each scenario along with what contextual information you will be given and what you will be asked to do. Detailed directions for Task 1 can be found in the Guidebook.

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<td>Subject Matter: General Science, Chemistry</td>
<td>Subject Matter: General Science, Biology/Life Sciences</td>
<td>Subject Matter: General Science, Biology/Life Sciences</td>
<td>Subject Matter: General Science, Physics</td>
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<tr>
<td>What is given</td>
<td>Elements of a Learning Experience in a Unit</td>
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<tr>
<td>You are asked…..</td>
<td>… to describe one or more combinations of instructional strategies and student activities that address both the chemistry learning goals and all of the developmental needs of the students.</td>
<td>… to analyze the assessment plan given.</td>
<td>… to identify two specific learning needs of the student.</td>
<td>… to identify a strategy or activity that could be challenging to the student.</td>
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<td>… to include an explanation of your plan and why it is appropriate.</td>
<td>… how the additional assessment can be incorporated into the assessment plan to address the teacher’s dilemma and improve the assessment plan overall.</td>
<td>… to suggest an adaptation to make the content accessible to the student.</td>
<td>… to explain why the strategy or activity could be challenging for the student.</td>
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<td></td>
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<td></td>
<td>… to explain why your adaptation would be effective.</td>
<td>… to suggest an adaptation to the plan to make the content accessible.</td>
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<td></td>
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<td>… to explain how the adaptation would be effective.</td>
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<tr>
<td></td>
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<td></td>
<td>… to select an assessment strategy, given the student’s language abilities and content area, and give a rationale for why it is appropriate.</td>
<td>… to select an assessment strategy, given the student’s learning needs and content area, and give a rationale for why it is appropriate.</td>
</tr>
</tbody>
</table>
Scenario 1: High School General Science, Chemistry - Developmentally Appropriate Pedagogy

Directions:
Read the contextual information below for this scenario. Analyze the information and incorporate it into your responses to the prompts.

CONTEXTUAL INFORMATION for SCENARIO 1:

<table>
<thead>
<tr>
<th>Elements of a Learning Experience in a Unit</th>
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</thead>
<tbody>
<tr>
<td><strong>Grade:</strong> High School</td>
</tr>
<tr>
<td><strong>Content Area:</strong> Science</td>
</tr>
<tr>
<td><strong>Subject Matter:</strong> General Science, Chemistry</td>
</tr>
<tr>
<td><strong>Time Period for the Learning Experience:</strong> Two 45-minute sessions in two consecutive days</td>
</tr>
</tbody>
</table>

**Learning Goals for the Learning Experience**
Students will be able to do the following with a focus on solutions:
- determine how increasing temperature affects the dissolving process
- measure and display data accurately and in an organized fashion

**State-adopted Academic Content Standards for Students**

**Solutions**
6. Solutions are homogenous mixtures of two or more substances. As a basis for understanding this concept, students know:
   - Definitions of solute and solvent
   - Temperature, pressure, and surface area affect the dissolving process

**Investigation and Experimentation**
1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the other four strands, students should develop their own questions and perform investigations. Students will:
   - Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data

**Instructional Resources Available**
Goggles, rubber gloves, thermometers, beakers, stands, water, Bunsen burners, sugar, glass stirrers, graph paper
Class Description

Students are in a high school general science, chemistry class. They particularly need to have opportunities to learn content in different ways and to revisit content. Many of the students enjoy the school environment and like to socialize with each other. Most of the students are active in after-school activities, including sports, clubs, tutoring, and jobs, which leaves little time for homework. The majority of the class plans to attend the local community college or technical computer school. There are some students who are unsure about what careers they want to pursue. About two-thirds of the students in this class have at least one other class with their classmates.

Developmental Needs of the Students in Grades 9-12

1) understand connections between the lesson content and life outside of school
2) develop advanced thinking and problem-solving skills
3) develop socially and handle the intense social peer pressure to conform while maintaining individuality

PROMPTS for SCENARIO 1:

Directions: (Type your response in the boxes provided below prompt 1 and in the space directly below prompt 2.)  Review the contextual information for this scenario and use the information to respond to the following:

1) Think about a lesson you might use with these students that addresses both the general science, chemistry learning goals and the developmental needs of the students that are listed above. What combination of instructional strategies and student activities would you include in the lesson? Describe one or more combinations of instructional strategies and student activities that address both the general science, chemistry learning goals and all of the developmental needs of the students. You may either describe one comprehensive strategy/activity or two or three separate strategy/activity combinations.

Note: Instructional strategies are what the teacher does during instruction and student activities are what the students do during instruction.

Your description of the instructional strategies and the student activities should refer to and include what instructional resources would be used and how they would be used. Remember to choose strategies and activities based on the general science, chemistry learning goals.
2) Use your knowledge of science pedagogy and adolescent (9-12) development to explain why your instructional strategies and student activities:
   a) are appropriate for this high school class,
   b) address the developmental needs of these students, and
   c) help these students make progress toward achieving these state-adopted academic content standards for students in science that are addressed in this unit.

END OF SCENARIO 1
Scenario 2: High School General Science, Biology - Assessment Practices

Directions:
Read the contextual information below for this scenario. Analyze the information and incorporate it into your responses to the prompts.

CONTEXTUAL INFORMATION for SCENARIO 2:

<table>
<thead>
<tr>
<th>Elements of a Learning Experience in a Unit</th>
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<tbody>
<tr>
<td><strong>Grade:</strong> High School</td>
</tr>
<tr>
<td><strong>Content Area:</strong> Science</td>
</tr>
<tr>
<td><strong>Subject Matter:</strong> General Science, Biology</td>
</tr>
<tr>
<td><strong>Time Period for Whole Unit:</strong> 3 weeks</td>
</tr>
</tbody>
</table>

State-adopted Academic Content Standards for Students
Cell Biology
1. Fundamental life processes of plants and animals depend on a variety of chemical reactions that are carried out in specialized areas of the organism’s cells. As a basis for understanding this concept, students know:
   a. Cells are enclosed within semi-permeable membranes that regulate their interaction with their surroundings.
   b. Enzymes are proteins and catalyze biochemical reactions without altering the reaction equilibrium.
   The activity of enzymes depends on the temperature, ionic conditions, and the pH of the surroundings.

Investigation and Experimentation
1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content of the other four strands, students should develop their own questions and perform investigations. Students will:
   a. Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data.

Learning Goals for Whole Unit
Students will be able to do the following:
- identify basic cellular structures and functions (prior knowledge)
- identify the structure and function of a semipermeable membrane
- identify osmotic pressure
- understand and adapt the mechanism of osmosis
- identify the basic structure of proteins
- identify common proteins
- understand how enzymes catalyze biochemical reactions
- analyze the effects of temperature, ionic conditions, and pH on enzymatic activity
- select and use appropriate scientific equipment in a safe manner
- perform a scientific investigation to collect and display data and to analyze relationships
Teacher’s Dilemma

I am not pleased with the assessment plan I used for the last unit of study. I gave the students a diagnostic test at the beginning of the unit, two quizzes during the unit, and a final test from the teacher’s guide. The information that I got from those assessments was minimal, and I’m just not getting a handle on what they really know and understand, their misconceptions, what they learned during instruction, and their progress toward achieving the learning goals. I am looking for ways to improve my assessment plan, so I can have a more complete understanding of how well these students learned the subject matter.
### Assessment Plan
Unit on Enzymes

<table>
<thead>
<tr>
<th>When</th>
<th>Goals Assessed</th>
<th>Type</th>
<th>Purpose</th>
<th>Implementation</th>
<th>Feedback Strategies</th>
<th>Informing Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Identify basic cellular structures and functions</td>
<td>Formal, diagnostic test from curriculum guide; multiple choice; formative</td>
<td>Assess previous knowledge and skills</td>
<td>Individual assessment; paper and pencil; teacher corrects with an answer key</td>
<td>Tell students of scores and inform students of correct and incorrect items</td>
<td>To determine what needs to be reviewed and where to begin teaching</td>
</tr>
<tr>
<td>Day 6</td>
<td>Identify the basic structure of common proteins and the mechanism of osmosis</td>
<td>Formal quiz from the textbook; multiple choice; formative</td>
<td>Assess acquired concepts and skills</td>
<td>Individual assessment; paper and pencil; teacher corrects with an answer key</td>
<td>Inform students of correct and incorrect items</td>
<td>To determine who has learned the material presented</td>
</tr>
<tr>
<td>Day 11</td>
<td>Identify how enzymes catalyze biochemical reactions, appropriate scientific equipment, and safety measures</td>
<td>Formal quiz from the textbook; multiple choice; formative</td>
<td>Assess acquired concepts and skills</td>
<td>Individual assessment; paper and pencil; teacher corrects with an answer key</td>
<td>Inform students of correct and incorrect items</td>
<td>To determine who has learned the material presented</td>
</tr>
<tr>
<td>Day 15</td>
<td>Identify cellular structures and functions, common proteins, osmosis, enzyme catalysis, scientific equipment, and safety measures</td>
<td>Formal, final chapter/unit exam from textbook; multiple choice and fill in the blank; summative</td>
<td>Assess acquired knowledge and skills from instructional unit</td>
<td>Individual assessment; paper and pencil; teacher corrects with an answer key</td>
<td>Inform students of correct and incorrect items</td>
<td>To determine the achievement level of each student towards the goals</td>
</tr>
</tbody>
</table>
PROMPTS for SCENARIO 2:

Directions: (Type your response in the space directly below prompts 1 and 3 and in the boxes provided below prompt 2.) Review the contextual information for this scenario and use the information to respond to the following:

1) Analyze the given assessment plan.
   a) Identify one strength in the plan and explain why it is a strength in relation to the learning goals of this general science, biology unit.
   b) Identify one weakness in the plan and explain why it is a weakness in relation to the learning goals of this general science, biology unit.

Note: Refer to this additional assessment when responding to prompts 2 and 3.

Additional Assessment

1. Compare and contrast the effects of temperature, ionic conditions, and pH on enzymatic activity based on the results of your scientific investigation performed in the lab.

2. Which of the three conditions - temperature, ionic conditions, or pH - has the greatest effect on enzymatic activity? Why? Use your investigation results to justify your answer.

2) Suppose you found the additional assessment in a supplementary resource. Think about how the additional assessment could improve the teacher’s assessment plan. Explain to the teacher how it might be used to improve the plan by answering the following questions:
   a) When in the plan would you use this assessment?
   b) What goals would be assessed by this assessment?
   c) What type of assessment would it be?
   d) What would be the purpose of the assessment?
   e) How would you implement the assessment?
   f) What feedback strategies would you use?
   g) How would the results of the assessment inform science instruction?

<table>
<thead>
<tr>
<th>When</th>
<th>Goals Assessed</th>
<th>Type</th>
<th>Purpose</th>
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3) Explain how using the additional assessment as you described in prompt 2 improves the teacher’s assessment plan and addresses the teacher’s dilemma of needing more information about what the students really know and understand, their misconceptions, and their progress toward achieving the learning goals in general science, biology.

END OF SCENARIO 2
Scenario 3: High School General Science, Biology - Adaptation of Content-Specific Pedagogy for English Learners

Directions:
Read the contextual information below for this scenario. Analyze the information and incorporate it into your responses to the prompts.

CONTEXTUAL INFORMATION for SCENARIO 3:

<table>
<thead>
<tr>
<th>Elements of a Learning Experience for 2 Days in a Unit</th>
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<tbody>
<tr>
<td>Grade: High School</td>
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</tbody>
</table>

Time Period for Whole Unit: 3 weeks

State-adopted Academic Content Standards for Students
Evolution
8. Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept, students know:
   a) How natural selection determines the differential survival of groups of organisms.
   b) A great diversity of species increases the chance that at least some organisms survive major changes in the environment.
   c) The effects of genetic drift on the diversity of organisms in a population.
   d) How reproductive or geographic isolation affects speciation.

Learning Goals for Whole Unit
Students will be able to do the following with a focus on evolution:
• perform, analyze, and present scientific inquiry
• plan and conduct a long-term investigation
• collect information by observing, measuring, and graphing
• compare, contrast, and evaluate basic principles of evolution

Relationship to Preceding and Subsequent Learning Experiences
Basic principles of evolution will be covered in a manner similar to other scientific units. Science process skills are important inquiry tools, and opportunities for developing them are provided throughout the unit. Some of the skills, such as observation and measurement, have been covered in other scientific units. This investigation will form the basis of the next unit on ecosystems.
Outline of Plans for Days 1 and 2

The following outline addresses some of the academic content standards and unit goals, but it is not expected that the students will achieve them during the two days.

Instructional Strategies

- On Day 1, lead a discussion about the term “species”: characteristics, examples, development, and extinction. Write student ideas on the board. Have students independently read a handout concerning a recently discovered new species of beetle. Then present the following scenario: “Suppose you have discovered a new species of living thing. Write three or four paragraphs describing the species, one unusual structure it has, the characteristics of the structure, and how this structure might help the species survive a specific drastic environmental change.” Have students write paragraphs using newly acquired scientific terms/vocabulary to explain their answer to classmates.
- On Day 2, allow students to complete written response. Have students practice with a partner orally summarizing their written work. Then have them individually share their oral summaries using newly acquired scientific terms/vocabulary with the whole class and receive feedback.

Student Activities

- Participate in discussion about “species”. Read the handout about a newly discovered species. Listen to and carefully consider the scenario. Write three or four paragraphs using newly acquired scientific terms/vocabulary to address the scenario.
- Complete the written response. Practice with a partner to orally summarize their written work. Present oral summary, using newly acquired scientific terms/vocabulary, to the whole class. Provide feedback to other students.

Progress Monitoring

- Teacher will use class discussions, written responses to questions, projects, scientific inquiry investigations, portfolio, and chapter test to determine level of learning.
- Students will receive written and oral comments from the teacher and other students.
Student Description (English Learner)

Elena is a 15-year-old 10th grader. She is from Mexico and both of her parents are professionals. Her extended family includes aunts, uncles, and cousins. Her grandparents live in Mexico and she and her family visit them in the summer. She has been in the United States for one and a half years. She is literate in Spanish and often reads Spanish literature. Her report cards from her school in Mexico indicate above average grades. Elena is somewhat shy socially but is well liked and works well in small groups. She is seldom absent from school. The CELDT results indicate an overall score in the Early Intermediate range, and she has been identified as an English learner. (Listening and Speaking = 240, Early Intermediate level. Reading = 121.25, Early Intermediate level. Writing = 120, Early Intermediate level.)

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Written Response to: “What is your favorite family day?”

A Special Family Celebration

A special family time is when my family celebrate the anniversary of my grandmother and grandfather. They are my abuelita and abuelito. Why is it especial? I like this because all my family come to my grandparent house for make especial food of my country. The fiesta is very especial. My grandparent have marry 45 year. They live in Mexico my tia, tio and primos all go to Mexico for all family celebrate together. We like have all family together. My primos and me see friends in our city. We give grandparent big picture of all family. Grandparent like fiesta and gift. They are much happy.

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Transcript of Oral Response to: “Tell me about your dance class.”

I like my dance class at community center. I need class for forget my problems. Is like help. I forgot my problems. When I dance, I like my dress because everybody look me and say, “Oh, that look pretty.” Everybody take my picture. I was in newspaper. When I dancing, I feel very good. I like that because I represent my country.
PROMPTS for SCENARIO 3:

Directions: (Type your response in the space directly below each prompt.) Review the contextual information for this scenario and use the information to respond to the following:

1) Identify two specific learning needs the student has as an English learner, based on the student description and the responses.

2a) Identify one instructional strategy or student activity from the outline of plans that could be challenging for the student.

2b) Explain why the strategy or activity you chose could be challenging to the student. Use your knowledge of English learners and your analysis of the student’s learning needs in your explanation.

3a) Describe how you would adapt the strategy or activity you identified above to meet the learning needs of the student. Consider specific subject matter pedagogy when writing your description.

3b) Explain how your adaptation would be effective for the student in making progress toward:
   a) the learning goal(s) of the lesson
   b) English language development

   In your explanation of the adaptation, refer to specific aspects of the student description and to the samples of proficiency in English.

4a) Which progress monitoring assessment from the outline of plans would you choose to monitor this student’s progress toward achieving the learning goal(s) in general science, biology?

4b) Give a rationale for your choice of progress monitoring assessment. Use your knowledge of science content in this unit, science pedagogy, and this student’s English language abilities in your rationale.

5) Based on what you learned about this student’s English proficiency, what would be your next steps in planning to facilitate her English language development? Consider specific information from the student description and her written and oral language samples when responding.

END OF SCENARIO 3
Scenario 4: High School General Science, Physics - Adaptation of Content-Specific Pedagogy for Students with Special Needs

Directions:
Read the contextual information below for this scenario. Analyze the information and incorporate it into your responses to the prompts.

CONTEXTUAL INFORMATION for SCENARIO 4:

<table>
<thead>
<tr>
<th>Elements of a Learning Experience for 3 Days in a Unit</th>
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<tbody>
<tr>
<td>Grade: High School</td>
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<tr>
<td>Time Period for Whole Unit: 3 weeks</td>
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</tbody>
</table>

State-adopted Academic Content Standards for Students
Motion and Forces
1. Newton's laws predict the motion of most objects. As a basis for understanding this concept, students know:
   a. How to solve problems involving constant speed and average speed.
   b. When forces are balanced no acceleration occurs, and thus an object continues to move at a constant speed or stays at rest.
   c. How to apply the law $F = ma$ to solve one-dimensional motion problems involving constant forces.
   d. When one object exerts a force on a second object, the second object always exerts a force of equal magnitude and opposite direction.

Learning Goals for Whole Unit
Students will be able to do the following:
- select and use appropriate tools and technology to perform tests, collect data, analyze relationships and display data
- identify and communicate sources of unavoidable experimental error
- identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions

Relationship to Preceding and Subsequent Learning Experiences
Motion and Forces are the foundation of other concepts to be studied in this course. Concepts are necessary for understanding the next unit: Conservation of Energy and Momentum. Students have performed experiments but mostly in chemistry.
Outline of Plans for Days 3, 4, and 5

The following outline addresses some of the academic content standards and unit goals, but it is not expected that the students will achieve them during the three days.

Instructional Strategies

- On Day 3, read textbook about Newton’s Laws (vary between independent, silent, and oral reading to whole class). Present additional information about the concepts and lead whole-class discussion. Have students respond in writing to the questions in the book.
- On Day 4, do a demonstration experiment about motion and speed with whole class. Demonstrate the key concepts of experimental design and write-up. Students work in small groups to conduct their own trials and to collect, analyze and display data. Students write individual summaries. As a group, they present their findings to the class and receive feedback from others.
- On Day 5, have students read excerpts of entries from a scientist’s journal in their textbook. Journal entries describe the scientist’s findings regarding the same experiment performed on Day 4. Students discuss the entries with a partner. Each student writes a letter to the scientist comparing his/her group’s results to the scientist’s and providing a rationale for any differences with specific reference to measurement error. Sample letters are in textbook for Day 5 instruction.

Student Activities

- In class, read textbook, take notes, and participate in class discussion about concepts presented. For homework, complete written responses to questions in textbook.
- Watch demonstration experiment, take notes, and participate in class analysis and discussion. Work in a group to conduct own trials. Individual students write summaries of findings. Present group findings to whole class. Provide feedback to other groups.
- Read journal entries and discuss entries and findings with a partner. Write a letter to the scientist. Read a letter written by another classmate and analyze for scientific understanding and reasonableness.

Progress Monitoring

- Teacher will use class discussions, responses to questions, written summary of findings, group presentation, and letter to scientist to monitor student progress.
- Students will receive written and oral comments from the teacher and other students.
Student Description

Alex is a 15-year-old boy in the 10th grade. He had difficulty with the development of his early literacy skills, including the acquisition of sound/symbol relationships and word identification, demonstrated in both his reading and writing. In the second grade, Alex was identified as a student with specific learning disabilities. Since then, Alex has received special education support primarily in a resource room for language arts, while he is included in the general education curriculum. He is able to independently read text at a 7th grade level and continues to struggle with decoding words. Alex also has asthma for which he takes daily medication and occasionally needs to use an inhaler. He is a self-isolating person who does not readily join into whole-class conversations or contribute to group learning situations. His tendency is to sit alone at lunch and to be by himself during transitional time. There is no in-class support for this student.

PROMPTS for SCENARIO 4:

Directions: (Type your response in the space directly below each prompt.) Review the contextual information for this scenario and use the information to respond to the following:

1a) Identify one instructional strategy or student activity from the outline of plans that could be challenging for the student, considering the description of the student’s learning disability.

1b) Explain why the strategy or activity you chose could be challenging for the student, based on specific aspects of the student description.

1c) Describe how you would adapt the strategy or activity you identified to meet the needs of the student in science.

1d) Explain how your adaptation would be effective for the student in making progress toward achieving the learning goal(s) of this unit.

2a) Identify one additional instructional strategy or student activity from the outline of plans that could be challenging for the student, considering the student’s other learning needs.

2b) Explain why the strategy or activity you chose could be challenging for the student, based on specific aspects of the student description.

2c) Describe how you would adapt the strategy or activity you identified to meet the needs of the student in science.
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2d) Explain how your adaptation would be effective for the student in making progress toward achieving the learning goal(s) of this unit.

3a) What progress monitoring assessment would you choose to obtain evidence of the student’s progress toward a learning goal(s) in general science, physics?

3b) Give a rationale for your choice of assessment. Use your knowledge of science content in this unit, science pedagogy, and this student’s learning needs in your rationale.

END OF SCENARIO 4