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EDUC 340

Test Creation Project

1. Overview and description of the course and classroom context for which this test is designed, being certain to create a rationale for how the course and classroom characteristics inform decisions about the purpose, content, and format of the test:
 - a. Description of the course and its major goals
Mrs. Florence's first grade classroom serves to provide students with information in all school subjects. Science at the first grade level introduces various topics including scientific investigations, plant and animal life, force, motion, and energy, matter, earth patterns and cycles, and resources. These topics expand on the information that students learned in kindergarten and provides a foundation for the information students will learn in later grades. It is intended that students will develop scientific investigation, observation, reasoning, and logic skills with the science lessons.
 - b. Description of the specific unit
The plant unit focuses on the life processes of plants. Three weeks will be spent on plant lessons. The major topics developed in the unit include basic needs (air, water, sunlight, and a place to live) and life processes of plants, plant parts (stem, roots, leaves, flower, seed, and seed coat), characteristics (edible/non edible and flowering/non flowering), and orderly changes in life cycles. Students will learn that some plants stay green all year long (evergreen) while others lose their leaves each fall (deciduous).
 - c. Description and explanation of intended learning outcomes being assessed within your unit, identifying those being assessed by the test and those being assessed through other assessments.
Although elements of the intended learning outcomes from the unit will be assessed with the test, it is impossible to assess all aspects of the outcomes. For example, the written test will not allow students to actually conduct experiments or investigations on the plant needs. These activities will be done during the unit and serve as formative assessment for the teacher. The students will be able to identify the plants needs and determine which aspect a plant might be missing with this test. Since students' artistic abilities vary, it would be hard to assess the students with a drawing of plant parts on the test. Therefore the test requires only that the students know the names of the parts and identify their functions. Students will be asked to draw and diagram information during classroom work which will serve as formative assessment. The students will also be able to classify plants based on their characteristics on the test and determine the order of the plant's life stages.

- d. Overview description of characteristics of the classroom/school context, including relevant characteristics of students

I am placed at Magruder Elementary School in York County. I work with Mrs. Florence's first grade classroom. The classroom consists of 22 students. The class has twelve boys and ten girls. Although Magruder Elementary School is a full inclusion school, none of the students in my classroom are identified as students with disabilities. Two of the girls in the classroom are receiving reading recovery services, one of whom also receives services for ESL. Two of the boys in the classroom are classified as Gifted and Talented, and they attend a Gifted Program each Monday. One of the students classified as Gifted also has behavioral problems, so he has his own behavior management plan. Another boy in the classroom receives services for speech difficulties and another boy takes medication for ADHD. The students range in reading levels from level 13 to level 22, so they are divided into guided reading groups based on their reading abilities.

- e. Purpose(s) or use(s) of the test

This test can be used as a pre instruction test or a post instruction test. Using the test prior to instruction would allow the teacher to gauge students' prior knowledge of plants and gear the unit toward their understanding. Some of the activities in the original unit may be too easy or hard, depending on what the students already know. Additionally, extra enrichment activities may need to be used with the students who are gifted and talented. The test would ideally serve as a post assessment of instruction. The summative assessment will allow the teacher to see what the students learned from the unit on plants. Since the students are at varying reading levels, the teacher will orally administer the test to the students. By reading each question orally, the students who read at lower levels will not have to struggle to read the questions. Students will complete the test during science which is from 2:00 – 2:45 PM, and they will be given as much time during the period as they need to take the test.

2. Design elements of the test

- a. Intended learning outcomes, standards, and/or instructional objectives

Virginia Standard of Learning –

1.4 The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics. Key concepts include

- a) needs (food, air, water, light, and a place to grow);
- b) parts (seeds, roots, stems, leaves, blossoms, fruits); and
- c) characteristics (edible/nonedible, flowering/nonflowering, evergreen/deciduous).

1.7 The student will investigate and understand the relationship of seasonal change and weather to the activities and life processes of plants and animals. Key concepts include how temperature, light, and precipitation bring about changes in

- a) plants (growth, budding, falling leaves, and wilting);

Objectives:

The student will be able to:

- identify and conduct simple experiments/investigations related to plant needs by changing one variable (food, air, water, light, or place to grow) at a time;

- create and interpret a model and/or drawing of a plant, including seeds, roots, stems, leaves, blossoms, and fruits;
- identify the functions of the seed, root, stem, and leaf;
- classify plants by the characteristics of edible/nonedible, flowering/nonflowering, and evergreen/deciduous, using tables, charts, and picture graphs.
- determine how seasons and time will lead to changes in life processes of plants with experiments and tables.

b. Table of specifications (numbers correlate with the test questions)

<i>Content</i>	<i>Cognitive Levels</i>					
	<i>Knowledge</i>	<i>Comprehension</i>	<i>Apply</i>	<i>Analyze</i>	<i>Synthesize</i>	<i>Evaluate</i>
Plant Unit						
Plant Needs		X 8, 9, 10, 11, 12, 19				
Parts of a Plant & Function of Plant Parts		X 1, 2, 3, 4, 5, 6, 7				
Life Process of a Plant			X 16, 17, 18			
Characteristics of a Plant			X 13, 14, 15			

c. Discussion of construct validity

This test fulfills the requirement of construct validity. The questions in the test were developed off of Virginia's standards of learning for first grade science units on plants and align with the National Science Education Standards. Additionally the questions follow the York County School Divisions standards and curriculum guidelines for first grade students. A table of specifications was used to reveal which test questions align with the different intended learning outcomes that are based off of the curriculum

framework. Additionally, the cognitive levels of each of the test items are aligned with the different cognitive levels of the intended learning outcomes.

d. Discussion of content validity

Each intended learning outcome is based off of the content of the plant unit, and the test questions directly fit the goals of the unit. The table of specifications shows that the questions adequately address the content that students should know, comprehend, and apply the concepts about plants. All of the questions focus on plants, their parts and functions, their needs, their characteristics, and the life cycle of plants. The use of images also allows students to visualize information in the questions and select the best option.

e. Rationale for test item types

The questions used in the test focus on the students' ability to select the correct response from a list of choices. The test involves objective scoring and can be quickly graded. At the first grade level, the majority of the learning objectives focus on attaining basic understanding and comprehension of new material. The use of matching and multiple choice items easily fits with lower level cognitive objectives. In order to make the matching section more difficult, the options may be used more than once. All of the multiple choice questions include four options which make guessing more difficult for students. Items with pictures are used to test student's ability to apply what they have learned to new images. The only supply item on the test involves writing the correct order for the stages of a dandelion flower going from blossom to seed dispersal. This item is similar to the multiple choice items, but it requires the students to write in their answer. With a wide range of reading and writing levels in the classroom, it is easiest to assess the students' knowledge by having them use select response items rather than supply response items. Supply response items would cause problems for student would can not write legibly and spell words correctly.

f. Discussion of potential threats to reliability for this test, including issues related to item construction, issues related to test administration, and plans for item analysis

The test could introduce a variety of threats to reliability. For example, the test questions could be above the student's developmental level. One of the items includes the terms "deciduous" and "evergreen" which may be too complex for the first graders. Since students will have lessons focused on the plant characteristics and they do not have to read the terms on their own, this problem should not be a problem. Another threat to reliability involves the number of questions used to sample the intended learning outcomes. Although each intended learning outcome has at least three questions, more questions would help strengthen the reliability of the test. Other threats to the construction could be poor directions, ambiguous items, and errors on the test. I reviewed the test for typing and wording errors to ensure that the questions make sense and have only one correct answer. The test will be administered orally to eliminate a bias against students who can not read well. However, students may not be able to hear the options being read and the way that items are read could introduce bias. Additionally, students may know the information but be unable to connect

something they can verbally explain to the options provided with each test item. During the test day, students may have test anxiety, be tired, or feel sick. All of these factors could also impact the reliability of the test. Finally, the item scoring could involve bias. Although students are given specific directions, the person grading the test may grade differently than another person would. For example, items 1-7 involve writing a letter in the blank, but students might write the word. Depending on the teacher grading the test the students may or may not be given credit for writing the entire word. Additionally, item 16 involves writing the numbers on blanks to put the pictures in order, but some students may not form their numbers correctly which could impact the way it is scored.

- g. Discussion of potential for predictive validity
If students score well on this assessment it is likely that they will do well on future tests that are focused on plant units, such as county benchmark tests and future grade level tests. Additionally, since some of the test items were adapted and modified off of the released standard of learning tests, students may score similarly on plant items when they take their third grade SOL tests.
- h. Discussion of potential threats to consequential validity
After students take the test and receive their scores there are a variety of factors that could be affected. For example, depending on the difficulty of the assessment students may gain or lose motivation. If a student does well on the test they may feel motivated to continue to learn about different topics or they may lose motivation because they feel the test was too easy. The test may also impact a student's study skills. If the student does really well, they may not bother studying in the future because it was so easy. If the student does poorly, they may try to study more in the future or give up on trying.
- i. Description of scoring and grading procedures
This test will involve objective scoring because each question has only one correct response. The questions are all worth the same amount. Scores will be determined by dividing the number of correct responses by the total number of questions to determine the percentage score. If there is an item that a majority of the class gets incorrect, then the question will not be counted.

3. The test and answer key

See Attached File in E-mail for Plant Test & Answer Key

*Images from the test were borrowed from released 3rd grade SOL tests