Assessing students' understanding of science concepts through portfolio assessment

Maria Elizabeth De Anda
ASSESSING STUDENTS' UNDERSTANDING OF SCIENCE CONCEPTS
THROUGH PORTFOLIO ASSESSMENT

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education: Bilingual/Crosscultural

by
Maria Elizabeth De Anda
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Abstract

Portfolios have gained much popularity in the field of authentic assessment. With the move toward a more integrated curriculum, portfolios provide a means of assessing student learning that is more aligned with the curriculum. This research project focused on the use of portfolios to assess student understanding of science concepts. It is believed that the use of portfolios will provide a more comprehensive picture of student learning.

The students in this study were four students who were designated Limited English Proficient (LEP). They kept a portfolio of their work in science over a six week period. The portfolios show how students build their understanding through various experiences and activities.
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Chapter One

Introduction

Assessment is an essential part of education. Teachers must assess student learning and document student progress. Over the years, teachers have relied heavily on standardized multiple choice tests. These types of tests are considered convenient and efficient. These tests provide the teacher with a numerical score which parents, teachers, and administrators can understand. Those in favor of standardized testing see it as an “objective” method of enforcing accountability, as a way of measuring student achievement, staff competence, and educational quality. However, despite their widespread use, standardized tests often produce results that are inaccurate, inconsistent, and biased against minorities, females and students from low-income families (Neill and Medina, 1989).

Mercer (1971) studied the relationship between membership in ethnic minority groups and placement in classes for the mentally retarded in public schools in Riverside, California. Her findings showed that a disproportionate number of Mexican American and Negro children scored below 80 on I.Q. tests which made them eligible for placement in a special education classroom. Also, there were disproportionately more Mexican American children placed in classes for the mentally retarded than would be expected from their proportion in the school district population. Mercer hypothesized that children from low socioeconomic or ethnic minority groups are more vulnerable to being labeled mentally retarded, because clinical measures are interpreted from a culture-bound perspective. This raises serious questions about using standardized tests with ethnic minority
students, especially those who are not proficient in English. Language minority students may not have the English language proficiency necessary to understand standardized achievement tests. They may not use proper problem-solving strategies or know how to balance speed and power. They may also suffer from test anxiety especially if they do not understand the test. Western culture emphasizes achievement and problem-solving. Some minority children may not view the testing situation as an opportunity to achieve. North American Indian children, for example, may not work quickly because they do not desire to compete with others (Sattler, 1982).

Sattler further suggests that ethnic minority children may have an adequate storage and retrieval system to answer questions correctly; however, they may fail on tests. They may not have been exposed to the material, or are not motivated to answer correctly. Children wary of adults, may answer incorrectly in order to put an end to the testing situation. Minority students are less motivated to be correct for the sake of correctness alone and they are willing to settle for lower levels of achievement (Sattler, 1982). Sattler (1974) found that Negro children may show fear and suspicion, verbal construction, strained and unnatural reactions, and a facade of stupidity to avoid appearing "Uppity". Ramirez and Gonzalez (1971) further argue, that intelligence tests fail to adequately measure the intelligence of Mexican American children because the language and content of the tests are inappropriate, the group is not represented in the norms, and the testing situation is atypical (cited in Sattler, 1974).

Accused of not considering the cultural and linguistic difference of minority children, test publishers responded by translating existing
intelligence tests for non-English speaking children; adjusting norms for ethnic sub-groups; and attempting to construct culture-free tests. These solutions, however, cause more problems than they solve. Regional differences within a language make it almost impossible to use a single translation. Also, many non-English speaking children have never learned to read in the language they speak. Another problem with test translations is that the direct translation of a word or phrase in one language may result in a word which is not used with the same frequency or have the same intensity in the second language. Also, translating a word may drastically alter its meaning (De Avila, 1976).

De Avila (1976) warns against the dangers of establishing regional and ethnic norms. This practice leads to lower expectations for minority children which in turn lowers their aspirations to succeed. Also, ethnic norms provide a basis for invidious comparisons between different racial groups.

The influence of culture on standardized tests is subtle in some instances, obvious in others. Culture-free tests are difficult, if not impossible, to construct. Attempts have been made to create culture-fair tests which emphasize pictorial, spatial, or figural content, because it is believed that problems involving this content may be answered from experiences that are more nearly equal in different ethnic and racial groups (Sattler, 1982). However, culture-fair tests have not been successful. Sattler (1982) states that ethnic minority children do not perform any better on supposedly culture-fair tests than on the more conventional tests of intelligence. Further, ethnic minorities may have even less chance of entering educational
institutions or of being considered for a job or training programs when culture- fair tests rather than more traditional tests of cognitive abilities are used as the selection instruments. It is important to consider the use of any form of standardized tests in our schools.

The case of Larry P. v. Riles (1980) led California to ban the use of intelligence tests for the placement of children in special education classes (cited in Linn, 1986). This case brought attention to the disproportionate classification of minorities into separate special education classes and the role of intelligence tests in the placement process (Linn, 1986). Since the 1960's hundreds of lawsuits concerning testing in education have been brought in both state and federal courts. Yet, according to Pipho (cited in Haney and Madaus, 1989), "Nearly, every large education reform effort of the last few years has either mandated a new form of testing or expanded uses of existing testing". In spite of the complaints against standardized tests, they seem to be increasingly institutionalized. Since their first use in the early part of this century, when school populations were growing rapidly and large school systems were being organized in increasingly bureaucratic fashion, standardized tests have become a fixture in modern education (Haney and Madaus, 1989). The time has come for us to ask ourselves, do these tests really tell us what students have learned? Do the scores really represent student knowledge? Is there a better way for students to demonstrate the knowledge they have learned?

Some people believe that our current methods of assessment do not adequately reflect student learning (Paris, Lawton, Turner, and Roth, 1991). Standardized tests have been criticized because they do not measure how
well students think, how effectively they solve problems, what subjects they know in depth, or how responsible they are in helping to direct their own learning (Bracey and Pool, 1992). Others complain that "the tests do not cover the full range of important instructional objectives" and "items do not measure a respondent's ability to organize relevant information and present a coherent argument" (Shepard, 1989).

The fundamental nature of most widely used standardized tests has changed relatively little during the last half of the century. Despite technical changes which have occurred over the years, they have not resulted in any major changes in the nature of the items that appear on most widely used ability and achievement tests (Linn, 1986). Standardized tests are primarily measures of factual or declarative information. Students are required to retrieve information from long term memory and compare and contrast different pieces of information. Standardized tests do not measure general cognitive skills. The low level factual information tested has little to do with thinking ability. Students who know the concepts and principles contained in the test items do well, those who do not know the information do not (Marzano and Costa, 1988). Standardized achievement tests attempt to measure the complex cognitive processes of language, reading, writing, mathematics and reasoning through simplistic means. Paris et al. (1991) assert that "students' learning is more than a collection of discrete skills." The content and setting of the task, along with the motivation of the learner, has a strong effect on learning. Furthermore, scores on achievement tests are not an accurate or complete indication of a student's accumulated knowledge and academic achievement. Standardized achievement tests
measure only a small part of what is taught in school (Paris et al.). Stenmark (1989) reminds us that in the real world, people are valued for the tasks or projects they do, their ability to work cooperatively and their problem solving skills. To prepare students for success in the work place, both curriculum and assessment must promote these skills. Bracey (1994) makes it clear that "even the best standardized tests fail because what people know is not nearly so important as what they can do with what they know, in other words how they can use their knowledge."

Glazer (1993) points out that test scores provide only one type of information about learning. The information is a picture of the student’s performance at a particular moment in time, in a particular situation, on a particular measuring instrument. Real assessment is not a one time shot. Assessment begins with a question. Once the question is asked, information to answer the question is gathered. The information is collected over a period of time and in several situations. This is the system of assessment most people use in everyday situation before they make decisions. It only seems logical that teachers would use the same process to make decisions about student learning (Glazer, 1993). Teachers should not make a judgment about student learning based on one test, one piece of information. Teachers need to collect information about students as they carry out tasks. Realistic assessment in the classroom should be based on several kinds of information gathered over time.

Current practices in education are moving toward a more integrated curriculum. Students are becoming more involved in their own learning. Teachers are relying less on textbooks as their only tool for educating
students. However, many teachers still rely on standardized tests to measure student learning. These tests are not the best indicators of achievement, especially among minority students. Rakow and Bermudez (1993) stated that Hispanic American students consistently fall below Euro-American students on national achievement tests in science and mathematics. They also warn that while there may be many factors that contribute to these results it is important not to disregard the instrument itself as the potential source of the problem. Neill and Medina (1989) state that standardized tests tend to reflect the language, culture, or learning style of middle- to upper-class whites. In order to communicate their levels of ability, achievement, or skill, students must understand the language of the test. These tests use "elaborated, stylized English" which makes it difficult for students who speak nonstandard dialects (Neill and Medina, 1989).

Statement of the problem

Standardized tests assume that all individuals perceive information and solve problems in the same way. Researchers state that tests are as much measures of race or ethnicity and income as they are of ability and achievement or skill (Neill and Medina, 1989). Standardized assessment measures cannot adequately demonstrate elementary second language learners' understanding of science concepts.

Research Question

This research project will address the problem by examining the use of portfolios in science assessment. Specifically: How do portfolios
demonstrate second language learners understanding of complete and incomplete habitats?

Definition of Terms

Authentic Assessment: Assessment which provides students with the opportunity to demonstrate conceptual understanding of the big ideas of science; to use scientific tools and processes, and to apply their understanding of these big ideas to solve new problems (Comfort, 1994).

Complete Habitat: a complete habitat gives an organism immediate access to all the resources required to meet its basic needs.

Incomplete Habitat: an incomplete habitat does not provide the organism with all the resources it needs for survival. Some resources must be obtained outside the habitat.

Microhabitat: Habitat constructed by student designed to meet the basic needs of an organism.

Minibeast (ballestuela): Small organism (living thing).

Portfolio: a collection of student work samples that indicate progress, improvement, accomplishment, or special challenges.

Science Concepts: Complete and incomplete habitats.

Second language learners: students who have been determined to be limited in their English proficiency.

Standardized test: Test which focuses on basic skills. It emphasizes the quick recognition of isolated facts.

Understanding: the ability to apply acquired knowledge.
Theoretical Framework

Yager (1991) explains that in the constructivist theory of knowing, the brain is continually seeking to impose order on the incoming stimuli and to generate models that lead to adaptive behavior and useful predictions. It is difficult to simulate the exact pathway for learning. Learning is an active process occurring within the individual. It is influenced by the learner as well as the teacher and school. Yager further explains that learning outcomes are an interactive result of the information the student encountered and how it was processed based on perceived notions and existing personal knowledge.

Constructivism is an underlying theory in the use of portfolios as authentic assessment. Constructivism is a learning process where the student constructs meaning out of his experiences and interactions in a curricular area, such as science. To a constructivist the best way to assess students' understanding of science is by giving them a novel problem to solve. This is a problem the students have not encountered before. The constructivist is more interested in the students' approach to solving the problem than the solution itself. Competence cannot be assessed on the basis of one performance. Students' work must be assessed repeatedly. One way of doing this is through portfolios (Barrow, 1993).
Chapter Two
Review of Related Literature

Alternative Assessment

Alternatives to standardized tests have been proposed under a variety of different names. Authentic assessments, direct assessments, and performance assessments have in common the idea that measurement tasks should involve complex performances that directly represent the ultimate goals of education. Assessment is authentic when it directly examines student performance on meaningful intellectual tasks. The use of these tasks would lead instruction in a positive direction.

Shepard (1991) states that authentic assessments should elicit the actual performance at which we want students to be good. Authentic assessment tasks should be complex and embedded in local contexts, they should test for mastery of concepts and insights central to the subjects being studied, they should demonstrate students' habits of mind. These tasks, for example, would reveal how students frame a question as well as how they solve it. Direct assessments would evaluate a cognitive skill as it is expressed in the performance of extended tasks. The tasks would cover, as much as possible, all the knowledge, skills, and strategies required to do well in the activities (Frederiksen & Collins, 1989). Performance assessment also requires students to demonstrate their ability to apply thinking skills and knowledge to solve problems.

The alternative assessment movement strives to put the responsibility for teaching and learning back into the hands of the key players: teachers
and students. Instead of focusing on skills that can be easily measured, alternative assessment calls for strategies which cultivate student thinking, cooperative problem solving and self-evaluation (Chandler, 1991).

All teachers want their students to understand the concepts being presented. However, teaching for understanding requires that close attention be paid to assessment. Teachers have to seek proof of understanding through student performance. Assessment is not something that you do at the end of a unit. Assessment is an ongoing component of instruction that guides student learning (Simmons, 1994).

Through the use of ongoing assessment the teacher is able to help students understand the standards by which their work will be judged. Students are able to keep track of their own work through journals and portfolios and use these for self-assessment. As students receive feedback for their performance tasks they come to understand that some questions do not have easy answers. Developing understanding involves trial and error attempts which emphasize the importance of processes (Simmons, 1994). This is especially important in math and science where students tend to memorize formulas without understanding them. If teachers use ongoing assessments in these curriculum areas, they will be able to determine if students are thinking through what they need to do to solve a problem or just using formulas by rote.

Students gain understanding when they construct their own knowledge through social interaction (Garton, 1992). They develop their own cognitive maps by making connections among concepts and facts. To help students develop their thinking and reasoning abilities, students need
to practice solving real problems and comprehending complex texts (Shepard, 1989). Educators know that learning is a social activity. Yet, we tend to assess in isolation. Children are discouraged, in fact forbidden, to interact during standard multiple choice and essay tests. Authentic assessment is one form of assessment that allows interaction among students. Students might work in cooperative groups for some tasks and share their knowledge and understanding with the group. Yet students are still accountable for their own learning. They must be able to take the information shared by other group members and apply it in a given situation.

Assessment in Science

With the current movement toward hands-on instruction, science teachers need to rethink their assessment practices. Science involves observing, recording, predicting, designing, inferring, and communicating. The assessment of science knowledge should also involve these skills. Brown and Shavelson (1994) give three features of a performance assessment in science:

1) The assessment should present students with a concrete meaningful task,
2) The assessment should include a response format with which students communicate their findings,
3) The assessment’s scoring system should capture not just the ‘right’ answer but the reasonableness of the procedure used to determine the answer.

Brown and Shavelson (1994) further explain that the performance
assessment should give students real materials to work with to solve a real problem. One example given of a performance assessment had students investigating which of three kinds of paper towels absorbed the most water, and which absorbed the least. Students were to use an array of laboratory equipment to conduct their investigation. The students were given forms which had questions they answered about their experiment. The students were to explain the steps of their experiment. ‘What did they do?’ Then they answered questions about their findings. These pages were then put into their assessment notebook. The teacher then completed a score form based on the work they included in their assessment notebook.

Activities such as these which require complex thinking skills, problem-solving and cooperative effort would benefit all students including second language learners. The assessment of their skills was not based on a multiple-choice test; but on a task which demonstrated their higher level cognitive processing skills. Through performance assessments second language learners can demonstrate their understanding of science concepts through their completion of a task. Also, students are able to develop and exercise the thinking skills which will benefit them in the world outside of school.

Performance assessment is a broad term that covers various ways to assess student understanding. Feuer and Fulton (1993) outline some commonly used forms of performance assessment.

1) Constructed-response items require students to produce an answer to a question rather than to select one from an array of possible answers.
2) Essays are used to demonstrate how a student can use facts in context and structure a coherent discussion.

3) Oral discourse can be used to assess young children, when written tests are not appropriate. Older students can defend their written work through oral arguments.

4) Exhibitions are designed as comprehensive demonstrations of skills or competence.

5) Experiments are used to test how well a student understands scientific concepts and can carry out scientific processes.

6) Portfolios are collections of a student’s work assembled over time.

The portfolio is a record of the student’s process of learning. By examining the contents of the portfolio, the teacher can see how the student thinks, questions, analyzes, synthesizes, produces and creates. It provides an individualized student centered approach to assessment that can be used in most subject areas. Decisions about items to place in a portfolio are based on the purpose of the portfolio. In science, for example, a portfolio might include a report on findings of an experiment, an essay on the importance of genetic testing, or a detailed drawing of the anatomy of a frog.

Journals or learning logs are another way for students to record and show their understanding. Journals are frequently used in Language Arts to evaluate students’ writing development. Through the use of journals, teachers have a record of students’ writing in one place. They can refer to it and see how the child has progressed throughout the year. All the various aspects of writing can be analyzed in the journal. Teachers can see if
students are applying what they learned about grammar, punctuation, sentence structure, and paragraph organization in their own writing. Some teachers who prefer the standard tests might just decide to give a test on punctuation. However, one problem exist, many students are able to do well on standard tests, they may know all the rules of punctuation. But, when it comes to actually writing a sentence or paragraph, the rules are not applied. It is not enough to have the knowledge, students must use it. Through the use of journals teachers are able to see how students use language.

Learning logs might be considered another form of journals. Students use learning logs in subjects such as science and social studies. Students keep a log of what they learned or did that day. Everyday they write an entry in their log. Sometimes they might respond to a teacher's prompt about the day's lesson or activity. Student entries provide insights for the teacher. They might reveal activities the students particularly liked or disliked. Also, they could show that what the students learned was not necessarily what the teacher wanted them to learn.

Authentic assessments require students to use their knowledge to perform a task. These tasks might include conducting research; writing, revising and discussing a paper; providing an oral analysis of a political event; or, participating in a debate. Authentic assessments evaluate whether the student can develop, analyze, refine answers, perform a task, or make a product (Wiggins, 1990).

One concern about authentic assessment is its reliability. Some think the authentic assessment is less reliable than norm-referenced assessments. Authentic assessments are criterion-referenced instead of
norm-referenced. Wiggins (1990) states that "authentic assessment achieves validity and reliability by emphasizing and standardizing the appropriate criteria for scoring products." Students clearly understand the criteria. There are no surprises. Performance assessments are based on tasks the students have been performing in class. The assessment matches the curriculum.

**Portfolio Assessment**

Science education assessment has traditionally emphasized memorization. Assessment was seen as a closure to the learning process with the focus on science facts and terminology, rather than processes or broad general ideas. Evaluation was based on knowing the right answer and was separate from the teaching process (Foster and Heiting, 1994). With the current move toward a more integrated curriculum, this type of assessment no longer makes sense. Teaching and assessment must go hand in hand. Assessment guides instruction and instruction guides assessment. Foster and Heiting (1994) believe that “integrating teaching and assessment establishes a structure conducive to learning. It puts the focus on both the learning processes and the products of learning.”

In recent years, portfolios have gained much popularity in the field of authentic assessment. Teachers have been using portfolios in Language Arts and math assessment to evaluate students' conceptual development and their process skills and problem solving abilities (Jones, 1994). It is believed they provide a means of assessing student learning that is more aligned with the curriculum. Instead of testing students to see if they
remember isolated facts, portfolios provide a means for students to
demonstrate how they solve problems, as well as, organize and synthesize
information. Portfolios may vary in style and content depending on their
purpose, but they do have common elements. Paulson, Paulson, and Meyer
(1991) have defined a portfolio as "a purposeful collection of student work
that exhibits the student's efforts, progress, and achievements in one or
more areas." Hamm and Adams (1991) define a portfolio as a "deliberate,
specific collection of accomplishments." The purpose of a portfolio is to
show "evidence of student development over time or a record of various
stages that led to completion of a major project" (Hoepfl, 1993).

Artists use portfolios to demonstrate their abilities to prospective
employers. This is one real life situation in which a person's abilities are
judged by samples of their work. Wolf (1989) discusses how PROPEL a
consortium of administrators, teachers, and researchers see portfolios as a
way of demonstrating that "it is possible to assess the thinking processes
characteristic of the arts and humanities in rigorous, but undistorted, ways."
Students collect diverse samples of their work. Throughout the course of a
semester or year students are asked to reflect on their work. They are asked
to critique their work by "noticing what is characteristic, what has changed
with time, or what still remains to be done" (Wolf, 1989). At the end of the
course students are given enough time to review their collection and select
samples which best show changes in the student over that time period.
These samples make up the final portfolio which includes student and
teacher commentaries on the work. The portfolio is passed on from year to
year.
Portfolio use is beginning to expand to other curricular areas such as science and social studies. Barrow (1993) found that students who kept portfolios "reflected critically on what they were required to know in ways that helped them to connect the various parts into a coherent whole." Portfolios give students the opportunity to show off what they know, while allowing the teacher to see the individual growth of each student. Portfolios can also motivate students to explore questions or ideas which interest them.

The purpose of the portfolio is to make sense of the students' work. Portfolios can also motivate students by showing them that their work is not discarded after it is graded. They promote learning through reflection and self-assessment. They can be used in evaluating the students' thinking and writing processes. Teachers can evaluate whether students are able to analyze and synthesize science concepts, and report science experiment results. Teachers can also give students the opportunity to self-evaluate by having them select work samples to include in their portfolios. These items might be a sample they think shows the most improvement, their understanding, their favorite, or one they think is their best work (Wiggins, 1990).

Portfolio work samples are scored based on predetermined criteria. Adams and Hamm (1992) suggest the following criteria for evaluating student portfolios.

1) Evidence of critical and creative thinking.
2) Quality of activities and investigations.
3) Variety of approaches and investigations.
4) Demonstrate understanding and skill in situations that parallel
previous classroom experience.

5) Assessment should be integrative (oriented toward critical thinking and problem solving, not just recall).

Students must meet the predetermined criteria. However, unlike multiple choice tests that just yield a score, these work samples reflect how the students think. The teacher is able to see the process the students used to complete their task. If a student misunderstood a concept the teacher is able to see the reasoning behind it. On a multiple choice test, all the teacher sees is the right or wrong answers. Students do not show how they arrived at those answers.

Portfolios create a context where the students and the learning process take center stage. Students are given the opportunity to reflect not only on the science concepts but on the process of learning. Teaching, learning and assessment are not seen as separate, but integral parts of the same process.
Chapter Three
Design and Methodology

Portfolios can help students organize their work and reflect on what they are learning. For this study, students will be required to construct a microhabitat for a living organism. Students will need to use their knowledge of the basic needs of all living organisms to provide a habitat which will meet their organism's needs and sustain it for an extended period of time. While all living things have the same basic needs for food, water, shelter, air, space, and light, not all habitats meet these needs in the same way. The best way to assess students' understanding of how habitats meet different organisms' needs is to allow them to observe, explore and record what they learn. Asking students to keep a portfolio of their work seems a logical way of assessing their understanding of the concepts being studied. A true or false or multiple-choice test would be a one time assessment at the end of the unit. It would not give an overall view of the processes the students went through during the unit of study.

The students will keep a portfolio of their work during the unit of study. During the background part of the study, students will be exploring the school yard and their homes to identify organisms and their habitats. They will have to determine if the habitats meet the organism's basic needs. Once the students understand the basic needs of organisms and how habitats meet those needs, they will pick an organism to invite to the classroom. The students will then write out a plan to construct a habitat specifically for that organism. The students will gather materials from the animals' natural habitat to construct the microhabitat for their organism in the classroom.
Other necessary materials will be provided for the students. The students will implement their plan by constructing the microhabitat for their organism. The students will keep their organism in its classroom habitat for a week. The teacher will verify on a checklist whether the organism’s needs were met by the habitat. The students’ plan and the teacher checklist will be placed in the portfolio. Finally, the teacher will conduct a post-unit interview with each student. This will also be placed in the portfolio.

**Data Needed**

Each portfolio will contain nine student work samples. These include the Introductory Questionnaire, Home-School Worksheet- A Question of Needs, Home-School Worksheet-My Home as Habitat, Home-School Worksheet-Exploring Other Habitats, Construct a Habitat- Student Plan, Construct a Habitat- Teacher Checklist, Science Notebook Page-Inviting a Minibeast for an Extended Classroom Visit, Post Interview and Learning log entries.

**Introductory Questionnaire**

The Habitats Introductory Questionnaire consists of five items. Items 1, 3, and 5 are open ended questions which require students to give a written response. Items 2 and 5 are multiple-choice; students simply circle their choices. Question 1 is designed to elicit a response pertinent to the basic needs of all living things for food, water, shelter, or a means of maintaining warmth. Question 2 elicits students’ understanding of the concept of environment, and application of this concept to a specific organism. Question 3 elicits students’ grasp of the concept of protective coloration and
students' ability to explain it. Question 4 elicits students' understanding of the concept of adaptation under adverse circumstances and students' ability to apply this concept to specific organisms. Question 5 is a problem-solving question. The students are asked to explain how they could find out about the needs of a small animal in order to create a habitat for it in the classroom.

**Home-School Worksheet- A Question of Needs**

This homework assignment asks the students to choose an organism at home. They have to describe how their home meets the organism’s specific needs. Where or how are the needs met? Are the needs completely met at their home, or are things brought in?

**Home-School Worksheet- My Home as Habitat**

This assignment consists of a chart which the students fill in with assistance from someone at home. The students are asked to describe where and how their home meets their basic needs. The students must chart their basic needs; where and how their basic needs are met in their home; and whether their basic needs are met completely or only partly.

**Home-School Worksheet- Exploring Other Habitats**

This worksheet asks students to work with a family member. They are to find a minibeast (organism) in or around their home. The students are to draw a picture or describe their organism. They have to describe the organism’s habitat. They must describe how they think it meets its needs for food, water, shelter, air, light, and space.

**Construct a Habitat - Student Plan**

The students will identify an organism they wish to have visit the
classroom for an extended period of time (1 to 2 weeks). They must identify the organism’s specific needs and tell how they plan to meet these needs.

**Construct a Habitat- Teacher Checklist**

The teacher will complete a simple checklist to determine if the microhabitats the students constructed meet the needs (food, water, shelter, light, air, space) of the organism. The checklist has space for teacher comments and observations about the students’ work.

**Science Notebook Page- Inviting a Minibeast for an Extended Classroom Visit**

This page asked the students to draw a picture of the microhabitat they built for their minibeast. It also lists the basic needs of food, water, shelter, air, light and, space. Students are asked to circle the needs which their minibeast will be able to satisfy in their microhabitat.

**Post Interview**

The Post Interview questions will be asked and recorded by the teacher. The students’ will not need to give a written response. The teacher will write their responses. The interview will consist of five questions related to the study of habitats.

**Learning Log**

A written record of the students’ responses to teacher questions; their record of experiences during outdoor explorations; and their observation of the organism in the habitat they created for it. Some of the questions to which students will respond are as follows: What is an organism? What does an organism need to survive? Explain which of your basic needs are met by your neighborhood habitat and how. Describe your minibeast and
how its basic needs are met in its microhabitat. Keep a daily observation log on how your minibeast is having its needs met.

Subjects

The subjects of this study are four third grade students. The subject group includes three boys and one girl. All have been designated Limited English Proficient (LEP) based on the Idea Proficiency Test (IPT) which is used to test oral proficiency in English and/or Spanish. The students were assessed by the Language Assessment Center in their school district. The subjects were assessed in both Spanish and English. All subjects scored at levels F-M (intermediate fluency) in Spanish. Two subjects scored at levels D-E (speech emergence) in English. The other two scored at level F (intermediate fluency) in English. These subjects were chosen because they scored high in Spanish. The subjects are currently in a bilingual classroom. They receive instruction in Spanish.

Methodology

This study is a qualitative investigation into the use of portfolios for the assessment of science concept learning. The research will be conducted in a third grade bilingual classroom. The entire class will go through the Habitats module which is part of the Insights Elementary Science Curriculum. This is an inquiry-based, hands-on science curriculum. This study will focus on four Limited English proficient (LEP) students. These students will receive science instruction in Spanish and will complete their work in Spanish. Case studies of their science learning will be done by
analyzing their science portfolios.

Portfolios will provide the information needed to determine if the subjects understand the science concepts of complete and incomplete habitats. The portfolios will consist of student work samples which include:

1) Introductory Questionnaire,
2) Home-School Worksheet- A Question of Needs,
3) Home-School Worksheet-My Home as Habitat,
4) Home-School Worksheet-Exploring Other Habitats,
5) Construct a Habitat- Student Plan,
6) Construct a Habitat- Teacher Checklist,
7) Science Notebook Page-Inviting a Minibeast for an Extended Classroom Visit,
8) Post Interview and
9) Learning log.

Students who may not be able to express themselves well in writing may be able to show what they know through their planning and construction of a habitat for a living organism.

Data Collection

The portfolio will include work from the Habitats science unit collected over a six week period. This science unit provides Science Notebook pages, homework pages and group exploration activities with the lessons. Some of these assignments will be included in the portfolio. At least one work sample will be added to the portfolio per week. The samples will be teacher selected. Work samples will be collected in four stages: background,
planning, implementation and post. During the background stage, students will be exploring the school yard and their homes. They will observe organisms in their natural habitat. They will exam the habitats to see which needs are met and how. The planning stage will involve selecting an organism to invite to the classroom. The students must take into account all the organism’s needs (food, water, shelter, air, light, and space) and plan for them. During the planning, students might observe the organism or read about it. Once their plan is developed, students will implement it by gathering materials and constructing a microhabitat in the classroom. Some materials will be provided by the teacher. After the microhabitat is constructed (post stage) the organism will stay in the classroom for a week. After that time it will be returned to its natural habitat if possible. The only exception to this will be domesticated animals such as birds.

Type of Analysis

The portfolio of work samples will be scored based on two teacher developed rubrics (Tables 1 and 2 which will follow). The objective of this unit is for students to understand that an organism’s habitat is that part of the total environment which it uses to meet its basic needs for survival. A complete habitat must provide all the resources a particular organism needs to survive: food, water, shelter, space, air and light. When constructing a microhabitat for an organism outside its nature environment students must make sure all the organism’s needs are met. Students will need to provide for the organism’s needs. Thus, student constructed habitats may be incomplete habitats. The students’ portfolio will include work samples that
demonstrate the degree to which they understand the concept of a complete and incomplete habitat.

1) Introductory Questionnaire: Each item on the Introductory questionnaire will be scored on a five-point rubric based on the guidelines given in the Habitat unit (see Table 1). The points scored for each item will be added up to give the student the number of total points earned. There are 25 total points possible for this questionnaire. This will determine the level or depth of knowledge the student has about habitats before we start our unit of study.

2) The Home-School Worksheet: A Question of needs will be scored on a 18 point scale. One point will be given for each specific need the student indicates in each “specific needs” section. There are two points possible for each section under: Where or how are the needs met? and Are the needs completely met at your home, or are things brought in? For example, if the organism indicated is a cat, its basic need for food must be met by food suitable for cats. The appropriate food would be listed under specific needs. This food item might be purchased at a store and brought to the home. The home habitat is an incomplete habitat for the cat unless it is able to hunt for its own food.

3) Home-School Worksheet: My Home as Habitat has 30 points possible. Students will receive one point for each of the basic needs they identify (food, water, shelter, air, light, and space). They will receive two points each for telling where and how each of their basic needs are met at home and whether their basic needs are met completely or only partly.

4) The following work samples will all be scored using Portfolio
Assessment Rubric 2 (see Table 2): Home-School Worksheet- Exploring Other Habitats; Construct a Habitat- Student Plan ; Construct a Habitat-Teacher Checklist; and Science Notebook Page- Inviting Minibeast for an Extended classroom visit.

5) The Post Interview will also be scored with the Portfolio Assessment Rubric 1. However, each question will be assessed using the 5 point rubric with a possible 30 points total.

6) The learning log will not be scored. It will be used to gain better understanding of the students thinking. It will serve as another piece in the portfolio.

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td><strong>Portfolio Assessment Rubric 1</strong></td>
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</tbody>
</table>

5- A complete and correct response to the question asked.

4- An essentially correct response but one that omits some details or underlying explanation, or that contains a slight inaccuracy.

3- A response that is wrong or skimpy simply because the student does not know the concept or information.

2- A naive conception: a response that is logical and coherent, and explains the data from the student's point of view, but scientifically wrong.

1- A naive, childish answer, or one that repeats the question.

0- No answer, or "I don't know."
Table 2

Portfolio Assessment Rubric 2

5- Student's work demonstrates a complete understanding of what is necessary for an organism to survive. The work sample provides for all of the basic needs: food, water, shelter, space, air, and light.

4- Student's work sample shows an essentially correct understanding but omits one of the basic needs of an organism.

3- Student's work sample includes four of the basic needs.

2- Student's work sample includes three of the basic needs.

1- Student's work sample includes less than three of the basic needs.
Chapter Four
Analysis and Results

The data was collected over a six week period during November and December of 1995. Student work samples were put into a science portfolio. Each sample in the portfolio was scored based on preestablished rubrics. Each portfolio can provide a qualitative, as well as a quantitative, assessment of the students' understanding of complete and incomplete habitats. Each work sample will be given a numerical score based on the rubrics. These scores will be converted into a percentage. The portfolios will also be looked at quantitatively. By looking at each work sample and highlighting the student's strengths and weaknesses, a better understanding of the students' thinking process can be gained.

Analysis: Portfolio Samples for Marcos O.

Introductory Questionnaire

Each item on the Introductory Questionnaire demonstrates what Marcos O. knew about habitats before we started our study unit. He scored 17 points on this work sample. He showed an understanding of some of the basic needs of living things. Item 1 shows that he knows living things need water, food, light, and shelter. Item 2 required that he circle the things that are part of a mouse's environment. He circled light, wind, water, and the length of the mouse's tail. He got three out of four correct. On item 3, Marcos showed a limited understanding of protective coloration. He was given a scenario of going on a nature walk and seeing brown caterpillars on the ground and green caterpillars up in the trees. He was asked to explain how
these colors help the caterpillars. His response was that it helps caterpillars at night because they can't be seen. He also stated that they can be stepped on and killed. His response is logical from his point of view. A brown caterpillar will be harder to see at night. But, he did not show an understanding of the scientific explanation of protective coloration which enables animals to avoid detection during the day. On item 4, he correctly circled all the examples which show how animals react to their surroundings in order to survive. Item 5 asked students to explain how they would find out about an animal's needs in order to construct a habitat for it in the classroom. Marcos' response to item 5 showed that he knew an animal would need food, water and air. It would also need to be keep in a cage and it would need to sleep. He just did not tell how he could find out more about a specific animal's needs. He knew the general needs of all animals (see Appendix A).

Home-School Worksheet- A Question of Needs

This work sample was worth 18 points. Marcos O. received all 18 points. He explained that a cricket needs grass, water, shelter, space, and a little light. He keeps the cricket in a plastic box his mother bought. He gives it the grass and water it needs to live.

Home-School Worksheet- My Home as Habitat

This sample demonstrated that Marcos O. knew what his basic needs are and how they are met in his home. His mother prepares the food. He buys his water at the store. This mother has provided shelter for him. He gets air, light, and space outside. He states that all of his needs are met at home. He does not recognize his home as an incomplete habitat. It is not
self sustaining. Some things must be brought in from other places. Marcos scored 23 out of 30 points.

**Home-School Worksheet - Exploring Other Habitats**

This sample required that the students pick an organism at home. They then had to describe it (in words or picture) and where it lives. Marcos O. picked a bee. He drew a picture of a bee. He also drew a picture of where it lived. He drew a house with a hive under the roof. He labeled this "vivie" (lives). He also drew a bee flying toward flowers and labeled the flowers "come" (eats). He did not label the open area of his picture. But, his drawing shows space which is not colored dark. This would indicate light. It is assumed that outside there is air. Through his drawing Marcos showed the basic needs of a bee. It must have a hive for shelter. It must have a food source, flowers. It also must be able to fly through space and air. Marcos scored four points using Portfolio Assessment Rubric.

**Construct a Habitat - Student Plan**

Marcos O. scored four points using Portfolio Assessment Rubric. He may not have written in great detail. But, he did indicate the specific needs of a snail. It would need leaves which he would get from a tree outside. It would need a little water which he would get from the sink inside. He would also need a plastic box (container) which he would get inside the classroom. He stated that it would need a little light which it would get from the lamp. It would need lots of air which it would get from outside. It would need lots of space which it would get from its plastic box.

**Construct a Habitat - Teacher Checklist**

Marcos O. provided for all the needs of his organism. He received
five points using Portfolio Assessment Rubric 2. Marcos constructed a microhabitat for a snail using a large plastic jar. He put enough water to create a small puddle. He also included leaves and a small plastic aquarium hill for the snail to climb on. He made sure the lid had holes to allow for air.

**Science Notebook Page- Inviting a Minibeast for an Extended Classroom Visit**

This sample received four points using Portfolio Assessment Rubric 2. It shows a drawing of the microhabitat created by the student. Marcos' drawing shows two snails immersed in water. He did not include any other details of the habitat. The student also is asked to circle all the needs the organism will be able to meet in this habitat. He indicated that his microhabitat would met the snails' need for food, water, shelter, air and space. He did not circle light. However, light would be provided by the larger classroom habitat.

**Post Interview**

Marcos O. received 21 of the 30 points possible. He was able to name four of the six basic needs of all living things. When asked what his organism needed in its microhabitat to live, he mentioned water, leaves and air. He forgot to mention shelter, light and space. Marcos does not have a clear understanding of complete and incomplete habitat. He thinks that because he has provided for all the organism's needs the microhabitat is complete. This is incorrect.

Marcos O. had an overall score of 78 percent (see Table 3) on his portfolio work samples. He received 96 out of a possible 123 points. He may
not always be able to express his understanding in writing. Nevertheless, the work samples in Marcos' portfolio show that he does have an understanding of the basic needs of living things and how a habitat provides for those needs. In his learning log Marco defined an organism as a living thing. In order to live, it needs water, food, air and a home. In his "My Needs" concept web he included space, shelter, food and water. These are some of the basic needs of all living things. His understanding of these needs shows in the microhabitat he constructed.

**Analysis: Portfolio Samples for Marcos V.**

**Introductory Questionnaire**

Marcos V. scored 15 on this sample. He had a limited understanding of habitats and the basic needs of living organisms. His response to item 1 was skimp. He did not know what an insect would need to find in order to survive in a new environment. On item 2, he could identify things that would make up the environment of a mouse. He circled light, wind, ocean, and water. On item 3, he indicated that the green or brown color of caterpillars would help them not get eaten by birds. On item 4, only one of the choices he made correctly shows how animals react to their environment in order to survive. The examples he chose were: Bears in cold climates sleep during winter; People carve pumpkins for Halloween; and, Children go to school in the fall. He does not show a clear understanding of what is essential for survival and what is not. He was also unable to tell how he might find out what an animal needs to live (see Appendix B).
Home-School Worksheet- A Question of Needs

Marcos V. scored 17 points on this work sample. He indicated that ants which he kept in a bag got their food from him. He gave them chips which he bought at the store. He used a cup to give them water from the sink. They got air through holes in the bag. Light was supplied by the sun.

Home-School Worksheet- My Home as Habitat

Marcos V. received only 18 points on this sample. He was able to tell what his basic needs are and how they are met at his house. However, he could not tell if these needs were met completely or only partly.

Home-School Worksheet- Exploring Other Habitats

Marcos V. explored the habitat of a worm. He stated that it eats the roots found in the soft soil. It lives in the moist soil. He only mentioned these two aspects of the worm’s habitat. He received a score of three using the Portfolio Assessment Rubric 2.

Construct a Habitat- Student Plan

Marcos V. scored a four using the Portfolio Assessment Rubric 2. This sample shows that Marcos understands the needs of a caterpillar. He planned to use a large plastic terrarium to provide shelter. He would provide leaves for it to eat. As for water, Marcos seems to understand that caterpillars get their water from rain. However, he would use a cup to provide it with water. He would also open the terrarium so that it could get air and light.

Construct a Habitat- Teacher Checklist

Marcos V. had planned to construct a microhabitat for a caterpillar. However, he later decided to team up with Oscar and make a microhabitat.
for a bird. Marcos V. received five points using Portfolio Assessment Rubric 2. He and Oscar provided for all the needs of their organism, a bird. The cage was of adequate size for the bird. Appropriate bird food and fresh water were provided. Air and light were provided by the classroom environment. The habitat also included a swing and long rod for the bird to perch on.

**Science Notebook Page-Inviting a Minibeast for an Extended Classroom Visit.**

On this sample Marcos V. scored four points using the Portfolio Assessment Rubric 2. He drew a cage with a bird in it. He did not draw anything else in the cage. However, he did indicate that all the bird’s needs would be met in this microhabitat. His drawing did lack details. However, he did identify all the needs which this microhabitat would meet for the bird.

**Post Interview**

Marcos V. received 16 points on his interview. He mentioned five of the basic needs. He explained that his bird needed someone to feed it and give it fresh water everyday. It needs air to breathe and live. It gets its air from outside. It needs a cage to protect it from dogs and cats. It needs space to walk and do things. He said he learned that small animals which live in soil need the same soil to survive.

Marcos V. had an overall score of 67 percent. He scored the least amount of points among the four students (see Table 3). In his Post Interview he did not answer the question about whether the microhabitat he constructed was a complete or incomplete habitat. While he may not have been able to tell the difference, there was much he did know. He knew
about the basic needs of all living things. He knew what to provide for his
bird to help it survive in our classroom environment. He also knew that you
cannot remove an organism from the soil in which it lives and expect it to
survive without at least taking some of that soil with it. In his learning log,
Marcos V. defines an organism as a thing that moves and eats. While this
may not be the best definition, he did know that an organism needs space,
water, and food. He also stated that it needed someone to love it. In his "My
Needs" concept web he included the six basic needs of living things: shelter,
space, food, water, light, and air.
Table 3
Portfolio Scores

<table>
<thead>
<tr>
<th>Student</th>
<th>Introductory Questionnaire</th>
<th>A Question of Needs</th>
<th>My Home as Habitat</th>
<th>Exploring Other Habitats</th>
<th>Habitat Plan</th>
<th>Habitat Checklist</th>
<th>Invite Minibeast</th>
<th>Post Interview</th>
<th>Total Score</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marcos O.</td>
<td>17</td>
<td>18</td>
<td>23</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>21</td>
<td>96</td>
<td>78%</td>
</tr>
<tr>
<td>Marcos V.</td>
<td>15</td>
<td>17</td>
<td>18</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>16</td>
<td>82</td>
<td>67%</td>
</tr>
<tr>
<td>Oscar V.</td>
<td>18</td>
<td>18</td>
<td>17</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>20</td>
<td>93</td>
<td>76%</td>
</tr>
<tr>
<td>Betsy V.</td>
<td>20</td>
<td>18</td>
<td>16</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>23</td>
<td>97</td>
<td>79%</td>
</tr>
</tbody>
</table>
Analysis: Portfolio Samples for Oscar V.

Introductory Questionnaire

Oscar V. received 18 points on this sample. He demonstrated on item 1 that he understands that an insect would need to find food, water and shelter in order to survive in a new environment. On item 2, he could identify the parts of a mouse’s environment such as light, wind and water. But, he also thought the mouse’s age and the length of its tail were part of its environment. On item 3, he knew that the color of the brown caterpillar on the ground would help prevent it from getting eaten by an animal passing by. He knew that the color served as protection but did not explain that it made the insect less visible. On item 4, he circled two of the three statements which gave examples of animals’ reactions to their environment that help them survive. On item 5, he named water, food, air and light as things an animal would need to live. However, he did not clarify how he would find out about the specific needs of an animal (see Appendix C).

Home-School Worksheet- A Question of Needs

Oscar V. scored 18 out of 18 on this work sample. He stated all the needs of a fish and how those needs are met. He buys the fish food at the store. He gets the water from the sink. The fish is kept in a small tank because it is a small fish. The fish gets its air from the water.

Home-School Worksheet- My Home as a Habitat

Oscar V. received 17 out of 30 points on this sample. He stated his basic needs for food, water, shelter, air, light and space. His mother buys and prepares the food. Water is bought at the store. Air is everywhere. Light comes from the sun. The space he lives in is big. He lost points
because he did not state whether his needs were met completely or only partly at his home.

Home-School Worksheet- Exploring Other Habitats

Oscar V. scored five points using Portfolio Assessment Rubric 2. He drew a picture of a fish, a fish bowl and fish food. He explained that his fish lives in a bowl. He gives it food. He stated that the fish lives in water so it does not need to drink water. It needs to be in a place where it can get air and light. It has a lot of room in its fish bowl.

Construct a Habitat- Student Plan

Oscar V. scored five points using Portfolio Assessment Rubric 2. He planned a microhabitat for a worm. He recognized that the worm gets its food and water from the soil outside. Air and light also come from outside. The worm will need a large area with soil.

Construct a Habitat- Teacher Checklist

Oscar V. and Marcos V. had both originally planned to make microhabitats for different organisms. However, they decided to get together and make a habitat for a bird. The microhabitat they constructed was of adequate size for the bird and provided for all its needs. The boys fed the bird and gave it fresh water daily. Oscar did not include a student plan for this habitat in his portfolio. But, the microhabitat did meet all the needs of the bird. He received all five points for this sample.

Science Notebook Page- Inviting a Minibeast for an Extended Classroom Visit

This sample received five points using Portfolio Assessment Rubric 2. It shows a detailed drawing of a bird's microhabitat. It consists of a large
cage, water dispenser, toy swing, perch and food bowl. Oscar indicated that all the bird's needs would be met by this microhabitat.

**Post Interview**

Oscar V. received 20 out of 30 points. He named four of the six basic needs. He said all living things need water, food, space, air and love. He left out light and shelter. He made a microhabitat for a bird. When asked what the bird needed in its microhabitat to live, he replied water, food, space, and love. He believed the microhabitat he created was a complete habitat because it had air, water, and space. He did not recognize that he had to provide the food and water for the bird. Thus, the microhabitat was an incomplete habitat. On the last question, he stated that he learned not to treat organisms bad. They need lots of food and love. They need to be treated well. Learning respect for other living things is also important.

Oscar V. had an overall score of 76 percent. While Oscar may not know the distinction between a complete and incomplete habitat, there is much he does know. In his learning log, Oscar states that an organism needs water, food, a house and family to live. His "My Needs" concept web included house, space, food, light, water and air. He knows that living things need food, water, space and air in order to live.

**Analysis: Portfolio Samples for Betsy V.**

**Introductory Questionnaire**

Betsy V. scored 20 out of 25 on this sample. She knew that an insect would have to find food, house (shelter) and water to survive in a new environment. She also thought it would need family and things. When
asked about the parts of mouse’s environment, she included light, wind, and water in her choices. She did not choose grain as part of a mouse’s environment. When asked how their colors help caterpillars, she was not able to explain the concept of protective coloration. She simply indicated that brown helps because dirt is brown and green because the tree is green. She did not explain that their colors help them hide from predators. She was able to correctly identify the three examples of how animals react to their surroundings in order to survive. Betsy was the only subject in this study who correctly indicated that she could learn more about an animal by reading a book. Researching the specific needs of an animal is important in order to create an appropriate microhabitat (see Appendix D).

Home-School Worksheet- A Question of Needs

Betsy V. received 18 out of 18 points on this sample. She told how her home habitat met the needs of her dog. It eats Pedigree which she buys at the store. She gives it water from the water hose outside her house. It lives in a dog house which someone gave to her. It gets air from outside through the opening in its house. It gets light from the sun. The sunlight also enables her to see the dog. Betsy states that it has sufficient space in her yard.

Home-School Worksheet- My Home as a Habitat

Betsy V. received 16 of the possible 30 points on this sample. She was able to identify her six basic needs and how they were met. However, she did not indicate whether these needs were met completely or only partly by her home habitat.
Home-School Worksheet- Exploring other Habitats

Betsy V. received five points using the Portfolio Assessment Rubric 2. She drew a colorful detailed picture of a butterfly near a flower. She stated that it gets its food from flowers and water from the soil. It gets light from the sun and shelter from plants. She did not mention air and space. However, her drawing does demonstrate enough space for the butterfly to fly freely and find what it needs to survive.

Construct a Habitat- Student Plan

Betsy V. planned a microhabitat for a snail. She received five points using Portfolio Assessment Rubric 2. She indicated that the snail would eat lettuce and leaves which she would give it. The leaves would also provide water for the organism. The snail could be kept in a large jar with large holes to allow for air. The jar would be kept near light but in the shade so it would not get too much light.

Construct a Habitat-Teacher Checklist

Betsy V. received five points using Portfolio Assessment Rubric 2. Betsy ended up constructing two habits; one for snails and one for ants. The snail habitat consisted of a plastic terrarium with a small amount of water at the bottom. It was enough water to keep the snails moist without submerging them completely. She also put leaves and a plastic aquarium hill for them to climb on. She worked with another student to make an ant microhabitat. Her ant microhabitat was also a plastic terrarium. She put sand and soil in it. The container was half full of dirt. She put leaves and sprinkled some water in there. There was an opening at the top to provide for air. She also put some bread crumbs in there daily. She provided for all
the needs of these organisms in the microhabitats she created.

**Science Notebook Page- Inviting a Minibeast for an Extended Classroom Visit**

Betsy V. received five points on this sample using Portfolio Assessment Rubric 2. She drew a detailed picture of her snail habitat. It showed three snails moving around in their microhabitat. It consisted of water, leaves and a hill within the plastic terrarium. Betsy indicated that this terrarium will meet all the basic needs of the snails.

**Post Interview**

Betsy V. scored 23 out of 30 points on the Post Interview. She identified the six basic needs of all living things. She also indicated that ants need soil, food, and water in their microhabitat. They also need holes to allow for air and dirt to provide shelter. She did not mention space and light in her response. She was the only student to correctly identify her microhabitat as an incomplete habitat. She stated that it had no water and she had to provide food. She got the soil from the teacher. She learned that she had to feed her organisms everyday and there had to be holes in the cage for them to breath.

Betsy V. had an overall score of 79 percent. This was the highest among the four subjects. She put much effort into her work. This can be seen in her learning log entries. She defined an organism as something that moves and lives. She gave examples such as a person, dog, fish, bird, elephant, insects and teacher. She further explained that a book is not an organism because it does not move. It does not eat and it does not need water. Her “My Needs” concept web was much more detailed than the
others. She gave several examples for each need on her web. For example, next to food and water she listed mom, market, filter, hamburger, pizza and soup.

Results

How do portfolios demonstrate student understanding of science concepts? Portfolios give the opportunity to look at student work over a period of time. They do not limit assessment to a one time shot. In this study, there was the opportunity to examine nine sources of information about each students' understanding of the science concept, habitats. In each work sample one could see different aspects of the students' thinking. Each piece gave evidence of the students' understanding.

A qualitative analysis reveals that the subjects were able to name the basic needs of organisms. They did not always name them all in each work sample. However, looking at the various samples one can see that the needs were mentioned throughout the samples. The majority of the subjects had a hard time distinguishing between a complete and an incomplete habitat. They did know that a habitat must meet certain needs if an organism is to survive. They were all successful in constructing a microhabitat for an organism of their choice. They made practical use of their knowledge about basic needs and how habitats meet these needs.

A quantitative analysis also assesses student understanding. Every subject received 67 percent or more of the points possible on their portfolios. Most of the points lost were on work samples that asked about complete versus incomplete habitats. This distinction was hard for students. They had
difficulty with the idea that one habitat could be contained within a larger habitat. As long as their organism's needs were met, they considered the microhabitat complete.
Chapter Five

Discussion

Interpretation

This study focused on the use of portfolios to assess students’ understanding of science concepts. For the purpose of this study, the science concept being studied was habitats and how they meet an organism’s basic needs. The students had several opportunities to explore organisms in their natural habitats in the school yard and at home. They also were able to examine how their home habitat met their needs as human beings and the needs of their pets. Portfolios allow one to assess students in the manner in which they learn through social interaction. Work samples may show work completed independently or with a partner. The Home-School worksheets ask the students to work with someone at home.

The analysis of student portfolios allows the teacher to see what concepts the students are not grasping. Students in this study had difficulty seeing the difference between complete and incomplete habitats. Being able to see this allows for adjustments in instruction. The assessment of work samples also shows what concepts are easily understood by students. For example, living things have six basic needs: food, water, shelter, air, light, and space. Most students easily grasped the need for food, water, shelter and air. However, the need for light and space was not always mentioned by students. Students may not always mention all six needs in all their work. However, by looking at different work samples, it is apparent that the students do know all six needs. They just stressed different needs in
different work samples.

Conclusions

The use of portfolio assessment, as opposed to an end of unit test, allows one to see many snapshots of student understanding. If one relies solely on one test than that's just one view into the student's understanding. This does not provide a wide perspective on the student. Nor does it give students a voice in their own assessment. In a portfolio, a student can choose to include a work sample or leave it out. The student has some ownership and control of what's being assessed. In this study, Marcos V. and Oscar had originally planned to construct microhabitats for a caterpillar and worm. They completed habitat plans with these organisms in mind. They later decided to join forces and construct a microhabitat for a bird. Neither included a habitat plan for a bird in their portfolio. However, the habitat they constructed for the bird did meet all its needs and they received full credit. The use of portfolios allows for flexibility on the part of teacher and students. After examining the work samples in these portfolio, one can see that the students have an understanding of habitats and how they meet organisms' needs in general. They also reveal that the students do not all understand the concept of incomplete habitat. The concept of a self-sustaining habitat was difficult for some students to grasp. They thought that as long as food was provided by someone the habitat was complete.

Implications

The use of portfolio assessment allows one to see a student's growth
over time. The portfolio kept for this study showed various work samples that led to the completion of a project. Through their explorations and activities students gained understanding of habitats and later used their knowledge to build a microhabitat. Portfolios help students make sense of their work. They have a purpose. Unlike tests, portfolios give students the chance to examine their work samples and see their growth in understanding.

Students can also give their portfolio some direction. They can focus on different aspects of the overall topic of the portfolio. The students in this study did not all focus on the same organisms. They were able to explore the organisms that interested them. Portfolios give students a voice.
Appendix A
Portfolio Samples for Marcos O.
Hábitats
Cuestionario Preliminar

1. Un insecto fue llevado a tu vecindario desde las Islas del Caribe, en un gajo de bananos. Haz una lista, abajo, de las cosas que el insecto tendrá que encontrar aquí para poder vivir.

   - Casa
   - Agua
   - Comida
   - Luz
   - Amigos

   4

2. ¿Cuáles de las cosas de abajo harán parte del medio ambiente (el lugar donde vive) de un ratón? Marca las cosas que seleccionas con un círculo.

   A. Luz
   B. Viento
   C. El mar
   D. Granos
   E. La edad del ratón
   F. Agua
   G. El largo de la cola del ratón

4

Se ven el día en la noche.

4. Entre las frases abajo, haz un círculo alrededor de aquellas que dan ejemplos de cómo los seres vivos reaccionan a sus alrededores para ayudarse a sobrevivir (continuar a vivir).

A. Los osos en los climas fríos duermen durante el invierno.
B. Los patos vuelan hacia el sur durante el invierno.
C. La gente esculpe calabazas para Halloween.
D. Los ratones del desierto permanecen en huecos durante el día.
E. Los niños van a la escuela en el otoño.

5. Quieres traer un animal pequeño o un insecto al salón de clases por unos días. ¿Cómo aprenderás lo que necesita para vivir y sentirse cómodo en el nuevo hábitat que le prepararás?

Escribe tu respuesta atrás de la página.
darle de comer
hueso que no se duerma
Hoja de Trabajo en Casa y Escuela
Una Cuestión de Necesidades

Seleciona un ser vivo (organismo) en casa. Llena la tabla de abajo, describiendo cómo su hábitat casero satisface las necesidades del organismo.

<table>
<thead>
<tr>
<th>Organismo:</th>
<th>?Dónde o cómo se satisfacen las necesidades? ¿Se satisfacen estas necesidades por completo en tu casa, o se traen cosas de afuera?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necesidades Generales</td>
<td>Necesidades Específicas</td>
</tr>
<tr>
<td>Comida</td>
<td>Socate</td>
</tr>
<tr>
<td>Agua</td>
<td>De la casa</td>
</tr>
<tr>
<td>Albergo</td>
<td>Mi mamá compra una caja de plástico</td>
</tr>
<tr>
<td>Aire</td>
<td>Si tiene espacio</td>
</tr>
<tr>
<td>Luz</td>
<td>No necesita mucha luz</td>
</tr>
<tr>
<td>Espacio</td>
<td>Si tiene espacio</td>
</tr>
</tbody>
</table>
Hoja de Trabajo en Casa y Escuela
Descubramos el Hábitat de Nuestra Escuela

**Mi Casa Como Hábitat**

Junto con alguien en tu casa, usa la tabla de abajo para describir dónde y cómo tu casa satisface tus necesidades.

<table>
<thead>
<tr>
<th>Mis Necesidades Básicas</th>
<th>Dónde y Cómo se Satisfacen Mis Necesidades en Mi Casa</th>
<th>¿Se Sufren Mis Necesidades por Completito o Sólo Parcialmente?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comida</strong></td>
<td>Mi mamá hace</td>
<td>Se satisfacen</td>
</tr>
<tr>
<td><strong>Agua</strong></td>
<td>Yo tomo agua del baño</td>
<td>Se satisfacen</td>
</tr>
<tr>
<td><strong>Albergue</strong></td>
<td>Mi mamá agarría</td>
<td>Se satisfacen</td>
</tr>
<tr>
<td><strong>Alguna</strong></td>
<td>Yo lo tomo de aquí</td>
<td>Se satisfacen</td>
</tr>
<tr>
<td><strong>Luz</strong></td>
<td>Yo la agarré de aquí</td>
<td>Se satisfacen</td>
</tr>
<tr>
<td><strong>Estudio</strong></td>
<td>Hay lámpara</td>
<td>Se satisfacen</td>
</tr>
</tbody>
</table>
Encuentra una bestezuela en tu casa o en sus alrededores. Trabaja con un miembro de tu familia para completar esta hoja.

Encontramos esta bestezuela: **Abeja**

Aquí está un dibujo o una descripción de la bestezuela:

El hábitat de la bestezuela es **en el techo de la casa**

Aquí está una descripción del lugar donde vive la bestezuela y de cómo pensamos que satisface sus necesidades de comida, agua, albergo, aire, luz y espacio.
## Construct a Habitat - Student Plan

### Construir un Habitat - Plan de Estudiante

<table>
<thead>
<tr>
<th>Necesidades básicas</th>
<th>Necesidades específicas</th>
<th>Como pienso satisfacer estas necesidades</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comida</strong></td>
<td>Ogas</td>
<td>de afuera de arboles</td>
</tr>
<tr>
<td><strong>Agua</strong></td>
<td>poquita</td>
<td>de las manos de adentro</td>
</tr>
<tr>
<td><strong>Albergue</strong></td>
<td>de la caja de plastico</td>
<td>de adentro</td>
</tr>
<tr>
<td><strong>Luz</strong></td>
<td>poquita</td>
<td>en la porra</td>
</tr>
<tr>
<td><strong>Aire</strong></td>
<td>mucho</td>
<td>de afuera</td>
</tr>
<tr>
<td><strong>Espacio</strong></td>
<td>mucho</td>
<td>de la caja de plastico</td>
</tr>
</tbody>
</table>
Construct a Habitat- Teacher Checklist

Student Name: Marcos | Organism: Snail

The habitat constructed meets the following needs for this organism.

<table>
<thead>
<tr>
<th>Basic Needs</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shelter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td></td>
<td></td>
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<tr>
<td>Space</td>
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</tbody>
</table>

Teacher comments/observations:

Marcos picked a large plastic jar to create his habitat. He included a small puddle of water, leaves, a small plastic aquarium, soil for the snail to climb on. He made sure the lid had holes to allow for air.
Página del Cuaderno de Ciencia

Invitación a las Bestezuelas para una Visita
Prolongada al Salón de Clases

Terrario de Bestezuelas

Invitamos a Caracol al salón de clases.

Este es un dibujo del micro hábitat que construimos para nuestras bestezuelas:

En este micro hábitat, la bestezuela deberá satisfacer las siguientes necesidades (haz un círculo alrededor de todas las necesidades satisfechas):

- Alimento
- Agua
- Albergue
- Aire
- Luz
- Espacio

Nombre: Mirco
Fecha: 12-7-95
1. What are the six basic needs of all living things? (¿Qué son las seis necesidades básicas de todos los seres vivos?)

agua, aire, comida, espacio

2. What was the organism you invited to the classroom? (¿Cuál fue el organismo que invitaste al salon?)

3. What did it need in its microhabitat in order to live?

4. Was the microhabitat you built a complete or incomplete habitat? Why?

5. Tell about something important you learned about organisms and their needs? (¿Fue algo importante que aprendiste acerca de organismos y sus necesidades?)
Learning Log

What is an organism? What does it need to live?

11-27-05

¿Qué es un organismo? Es algo que tiene vida.
¿Un organismo camina? Es algo que se mueve.
¿Un organismo puede ver en una cana?

Necesita agua para vivir.
Necesita comida para vivir.
Necesita aire para vivir.
Necesita respirar para vivir.
Learning Log
Concept Web: My Needs
Appendix B
Portfolio Samples for Marcos V.
1. Un insecto fue llevado a tu vecindario desde las Islas del Caribe, en un gajo de bananos. Haz una lista, abajo, de las cosas que el insecto tendrá que encontrar aquí para poder vivir.

   El agua y el gusano

2. ¿Cuáles de las cosas de abajo harán parte del medio ambiente (el lugar donde vive) de un ratón? Marca las cosas que selecciones con un círculo.

   A. Luz
   B. Viento
   C. El mar
   D. Granos
   E. La edad del ratón
   F. Agua
   G. El largo de la cola del ratón
3. Imagina que vas de excursión en la naturaleza con tu clase. Encuentras unas orugas de color marrón en la tierra y otras verdes en los árboles. Explica cómo estos colores ayudan a las orugas para que no sean comidas.

4. Entre las frases abajo, haz un círculo alrededor de aquellas que dan ejemplos de cómo los seres vivos reaccionan a sus alrededores para ayudarse a sobrevivir (continuar a vivir).

- Los osos en los climas fríos duermen durante el invierno.
- Los patos vuelan hacia el sur durante el invierno.
- La gente esculpe calabazas para Halloween.
- Los ratones del desierto permanecen en huecos durante el día.
- Los niños van a la escuela en el otoño.

5. Quieres traer un animal pequeño o un insecto al salón de clases por unos días. ¿Cómo aprenderás lo que necesita para vivir y sentirse cómodo en el nuevo hábitat que le prepararás? Escribe tu respuesta atrás de la página.
darle comida mucha comida.
Home-School Worksheet- A Question of Needs

Hoja de Trabajo en Casa y Escuela

Una Cuestión de Necesidades

Selecciona un ser vivo (organismo) en casa. Llena la tabla de abajo, describiendo cómo su hábitat casero satisface las necesidades del organismo.

<table>
<thead>
<tr>
<th>Organismo: Orugas</th>
<th>¿Dónde o cómo se satsisfacen las necesidades? ¿Se satsisfacen estas necesidades por completo en tu casa, o se traen cosas de afuera?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necesidades Generales</td>
<td>Necesidades Específicas</td>
</tr>
<tr>
<td>Comida</td>
<td>las papitas de la tienda</td>
</tr>
<tr>
<td>Agua</td>
<td>del sin</td>
</tr>
<tr>
<td>Albergro</td>
<td>chica</td>
</tr>
<tr>
<td>Aire</td>
<td>por los ojos chicos</td>
</tr>
<tr>
<td>Luz</td>
<td>la aguajita del sol</td>
</tr>
<tr>
<td>Espacio</td>
<td>grande</td>
</tr>
</tbody>
</table>
Hoja de Trabajo en Casa y Escuela

**Descubramos el Hábitat de Nuestra Escuela**

**Mi Casa Como Hábitat**

Junto con alguien en tu casa, usa la tabla de abajo para describir dónde y cómo tu casa satisface tus necesidades.

<table>
<thead>
<tr>
<th>Mis Necesidades Básicas</th>
<th>Dónde y Cómo se Satisfacen Mis Necesidades en Mi Casa</th>
<th>¿Se Satisfacen Mis Necesidades por Completo o Sólo Parcialmente?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comida</td>
<td>en la tienda</td>
<td>en la arboleda.</td>
</tr>
<tr>
<td>Agua</td>
<td>en el sin</td>
<td>del sin</td>
</tr>
<tr>
<td>Albergue</td>
<td>en el otro</td>
<td>tengo una mi casa.</td>
</tr>
<tr>
<td>Aire</td>
<td>lo agarro por de afuera.</td>
<td>de afuera.</td>
</tr>
<tr>
<td>Luces</td>
<td>de la lampara.</td>
<td>de la lampara.</td>
</tr>
<tr>
<td>Espacio</td>
<td>tengo mucho espacio</td>
<td>mucho espacio.</td>
</tr>
</tbody>
</table>
Hoja de Trabajo en Casa y Escuela

Exploramos Otros Hábitats

Encuentra una bestezuela en tu casa o en sus alrededores. Trabaja con un miembro de tu familia para completar esta hoja.

Encontramos esta bestezuela: \textit{la encontré en mi jardín.}

Aquí está un dibujo o una descripción de la bestezuela:

\begin{center}
\includegraphics[width=0.5\textwidth]{image.png}
\end{center}

El hábitat de la bestezuela es \textit{vive en la tierra.}

Aquí está una descripción del lugar donde vive la bestezuela y de cómo pensamos que satisface sus necesidades de comida, agua, albergo, aire, luz y espacio.

\begin{itemize}
  \item Come las raíces de \textit{en donde están la suelo.}
  \item Vive \textit{en la tierra} ame da.
  \item en \textit{los lugares} húmedos.
\end{itemize}
### Construct A Habitat - Student Plan

- **Nombre:** Marcos V.
- **Fecha:** 12/1/95

**Voy a construir un habitat para:** Caterpillar.

<table>
<thead>
<tr>
<th>Necesidades básicas</th>
<th>Necesidades específicas</th>
<th>Como pienso satisfacer estas necesidades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comida</td>
<td>Mucha comida.</td>
<td>le voy a tirar y darle la comida.</td>
</tr>
<tr>
<td>Agua</td>
<td>Mucha agua.</td>
<td>le voy a dar en un bao.</td>
</tr>
<tr>
<td>Albergo</td>
<td>Una casa muy grande.</td>
<td>le voy a dar una cosa muy grande.</td>
</tr>
<tr>
<td>Luz</td>
<td>Mucha luz.</td>
<td>le voy a poner para que tenga mucho sol</td>
</tr>
<tr>
<td>Aire</td>
<td>Mucho aire al fresco.</td>
<td>le voy a poner.</td>
</tr>
<tr>
<td>Espacio</td>
<td>Mucha muy espesor.</td>
<td>le voy a poner en una grande caja.</td>
</tr>
</tbody>
</table>
Construct a Habitat- Teacher Checklist

Student Name: Marcos
Organism: bird (parakeet)

The habitat constructed meets the following needs for this organism.

<table>
<thead>
<tr>
<th>Basic Needs</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Shelter</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Space</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Teacher comments/observations:
Marcos and Oscar kept the bird in a large cage. They made sure it had enough food and water everyday. They filled the food dish and water bottle as needed.
Página del Cuaderno de Ciencia

Invitación a las Bestezuelas para una Visita
Prolongada al Salón de Clases

Territorio de Bestezuelas

Invitamos a las Pájaras al salón de clases.

Este es un dibujo del micro hábitat que construimos para nuestras bestezuelas:

En este micro hábitat, la bestezuela deberá satisfacer las siguientes necesidades (haz un círculo alrededor de todas las necesidades satisfechas):

- Alimento
- Agua
- Alojamiento
- Aire
- Luz
1. What are the six basic needs of all living things? (¿Qué son las seis necesidades básicas de todos los seres vivos?)
   - agua, comida, lugar para vivir, aire, espacio
   - alguien que lo cuide

2. What was the organism you invited to the classroom? (¿Cuál fue el organismo que invitaste al salon?)
   - Pájaro

3. What did it need in its microhabitat in order to live? (Qué necesito en su microhabitat para vivir?)
   - de comida y agua, que le cambien la agua todo los días. Necesita aire para respirar y que no se muera. Consigue el aire de afuera y los depós de afuera pero tapados. Necesitan una jaula para protegerse de los gatos y perros, los enemigos. Necesita espacio para correr y hacer cosas.

4. Was the microhabitat you built a complete or incomplete habitat? Why? (¿Fue un habitat completo o incompleto el microhabitat que construiste? ¿Por qué?)

5. Tell about something important you learned about organisms and their needs? (Qué fue algo importante que aprendiste acerca de organismos y sus necesidades?)
   - los animalitos chicitos que viven en la tierra necesitan la misma tierra para vivir.
Learning Log
What is an organism? What does it need to live?

11-27-95

¿Qué es un organismo?
Es una cosa que se mueve y come.
Es algo que se mueve.
Un perro necesita agua.
A un pájaro le dan comida.
Es algo que vive.

11-27-95

¿Qué necesita un organismo para vivir?
Necesita lugar y espacio.
Necesita aire.
Necesita algún que lo quiera.
Necesita comida.
Necesita agua.
Learning Log
Concept Web: My Needs

Yo vivo en una casa.

Casa

MIS

Espacio

mucho espacio.

Necesidades

mi casa

niño

tienda

Día

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batala
Appendix C
Portfolio Samples for Oscar V.
Hábitats
Cuestionario Preliminar

1. Un insecto fue llevado a tu vecindario desde las Islas del Caribe, en un jardín de bananos. Haz una lista, abajo, de las cosas que el insecto tendrá que encontrar aquí para poder vivir.

A. Bananas
B. Agua
C. Una casa
D. Algunos árboles
E. Mucha comida

2. ¿Cuáles de las cosas de abajo harán parte del medio ambiente (el lugar donde vive) de un ratón? Marca las cosas que seleccionas con un círculo.

A. Luz
B. Viento
C. El mar
D. Granos
E. La edad del ratón
F. Agua
G. El largo de la cola del ratón

A. ¿Para qué no se lo comen?
B. Una cafetería se pone sentado y cuando pasa alguien no lo puede comer.
C. Se queda en la tierra y cuando un animal pasa se lo come.

4. Entre las frases abajo, haz un círculo al rededor de aquellas que dan ejemplos de cómo los seres vivos reaccionan a sus alrededores para ayudarse a sobrevivir (continuar a vivir).

A. Los osos en los climas fríos duermen durante el invierno.
B. Los patos vuelan hacia el sur durante el invierno.
C. La gente esculpe calabazas para Halloween.
D. Los ratones del desierto permanecen en huecos durante el día.
E. Los niños van a la escuela en el otoño.

5. Quieres traer un animal pequeño o un insecto al salón de clases por unos días. ¿Cómo aprenderás lo que necesita para vivir y sentirse cómodo en el nuevo hábitat? ¿Qué le prepararás?
Agua para que tome.
Comida para comer.
Haga
Luz para ver.

Es un bonito.
Se selecciona un ser vivo (organismo) en casa. Llena la tabla de abajo, describiendo cómo su hábitat casero satisface las necesidades del organismo.

<table>
<thead>
<tr>
<th>Organismo:</th>
<th>Péz</th>
<th>¿Dónde o cómo se satisfacen las necesidades? ¿Se satisfacen estas necesidades por completo en tu casa, o se traen cosas de afuera?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necesidades Generales</td>
<td>Necesidades Específicas</td>
<td>Comida de Pez - lo agarro en la tienda</td>
</tr>
<tr>
<td>Agua</td>
<td>Yo agarro la agua del sink.</td>
<td>del sink.</td>
</tr>
<tr>
<td>Albergue</td>
<td>La pongo en una pezera.</td>
<td>Le compro una pezera</td>
</tr>
<tr>
<td>Aire</td>
<td>Agarrar el aire de la agua.</td>
<td>Le pongo agua y le da aire.</td>
</tr>
<tr>
<td>Luz</td>
<td>No necesita mucha luz.</td>
<td>Le pongo por el sol.</td>
</tr>
<tr>
<td>Espacio</td>
<td>El tanque está chiquito y el también.</td>
<td>Yo compro el tanque.</td>
</tr>
</tbody>
</table>
Home-School Worksheet- My Home as a Habitat

Hoja de Trabajo en Casa y Escuela

Descubramos el Hábitat de Nuestra Escuela

_Mi Casa Como Hábitat_

Junto con alguien en tu casa, usa la tabla de abajo para describir dónde y cómo tu casa satisface tus necesidades.

<table>
<thead>
<tr>
<th>Mis Necesidades Básicas</th>
<th>Dónde y Cómo se Satisfacen Mis Necesidades en Mi Casa</th>
<th>¿Se Satisfacen Mis Necesidades por Completo o Sólo Parcialmente?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comida</td>
<td>Mi mamá, mi papá la comienda</td>
<td>Mi mamá no auir a fuera a comprar.</td>
</tr>
<tr>
<td>Agua</td>
<td>La tengo que comprar</td>
<td>La aguaro en la tienda</td>
</tr>
<tr>
<td>Albergue</td>
<td>Mi casa esta a grande</td>
<td>La compra.</td>
</tr>
<tr>
<td>Aire</td>
<td>La aguaro de todos los lados</td>
<td>La aguaro a fuera.</td>
</tr>
<tr>
<td>Luz</td>
<td>De mi sol</td>
<td>O de mi casa.</td>
</tr>
<tr>
<td>Espacio</td>
<td>Esta a grande</td>
<td>Mi cuarto.</td>
</tr>
</tbody>
</table>
Encuentra una bestezuela en tu casa o en sus alrededores. Trabaja con un miembro de tu familia para completar esta hoja.

Encontramos esta bestezuela: Adentro de mi Casa

Aquí está un dibujo o una descripción de la bestezuela:
El pezcardo es color azul, rojo y verde

El hábitat de la bestezuela es una pesera y lo tengo en mi casa.

Aquí está una descripción del lugar donde vive la bestezuela y de cómo pensamos que satisface sus necesidades de comida, agua, albergue, aire, luz y espacio.

El pezcardo vive en una pesera y yo le doy de comer. El pezcardo vive en el agua. Aun cuando no necesita tomar agua necesita estar en un lugar donde pueda tomar agua y le da mucho aires. Tiene mucho espesio en su pesera.
Construct a Habitat- Student Plan

Construir un Habitat- Plan de Estudiante

Nombre: Oscar Vazquez  Fecha: 12-1-95

Voy a construir un habitat para Worms

<table>
<thead>
<tr>
<th>Necesidades básicas</th>
<th>Necesidades específicas</th>
<th>Como pienso satisfacer estas necesidades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comida</td>
<td>¿es el suelo limpio?</td>
<td>le agario las ojas, tierra y agua fuera.</td>
</tr>
<tr>
<td></td>
<td>¿es suelo limpio?</td>
<td>le agario de tierra</td>
</tr>
<tr>
<td>Agua</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albergo</td>
<td>¿es el albergue grande?</td>
<td>le agario de tierra</td>
</tr>
<tr>
<td></td>
<td></td>
<td>que este grande</td>
</tr>
<tr>
<td>Luz</td>
<td>¿es el sol?</td>
<td>le ponigo en la ventana</td>
</tr>
<tr>
<td>Aire</td>
<td>¿es el aire limpio?</td>
<td>le abro la ventana</td>
</tr>
<tr>
<td>Espacio</td>
<td>¿es el espacio limpio?</td>
<td>le doy un espacio</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tierra grande</td>
</tr>
</tbody>
</table>
Construct a Habitat- Teacher Checklist

Student Name: Oscar / Marcos  
Organism: Bird (parakeet)

The habitat constructed meets the following needs for this organism.

<table>
<thead>
<tr>
<th>Basic Needs</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Shelter</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Space</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Teacher comments/observations:

Marcos and Oscar keep their bird in a large cage. They make sure it has enough food and water everyday. They are very conscientious of the animal’s needs.
Página del Cuaderno de Ciencia
Invitación a las Bestezuelas para una Visita Prolongada al Salón de Clases

Territorio de Bestezuelas
Invitamos a Pájaros al salón de clases.

Este es un dibujo del micro hábitat que construimos para nuestras bestezuelas:

En este micro hábitat, la bestezuela deberá satisfacer las siguientes necesidades (haz un círculo alrededor de todas las necesidades satisfechas):

- Alimento
- Agua
- Albergue
- Aire
- Luz
- Espacio
1. What are the six basic needs of all living things? (¿Qué son las seis necesidades básicas de todos los seres vivos?)

   agua, comida, espacio, aire, cariño, light, shelter

2. What was the organism you invited to the classroom? ¿Cuál fue el organismo que invitaste al salón?

   pájaro

3. What did it need in its microhabitat in order to live?

   ¿Qué necesito en su microhabitat para vivir?

   agua, comida, espacio, cariño

4. Was the microhabitat you built a complete or incomplete habitat? Why?

   ¿Fue un habitat completo o incompleto el microhabitat que construiste? ¿Por qué?

   Completo porque tenía aire, comida, agua, espacio,

5. Tell about something important you learned about organisms and their needs? ¿Qué fue algo importante que aprendiste acerca de organismos y sus necesidades?

   Que no los traten mal. Necesitan mucha comida, que tengan cariño. Que los traten bien.
Learning Log
What is an organism? What does it need to live?

11-27-95

¿Qué es un organismo?
Es algo que se mueve.
Es que come.
Un perro necesita agua.
Un pájaro le dan comida.
Se necesitan beber.
11-27-95

¿Qué necesita un organismo para
Un organismo necesita agua.
Un organismo necesita comida.
Un organismo necesita una casa.
Un organismo necesita familia.
Un organismo necesita vivir.
Learning Log
Concept Web: My Needs
Hábitats  
Cuestionario Preliminar

1. Un insecto fue llevado a tu vecindario desde las Islas del Caribe, en un jardín de bananos. Haz una lista, abajo, de las cosas que el insecto tendrá que encontrar aquí para poder vivir.

Comida  
Familia  
Casa  
Agua  
Cosas

2. ¿Cuáles de las cosas de abajo harán parte del medio ambiente (el lugar donde vive) de un ratón? Marca las cosas que seleccionas con un círculo.

A. Luz  
B. Viento  
C. El mar  
D. Granos  
E. La edad del ratón  
F. Agua  
G. El largo de la cola del ratón

El café es que la tierra es café; y las verdes porque el arco es verde.

4. Entre las frases abajo, haz un círculo alrededor de aquellas que dan ejemplos de cómo los seres vivos reaccionan a sus alrededores para ayudarse a sobrevivir (continuar a vivir).

A. Los osos en los climas fríos duermen durante el invierno.
B. Los patos vuelan hacia el sur durante el invierno.
C. La gente esculpe calabazas para Halloween.
D. Los ratones del desierto permanecen en huecos durante el día.
E. Los niños van a la escuela en el otoño.

5. Quieres traer un animal pequeño o un insecto al salón de clases por unos días. ¿Cómo aprenderás lo que necesita para vivir y sentirse cómodo en el nuevo hábitat? ¿Qué le prepararás?

Escribe tu respuesta atrás de la página.
5. Nécesita comida.
Una gaula.
Agua. Yo puedo saver
de sese animal a leer
un libro de el animal.
Respirar, una perra
<table>
<thead>
<tr>
<th>Necesidades Generales</th>
<th>Necesidades Específicas</th>
<th>¿Dónde o cómo se satisfacen las necesidades? ¿Se satisfacen estas necesidades por completo en tu casa, o se traen cosas de afuera?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comida</td>
<td>Pedigree</td>
<td>Los trastos de la margueta.</td>
</tr>
<tr>
<td>Agua</td>
<td>De la manguera.</td>
<td>Afuera de la Casa.</td>
</tr>
<tr>
<td>Albergue</td>
<td>Vive en una casa de perra.</td>
<td>Medieron la casa.</td>
</tr>
<tr>
<td>Aire</td>
<td>Donde se sale.</td>
<td>Afuera.</td>
</tr>
<tr>
<td>Luz</td>
<td>Necesitan luz para que la vean.</td>
<td>Del sol.</td>
</tr>
<tr>
<td>Espacio</td>
<td>En la llarada.</td>
<td>Ay suficiente.</td>
</tr>
</tbody>
</table>
### Hoja de Trabajo en Casa y Escuela

**Descubramos el Hábitat de Nuestra Escuela**

**Mi Casa Como Hábitat**

Junto con alguien en tu casa, usa la tabla de abajo para describir dónde y cómo tu casa satisface tus necesidades.

<table>
<thead>
<tr>
<th>Mis Necesidades Básicas</th>
<th>Dónde y Cómo se Satisfacen Mis Necesidades en Mi Casa</th>
<th>¿Se Satisfacen Mis Necesidades por Completo o Sólo Parcialmente?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comida</td>
<td>mi mamá me la case</td>
<td></td>
</tr>
<tr>
<td>Agua</td>
<td>Sí, la agarramos</td>
<td></td>
</tr>
<tr>
<td>Albergo</td>
<td>casa propia</td>
<td></td>
</tr>
<tr>
<td>Aire</td>
<td>de afuera</td>
<td></td>
</tr>
<tr>
<td>Luz</td>
<td>agarro la luz del sol</td>
<td></td>
</tr>
<tr>
<td>Espacio</td>
<td>mucho para moverme</td>
<td></td>
</tr>
</tbody>
</table>

**Padre/Guardián**

Nombre: Enoch Verdin

**Estudiante**

Nombre: Betty

Aprendizaje 2

10/30
Hoja de Trabajo en Casa y Escuela

Exploramos Otros Hábitats

Encuentra una bestezuela en tu casa o en sus alrededores. Trabaja con un miembro de tu familia para completar esta hoja.

Encontramos esta bestezuela:

Aquí está un dibujo o una descripción de la bestezuela:

El hábitat de la bestezuela es:

Aquí está una descripción del lugar donde vive la bestezuela y de cómo pensamos que satisface sus necesidades de comida, agua, albergue, aire, luz y espacio.

ajara la comida de la flotres. Y la agua la ajara de la tiera. La luz la ajara del sol. Su albergo es la planto.
### Constructir un Habitat- Plan de Estudiante

**Nombre:** Betsy  
**Fecha:** 19-1-95

Voy a construir un habitat para **un caracol**

<table>
<thead>
<tr>
<th>Necesidades básicas</th>
<th>Necesidades específicas</th>
<th>Como pienso satisfacer estas necesidades</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comida</strong></td>
<td>lechuga, ojia</td>
<td>ledoi comida cada día.</td>
</tr>
<tr>
<td><strong>Agua</strong></td>
<td>de las ojas</td>
<td>mis hermanas me pueden ayudar.</td>
</tr>
<tr>
<td><strong>Albergue</strong></td>
<td>una jarra, una caja</td>
<td>yo les pongo unas jarras</td>
</tr>
<tr>
<td><strong>Luz</strong></td>
<td>sombra, mucha luz</td>
<td>las pongo junto de la luz.</td>
</tr>
<tr>
<td><strong>Aire</strong></td>
<td>ollos, grandes</td>
<td>les pongo ollos grandes</td>
</tr>
<tr>
<td><strong>Espacio</strong></td>
<td>una jarra, no muchos</td>
<td>una jarra grande.</td>
</tr>
</tbody>
</table>
Construct a Habitat- Teacher Checklist

Student Name: Betsy  
Organism: snail

The habitat constructed meets the following needs for this organism.

<table>
<thead>
<tr>
<th>Basic Needs</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Shelter</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Space</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Teacher comments/observations:

Betsy used a plastic terrarium to build her habitat. She included water, leaves, and a plastic aquarium hill.
Construct a Habitat- Teacher Checklist

Student Name: Betsy  Organism: Ants (red)

The habitat constructed meets the following needs for this organism.

<table>
<thead>
<tr>
<th>Basic Needs</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shelter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Teacher comments/observations:

Betsy constructed a terrarium for her ants. She put sand and soil in it. The container was half full. She put leaves and sprinkled some water in there. There was an opening at the top to provide for air. She also put some bread crumbs in there daily.
Página del Cuaderno de Ciencia

Invitación a las Bestezuelas para una Visita Prolongada al Salón de Clases

Terrario de Bestezuelas

Invitamos a [caracol] al salón de clases.

Este es un dibujo del micro hábitat que construimos para nuestras bestezuelas:

En este micro hábitat, la bestezuela deberá satisfacer las siguientes necesidades (haz un círculo alrededor de todas las necesidades satisfechas):

- Alimento ☐
- Agua ☐
- Albergue ☐
- Aire ☐
- Luz ☐
- Espacio ☐
Post Interview

1. What are the six basic needs of all living things? (¿Qué son las seis necesidades básicas de todos los seres vivos?)
   agua, espacio, luz, aire, albergá, comida

2. What was the organism you invited to the classroom? (¿Cuál fue el organismo que invitaste al salón?)
   hormiga

3. What did it need in its microhabitat in order to live? (¿Qué necesito en su microhabitat para vivir?)
   tierra, comida, ollas para respirar, agua
   La tierra le da albergá.

4. Was the microhabitat you built a complete or incomplete habitat? Why? (¿Fue un habitat completo o incompleto el microhabitat que construiste? ¿Por qué?)
   Incompleto porque no tenía agua
   Yo le tuve que poner comida. La maestra me dio la tierra.

5. Tell about something important you learned about organisms and their needs? (¿Qué fue algo importante que aprendiste acerca de organismos y sus necesidades?)
   Le debemos de dar comida
cada día y debemos de ponerle
ollas en la jaula para que respire.
¿Qué es un organismo? ¿
Es una cosa que se mueven y viven. Como una persona, una perra, pez, pájaro, elefantes, insectos, maestra. Un libro no es un organismo porque no se mueve, ni come ni necesita agua. Un organismo se debe que mover, comer, agua. Como Mrs. De Anda, es un organismo. Mrs. Lara es un organismo, muñecas es un organismo. Un papel no es un organismo porque no se mueve.

¿Qué necesitan un organismo para vivir? Una perra necesita espacio, agua, el 
Learning Log
Concept Web: My Needs

Diagram with handwritten text: Mecesdodes, Betsy, Mrs. Mcneil, grande, agua, comida, margarita, Pizza, Sol, aire, ventrillo.
References


Foster, G. W. and Heiting, W.A. (1994). Embedded Assessment: This method not only helps teachers to evaluate student progress but also guides instruction. Science and Children, 32, 2, 30-33.


Jones, M.G. (1994). Assessment Potpourri: Knowing the characteristics of a variety of assessment methods can help you choose the most effective way to evaluate your students’ progress. Science and Children, 32, 2, 14-17.


