

# **From Paces to Feet**

Problem Solving/Data Gathering Unit  
Grade 2

TEED 521  
3/15/04  
Joanna Hsiao

## **Central Questions**

As students participate in various activities and engage in mathematical thinking, a central question that the class will keep addressing throughout the unit is: Why and how do people use standard units of measure? It is an important question deeply embedded in this unit because it helps students think carefully and critically what it means to measure. It also serves as a guide to assist students in viewing the meaningful role standard measurements play in communicating about the world.

## **Rationale & EARLs Connections**

Researchers and educators have studied extensively how children learn to measure. Many of them have followed Piaget's theory to believe that children's ideas about measurement grow out of "hands-on manipulation, exploration, freedom to make errors, talking with peers (TEED 512 Child Development class handout, 11/7/03)." This explains why and how this unit is created. The main rationale behind teaching this unit is to offer students many opportunities to explore different manipulative materials, and to develop measuring skills through repeated experiences with describing and comparing the sizes of things.

Guiding students to see the need of describing length in a reliable and accurate way is another rationale for teaching this inquiry-based unit. Students need to use informal as well as more standard measuring tools to learn about the relationship between sizes of measuring units and the results of measuring. This unit of study is planned in a way that students will learn problem solving and data gathering skills by discussing the methods and measuring units used in every lesson. The primary purpose of these discussions is to allow students to make sense of the world by learning that "defining procedures,

recording information, and agreeing upon a standard are critical parts of communicating measurement information to others (Corwin, Economopoulos, Mokros, Russell, 1995, p. 11).”

Since this math unit contains many activities that are designed to tailor each student’s different learning styles and multiple intelligences, students will be encouraged to participate in group as well as classroom discussions actively to draw upon real-world connections to meditate on this unit’s central question mentioned earlier in this paper. The ultimate goal of this unit is to immerse students in thinking about why people need to measure, the different tools and units we use for measuring, and how we analyze and interpret data that are based on measurements. I hope that, by teaching this unit through the use of manipulative materials, students will understand and apply concepts and procedures from “number sense (Math EARL 1.1),” “measurement (Math EARL 1.2),” and “probability and statistics (Math EARL 1.4).”

### **Moral & Ethical Considerations**

There are numerous moral and ethical issues needed to be taken into consideration in teaching this unit. As stated in one of the principles from *Synthesis of Research on Good Teaching* that we learned in TEED 512, “Effective teachers are thoughtful and reflective about their practice (Class handout, 10/15/03),” I hope to be one of these effective teachers who plan and prepare her instruction carefully and reflect thoughtfully on a regular basis regarding the choice of curriculums as well as the strategies or projects used to teach them. In addition, I will be sensitive to my students’ learning backgrounds. As my cooperating teacher pointed out, such disposition of sensitivity is essential as a teacher in order to implement a series of lessons in which students can easily relate

themselves to the activities encompassed in the unit. Knowing that some of the students in my class are familiar with the use of standard algorithms, while others are not, the lessons designed in this math unit will allow all of them an opportunity to explore a variety of hands-on activities and use various strategies to solve a problem so that each of them can learn in their own way and shine in their area of expertise.

Being flexible is also a crucial factor that contributes to a successful teaching and learning experience. In view of the fact that this unit offers students numerous chances for cooperative learning, it is my attempt to also provide options of individual assignments for several activities. The primary reason behind it is not to single out any particular student, but to make different choices available for them that can best serve their interests and needs. Part of the characteristics of flexibility is allowing students to express their work in a variety of formats. Knowing that some people focus more on details and some others tend to dwell more frequently on the big picture, I will make a conscious effort to encourage creativity and diversity rather than enforcing a single “correct” model in my classroom.

### **Learners**

Even though the 21 second graders in my classroom come from the Bellevue middle-to-upper socio-economic neighborhood of Somerset, they definitely do not make a homogenous group in terms of their cultural backgrounds. Half of the class is made up of Caucasian students. While there are five mix raced (White and Asian) students and one Korean student in the class, the rest is Chinese. This is a group of “highly capable” students, as my cooperating teacher said. Most of their reading abilities are in the third or even fourth grade levels. Two of them have been tested and are currently in Bellevue’s

Gifted and Talented Education (GATE) program. There are no students with special needs or on Individualized Instructional Plans (IEPs) in the class. Despite the language diversity existed among these students, all of the bilingual children are very proficient in English both verbally and literally. None of them is qualified for the ESL service.

Based on the field experience I have had with this group of students in the past month, I feel that their intellectual development is definitely at least at Piaget's concrete stage, with a few might be advancing toward the formal stage of operation. Using Vigotsky's constructivist approach, I will try to teach in each student's zone of proximal development in order to allow each of their potential to shine in different ways. (TEED 512 class notes/handout, 10/31/03) There are two students in my class whose social/emotional development seems to be taking a different route from their fellow classmates. Student A hardly ever manages to finish her in-class assignment on time. Her intellectual development and academic capability are both on par of her friends, but she has a personality filled with so many feelings. Her complex ways of thinking and use of sophisticated vocabularies often delay her start of work. Student B has a different set of social/emotional issues that puts him on a personalized Individual Behavior Plan. Being also academically capable, student B's constant seek for attention sometimes hinders the teacher's ability to conduct a whole-class lesson. In this case, I think appropriate amount of daily language and interactions are needed, based on Vigotsky's theory of emotional scaffolding, in order to boost the boy's self-confidence and to show care for him.

According to another principle of *Synthesis of Research on Good Teaching*, "Effective teachers are knowledgeable about their students, adapting instruction to their

needs and anticipating misconceptions in their existing knowledge” (TEED 512 class handout, 10/15/03) After having acquired basic knowledge of my students and being told that they need more practice on measurement using different standards of unit, I will try to teach this unit and adopt instructional methods that most suitably meet their interests and developmental needs. I will also encourage diversity in the students’ use of strategies to solve a problem. During our learning process of this unit, I plan to also pay extra attention to students A and B whenever possible, showing both of them support and allowing room for flexibility at the same time.

To foster an inclusive and supportive classroom, I think this unit is ideal for promoting a sense of community in my class. The lessons designed in the unit offer students plenty of opportunities for cooperative learning and working toward common purposes. The activities encompassed in each lesson are created to provide students with an authentic learning experience and to promote a feeling of supportiveness among them. With a constructivist approach of instruction, I believe firmly that my students will learn to work collaboratively and harmoniously with one another.

## Learning Targets & Assessments

Learning Target	Categorize Learning	EARLs Addressed in Learning Targets	National Standards (Pre-K—2)	Assessment Instrument Type	Criteria for Assessment of Learning Targets <i>(Adapted from Investigations in Number, Data, and Space: Assessment Sourcebook Grade 3)</i>
<p>1. Students will develop an awareness of both inches and centimeters, and understand how to measure those using standard measuring tools. (EARL 1.2)</p>	<p>Concept, Skill/ Process</p>	<p>1.1 Understand and apply concepts and procedures from number sense</p> <p><u>Estimation:</u> Use estimation to predict computation results and to determine the reasonableness of answers, <i>for example,</i></p>	<p><u>Measurement:</u> Apply appropriate techniques, tools, and formulas to determine measurements -Use tools to measure.</p>	<p>Pre-Assessment</p>	<p><u>Activity:</u> “Student Survey” – Students will use a ruler to measure a line twice – First with inches and then with centimeters. <u>Evidence of Achievement:</u> &gt; Able to use a ruler appropriately as a measuring tool. &gt; Accurately measure the line and record the measurement in inches. (4 inches) &gt; Accurately measure the line and record the measurement in centimeters. (~10 cm) (See Appendix 1)</p>

<p>2. Students will compare the effects of measurement using units of different sizes. (EARL 1.2)</p>	<p>Skill/ Process</p>	<p><i>estimating a grocery bill.</i></p> <p>1.2 Understand and apply concepts and procedures from measurement</p> <p><u>Attributes and dimensions:</u> Use directly measurable attributes such as <i>length, perimeter, area, volume/ capacity, angle, weight/mass, time, money, and temperature</i> to describe and compare objects.</p>	<p><u>Measurement:</u> Apply appropriate techniques, tools, and formulas to determine measurements -Develop common referents for measures to make comparisons and estimates.</p>	<p>Post- Assessment</p>	<p><u>Activity:</u> “Math Worksheet” – Students will use the “Student Survey” they filled out during Pre-Assessment to measure the line again. In addition, students will compare two different measurement results for this one length. <u>Evidence of Achievement:</u> &gt; See the requirements listed in LT 1. &gt; Recognize that there are more centimeters than inches in the given length. &gt; Understand that centimeters are a smaller unit of measure than inches are. &gt; Familiar with the idea that the smaller the unit of measure used, the greater the total number of units needed. (See Appendix 2)</p>
<p>3. Students will choose standard units and appropriate tools for measuring. (EARL 1.2)</p>	<p>Concept, Skill/ Process</p>	<p><u>Systems and tools:</u> -Understand appropriate units of measure for time, money, length, area, volume/ capacity, weight/ mass, and temperature. -Select and use appropriate tools for measuring time,</p>	<p><u>Measurement:</u> Understand measurable attributes of objects and the units, systems, and processes of measurement -Select an appropriate unit and tool for the attribute being measured.</p>	<p>Formative</p>	<p><u>Activity:</u> “Helping the Custodian” – Students will help an “imaginary” custodian to order a carpet by measuring the length and width of their classroom. <u>Evidence of Achievement:</u> Students’ written explanations should include: &gt; A standard unit of measure to be used. &gt; Measuring tools to be used. &gt; A brief description of a procedure for measuring. (See Appendix 3)</p>

<p>4. Students will communicate ideas about the need for a standard unit of measure. (EARL 1.2)</p>	<p>Concept</p>	<p>money, length, area, volume, mass, and temperature. -Understand the benefits of using standard units of measurement for measuring length, area, and volume.</p> <p>1.4 Understand and apply concepts and procedures from probability and statistics.</p>	<p><u>Reasoning and Proof:</u> Recognize reasoning and proof as fundamental aspects of mathematics. <u>Communication:</u> Use the language of mathematics to express mathematical ideas precisely.</p>	<p>Summative Performance</p>	<p><u>Activity:</u> “The King’s Foot” – Students will be read the story of “The King’s Foot”. Then, they will each write a letter to the carpenter to communicate the need for a standard measure. <u>Evidence of Achievement:</u> Students’ letters should include: &gt; An explanation of what went wrong. &gt; A description of what the carpenter could do to correct the problem. &gt; A diagram or a picture to show why the stall was too small. (See Appendix 4)</p>
<p>5. Students will describe a set of data that involves measurements , first representing these data on a line plot and then describing the general features of the data set. (EARL 1.4)</p>	<p>Skill/ Process</p>	<p><u>Statistics:</u> Organize and display data in numerical and graphical forms such as <i>tables, charts, pictographs, and bar graphs.</i></p>	<p><u>Data Analysis and Probability:</u> Select and use appropriate statistical methods to analyze data -Describe parts of the data and the set of data as a whole to determine what the data show. <u>Representation:</u> Create and use representations to organize, record, and communicate mathematical ideas.</p>	<p>Summative Performance</p>	<p><u>Activity:</u> “Being a Data Analyst” – Students will create a line plot and analyze a set of data given. <u>Evidence of Achievement:</u> &gt; Construct a line plot. &gt; Include all of the data given on the line plot. &gt; On the line plot, include all of the values within the range of the data. &gt; Describe at least one feature of the data, such as range, clumps, gaps, or values. &gt; Show at least one specific reference to the data in the answers. &gt; Explain way(s) to identify the length of a typical jump in this set of data. (See Appendix 5, and 6 for Rubric)</p>

<p>6. Students will give directions by estimating and using a nonstandard unit to measure a distance. (EARL 1.2)</p>	<p>Skill/ Process</p>		<p><u>Measurement:</u> Understand measurable attributes of objects and the units, systems, and processes of measurement -Understand how to measure using nonstandard and standard units. <u>Communication:</u> Use the language of mathematics to express mathematical ideas precisely.</p>	<p>Self-Evaluation</p>	<p><u>Activity:</u> “Robot Directions” – Students will self-evaluate if they can be direction-givers o help their partners (robots) reach a target. <u>Evidence of Achievement:</u> Students’ Self-Evaluations should include the following: &gt; A record of the route given to their partners. &gt; Use of mathematical language in their robot directions. For example, turn right, turn left, forward ? paces, and backward ? paces. &gt; An answer to the yes/no question about whether their partners managed to reach the designated targets. &gt; Write in at least one sentence to explain whether they think they are good direction-givers. (See Appendix 7)</p>
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## Parent Letter

Date

Dear Family,

Over the next several weeks, our class will be working on measurement in a unit called *From Paces to Feet*. We will start out measuring distances with “giant steps” and “baby steps.” Later on, your child will be pacing off distances in the classroom and at home. After making these informal kinds of measurements, we will start using rulers, yardsticks, and metersticks. We will be measuring things like people’s feet, their paces, and their heights.

Throughout this unit, your second grader will:

- 1) Develop an awareness of both inches and centimeters, and understand how to measure those using standard measuring tools.
- 2) Compare the effects of measurement using units of different sizes.
- 3) Choose standard units and appropriate tools for measuring.
- 4) Communicate ideas about the need for a standard unit of measure.
- 5) Describe a set of data that involves measurements, first representing these data on a line plot and then describing the general features of the data set.
- 6) Give directions by estimating and using nonstandard unit to measure a distance.

Your child will also participate in activities designed to introduce, teach, and review the concepts and skills that he or she will need in order to meet the learning targets described above. The following are some activities that will provide opportunities for various formal and informal assessments of student learning:

- Helping an “imaginary” custodian to order a carpet by measuring the length and width of the classroom.
- Writing a letter to a carpenter to communicate the need for a standard measure.
- Creating a line plot and analyzing a set of data given.
- Giving “robot directions” to help the partner reach a target.

The more experience with measurement that children get at school and at home, the better. Encourage your child to estimate and measure distances. Typical questions that might come up at home include these:

- How far is it across our kitchen table – and can we really reach that far?
- How many children can sit comfortably on our couch? How many adults?
- Will that extra bookcase really fit in the kids' bedroom?

These are good questions, and they are also very practical ones! Measurement questions come up a lot in our home lives, and it is exciting for children to be involved with these real-world issues.

Here are some ways you can contribute to your child's learning during this unit:

- Listen to your child's strategies for measuring
- Involve your child in your own measurement activities – hobbies like sewing, or carpentry are a natural for this.
- Work together on the measurement activities your child brings home.

Don't worry if your child does not use a ruler accurately yet – it is a skill that will develop over time, with more and more opportunities to measure. This unit will transpire over a period of approximately two weeks. I will keep you updated with your child's learning and well-being through e-mails or phone calls. Please feel free to contact me with any questions, concerns, or suggestions. Thank you for your support and participation in your child's learning process. I look forward to working with you in promoting a love of math in our classroom and making this unit a meaningful experience for your child.

Sincerely,

Joanna Hsiao

(Adapted from "Family Letter" in *From Paces to Feet* written by Rebecca B. Corwin, Karen Economopoulos, Jan Mokros, and Susan Jo Russell.)

## **Unit Overview**

This unit explores both measurement and simple statistics, as students develop ideas about why we need to measure, learn to use different measuring tools and systems, and interpret data they collect by measuring. Through some initial work with informal, nonstandard units of measure (baby steps, giant steps, paces), students see that defining a standard provides more accurate and more consistent measures. Students then learn to use standard measuring tools (inch rulers and yardsticks, centimeter rulers and metersticks) as they collect measurement data about themselves and their classroom. Next, they learn ways to organize, represent, and analyze this data, discovering the power of measurement in communicating about the world.

There are eleven lessons in this unit; each takes approximately an hour for a complete session of input/modeling, guided practice, group or independent practice, and closure to take place. Some of the lessons contain short homework assignments that offer students an opportunity for extra practice at home. Numerous extension activities are created throughout the unit to meet certain students' needs for challenge and a higher level of thinking. Lessons one to four emphasize a learning of measuring with paces and steps, while lessons five to eleven offer a transition from using a nonstandard unit (paces) to a standard unit (feet).

## **Outlines of Lessons**

### **Lesson 1 (Monday 2:20-3:20pm)**

Title: Giant Steps and Baby Steps

LT 2: Students will compare the effects of measurement using units of different sizes.

Rationale: Students will participate in familiar activities that link measurement to physical movement in this lesson. They will count their baby steps and giant steps as they measure distances in the classroom. As they collect data and compare their results, they will begin to notice and analyze the numerical differences that are produced when they use units of different sizes. Students' learning will focus on estimating length, using a nonstandard unit to measure distance, comparing the effects of measurement using units of different sizes, as well as collecting and analyzing data.

### **Lesson 2 (Tuesday 2:20-3:20pm)**

Title: Pacing and Comparing

LT 2: Students will compare the effects of measurement using units of different sizes.

Rationale: This lesson is devoted to comparing the number of units that are needed to cover a particular distance with giant steps, baby steps, and a walking pace. Students will get firsthand experience with the inverse relationship between the size of their steps and the number of steps needed to cover a certain distance. They will also estimate the number of paces needed to reach a target, and then they will check their estimates. Their learning will focus on using a nonstandard unit to measure distance, comparing the effects of measurement using units of different sizes, estimating distances, as well as collecting and analyzing data.

### **Lesson 3 (Wednesday 12:10-1:00pm)**

Title: Robot Directions

LT 6: Students will give directions by estimating and using a nonstandard unit to measure a distance.

Rationale: Students will give directions to move a robot from one point to another, taking turns being the direction-giver or the robot. The directions will involve both paces and turns. Learning to count off units (in this case, paces) along an unmarked distance in this lesson will provide students the opportunity to estimate and measure with familiar units. Students' learning will focus on estimating distance to various points, giving oral, then written directions that involve nonstandard measurement of distance, and comparing lengths of routes.

#### **Lesson 4 (Thursday 11:35am-12:35pm)**

Title: Robot Directions (Continued from Lesson 3)

LT 6: Students will give directions by estimating and using a nonstandard unit to measure a distance.

Rationale: Same as the one in Lesson 3.

#### **Lesson 5 (Friday 1:25-2:20pm)**

Title: The Need for a Standard Measure

LT 4: Students will communicate ideas about the need for a standard unit of measure.

Rationale: Students will demonstrate their understanding of the value of standard measures as they response to a story about a king who has difficulty communicating building directions to a carpenter. They will be introduced to standard measuring tools and will use rulers to collect data about the size of their feet. Students' learning in this lesson will focus on communicating ideas about the need for a standard unit of measure, using a ruler as a standard measuring tool, and collecting data through measuring.

#### **Lesson 6 (Monday 2:20-3:20pm)**

Title: Kids' Feet and Adults' Feet

LT 5: Students will describe a set of data that involves measurements, first representing these data on a line plot and then describing the general features of the data set.

Rationale: Students will use sketch graphs and line plots to organize the foot data they have collected about the size of their feet and the size of adult feet. They will use rulers to measure an object larger than 12 inches and discuss their ways of measuring. Their learning will focus on organizing and describing a set of measurement data, and using inches to measure objects bigger and smaller than one foot.

**Lesson 7 (Tuesday 2:20-3:20pm)**

Title: Measuring Centers

LT 3: Students will choose standard units and appropriate tools for measuring.

Rationale: In four activities organized in measuring centers around the classroom, students will use standard measuring tools to measure familiar objects in the classroom. They will locate “benchmarks” on their body, which they can use to estimate lengths without a ruler. Then, they will collect and discuss data about how far they can jump and how far they can blow a pattern block. Their learning will focus on using standard measuring tools, organizing data on a line plot, and describing data.

**Lesson 8 (Wednesday 12:10-1:00pm)**

Title: Measuring Centers

LT 3: Students will choose standard units and appropriate tools for measuring.

Rationale: Same as the one in Lesson 7.

**Lesson 9 (Thursday 11:35am-12:35pm)**

Title: Moving to Metric

LT 1: Students will develop an awareness of both inches and centimeters, and understand how to measure those using standard measuring tools.

Rationale: Students will individually analyze the data they have collected at the pattern block measuring center, allowing the teacher to assess their abilities in data analysis. They will be introduced to centimeters and meters as a different system of measurement used by most of the world, and they will begin to develop centimeter awareness by making their own centimeter and meter measures. They will then use these tools on a scavenger hunt in their classroom, looking for things that are about 1 meter and about 1 centimeter long. Students' learning in this lesson will focus on learning to describe a set of data that involves measurement and developing an awareness of centimeters and meters and how big these units of measure are.

**Lesson 10 (Friday 1:25-2:20pm)**

Title: Metric Measurement

LT 1: Students will develop an awareness of both inches and centimeters, and understand how to measure those using standard measuring tools.

Rationale: Students will conclude their scavenger hunt by examining the data from home and school. Then they will make metric measurements related to their clothing sizes. One of these measurements – head size – is used to assess how well students can measure using centimeters. Throughout this and the next lessons, students will learn more about meters and centimeters and how to use them. Their learning will focus on developing an awareness of centimeters and meters and how big these units of measure are. They will also practice measuring skills.

## **Lesson 11 (Monday 2:20-3:20pm)**

Title: Metric Measurement

LT 1: Students will develop an awareness of both inches and centimeters, and understand how to measure those using standard measuring tools.

Rationale: Same as the one in Lesson 10.

### **Technology/Web Resource**

There are two Web based resources that I have found helpful for teachers to use in teaching this unit. The first one is titled *Measurement Resources*, which can be found on the World Wide Web at this address:

<http://mathforum.org/paths/measurement/e.measlessons.html#stat>

This Web site contains a wide variety of lesson plans and activities elementary school teachers can use when teaching about measurement. The resources available here are organized into seven categories, which make it easy for teachers to search for ideas to expand and enrich their students' learning experience. These seven categories include 1) Length, Area and Volume; 2) Metric Units and Conversion; 3) Non-Standard Units and Estimation; 4) Natural Phenomena; 5) Statistics; 6) Reference Materials; 7) Projects and Competition. Some of the resources posted here include videos and software that teachers can use to show to their classes.

The other website I have found very educational and resourceful for teachers to use in this unit is called *Introduction to Measurement for Primary Students* . It can be accessed on the World Wide Web at this address:

<http://mathforum.org/varnelle/krods.html>

This Web site offers several excellent and fun activity ideas related to measurement. Each lesson included here is designed to include four types of activities for students to engage in. First, the activities are interactive and allow students to work on manipulative-based projects. Second, the activities offer students an opportunity for the use of technology during their learning process. Third, they include paper/pencil practice that most students have been familiar with. Last but not least, all of the activities are integrated and contain a literature connection.

### **Classroom Management**

Knowing that my students have been used to the way my cooperating teacher operates and manages the class, I think being flexible in terms of classroom management is really important as a student teacher. Even though I have my ideal Classroom Management Plan written out in TEED 512, I will try to adapt my plan as much as I can to make it align with my cooperating teacher's management style. The rationale for it is to prevent the students from feeling confused and having to relearn everything, such as the daily routine, from the beginning.

The class I will be student teaching in contains a group of many students who, if have taken the Myers-Briggs Assessment, probably would very likely be reported with a "judging" type of personality. Judging, in this case, refers to someone who prefers a planned and organized approach to life. Being aware of this, I firmly think it is extremely crucial to develop and communicate clear objectives each day. I will write "Today's Schedule/Agenda" on the board each day and describe to students in words appropriate to their age level their academic and/or social learning targets of the unit. When writing an

objective of a lesson, I think Bloom's taxonomy is a useful guideline in telling students what is to be accomplished in an assignment or activity.

As part of the preventive component of classroom management, managing time well and creating a clear signal for quieting the class are both equally important. I will use the procedures my cooperating teacher has established with students who need to a) seek attention or help, b) go to the bathroom, c) sharpen pencils, or d) get supplies. I will also adopt my cooperating teacher's five-beat handclap signal whenever I need to either quiet the class or call upon students' attention during their cooperative work.

The procedures for handling materials and supplies depend on the types of activity we are working on. In general, students in my class have their own set of stationery like crayons, pencils, and erasers. If other materials or supplies are needed, I will either have the two Paper Passers of the day pass them out for the class, or have students line up in a quiet and orderly manner to collect the items they need. Based on my observation of this class in the past few weeks, this group of students contains many well behaved self-managers and is very capable of maintaining their classroom shipshape.

In order to encourage my students to work effectively as individuals and in groups, I will make sure that I communicate my instructions for each lesson or activity clearly, and deliver my messages at an appropriate pace that makes my speech comprehensible to the students. More importantly, I will teach them the skills they will need in order to succeed in both working independently or cooperatively with others. There are three supportive components of classroom management I will also implement in teaching this unit. They include: First, to show interest in student work by asking questions, making positive comments, and providing help; second, to acknowledge and compliment good behaviors

in appropriate ways at appropriate times; and third, to use the words “please” and “thank you” when communicating with students.

In terms of the corrective component of classroom management, I do believe that disruptive behaviors should be stopped immediately and firmly. However, I highly doubt I will ever need to use any corrective procedure in my class, since my students hardly ever have any behavior problems. To monitor students’ social and academic learning, I think an on-going classroom based observation/assessment is an effectively way to be used in teaching this unit. It is mainly because a math unit like this usually involves many activities that rely heavily on the idea of cooperative learning, where students work together in a collaborative and reciprocal manner.

### **Community Resources/Collaboration**

There are plenty of ways community members and agencies can support or enhance students’ learning of this unit. Some family members who may be active in community or neighborhood groups can serve as an excellent resource to be invited to my classroom. A center or a station of math extensions can be set up in the classroom for family members to help guide and facilitate various activities related to the contents of this unit. In addition, family members or other volunteers from the community can also offer their help by organizing, preparing, and setting up daily materials for each lesson of this unit.

### **Service Learning**

My service-learning project is tied to the Themed Literature Unit created on 2/18/04.

## Annotated Bibliography

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- Corwin, Rebecca B., Economopoulos, Karen, Mokros, Jan, Russell, Susan Jo. (1995). *From Paces to Feet* . Palo Alto, CA: Dale Seymour Publications.  
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*The Principles for school mathematics reflect basic perspectives on which educators should base decisions that affect school mathematics. The Standards for school mathematics describe an ambitious and comprehensive set of goals for mathematics instruction.*
- Scott Foresman. *Assessment Sourcebook Grade 3* . Cambridge, MA: Pearson Education, Inc.  
*This book is designed to help teachers assess students' understanding of the most important mathematical ideas covered in that grade level's curriculum units.*
- Washington Commission on Student Learning. (1998). *Essential Academic Learning Requirements* .  
*A teaching manual that states clearly the learning targets for each academic discipline – reading, writing, communication, math, science, social studies, arts, and health/fitness. Generally, the learning targets are organized into three benchmarks – grades 4, 7, and 10.*

**Appendix 1:**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Pre-Assessment: "Student Survey"**

Use a ruler to measure the following line twice - first with **inches**  
and then with **centimeters**.

The line measures \_\_\_\_\_ in.

The line measures \_\_\_\_\_ cm.

**Appendix 2:**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Post-Assessment: "Math Worksheet"**

1) Use a ruler to measure the following line twice - first with **inches** and then with **centimeters**.

The line measures \_\_\_\_\_ in.

The line measures \_\_\_\_\_ cm.

2) Which measurement gives you a greater number?

Explain why you think that is.

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**Appendix 3:**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Helping the Custodian**

Our classroom is getting new carpet. We decide to help the custodian, who will order the carpet, by measuring the length and width of our classroom. What would be a good way to do this measuring? Explain why you think so.

1) Standard unit(s) of measure to be used:

\_\_\_\_\_

2) Measuring tool(s) to be used:

\_\_\_\_\_

3) Procedure for measuring:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Appendix 4:**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

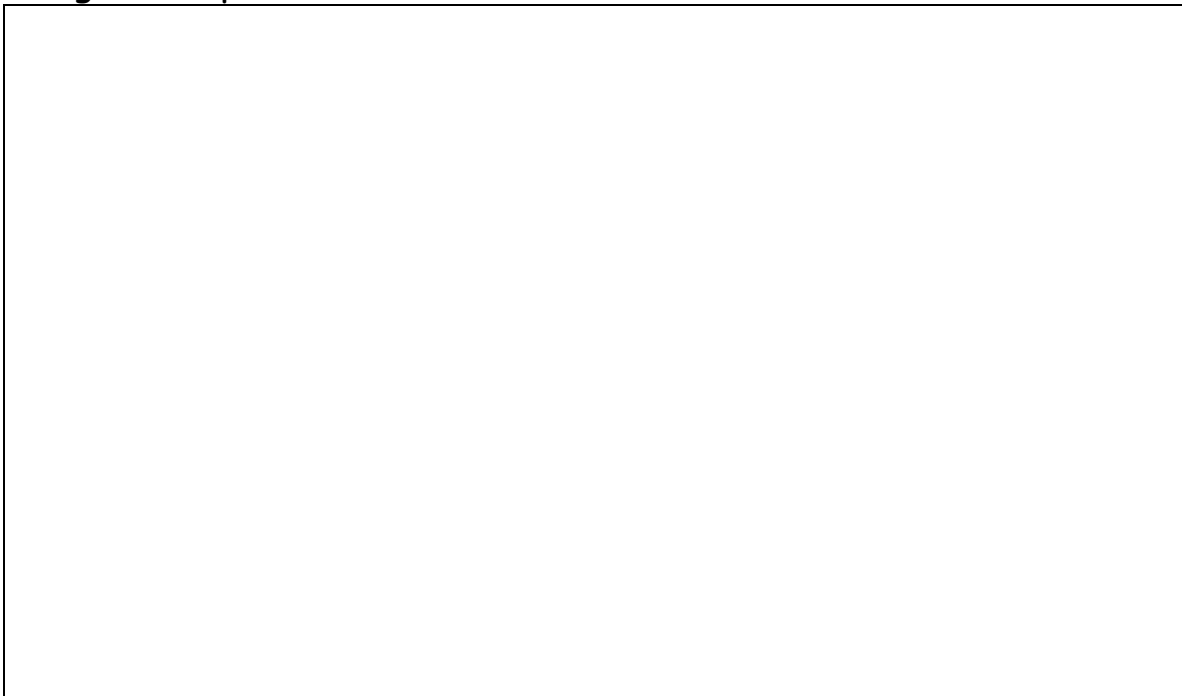
**The King's Foot**

The carpenter made a new stall for the king, but it was too small to fit the new horse for the princess. Write a letter to the carpenter on a separate sheet of paper (see next page ). Your letter should answer these questions:

- 1) Why did the stall end up too small for the new horse?
- 2) What could the carpenter do to correct her mistake?

Also make a diagram or picture to show why the stall was too small.

Diagram or picture:





**Appendix 5:**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Being a Data Analyst**

1) On field day, one second grade group recorded the following distances for the standing broad jump. Make a line plot of these data on a separate sheet of paper.

33 in.	32 in.	24 in.	28 in.
36 in.	33 in.	25 in.	34 in.
32 in.	29 in.	34 in.	33 in.

2) Describe the data. What can you say about the distances these second graders jumped?

3) What is the length of a typical jump for this class? Explain your thinking.

**Appendix 6:**

**Rubric: Summative Performance Assessment for Learning Target 5  
“Being a Data Analyst”**

<b>Category</b>	<b>Wow! Terrific!</b>	<b>You’ve Got It!</b>	<b>Try Again!</b>
<b>Line Plot</b>	Contains a line plot that accurately represents the set of data given. In addition, the X- and Y-axis are clearly and correctly labeled.	Contains a line plot that accurately represents the set of data given.	The line plot is missing. Or, if there is one, the set of data included is inaccurate or incomplete.
<b>Inclusion of Data</b>	All of the data given are included.	All of the data given are included.	More than one piece of data is missed from the line plot.
<b>Values Within the Range of Data (X-axis)</b>	The X-axis of the line plot shows a clear scale of every value encompassed within a range of data. All of the values are clearly and accurately labeled. (For example, write 26 and 27 on the line even though the set of data given jumps from 25 to 28)	The X-axis of the line plot shows a clear scale of every value encompassed within a range of data.	The X-axis of the line plot does not show a clear scale of every value encompassed within a range of data.
<b>Features of Data</b>	Describe more than one feature of the data.	Describe at least one feature of the data, such as range, clumps, gaps, or values.	No description of any feature of the data.
<b>Reference Skills</b>	Show more than one specific reference to the data in the answers.	Show at least one specific reference to the data in the answers.	Does not show any specific reference to the data in the answers.
<b>Mode</b>	Explain more than one way to identify the length of a typical jump in this set of data.	Explain at least one way to identify the length of a typical jump in this set of data.	Does not explain how the length of a typical jump in this set of data is identified.

**Appendix 7:**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Self Evaluation: "Robot Directions"**

Use mathematical language to record the "robot directions" you gave to your partner.

\*Mathematical language includes:

Turn right, Turn left, Forward ? paces, and Backward ? paces.

Route: \_\_\_\_\_

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Did your partner manage to reach your designated target?

Yes

No

Did you feel that you were a good direction-giver?

Explain your answer.

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