Science: Properties of Matter

4th Grade

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APPENDICES

The amount of money spent per pupil impacts the quality of education. This is an important factor to consider.

CONTEXTUAL FACTORS

Community, District, and School factors

Freshstart Elementary is part of The School District of the City of Where and is located directly outside of Where city. Most of the surrounding homes are one story with single parent families. On a more widespread note, the district also has a significantly lower budget than other surrounding Where County schools. Based upon 2001/2002 data, Where City schools only spend $130,463 per pupil, while the remaining districts have the luxury of spending $200,000 to $500, 000 dollars per pupil. Therefore, all of the schools in this district, including Freshstart Elementary, function from a stretched budget.

Statistics would be more meaningful than "the majority."

In addition, the majority of the students at Freshstart are disadvantaged. Most of them receive free or reduced lunch. Freshstart Elementary also has the support of many parents in the surrounding community. Furthermore, I have heard from the professional staff that Freshstart Elementary has the most parental support out of all the elementary schools in the district. My classroom, in particular, had 96% parental attendance at the most recent parent teacher conference.

Additional community or district information such as ethnicity and household income would be helpful. Include any information that impacts the quality of education.

Classroom factors

The desks in the class are set up in the shape of a diamond; all students face the front of the room. The desks are setup for mostly direct instruction but can also cater to pair work, which becomes useful for paired lab work during this unit. There is an overhead projector and tape player in the front of the room with two computers along the left wall. A television and VCR also reside in the right front corner of the room. The classroom rules are posted, and they are referred to as necessary.

Furthermore, the classroom management plan is the driving force behind the function of the classroom. The entire classroom management plan is based upon a "daily grade," which is kept track of on a clipboard containing a spreadsheet. Students are not told their daily grade until the end of the day, and parents are obligated to sign next to their child's grade every evening. The daily grade has many functions. For instance, each student's grade of the day is kept on file. Parents are presented with reasons why the grade is decreased. Moreover, students do not know whose grade is being dropped when the

clipboard is out. Therefore, when students observe the teacher writing on the clipboard, most comply with the expectations immediately.

It appears that the classroom management technique will impact student cooperation, on-task behaviors, and learning.

Student characteristics

The students in my class range from ages nine to eleven. Seventeen of the students are male, while only seven are female. In this particular classroom race is not an issue. Everyone is treated equally; my cooperating teacher and I have never noticed any learning differences related to race. On a daily basis, four students go to a resource room for individualized reading instruction. Three of those students go to the resource room for individualized math instruction. Also, three students are ELL students and go to a special ELL classroom three days out of a six-day cycle during the reading block. One student has a slight visual impairment and another student goes to speech therapy once a week. Three students are also involved in a Special Interest Program one day out of a six-day cycle. In order to be a part of this program, students are obligated to complete missed work. Two additional students are involved with Honors Chorus two days out of a six-day cycle. These students are also required to complete any missed work.

Ask your cooperating teacher for information on students who require instructional accommodations or curricular modifications. These students will have an IEP, 504 plan, and/or ELLs. This information should be included in the contextual factors.

Fortunately, with the exception of the students in Honors Chorus and the Special Interest Program, I will be teaching my unit during a time when all of the students will be in the room. Freshstart does not have a resource room for individualized science instruction, but the resource teacher is willing to work with the students that go to her for individualized science and math instruction. It should also be noted that none of the students in the class have been exposed to the subject of "matter" during any portion of the school year. In fact, previous to my arrival at the school, students have had very little exposure to any science concepts. Science has been pushed aside due to the strong emphasis on math and reading and the extensive fourth grade multidisciplinary resource project. Lastly, all of the students in the class have exceptional fine motor skills, which will be very helpful for the various hands-on activities included in my unit.

Note the collaboration with the resource teacher. Also, note the reference to prior knowledge and exposure to the unit of study.

Instructional implications

Most of the activities in my unit require paired lab work. As a result, I plan to assign lab groups prior to the start of my unit. Coincidentally, the classroom setup caters to paired work, so the seating arrangement should not be a problem. On the other hand, much thought will need to go into creating appropriate lab groups. I plan to pair strong math achievers with low math achievers, since some activities require math computations. I also plan to pair struggling readers and ELL students with strong readers, since many science activities require students to read directions and concepts correctly. I have observed that the ELL students in this particular class can reach proficient comprehension when paired with skilled readers. I will also monitor each group closely and make changes conducive to student learning as necessary. Based upon observation, I predict the student with the slight speech impairment will be unaffected by the lessons in my unit. Overall, the students in the class are excited about science and love to be engaged in hands-on experiences.

Insightful implication of need of low math and reading achievers.

LEARNING GOALS

[L1] Learning Goal #1: Students will be able to differentiate between various forms of matter.
PDE Academic Standards for Science & Technology: [3.4.4.4] Recognize basic concepts about the structure and properties of matter (i.e. know different material characteristics e.g., state of matter...).

Objective 1: The student will be able to identify solids, liquids, and gases.

Objective 2: The student will be able to analyze particle make-up for solids, liquids, and gases.

[L2] Learning Goal #2: Students will be able to successfully manage a scientific experiment related to matter.
PDE Academic Standards for Science & Technology: [3.2.4.C] Recognize and use the elements of scientific inquiry to solve problems (i.e. conduct an experiment).

Objective 1: The student will be able to conduct, record data, and report results of a scientific experiment.

[L3] **Learning Goal #3:** Students will be able to identify properties used to describe matter.
PDE Academic Standards for Science & Technology: [3.4.4.4] Recognize basic concepts about the structure and properties of matter (i.e. describe properties of matter).

Objective 1: The student will be able to define matter.

Objective 2: The student will be able to classify items using observable properties.

Objective 3: The student will be able to identify and describe mass as a property of matter.

It is not necessary for learning goals to be written in observable and measurable terms. Objectives must be written in observable and measurable terms.

Type and Level of Learning-

Based upon Bloom's Taxonomy Ll is included under the Analysis level of learning. L2 is included under the Synthesis level of learning. And, L3 is included under the Comprehension level of learning.

Label the level of goal or type of goal immediately following the goal, rather than in a separate section. LG 2 is application level rather than synthesis.

Appropriateness for Students-

L1 is an appropriate learning goal because students have little or no pre-requisite knowledge of the various forms of matter and its structure. Due to such a strong focus on math and reading, the subject of

science has taken a "back seat" in the classroom.

This does not clearly describe the appropriateness of this goal. If students do not have prior knowledge, the analysis level will be very difficult.

L2 is an appropriate learning goal because students need to be able to conduct experiments and use inquiry to solve problems. Many of the students are faced with problems everyday; therefore, it is important to test ideas and make changes when necessary. In addition, as students are exposed to the upper grades, scientific experiments will become more common. It is a skill that they must master. Up to this point in the curriculum, students in this class have not participated in many experiments.

Need for goal is tied to real-life experiences.

Lastly, L3 is an appropriate learning goal because it is the basis behind the unit. This learning goal will become established as the other learning goals are implemented. Basically, all three learning goals are part of a puzzle that will be created by the end of the unit.

ASSESSMENT PLAN

The assessment plan for this unit on properties of matter consists of a three part pre-assessment, formative assessments for each lesson, and a three part post-assessment.

The pre- and post- assessment evaluations are broken up into three parts, which coincide directly to each learning goal. Sections one and three of both the pre- and post- assessments are each broken up into ten additional sections and are scored against the rubric below. Copies of the pre- and post-assessments can be found in the appendices. These sections assess learning goals one and three.

Identify appendices

"Sections" are really questions. Be sure you label things correctly. Include point value for each question.

4- Advanced	9-10 sections correct
3- Proficient	8 sections correct
2- Basic	7 sections correct
1- Below Basic	0-6 sections correct

Scoring criteria is identified

Section two of both the pre- and post- assessments is a performance assessment and is scored against the rubric below. This section assesses learning goal two. Please refer to the pre- and post-assessments found in the appendices. Since all of the students' grades are based on a four point scale; a four point scale is appropriate for this particular unit. A score of one to four gives the students feedback they can comprehend.

4- Advanced	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers three "Drawing Conclusions" questions correctly.
3- Proficient	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers two "Drawing Conclusions" questions correctly.
2- Basic	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers one "Drawing Conclusions" question correctly.
1- Below Basic	Student writes a hypothesis. Student records observations. Student answers no "Drawing Conclusions" questions correctly.

The score appears to be dependent upon the number of conclusions drawn. The LG asks for more than this.

During the lessons/activities, students will be grouped heterogeneously based on needs. Two lower level readers will never be paired together; two lower level math learners will never be paired together; and the child with a visual impairment will always be placed towards the front of the room and have a copy of all the materials. In addition, the ELL students will constantly be paired with high-level readers. Based upon previous observation, I predict that the student with the speech impairment will

remain un-affected by the processes required of him during this unit. If records begin to show that the student is negatively affected by the lessons then adjustments will be made as necessary. Anecdotal/observational records of lab work, observational work, and other in-class work will be completed during the course of the lessons for all learning goals. The records will be used to ascertain which students need additional instruction.

The expected level of achievement was not stated. Are students expected to achieve at the "basic" or "proficient" level?

Assessment Plan Table

Learning Goals	Assessments	Format of Assessment	Accommodations
Learning Goal 1 Students will be able to differentiate between various forms of matter. Obj 1: The student will be able to identify solids, liquids, and gases. Obj 2: The student will be able to analyze particle make-up for solids, liquids, and gases.	Pre-Assessment	Pre-test: includes microscopic drawings of the various properties of matter, fill in the blank questions, and analysis questions.	Rephrase questions for ELL learners when needed. Allow ELL students and lower level readers to dictate responses.
	Formative Assessment	Anecdotal records of lab work, observational work, and other in-class work. Graphic Organizers	Pair ELL students with strong readers. Pair low-level readers with strong readers. Pair low-level math learners with high-level ma learners. Increase "wait time" for ELL students during Q & A parts of lessons. Seek assistance of the ESL and learning support teacher. Place the student with the visual impairment towards the front of the room and always give the student copies o the material.
	Post-Assessment	Post-test: includes microscopic drawings of the various properties of matter, fill in the blank questions, and analysis questions.	Rephrase questions for ELL learners when needed. Allow ELL students and lower level readers to dictate responses.
Learning Goal 2 Students will be able to successfully manage a scientific experiment related to matter. Obj 1: The student will be able to conduct, record data, and report results of a scientific experiment.	Pre-Assessment	Performance assessment: students will be given materials and asked to manage an inquiry-based lab related to matter.	Rephrase questions for ELL learners when needed. Allow ELL students and lower level readers to dictate responses.
	Formative Assessment	Anecdotal records of lab work and observational work.	Pair ELL students with strong readers. Pair low-level readers with strong readers. Pair low-level math learners with high-level math learners. Increase "wait time" for ELL students during Q & A parts of lessons. Seek assistance of the ESL and learning support teacher. Place the student with the visual impairment towards the front of the room and always give the student copies of the material.
	Post-Assessment	Performance assessment: students will be given materials and asked to manage another inquiry based lab related to matter.	Rephrase questions for ELL learners when needed. Allow ELL students and lower level readers to dictate responses.

Appropriate accommodation for ELL and low level reader.

Accommoda-tions should be made for assessment rather than instruction.

It is appropriate to collaborate with and utilize support of school personnel.

Assessment appears to align with LG and objectives on the same levels.

Accommodations may need to be different for different types of assessments. The same accommodations for all assessment is not realistic.

Performance assessment aligns with LG.

Learning Goal 3 Students will be able to identify properties used to describe matter. Obj 1: The student will be able to define matter. Obj 2: The student will be able to classify items using observable properties. Obj 3: The student will be able to identify and describe mass as a property of matter.	Pre-Assessment Formative Assessment *Assessment appears to align with LG and objectives on the same levels.* Post-Assessment	Pre-test: includes fill in the blank questions, multiple choice questions and comprehension questions. Anecdotal records of lab work, observational work, and other in-class work. Handout. Post-test: includes fill in the blank questions, multiple choice questions and comprehension questions.	Rephrase questions for ELL learners when needed. Allow ELL students and lower level readers to dictate responses. Pair ELL students with strong readers. Pair low-level readers with strong readers. Pair low-level math learners with high-level math learners. Increase "wait time" for ELL students during Q & A parts of lessons. Seek assistance of the ESL and learning support teacher. Place the student with the visual impairment towards the front of the room and always give the student copies of the material. Rephrase questions for ELL learners when needed. Allow ELL students and lower level readers to dictate responses.

Be sure to include the section title or item numbers for the pre- and post-assessments. This enables you and the reader to check for alignment of assessment with learning goals.

Multiple means of assessment have been provided.

DESIGN FOR INSTRUCTION

Results were linked to contextual factors. At least one implication was addressed.

Results of Pre-Assessment:

The majority of my students scored "below basic" on each and every one of my pre-assessments. However, student W received a score of two on learning goal number two, which is the performance assessment. Overall, I was not surprised by the results due to the fact that none of the students in the class have been exposed to the subject of "matter" during any portion of the school year. When asked to name the three most common "states" of matter, many students chose actual "states" in the United States (i.e. Pennsylvania, Texas, and New York). I was quite humored at first but knew I had a challenge ahead of me. I also knew that students in this class have not participated in many science experiments, so the majority of below basic scores on the performance assessment did not bewilder me. Based upon the results, I will have to take my lessons slowly and ask lots of questions. The students in the class were excited about the performance assessment, so I will incorporate many labs and hands-on activities into my instruction. Student W will be paired with lower level learners during lab work, since she has the strongest grasp on managing labs than anyone else in the class. Since my unit will be taught over several weeks, I will also need to make each activity memorable for the students.

Number of Students in Each Mastery Level for Learning Goals 1 through 3

Mastery Levels	Learning Goal 1 (L1)	Learning Goal 2 (L2)	Learning Goal 3 (L3)
Advanced	0 students	0 students	0 students
Proficient	0 students	0 students	0 students
Basic	0 students	1 student	0 students
Below Basic	24 students	23 students	24 students

Analysis of student performance relative to each learning goal has been reported in both narrative and visual formats.

In this section, include a brief overview of the unit in narrative format and in a block plan as shown on the next page.

Unit Overview Block Plan for 4th Grade States of Matter

Notice that the pre-assessment was given in advance of instruction, allowing for appropriate planning.

The objective sections of the pre-assessment were given on one day and the performance assessment on another day the week prior to instruction of the unit.

Day 1	Day 2	Day 3	Day 4	Day 5
LG 1, 2, 3 Topic: Matter – its definition and common properties of matter Teaching strategy: Directed teaching Activity: Video and worksheet Formative assessment: Worksheet	LG 2, 3 Topic: Properties of matter Teaching strategy: Inquiry instruction Activity: Lab Formative assessment: Observation and recording results of classification activity.	LG 1 Topic: Properties of solids, liquids, and gases Teaching strategy: Guided inquiry Activity: Lab using microscopes and images of solids, liquids, and gases Formative assessment: Worksheet	LG 1, 2, 3 Topic: Properties of solids, liquids, and gases Teaching strategy: Guided inquiry Activities: Lab (vinegar, baking soda, CO_2), video – "Ballooning: Floating with the Wind" Formative assessment: Observations with anecdotal notes; lab sheet	LG 2, 3 Topic: Mass "Is Bigger Always More?" Teaching strategy: Guided inquiry Activity: Lab (balloon and quarter) Formative assessment: Observations with anecdotal notes; lab sheet
Day 6	**Day 7**	**Day 8**	**Day 9**	
LG 1, 2, 3 Topic: Buoyancy Teaching strategy: Directed teaching Activity: Video – "Buoyancy" Formative assessment: Graphic organizer	LG 1, 2, 3 Topic: Matter – its definition and properties Teaching strategy: Directed teaching Activity: Review game Formative assessment: Observations with anecdotal notes	LG 1, 3 Topic: Matter – its definition properties Post test- Sections 1 & 3	LG 2 Topic: Matter – its definition properties Post test- Performance assessment	

All lessons are linked to a LG and all LGs are covered in the plan for instruction.

Notice the variety of instructional strategies and types of formative assessments that have been used.

Activities

Contextual factor and accommodations have been addressed.

Activity #1:

In this activity I am going to break up the class into appropriate pairs. Based upon my contextual factors I have pre-determined appropriate heterogeneous paired groups. Each group is going to receive one balloon, a funnel, four ounces of vinegar, one plastic teaspoon, a container of baking soda, and an empty soda bottle. To begin, each group is going to list the properties of vinegar and the properties of baking soda through hands-on exploration. This process coincides with L3. Next, the groups are going to follow procedures to place two teaspoons of baking soda into an empty soda bottle. Then, they are going to pour four ounces of vinegar into the top of a balloon then cover the bottle with the vinegar filled balloon. Subsequently, they will lift the balloon to let the vinegar mix with the baking soda. After this step, students are going to record observations. This process coincides with L2. After that, students are going to identify that the material produced by mixing baking soda and vinegar is a gas. Therefore, they will have to identify that the baking soda is a solid, the vinegar is a liquid, and the produced substance is carbon dioxide gas. This process coincides with L1. Lastly, the students will list the properties of the gas. This process coincides with L2. The overall activity also coincides with L2 because students are managing an experiment during the entire activity.

Alignment to LG has been made.

During this activity, I plan to assess student learning by walking around the room and making anecdotal observations. I will also collect students' lab work following the activity to make informal observations. The reason I am going to conduct this activity is because it relates directly to all three of my learning goals, which relate directly to all three of my pre-assessments on which the entire class scored below basic. I have also opted to show a video portraying other properties of gasses that students may have overlooked. I am going to show a video because it is a great use of technology that allows students to travel places that they cannot go to during their everyday lives.

Formative assessment has been identified.

Note the reference to pre-assessment results and to use of technology.

Alignment to LG

Activity #2:

In this activity, I am going to lead a class discussion where students list as many properties of an apple as they can. I will remind students that a property is a characteristic of something observable. This process coincides with L3. Next, I will break the class up into eight groups of three based on the needs mentioned in my contextual factors. Each group will choose a recorder, facilitator, and materials manager. Each group will be given 10 items (i.e. cork, cup of water, rubber band, wood, clay, toothpick, paperclip, balloon, limestone, and chalk). Then, each group will write the name of each item on an index card along with each item's properties. Then, I will instruct students to sort the items into groups based on properties they can *observe.* This process also coincides with L3. Lastly, each group will share their classification system with another group. The groups will also have a task of comparing and contrasting the properties of each item. We will then discuss each group's findings as a class to make *inferences* based on the class observations.

*Formative assessment has been identified.a*s a follow up activity we will play the property game entitled "20 Questions." I will think of one of the ten items in my head and students will ask up to twenty property questions as they try to *hypothesize* which small item I am thinking of. This activity is great, because when a student mentions something that is not a property, we have the opportunity to discuss the rationale for his or her choice. This game is fun and a great review. During this activity, I plan to assess student learning by walking around the room and making anecdotal observations. I will also collect each groups index cards to make informal observations. The overall activity also coincides with L2 because students are managing a quick lab during the entire procedure.

Formative assessment

Activity #3:

In this activity I am going to break up the class into appropriate pairs. Based upon my contextual factors I have pre-determined appropriate heterogeneous paired groups. Before the lab portion of this activity, we will review the definition of mass, which relates to L3. Then, each group is going to receive one balloon, one pre-tied meterstick balance, one quarter, and a piece of tape. To begin, each group is

going to *predict* whether an inflated balloon or a quarter has more mass. This process coincides with L2. Next, the groups are going to follow procedures to inflate a balloon and attach it to one end of a meterstick balance. Next, they will tape a quarter to the other end of the meterstick. Then, each group is going to record what happens to the meterstick in the *observation* section of their lab handout. Lastly, each group will *draw conclusions* by recording which object they found had more mass. This process coincides to L2 & L3. We will also keep a tally of which object was found to have more mass on the board. Then, each group will answer the question, "Do small objects ever have more mass than larger objects?" We will discuss. Lastly, each group will list some examples of matter that are smaller than an inflated balloon but have more mass than an inflated balloon.

During this activity, I plan to assess student learning by walking around the room and making anecdotal observations. I will make note of strugglers and give attention to those who need additional prompting/instruction. I will also collect students' lab work following the activity to make informal observations. The reason I am going to conduct this activity is because it relates directly to two of my learning goals, which relate directly to two of my pre-assessments on which the entire class scored below basic.

Technology

To begin my unit, I have opted to show a 5-minute video that illustrates properties of various items in a grocery store. This particular video helps students make real life connections to what we are learning in the classroom. Students will also be observing a 10-minute video entitled "Ballooning: Floating With the Wind." This video reviews buoyancy and the gas state of matter, which coincides with L3 & L 1. I am going to show this video because it is a great use of technology that allows students to travel to places that they cannot go to in their everyday lives. I also have a 23- minute Bill Nye video entitled *Buoyancy.* I will show this video as a review to the complex concept of buoyancy. Moreover, the video discusses other concepts related to matter, includes a lab that students can observe, and has accompanying questions for students to answer.

Use of videos and overhead projectors are not considered to be advanced forms of technology. Clarify why students have not used other forms of technology. In this unit, hands-on activities are more appropriate than computer simulations. Describe how you used technology to prepare your lessons and assessments.

INSTRUCTIONAL DECISION MAKING

Situation 1:

This example was initiated by <u>one</u> student and led to whole class instruction. An appropriate strategy was used to correct misconceptions.

As an opening activity to my first lesson, I had the students observe an introductory video related to the properties of matter. We also named the properties of various objects in the room. Students learned that hardness, color, texture, shape, and size are all examples of properties of matter. They also learned that color is an "observable idea." Color does not take up space or have mass; therefore, color is not matter. Color is a property of matter. During my lesson, one student stated, "How is color not matter? It takes up space and has mass." Many of the students in the class agreed with this particular student. I went on to explain, but many students seemed to become more confused. Finally, I remembered a previous discussion that I had with my cooperating teacher and asked, "Can you bring me some "green" to place on the balance?" (We used the balance to measure mass.) The student proudly took out a green crayon and placed it on the balance, which indeed leaned to one side. I asked, "Who agrees that this green crayon has mass and takes up space?" A majority of the students gave a "thumbs up." Then I stated, "Well, you are all correct! The green *crayon* does take up space and have mass, but I want just the *color* green. I do not want a green crayon. Can someone bring me just green?" Another student raised her hand and stated, "I can bring you some green paper from the bulletin board. It will make the balance move, and it takes up space on the bulletin board." I said with a smile, "You are correct, but you are talking about green *paper*, not just the color green." We continued to discuss more examples similar to the crayon and paper until everyone got the idea. We even discussed the green chalkboard, green paint, and a green shirt. After a few examples, students were able to explain why the color green was not "matter" to their peers. Towards the end of the lesson, I tried the same concept with other colors. Everyone had the right idea!

Based upon the previous experience, one can see that it is very important to keep a lesson flexible so that students' needs are met. It was also important for me to have concrete materials like a balance and various items to describe. I had items that students could manipulate. It was also essential for me to

An explanation was given as to why the strategy would improve student learning.

relate the lesson to things in the room with which students were familiar. It is crucial for students to see the connection between what they are learning in school and everyday life.

This example was initiated by assessment results of <u>one</u> student that were inconsistent with formative assessments.

<u>Situation</u> <u>2</u>:

After administering my post-assessment, one student scored below standard on learning goal number three. I was very disappointed in myself as a teacher, because this particular student showed no growth on learning goal number three. The student was on target during class, but I did detect some frustration on his part during the review game. I asked, "Are you OK?" The student replied, "Yes." Then I stated, "Do you have any questions? I want you to be successful on the test tomorrow." The student declined to ask questions. After thinking about his score, it was obvious to me that the student could not end the unit confused about the material. I came up with a few quick activities to work one-on-one with the student after school. I showed a cork floating in water and a balloon floating over a vent to explain buoyancy. I had him measure the mass of various objects with a balance. He listed several properties of an apple. We review the definition of matter and found various forms of matter in the room. I also found out that the student was not feeling well during the day of the assessment. It has been found that mood can influence scores, so his sickness could have been a factor. My reason behind this conjecture is that this student had a strong understanding of the concepts as I worked one-on-one with him. In addition, he had a strong grasp of the concepts in class. Nonetheless, I gave him the assessment the next morning and he met proficiency. I decided to wait a night to make sure the student did not answer the questions using only his short-term memory. This proficient score will not be reflected in my data since he was re-administered the assessment, but at least I know he has met all of my learning goals.

An explanation was given as to why the strategy would improve student learning.

Based upon the previous experience, one can see that it is imperative to pinpoint reasons why a student has not become successful in relation to various learning goals. Then, it is vital to help the student become successful. It is essential for a teacher to make accommodations that meet the needs of all the students in his or her class. It was also important for me to have tangible materials during my one-on-one activities. I had items to which the student could manipulate and relate.

ANALYSIS OF STUDENT LEARNING

Whole Class:

The table below shows that all students scored "basic(1)" or "below basic(2)" for learning goals one and two before instruction and became proficient(3) or advanced(4) in these learning goals after instruction. The table also shows that all students were below basic for learning goal number three before instruction and all but student L became proficient or advanced in this learning goal after instruction. Student L showe no growth from the time of his pre-assessment score to the time of his post-assessment score.

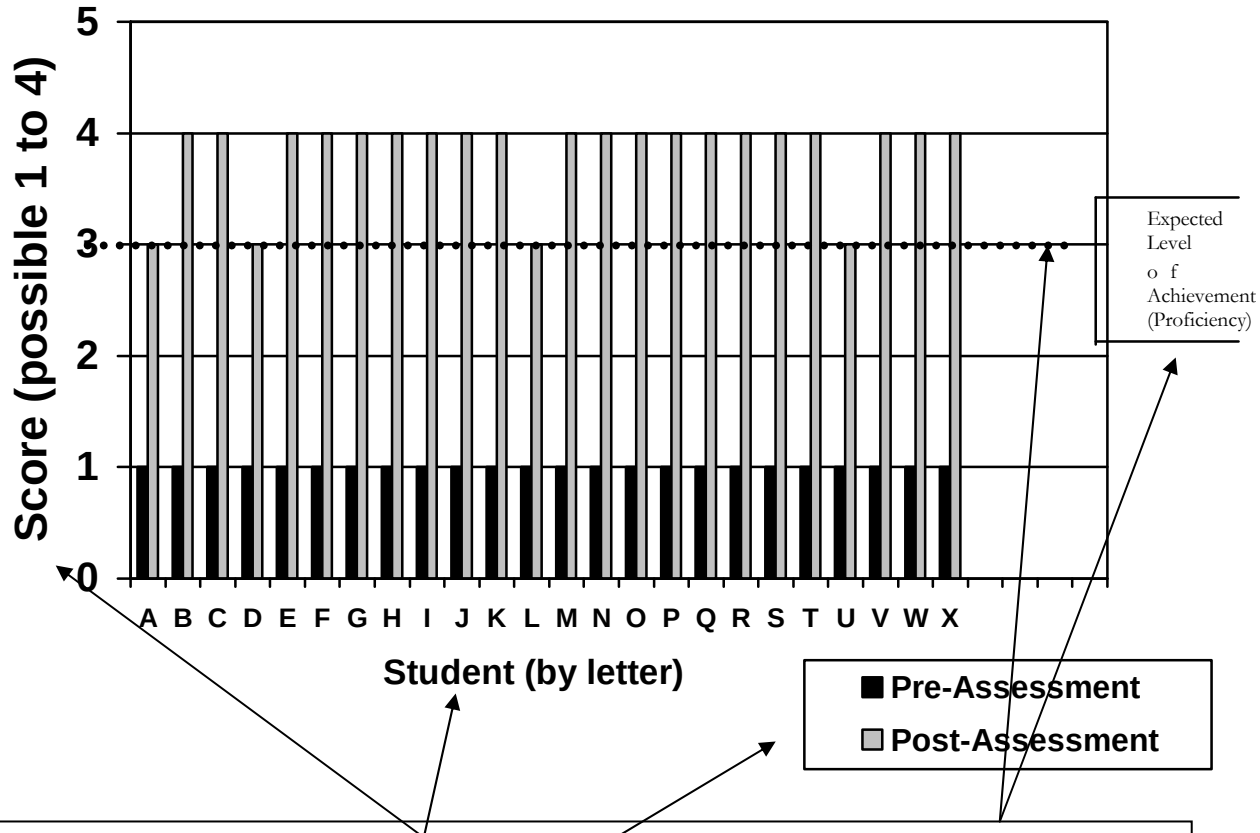
It would be appropriate to mention and include scores of the "retaken" post assessment.

Pre vs. Post Assessment Scores for All Students in Regards to Learning Goals 1, 2, & 3

STUDENT	Ll Pre-Assessment Score	Ll Post-Assessment Score	L2 Pre-Assessment Score	L2 Post-Assessment Score	L3 Pre-Assessment Score	L3 Post-Assessment Score
A	1	3	1	3	1	4
B	1	4	1	4	1	4
C	1	4	1	4	1	4
D	1	3	1	3	1	4
E	1	4	1	4	1	4
F	1	4	1	4	1	4
G	1	4	1	4	1	3
H	1	4	1	4	1	4
I	1	4	1	4	1	4
J	1	4	1	3	1	3
K	1	4	1	4	1	4
L	1	3	1	4	1	1
M	1	4	1	4	1	3
N	1	4	1	4	1	4
0	1	4	1	4	1	4
P	1	4	1	4	1	4
Q	1	4	1	4	1	4
R	1	4	1	4	1	4
S	1	4	1	4	1	3
T	1	4	1	4	1	4
U	1	3	1	3	1	4
V	1	4	1	4	1	4
W	1	4	2	4	1	4
X	1	4	1	4	1	4

The graph below shows pre- vs. post- assessment scores for every student in regards to learning goal number one. The graph represents how much progress each student made over the course of the instructional unit. Every student reached proficiency in this area.

Figure 1. Learning Goal 1 Scores



This graph is easy to understand. It has a title, labeled axes, and key. Notice the line indicating the expected level of achievement. This makes it easy to see how many students reached the goal. The original graph was in color that did not copy well.

Post-Assessment Rubric for Learning Goal 1

4- Advanced	9-10 sections correct
3- Proficient	8 sections correct
2- Basic	7 sections correct
1- Below Basic	0-6 sections correct

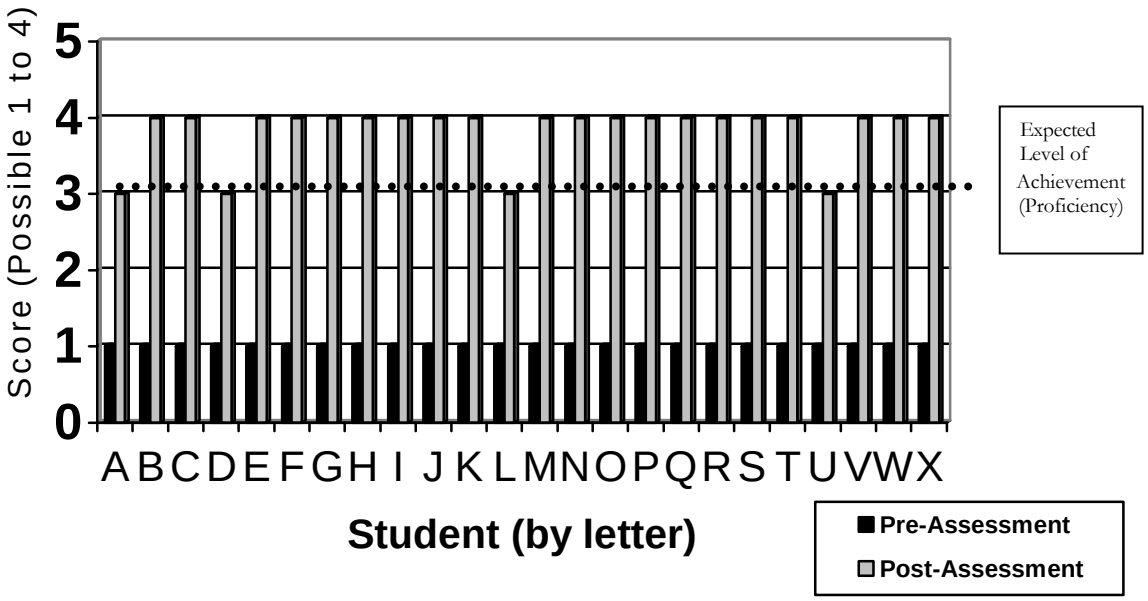
Number of Students in Each Mastery Level for Learning Goal 1

Mastery Levels	Learning Goal 1 (L1)
Advanced	20
Proficient	4
Basic	0
Below Basic	0

Scoring criteria is included. A summary table clearly identifies number of students who did or did not meet expected level of achievement.

The graph below shows pre- vs. post- assessment scores for every student in regards to learning goal two. The graph represents how much progress each student made over the course of the instructional unit. Every student reached proficiency in this area.

Figure 2. Learning Goal 2 Scores



Post-Assessment Rubric for Learning Goal Two (Performance Assessment)

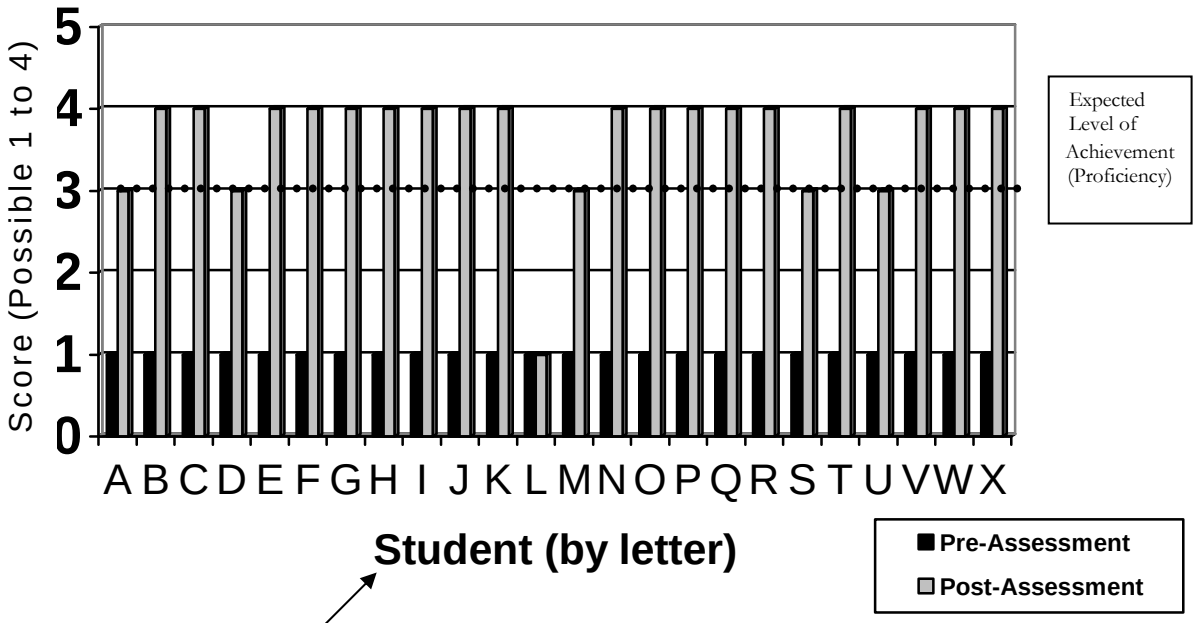
4- Advanced	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers three "Drawing Conclusions" questions correctly.
3- Proficient	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers two "Drawing Conclusions" questions correctly.
2- Basic	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers one "Drawing Conclusions" question correctly.
1- Below Basic	Student writes a hypothesis. Student records observations. Student answers no "Drawing Conclusions" questions correctly.

Number of Students in Each Mastery Level for Learning Goal 2

Mastery Levels	Learning Goal 2 (L2)
Advanced	20
Proficient	4
Basic	0
Below Basic	0

The graph below shows pre- vs. post- assessment scores for every student in regards to learning goal three. The graph represents how much progress each student made over the course of the instructional unit. All but one student reached proficiency. Unfortunately, student L showed no progress on learning goal three.

Figure 3. Learning Goal 3 Scores



Post-Assessment Rubric for Learning Goal 3

4- Advanced	9-10 sections correct
3- Proficient	8 sections correct
2- Basic	7 sections correct
1- Below Basic	0-6 sections correct

Notice that every student has been identified for every goal for pre and post assessment. Every learning goal has been graphed.

Number of Students in Each Master[y] Level for Learnin[g] Goal 3

Mastery Levels	Learning Goal 2 (L2)
Advanced	20
Proficient	4
Basic	0
Below Basic	0

A graphic summary of all learning goals is missing. A summary table can be found on page 18.

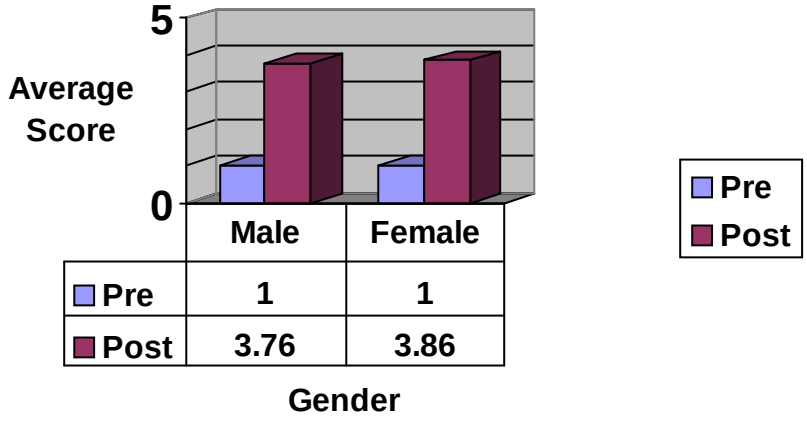
Rationale for subgroups has been clearly stated. A graph shows comparison of pre- and post-assessment scores for both groups. The narrative summarizes the data.

Subgroups-

Restating the number of males and females would be helpful for the reader.

The graph below shows pre- vs. post- assessment score averages for males vs. females in regards to learning goal number two. I decided to compare males vs. females due to the stereotype that states males are more likely to succeed as scientists. Research shows that males are called upon more often during science lessons, as well as encouraged more often in regards to science. Learning goal number two is a performance assessment where students had to manage a lab. My data shows that females can perform just as well as males on a science lab if encouraged and portrayed as equals during instructional time. In this particular case, the females outscored the males by one tenth of a point.

Figure 4. Pre vs. Post-Assessment Score Averages for Males vs. Females for Learning



Post Assessment Rubric for Learning Goal 2 (Performance Assessment)

4- Advanced	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers three "Drawing Conclusions" questions correctly.
3- Proficient	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers two "Drawing Conclusions" questions correctly.
2- Basic	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers one "Drawing Conclusions" question correctly.
1- Below Basic	Student writes a hypothesis. Student records observations. Student answers no "Drawing Conclusions" questions correctly.

Individuals-

Two students have been presented. Visuals are not required for analysis of the two individuals. Sample work should be included.

Student W

Student W is a very solitary and soft-spoken student. It is very hard to get her to share her ideas during class. In fact, it is very difficult to get her to speak at a volume loud enough for everyone to hear. After looking through my notes related to this unit, I noticed that this student rarely volunteered or even answered any questions without help from a peer. What is interesting about this student is that she performs very well on all types of assessments. She was the only student to score basic on the performance assessment. Overall, she is a very self-conscience student who is afraid to answer a question unless she knows that her response will be 100% correct. I think she would rather not answer a question then try to answer a question and fail. When I gave student W the pre-assessments for this unit, she became very distressed because of the unfamiliarity of the questions. Once I assured her that the assessments did not affect her grade, she became more relaxed and tried her best. I explained that she would learn the material over the next 3-4 weeks, and then take the tests over again.

It is important for me to understand the learning of student W because I want to make sure she continues to be successful. Her pre- versus post-assessment scores also show that she is affected by instruction. Her pre-assessment scores for learning goals one and three were below basic, and her pre-assessment score for learning goal two was at basic. After instruction, her post- assessment scores for learning goals one, two, and three were all advanced. Her growth shows that she is engaged during instruction; otherwise her scores could not have increased so rapidly.

Refer to appendices with sample work. Be sure to include analysis of formative assessments.

Student T

Student T is a student who needs lots of one-on-one instruction to become successful. For these reasons, he is pulled out of the room for individualized math and reading instruction for the majority of the day. Unfortunately, he was suspended as well as absent many times throughout my unit. His absences and misbehavior became a great concern for me. His responses during class were also sometimes off target in regards to what I was teaching. He worked very well within heterogeneous lab

groups, but I knew he had missed multiple lessons. Therefore, I contacted the resource teacher for help. I created a few activities for her to undertake with student T. As a teacher, I want all of my students to become successful. In this particular case, using the resource teacher for individualized instruction was the best accommodation to make for student T. In the end, this accommodation proved to be beneficial for him. His pre- versus post-assessment scores show that he is affected by instruction, and improves greatly when working one-on-one with a teacher. His pre-assessment scores for learning goals one, two, and three were all below basic. After instruction, student T's post- assessment scores for learning goals one, two, and three were all advanced. His growth shows that every student can become successful as along as the teacher finds the best way to meet his/her needs. It was important for me to see this particular student become successful, because I wanted to confirm that the accommodations made were not ineffective.

REFLECTION AND SELF EVALUATION

The students in my class were most successful in regards to learning goal number two (L2). Four out of the twenty-four students scored proficient, and twenty out of the twenty-four students scored advanced. Please refer to the "Analysis of Student Learning" section. One reason for student success is due to the fact that students participated in many hands-on labs during the course of the unit. L2 required students to successfully manage a scientific experiment related to matter. All of the exposure to experiments throughout the unit made this learning goal easy for students to master. Another reason for success is the high level of collaborative learning that took place throughout the unit. On the majority of the activities, students were able to learn from each other. When students were able to discuss concepts and make inferences together, the lessons became more meaningful for the learners. Fortunately, I was given the opportunity to work with students at various levels; as a result it was easy for me to implement heterogeneous collaborative learning. Each student brought different strengths and weaknesses to their p Therefore, the heterogeneous combination created a great balance.

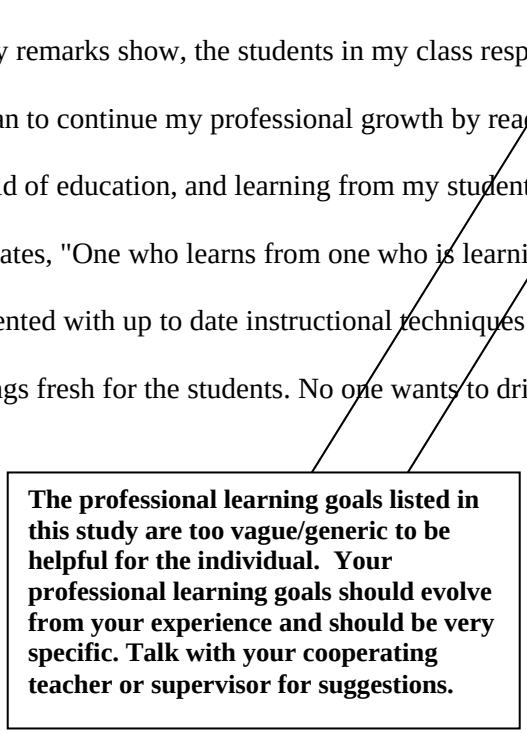
The most successful LG was identified. Multiple hypotheses were given for this success. Strategies for teaching as well as contextual factors were considered. **However, research has not been cited as criteria for success.**

As the "Analysis of Student Learning" section shows, students were successful in regards to all learning goals, but one particular student showed no growth in regards to learning goal number three. Plausible reasons for his lack of success are his health on the day that the assessment was administered, a his high level of frustration during the review session. Throughout my courses at Millersville University I have learned that mood and low self-confidence can negatively affect a student's assessment scores. Since the student was very sick the day of the assessment, his mood was definitively affected. (Note: He was also absent for two days after the analysis.) The student was also frustrated during the review session, and refused to ask any questions. I did however; take steps to ensure that the student understood the concepts being tested. As mentioned in my "Instructional Decision Making" section, I came up with a few quick activities to work one-on-one with the student after school. When presented with the assessment again, the student reached proficiency. His strong level of understanding during our one-on-one instruction time confirms my hypothesis that his assessment score was a result of his mood

Instead of analyzing the LG that was least successful for the class, the researcher selected one student but did provide hypotheses for his lack of success.

and his decision to not ask any questions. This situation shows that assessment results can be inconsistent with actual student growth.

Overall, my learning goals, instruction, and assessment were a success. At this point, I do not have any other ideas for modification. As a result of my success, two professional learning goals have emerged from my insights and experiences with the TWS. First, I plan to continually use many hands-on activities during instruction. As my remarks show, the students in my class respond more positively to concrete activities. Secondly, I plan to continue my professional growth by reading educational journals, taking courses related to the field of education, and learning from my students. I am a strong believer in the Native American proverb that states, "One who learns from one who is learning, drinks from a running stream." Students need to be presented with up to date instructional techniques and the latest research. Continued education also keeps things fresh for the students. No one wants to drink stagnant water.



APPENDICES

A. Pre-Assessments
B. Post-Assessments
C. Scoring Rubrics
D. Student Work

Student work is not included because it did not scan properly and could not be reproduced.

Should be labeled Appendix A

(*Split by section. See rubric)*

NAME _____

No directions were given for students. No answer key is provided. The student copy with answers included is sufficient. The numbering is very confusing. It is not clear if partial credit will be given for 5, 6, 7. Overall test format needs improvement.

Section 1 (L1): (Pre-Assessment)

1. The three most common states of matter are __1___, __2__ and ___3_____

2. Name a type of matter that can exist in all three states

   _____

3. Look at the table. What state of matter is matter *A?* Matter B? Matter C?

	Definite shape?	Size
Matter *A*	No	Fixed size
Matter B	Yes	Fixed size
Matter C	No	No fixed size

5. Matter *A* is_____ because

_____

_____

6 Matter B is a_____ because _____

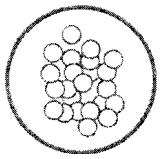
_____

7 Matter C is a_____ because _____

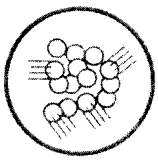
_____

_____

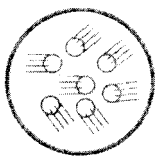
4. Label each type of matter below each picture.



Matter A



Matter B



Matter C

8 _____ 9 _____ 10 _____

Section 3 (L3): Pre-Assessment

No directions, no answer key, the numbering is very confusing.

1. Anything that takes up space and has mass is called ___1___

_____

2. Hardness, color, texture, shape, and size are all examples of ___2___ of matter.

3. The upward force of water or air that keeps an object afloat is called ___3___.

4. The amount of matter making up an object is its ___4___

5. Name three properties of an apple:

1) ___5___ 2)___6___ 3)___7___

6. What instrument is used to measure mass? ___8___

Scanning error

Word Bank For Numbers 1 through 6

matter	buoyancy	hard	round
properties	mass	red	balance

Avoid listing the words in the order of the questions.

7. Does the color green take up space? Why?

. ___9___

_____

8. **True** or **False 10** The color "yellow" is hard, small, and cold.

Name_____ **Date** _____ Section 2 (L2): Pre-Assessment

How Can You Identify Matter?

Definition / Hint

MATTER:
Anything that takes up space and has mass is called **matter.**

Materials
- 2 identical balloons
- metersticks w/ pre-tied strings
- tape

Hypothesize

Is air matter? Use what you know about matter to find out.
Write a **Hypothesis/Prediction:**

_____

_____

Experiment Procedures

1. Hold the meterstick from the loop of string positioned at the middle to see that the meterstick is balanced.
2. Inflate one balloon and hang it from one end of the meterstick.
3. Tie the balloon that is not inflated to the other end of the meterstick.
4. Hold the stick from the loop of string positioned at the middle of the stick.
5. What happens? Write observations below.

Observations/Results

Second page is missing. It included the following questions:
1. Is air matter? What evidence do you have to support your conclusion?
*2. **Infer** Dan blew up a balloon until it burst. Does the broken balloon support the idea that air is matter? Explain.*
*3. **Going Further: Infer** Think of another object that is filled with air (i.e. sports balls). Does it also provide evidence that air is matter? Explain.*

Performance assessment lab adapted from Mcgraw-Hill Science. National Geographic Society, New Yor, 2002.

Turn Paper Over 001

NAME _____ **Label Appendix B** *(Split by section. See rubric)*

No directions were given for students. No answer key is provided. The numbering is very confusing.

Section 1 (L1): (Post-Assessment)

1. The three most common states of matter are __1___, ___2___ and ____3_____

2. Name a type of matter that can exist in all three states

_____

3. Look at the table. What state of matter is matter *A?* Matter B? Matter C?

	Definite shape?	Size
Matter *A*	Yes	Fixed size
Matter B	No	Fixed size
Matter C	No	No fixed size

5. Matter *A* is_____ because

_____

_____

6 Matter B is a_____ because _____

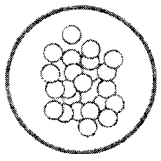
_____

7 Matter C is a_____ because _____

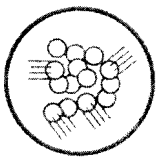
_____

_____

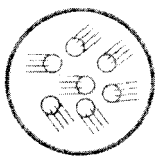
4. Label each type of matter below each picture.



Matter A



Matter B



Matter C

8 _____

9 _____

10 _____

Section 3 (L3): Post-Assessment

No directions, no answer key, the numbering is very confusing.

1. Anything that takes up space and has mass is called 1

2. Hardness, color, texture, shape, and size are all examples of 2 of matter.

3. The upward force of water or air that keeps an object afloat is called 3 .

4. The amount of matter making up an object is its 7

5. Name three properties of an apple:

   1) 4 2) 5 3) 6

6. What instrument is used to measure mass? 8

Scanning error

Word Bank For Numbers 1 through 6			
matter	buoyancy	hard	round
properties	mass	red	balance

7. Does the color green take up space? Why?

. 9

8. **True** or **False 10** The color "yellow" is hard, small, and cold.

Is Bigger Always More?

Definition/Hint

MASS:
The amount of matter making up an object is its mass.

Materials

- Balloon
- metersticks *w/* pre-tied strings
- *Jollv Rancher*

Hypothesize

Which has more mass, an inflated balloon or a *Jolly Rancher?*
Write a Hypothesis/Prediction:

Experiment Procedures

1. Inflate a balloon.
2. Attach it to one end of a meterstick.
3. Attach a *Jolly Rancher* to the other end.

Observations/Results: What happens to the meterstick?

Turn Paper Over

Drawing Conclusions

1. Which object has more mass? Circle one: inflated balloon OR Jolly Rancher Why?

2. **Infer** Do smaller objects ever have more mass than larger objects?

3. **Going Further** Can you name some examples of matter that are smaller than a balloon but have more mass than a balloon?

Performance assessment lab adapted from Mcgraw-Hill Science. National Geographic Society, New Yor, 2002.

Label Appendix C

Section 1 (L1): Pre-Assessment Rubric

4- Advanced	9-10 sections correct
3- Proficient	8 sections correct
2- Basic	7 sections correct
1- Below Basic	0-6 sections correct

Section 2 (L2): Pre-Assessment Rubric (Performance Assessment)

4- *Advanced*	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers three "Drawing Conclusions" questions correctly.
3- Proficient	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers two "Drawing Conclusions" questions correctly.
2- Basic	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers one "Drawing Conclusions" question correctly.
1- Below Basic	Student writes a hypothesis. Student records observations. Student answers no "Drawing Conclusions" questions correctly.

Section 3 (L3): Pre-Assessment Rubric

4- Advanced	9-10 sections correct
3- Proficient	8 sections correct
2- Basic	7 sections correct
1- Below Basic	0-6 sections correct

Section 1 (L1): Post-Assessment Rubric

4- *Advanced*	9-10 sections correct
3- Proficient	8 sections correct
2- Basic	7 sections correct
1- Below Basic	0-6 sections correct

Section 2 (L2): Post-Assessment Rubric (Performance Assessment)

4- *Advanced*	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers three "Drawing Conclusions" questions correctly.
3- Proficient	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers two "Drawing Conclusions" questions correctly.
2- Basic	Student writes a hypothesis referring to the definition of matter. Student records observations. Student answers one "Drawing Conclusions" question correctly.
1- Below Basic	Student writes a hypothesis. Student records observations. Student answers no "Drawing Conclusions" questions correctly.

Section 3 (L3): Post-Assessment Rubric

4- Advanced	9-10 sections correct
3- Proficient	8 sections correct
2- Basic	7 sections correct
1- Below Basic	0-6 sections correct