

## KINDERGARTEN MATH #4

# COUNTING & MEASUREMENTS

*Counting & Measurements* provides ways to determine the various magnitudes. It helps to bring familiarization with the use of numbers.

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This is the fourth of the seven levels of the troubleshooting guide for KINDERGARTEN MATH. See *Summary* for details on all seven levels.

These lessons are designed for kindergarten, but they may be applied to anybody to fill earlier blanks in understanding.

***Start with the Diagnostic. If the diagnostic fails, then do the Lesson & Exercise.***

Follow these guidelines.

- (a) *When helping, make sure you have the attention of the student.*
- (b) *If you lose the attention, then go back to the point in the lesson where the student was attentive. Then come forward checking student's understanding.*
- (c) *Always approach any situation in an affectionate and relaxed manner.*
- (d) *Always encourage the student to ask questions.*

- (e) Carefully listen to what the student has to say, and let the student know that you have heard him (or her).*
- (f) Answer all questions matching the interest and understanding of the student.*
- (g) Always talk to the student at his (or her) level. Use only those terms and words that the student can easily understand.*
- (h) When teaching a new concept, ask the student to think examples of his own. Allow enough time even days to let that happen.*
- (i) Get the student involved and thinking with mathematical principles.*
- (j) In the final analysis, make sure that the student can apply mathematics with confidence.*

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## DIAGNOSTICS & LESSONS

### ☺ Diagnostic K4.1      Counting to Measurement

*To pass, the student must be able to explain correctly, and with confidence the idea of measuring.*

Place a toy at least 5 steps away from another.

"Here are two toys at a distance from each other."

"How far are the toys from each other?"

"How do you measure the distance between them?"

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns how to communicate measurement concepts.*

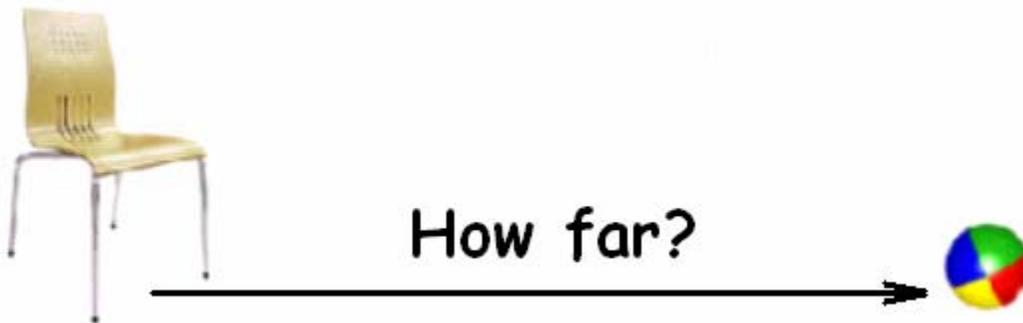
(a) Introduce the lesson.

"In this lesson we are going to learn about measurement."

(b) Place a ball at some distance from a chair.

"Here is a ball far from the chair."

"Let's see if we can measure the distance between the ball and the chair?"



- (c) Measure the distance by counting steps (see picture on the previous page).  
**"We can count the number of steps it takes from the chair to reach the ball."**
- (d) Explain the counting of steps.  
**"We may say that the distance from the chair to the ball is 8 steps."  
"One step is the distance between one foot print to the next."  
"We are counting the number of these steps to measure the distance."**
- (e) Get the student to measure the distance
1. From his chair to the front wall
  2. From his chair to the back wall
  3. From his chair to the wall on the left
  4. From his chair to the wall on the right
  5. From his chair to the door.
- (f) Get the student to
1. Measure how long the room is.
  2. Measure how wide the room is.
  3. Explain which measure is larger, and why?
- (g) Have the student ask you to measure some distances.
- (h) Continue with this lesson until the student can confidently express the idea of measuring.
- (i) Repeat the diagnostic test.

## ☺ Diagnostic K4.2      Measurement and Units

*To pass, the student should be able to measure length and distance using nonstandard units.*

**"Measure the distance between two walls using footsteps."**

**"Measure the length of a table using a pencil."**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns to measure length of objects, and distances, using nonstandard units.*

(a) Provide an example of measuring the length of a table.

**"We are going to measure the length of a table."**

(b) Hold up a pencil.

**"We shall count how many times this pencil will fit in the length of the table."**



(c) Measure the longer side of the table.

**"The length of the table is \_\_\_\_\_ PENCILS. The unit here is the length of a pencil."**

(d) Provide an example of measuring the length of a book.

**"We are going to measure the length of a book with the same pencil."**

(e) Try to measure the length of a book.

**"The pencil is too big to give a good measure."**

(f) Show a small paper clip.

**"We shall count how many times this paper clip will fit in the length of the book."**

(g) Measure the length of a book.

**"The length of the book is \_\_\_\_\_ PAPER CLIPS. The unit here is the length of a paper clip."**

(h) Provide an example of measuring the distance between the walls.

**"We are going to measure the distance between the walls with the same paper clip."**

(i) Try to measure the distance between the walls.

**"The paper clip is too small to give a good measure."**

(j) Show a footstep.

**"We shall count how many times footsteps will fit in the distance between the walls."**

(k) Measure the distance between the walls.

**"The distance between the walls is \_\_\_\_\_ FOOTSTEPS. The unit here is the distance covered by a footstep."**

- (l) Have the student measure the following:
  - 1. The length of the table.
  - 2. The length of a book.
  - 3. The distance between two opposite walls of the room.
  - 4. Use appropriate unit to measure the height of a chair.
  - 5. Use appropriate unit to measure the distance between two chairs.
- (m) Have the student ask you to measure certain lengths and distances.
- (n) Continue with this lesson until the student can confidently measure length and distance using nonstandard units.
- (o) Repeat the diagnostic test.

## ☺ Diagnostic K4.3      Units and their Size

*To pass, the student must understand that measurement depends on the size of the unit used to measure.*

**"Measure the length of the table using a pencil."**

**"Measure the same length using a paper clip."**

**"Why are the two measurements different?"**

If the diagnostic fails, then do the Lesson & Exercise.

### **Lesson & Exercise**

*In this lesson the student uses nonstandard objects, such as cubes, marbles, paper clips, and pencils, to measure classroom objects (for example, table length is fifty paper clips or five pencils).*

(a) Provide a demonstration.

**"We shall measure the length of the table using pencil and paper clip."**

(b) Measure the length of the table using a pencil.

**"The length of the table is \_\_\_\_\_ pencil units."**

(c) Measure the length of the table using a crayon.

**"The length of the table is \_\_\_\_\_ paper clip units."**

(d) Explain the difference.

**"The measurement depends on the size of the unit you are using to measure with. The smaller is the size of a unit, the larger would be the number in a measurement. "**

(e) Measure the length of a book using a paper clip, and then using a finger as the unit. Explain the difference.

(f) Have the student measure the LENGTH of a table using a pencil and a paper clip. Ask him (or her) why the two numbers for the same length are different.

(g) Have the student ask you to measure the same length with different units.

(h) Continue with this lesson until the student can see how a measure depends on the size of the unit.

(i) Repeat the diagnostic test.

## ☺ Diagnostic K4.4      Direct comparison

*To pass, the student must be able to sort and order the objects by their lengths confidently.*

**"Here are five objects of different lengths."**

**"Arrange them by their lengths from the longest to the shortest."**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student compares the lengths of objects directly and arranges them by their lengths.*

- (a) Obtain ten sticks of different lengths. Explain  
**"We are going to compare the length of these sticks and arrange them by their lengths."**
- (b) Pick up two sticks and place them side-by-side.  
**"The longer stick goes to the left and the shorter stick goes to the right."**
- (c) Pick up another stick and compare it to the earlier two sticks.  
**"Let's place this stick to the right of the longer stick but to the left of the shorter stick."**
- (d) Arrange rest of sticks the same way.  
**"We arrange all the sticks in this way from the longest to the shortest."**



- (e) Mix the sticks and have the student rearrange them from the longest to the shortest.
- (f) Have the student compare the lengths of the following as shorter or longer.
  - 1. The fingers on your hand
  - 2. Your height and your friend's height.
- (g) Have the student arrange some people stand in a row. Then rearrange them by their HEIGHTS from tallest to shortest.
- (h) Have the student ask you to compare lengths of objects in the room.
- (i) Continue with this lesson until the student can comfortably compare lengths directly.
- (j) Repeat the diagnostic test.

## ☺ Diagnostic K4.5      Indirect comparison

*To pass, the student must be able to compare the length of the tables by comparing their measurements indirectly.*

**"Here are two tables at a distance from each other."**

**"How will you tell which table is higher without moving them next to each other?"**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student compares the heights of two tables indirectly.*

- (a) Explain what you are going to do.  
**"We are going to compare the height of two tables without placing them side by side."**
- (b) Obtain a string. Tie something heavy, such as a crayon, at one end of it. Show the string to the student.  
**"We shall mark the heights on this string in different colors."**
- (c) Put the string against the first table and mark it for the height.  
**"We let the crayon hang till it is almost touching the floor. Then we mark the height of the first table in RED."**
- (d) Put the string against the second table and mark it for the height.  
**"Again we let the crayon hang till it is almost touching the floor. Then we mark the height of the second table in BLUE."**
- (e) Hold the string with the crayon almost touching the floor. Point to the two marks.  
**"By comparing these marks we can tell which table is higher."**
- (f) Indicate which table is higher from the marks.  
**"The \_\_\_\_\_ table is higher than the other table."**
- (g) Have the student compare heights of several people as follows.
1. Stick a paper on the wall.
  2. Have different people come and stand against the wall.
  3. Mark their height on the paper with their name next to the mark.
  4. Compare the various heights marked on the paper.
- (h) Have the student indirectly compare the following.
1. The width of the door and the width of a window
  2. Your height and the length of the chalk board in the classroom
- (i) Have the student ask you to indirectly compare some lengths.
- (j) Continue with this lesson until the student can comfortably compare two lengths indirectly.
- (k) Repeat the diagnostic test.



## ☺ Diagnostic K4.6      Uniform Nonstandard Units

*To pass, the student must understand that uniform units provide measurements that can be compared.*

**"Decide upon a unit of length."**

**"Use that unit to measure the length, width and height of a table."**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns to use uniform nonstandard units to measure objects.*

- (a) Show the span of the hand with the hand fully extended,  
**"The distance from the tip of the thumb to the tip of the little finger is called a SPAN. Let's use span to measure the length of table."**
- (b) Measure the length of table using the span.  
**"We count how many spans fit in the length of the table. The length of the table is \_\_\_\_\_ SPANS."**
- (c) Measure the width of table using the span.  
**"We can use the same unit to measure the width of the table. The width of the table is \_\_\_\_\_ SPANS."**
- (d) Measure the height of table using the span.  
**"The height of the table is \_\_\_\_\_ SPANS."**
- (e) Explain.  
**"We may now compare the length, width, and height of the table because we have measured them using the same unit."**
- (f) Fold paper to make a strip. Mark a small distance on that strip of paper.  
**"We are going to use this UNIT to measure the length, width and thickness of a book. As you can see, we can create our own UNIT to measure."**
- (g) Measure the length, width, and thickness of the book using this unit.  
**"We may now compare the length, width, and thickness of the book because we have measured them using the same unit."**
- (h) Have the student create a unit to measure length, and use it to compare the length, width, and height of a chair.
- (i) Have the student ask you to create a unit and compare some lengths using that unit.
- (j) Continue with this lesson until the student understands that a unit must be used uniformly to compare measurements.
- (k) Repeat the diagnostic test.

## ☺ Diagnostic K4.7      Estimate Length and Width

*To pass, the student must be able to estimate at least three lengths correctly, and with confidence.*

**"Consider a new pencil as the unit of length."**

**"Estimate the length and width of a table in this unit."**

**"Verify your estimate by measuring."**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student uses nonstandard units to estimate the length and width of common classroom objects and verifies by measuring,.*

- (a) Hold up a new pencil.  
**"We shall estimate the length, width and height of a table in this pencil unit."**
- (b) Ask the student to estimate the dimensions of the table.  
**"How many times do you think this pencil will fit in the length of this table?"**  
**"How many times do you think this pencil will fit in the width of this table?"**  
**"How many times do you think this pencil will fit in the height of this table?"**



- (c) Ask the student to measure the table to see how good his estimate is.  
**"Now use this pencil to measure the length, width and height of this table."**  
**"How close were your estimates to these measurements?"**
- (d) Have the student estimate the length, width, or height of at least 3 objects in a chosen unit. Verify by measuring.



- (e) Have the student estimate at least 3 distances around the room in a chosen unit. Verify by measuring.
- (f) Have the student ask you to estimate lengths and distances and verify by measuring.
- (g) Continue with this lesson until the student can comfortably estimate lengths and distances with reasonable accuracy.
- (h) Repeat the diagnostic test.

## ☺ Diagnostic K4.8      Concept of Weight

*To pass, the student must be able to compare heavier and lighter objects correctly, and with confidence.*

**“Compare the weight of a pencil with that of a book.”**

**“Which one is heavier? Which one is lighter?”**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns to identify heavier and lighter objects.*

- (a) Have the student hold an empty in one hand, and a cup filled with water in the other hand; and stretch his arms out. Explain to the student.

**“The cup filled with water pulls your hand down more because it is HEAVIER in weight. The empty cup pulls down your hand less.”**



- (b) Have the student hold a sheet of paper in one hand and a thick book in the other. Ask.  
**“Can you sense that the thick book is heavier, and the sheet of paper is lighter.”**

- (c) Get a balance. Place a pencil on one side and a paper clip on the other.

**“The side with the pencil dips lower. Therefore, the pencil is heavier than the paper clip.”**



- (d) Place some cotton on one side and some pennies on the other.

**“The side with pennies dips lower. Therefore, the pennies are heavier than cotton.”**

- (e) Have the student compare some objects for heavier and lighter.

- (f) Have the student ask you to compare some objects for heavier and lighter.

- (g) Continue with this lesson until the student can compare heavier and lighter objects with confidence.

- (h) Repeat the diagnostic test.

## ☺ Diagnostic K4.9      Order by Weight

*To pass, the student must be able to compare the weight of the objects on a balance, and then order them from the heaviest to the lightest.*

**"Here are five objects of different weights."**

**"Arrange them from the heaviest to the lightest by comparing their weights."**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student compares the weight of objects and sorts them by their weights.*

- (a) Obtain at least five different objects, such as, pencil, crayon, chalk, small toys, etc.  
**"We are going to compare the weight of these objects, and then arrange them by their weights."**
- (b) Place two of these objects on the two sides of a balance. Pick up the heavier object.  
**"Let's place the heavier object to the left, and the lighter object to the right."**
- (c) Pick up another object and compare its weight to the weight of the previous two objects.  
**"Let's place this object to the left of the lighter object but to the right of the heavier object."**
- (d) Pick up another object and compare it to the earlier objects.  
**"Let's place this object to the left of the lighter objects but to the right of the heavier objects."**
- (e) Continue this way one at a time with the rest of the objects. In the end, you will have all objects arranged by their weights from the lightest to the heaviest.
- (f) Have the student sort five books by their weight
- (g) Have the student sort a quarter, a cup, and a flower pot by weight.



- (h) Have some people stand in a row. Have the student use a weighing machine to sort them by their weights from heaviest to lightest.
- (i) Have the student ask you to sort some objects by weight.
- (j) Continue with this lesson until the student can comfortably compare objects by weight and sort them from heaviest to lightest.
- (k) Repeat the diagnostic test.

## ☺ Diagnostic K4.10     Appropriate Nonstandard Units

*To pass, the student must demonstrate the sense of using appropriate unit to measure with confidence.*

**"Select appropriate unit (steps, feet, paper clips, marbles, pennies, pencils, crayons, or grains of rice) to measure**  
**(a) The length of a room**  
**(b) The length of a finger**  
**(c) The weight of a leaf**  
**(d) The weight of a cup"**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns to use the appropriate non-standard units for the given measurement.*

- (a) Provide a pencil, a crayon, a penny, a marble, a paper clip, and some grains of rice.  
**"Here are some units for measuring lengths and weights."**
- (b) Ask for the appropriate unit needed to measure the length of the table, and length of the book respectively. Respond to the answer given by the student without any comment.  
**"Tell me which of these units is appropriate to measure the length of this table."**  
**"Good. The appropriate unit is pencil because the length of the table is large."**  
**"Tell me which of these units is appropriate to measure the length of this book."**  
**"Good. The appropriate unit will be a paper clip because the length of the book is small."**
- (c) Ask for the appropriate unit needed to measure the weight of the book, and weight of the paper respectively. Respond to the answer given by the student without any comment.  
**"Tell me which of these units is appropriate to measure the weight of this book."**  
**"Good. The appropriate unit will be a penny because you won't need too few or too many pennies to measure the weight of the book."**  
**"Tell me which of these units is appropriate to measure the weight of this sheet of paper."**  
**"Good. The appropriate unit will be a grain of rice because you won't need too few or too many grains of rice to measure the weight of this sheet of paper."**
- (d) Have the student use appropriate non-standard units to measure (a) the length of a room, (b) the length of a finger, (c) the weight of a leaf, and (d) The weight of a cup.
- (e) Have the student ask you to use appropriate non-standard units to measure to measure some lengths and weights.
- (f) Continue with this lesson until the student can use appropriate units for a given measurement.
- (g) Repeat the diagnostic test.

## ☺ Diagnostic K4.11    Concept of Capacity

*To pass, the student must be able to compare greater and lesser capacity correctly, and with confidence.*

**"Take a look at a cup and a jug."**

**"Which container has greater capacity?"**

**"Which container has lesser capacity?"**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student explores the concept of capacity as how much something can hold.*

(a) Introduce the lesson.

**"In this lesson we are going to learn about capacity."**

**"CAPACITY is how much something may hold."**

(b) Give a demonstration of capacity.

**"Here is a cup and a bucket. We fill the cup with water and pour it in the bucket. "**



**"The water from the cup hardly fills the bucket. The bucket can hold more water than the cup can. The bucket has more CAPACITY than the cup."**

(c) Provide some real examples,

**"A hall can hold more people than a room. Therefore, a hall has greater capacity."**

**"A swimming pool has a greater capacity than a bathtub."**

**"A bus has a greater capacity than a van."**

(d) Have the student tell you which of the following have greater capacity than others on this list.  
Cup, spoon, glass, jug, mug, bathtub, pond, sea.

(e) Have the student ask you to describe things of greater and lesser capacities.

(f) Continue with this lesson until the student can comfortably use the concept of capacity.

(g) Repeat the diagnostic test.

## ☺ Diagnostic K4.12    Measuring tools

*To pass, the student must be able to identify with confidence the standard tools and units that are in common use.*

**"What standard measuring tool would you select to measure**

- (a) Length      (b) Weight      (c) Capacity?"**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns about tools commonly used for measuring length, weight, and capacity.*

- (a) Show a foot ruler with inches marked on it, preferably with no subdivisions of inches.

**"This is a foot ruler. It provides a unit length called a FOOT."**



**"These marks on the foot ruler are called INCHES. An INCH is a smaller unit of length."**

- (b) Measure the edge of the table with a foot ruler.

**"We may measure the edge of a table with a foot ruler like this..."**

**"The remaining length less than a foot can be measured in inches."**

**"The length of this table is \_\_\_\_ feet and \_\_\_\_ inches."**

- (c) Show the standard weights of a pound and ounce.

**"This is a unit weight called a POUND, feel it.**

**"This is a smaller unit weight called an OUNCE, feel it."**



- (d) Measure the weight of a thick book on a kitchen scale.

**"The weight of this book is \_\_\_\_ pounds and \_\_\_\_ ounces."**

- (e) Show the measuring containers of standard capacity of gallon and quart.

**"You may measure the amount of water or milk by using these containers. This large container measures a gallon.**

**This small container measures a quart."**

- (f) Have the student measure some lengths, weights and capacities using these tools.

- (g) Have the student ask you to measure some lengths, weights and capacities using these tools.

- (h) Continue with this lesson until the student can comfortably use these tools to measure length, weight and capacity.

- (i) Repeat the diagnostic test.



## ☺ Diagnostic K4.13      Concept of Hot and Cold

*To pass, the student must be able to compare hot and cold correctly, and with confidence.*

**"Feel the water from the taps on the sink."**

**"Which tap has cold water?"**

**"Which tap has hot water?"**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns about the concept of hot and cold.*

- (a) Introduce the lesson.  
**"In this lesson we are going to learn about hot and cold."**
- (b) Provide some real examples,  
**"HOT is how being out in the sun feels in summer."  
"COLD is how ice feels to touch."  
"Ice cream is cold. A cup of hot chocolate is hot."**
- (c) Place two cups on the table. Fill them up with cold and hot water respectively.  
**"Feel the water in the two cups. Which cup has hot water? Which cup has cold water?"**
- (d) Mix hot and cold water in a third cup.  
**"When we mix hot and cold water together in a third cup, then it is neither too hot nor too cold."**
- (e) Have the student compare hot and cold in the following examples.
  - 1. An ice cream cone compared to a cup of tea
  - 2. Summer compared to Winter
  - 3. Being in the sun compared to being under a shade
  - 4. The water in the pool compared to water in the shower
- (f) Have the student describe some things that are hot, and some things that are cold.
- (g) Have the student ask you to describe things that are hot and things that are cold.
- (h) Continue with this lesson until the student can comfortably tell apart hot from cold.
- (i) Repeat the diagnostic test.

## ☺ Diagnostic K4.14    Concept of Time

*To pass, the student must be able identify the order in time as before and after correctly, and with confidence.*

**"Here are two actions.**

**(a) The cat chased the mouse**

**(b) The cat caught the mouse**

**"Which action comes BEFORE the other?"**

**"Which action comes AFTER the other?"**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns to describe the concept of time in terms of interval between changes.*

(a) Introduce the lesson.

**"We are going to look at the idea of TIME."**

(b) Drop a ball and watch it bounce till it stops.

**"Watch this ball bounce, and then come to a total stop."**

**"When things are moving you get a sense of time passing."**

**"When things are totally still you get a sense of no time passing."**

(c) Have the student observe the class with everyone moving and doing their projects normally.

**"With everyone moving do you get the feeling that time is passing?"**

(d) Have everyone in the class totally freeze in place.

**"With nothing moving do you get the feeling that no time is passing?"**

(e) Explain TIME as change occurring.

**"Because the day changes into night, and then the night changes into day, you know that time is passing."**

(f) Give the student one object to hold at a time:

**"Hold this ball. Then hold this book. Then hold this pen."**

**"You held the ball BEFORE you held the book."**

**"You held the pen AFTER you held the book."**

(g) Provide another example,

**"BEFORE afternoon we have morning."**

**"AFTER afternoon we have evening."**

**"There is TIME because events follow one another."**

(h) Have the student observe and indicate at least 3 instances of BEFORE and AFTER.

(i) Have the student ask you to show instances of BEFORE and AFTER.

(j) Continue with this lesson until the student can confidently identify order in time as before and after.

(k) Repeat the diagnostic test.

## ☺ Diagnostic K4.15 Measure of Time

*To pass, the student must be able to compare longer and shorter durations of time correctly, and with confidence.*

"Here are two activities.

(a) Drinking water

(b) Eating a meal

"Which activity takes more time? Which activity takes less time?"

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns to identify which of two daily activities takes more or less time.*

(a) Introduce the lesson.

"I am going to spin two coins. Let's see how much time it takes for them to come to a stop."

(b) Point to the coin that came to rest first.

"This coin took less time to come to a stop."

(c) Point to the coin that came to rest later.

"This coin took more time to come to a stop."

(d) Spin the two coins again. Ask the student:

"Tell me which coin took longer to come to a stop?"

(e) Discuss time taken by the following activities:

1. "Drinking water" compared to "eating a meal"

2. "Cleaning the room" compared to "making the bead"

3. "Doing an addition" compared to "Reading a book"

(f) Have the student compare the time taken by the following activities.

1. "Peeling an apple" to "peeling a banana."

2. "Breaking a toy" to "gluing that toy back together."

3. "Writing your name ten times" to "doing ten jumping jacks."

(g) Have the student ask you to compare the time taken by some activities.

(h) Continue with this lesson until the student can comfortably compare longer and shorter durations of time.

(i) Repeat the diagnostic test.

## ☺ Diagnostic K4.16      Time of Day

*To pass, the student must be able identify the time of the day as morning, afternoon, evening and night correctly, and with confidence.*

**"Draw the position of the sun in the sky."**

- (a) In the **MORNING**
- (b) In the **AFTERNOON**
- (c) In the **EVENING**
- (d) In the **NIGHT**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns to identify the parts of a day as **MORNING, AFTERNOON, and EVENING***

- (a) Have the student visualize what a **DAY** is.  
**"The day is when the sun is up and there is light."**  
**"Night is when the sun is down and it is dark."**
- (b) Have the student visualize a **MORNING**.  
**"MORNING is that time of the day when the sun is rising, and you get out of the bed, get ready and eat breakfast."**
- (c) Have the student visualize **NOON**.  
**"NOON is that time of the DAY when the sun has reached the highest point in the sky. You eat lunch about this time."**
- (d) Explain what **AFTERNOON** is.  
**"The time after noon is called AFTERNOON. The day is hottest during this period."**
- (e) Have the student visualize the **EVENING**.  
**"EVENING is the time of the day when the sun is setting, it is getting dark, and you eat dinner."**
- (f) Describe the sequence of the times of the day.  
**"After morning comes noon, then afternoon, then evening, then night. After night comes the morning of a new day."**
- (g) Have the student ell some of things that happen (a) in the **MORNING**, (b) in the **AFTERNOON**, (c) in the **EVENING**, and (d) in the **NIGHT**
- (h) Have the student sketch on a piece of paper how high the sun is (a) in the **MORNING**, (b) at **NOON**, (c) in the **AFTERNOON**, (d) in the **EVENING**, and (e) in the **NIGHT**
- (i) Have the student ask you to identify the time of the day.
- (j) Continue with this lesson until the student can comfortably identify the time of the day.
- (k) Repeat the diagnostic test.

## ☺ Diagnostic K4.17      Yesterday, Today and Tomorrow

*To pass, the student must be able identify the time as yesterday, today and tomorrow correctly, and with confidence.*

- “Can you think of something  
(a) That happened yesterday?  
(b) That happened today?  
(c) That may happen tomorrow?”

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student explores the concepts of past, present and future by identifying YESTERDAY, TODAY and TOMORROW.*

- (a) Have the student visualize TODAY.  
“TODAY started with the first light this morning. You are in school TODAY. You shall be going back to home after the school.”  
“Think of something you have done today.”
- (b) Have the student visualize YESTERDAY.  
“YESTERDAY was the day that came before last night. You went to school YESTERDAY, and then went home after the school.”  
“Think of something you did yesterday.”
- (c) Have the student visualize TOMORROW.  
“TOMORROW is the day that will start after tonight. You may have no school TOMORROW if it is a weekend or a holiday.”  
“Think of something you plan to do tomorrow.”
- (d) Have the student identify at least three actions belonging to YESTERDAY, three actions belonging to TODAY, and three actions that may belong to TOMORROW.
- (e) Have the student ask you to identify actions belonging to YESTERDAY, TODAY and TOMORROW.
- (f) Continue with this lesson until the student can identify the time as yesterday, today and tomorrow correctly, and with confidence.
- (g) Repeat the diagnostic test.

## ☺ Diagnostic K4.18      Days of Week

*To pass, the student must be able identify the seven days of the week correctly, and with confidence.*

**"What are the days of a WEEK?"**

**"What day comes before WEDNESDAY?"**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns about the days of a week.*

(a) Introduce the days of week from a calendar.

**"7 days make a week. These days are named as follows."**

SUN	Sunday
MON	Monday
TUE	Tuesday
WED	Wednesday
THU	Thursday
FRI	Friday
SAT	Saturday



**"You go to school from Monday to Friday, or 5 days of the week. On Saturday and Sunday the schools are closed."**

(b) Point to the numbers on a calendar.

**"Each number on this sheet refers to a DAY. There are 30 different days on this sheet."**

(c) Point to the columns.

**"These days are arranged in seven columns for 7 days of the week."**

**"On this calendar, day 1 is a Tuesday. Day 17 is a Thursday."**

(d) Now point to the row.

**"Each row refers to a week. There are 7 days in a week. A WEEK starts on a Sunday and ends on a Saturday. After Saturday comes Sunday again."**

(e) Introduce the concept of a WEEK as a larger unit of time.

**"A DAY is a smaller unit of time. A WEEK is a larger unit of time."**

(f) Have the student recite the 7 DAYS of a WEEK in proper sequence.

(g) Have the student answer the following. Assist the student as needed.

1. What DAY comes before WEDNESDAY?
2. What DAY comes after SUNDAY?
3. If today is THURSDAY, what day was yesterday?
4. If today is TUESDAY, what day will be tomorrow?
5. If today is SATURDAY, what day will it be in 2 days?

(h) Have the student ask you to recite the days of the week.

(i) Continue with this lesson until the student can identify the seven days of the week correctly, and with confidence.

(j) Repeat the diagnostic test.

## ☺ Diagnostic K4.19      Months of Year

*To pass, the student must be able identify the twelve months of the year correctly, and with confidence.*

**“What are the MONTHS of a YEAR?”**

**“What month comes before SEPTEMBER?”**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns the twelve months of a year and the sequence in which they occur.*

(a) Show the sheets on the calendar.

**“There are twelve sheets in this calendar for 12 different months. 12 months make a year. A YEAR is the time from one birthday to the next.”**

(b) Introduce the concept of a MONTH as a larger unit of time.

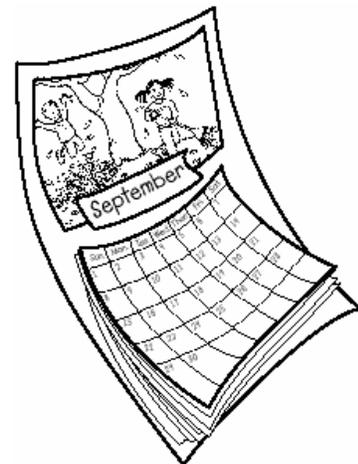
**“A MONTH is made up of about 30 days, or about 4 weeks. A month is a larger unit of TIME.”**

(c) Describe a year.

**“The names of the months of a year are:**

- |             |              |
|-------------|--------------|
| 1. JANUARY  | 7. JULY      |
| 2. FEBRUARY | 8. AUGUST    |
| 3. MARCH    | 9. SEPTEMBER |
| 4. APRIL    | 10. OCTO BER |
| 5. MAY      | 11. NOVEMBER |
| 6. JUNE     | 12. DECEMBER |

**“A YEAR starts from January and ends in December. After December comes January again.”**



(d) Explain

**“SPRING starts in the month of MARCH. SUMMER starts in the month of JUNE. FALL starts in the month of SEPTEMBER. WINTER starts in the month of DECEMBER. After WINTER comes SPRING again.”**

(e) Have the student recite the 12 MONTHS of a YEAR in proper sequence.

(f) Have the student explain

1. What month comes after JUNE?
2. What month comes before SEPTEMBER?
3. What month comes before JANUARY?
4. If the current month is DECEMBER, what is the next month?
5. If the current month is MAY, what was the previous month?

(g) Have the student ask you to recite the months of the year in sequence.

(h) Continue with this lesson until the student can identify the twelve months of the year correctly, and with confidence.

(i) Repeat the diagnostic test.

## ☺ Diagnostic K4.20     Dates on Calendar

*To pass, the student must be able to comfortably locate any date on the calendar with confidence.*

**"Show today's DATE on the CALENDAR."**

**"Show your birthday on the CALENDAR."**

If the diagnostic fails, then do the Lesson & Exercise.

### Lesson & Exercise

*In this lesson the student learns the concept of date and locates dates on a calendar.*

- (a) Point to the calendar.

**"This is the calendar for the year 2001."**

- (b) Point to the sheet for a month.

**"This is the sheet for the month of August."**

- (c) Point to day 1 on that sheet.

**"This is day number 1. The special name for this day is Day 1 of August of 2001. You may also call it August 1, 2001."**

August 2001						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

- (d) Introduce the concept of a date.

**"This special name is called the DATE. No other day can have the same DATE."**

- (e) Get this current calendar and point to the date for TODAY.

**"Every year you get a new calendar. This is the calendar for the current year**

**The current year is \_\_\_\_\_.**

**The current month is \_\_\_\_\_.**

**This is the \_\_\_\_ day of this month.**

**So, the date for today is \_\_\_\_\_."**

**The day of the week for today is \_\_\_\_\_."**

- (f) Have the student explain

1. What DATE comes after January 11 on the calendar?
2. What day of the week is April 15 this year?
3. What day of the week is February 14 this year?
4. What date comes after May 21, 2000?
5. What day of the week is your birthday this year?

- (g) Have the student identify his (or her) birthday on the calendar for this year.

- (h) Have the student ask you to identify some dates.

- (i) Continue with this lesson until the student can comfortably locate any date on the calendar with confidence..

- (j) Repeat the diagnostic test.

## SUMMARY

This is the fourth of the seven levels of the Troubleshooting Guide for Kindergarten Math. The Troubleshooting Guide for Kindergarten introduces the concept of UNIT, and explores ways to measure length, weight, capacity and time. It further develops the concept of counting into the concepts of addition and subtraction.

The Kindergarten troubleshooting guide is divided into the following levels:

### **(1) ORIENTATION & SPATIAL SENSE**

Orientation and Spatial Sense forms the foundation of the subject of GEOMETRY. It introduces the elements of space and how they relate to us.

### **(2) NUMBERS & PLACE VALUES**

Numbers and Place Values form the foundation of the subject of ARITHMETIC. It introduces a system of whole numbers to represent quantities in a simple manner.

### **(3) UNITS & FRACTIONS**

Units & Fractions addresses ways to represent quantities, which cannot be represented by whole numbers.

### **(4) COUNTING & MEASUREMENTS**

Counting & Measurements provides ways to determine the various magnitudes. It helps to bring familiarization with the use of numbers.

### **(5) NUMBERS & OPERATIONS**

Numbers & Operations introduces the basic operations with numbers and how such operations may be executed with skill.

### **(6) PATTERNS & RELATIONAL SENSE**

Patterns and Relational Sense forms the foundation of the subject of ALGEBRA. It is a study of patterns underlying numbers, and quantitative relationships.

### **(7) DATA ANALYSIS & PROBABILITY**

Data Analysis & Probability shows how to display quantitative comparisons graphically. It introduces the estimation of likelihood.

Though these lessons are designed for the kindergarten level, these diagnostic actions may be used for students at higher grades to help discover and resolve missing basics.

## GLOSSARY

*[For additional words refer to the glossary at the end of earlier levels.]*

<b>Capacity</b>	<b>Capacity</b> is how much amount something can hold. For example, the capacity of a bucket is how much water it can hold.
<b>Distance</b>	A <b>distance</b> is a measure of how far a location is from another.
<b>Length</b>	A <b>length</b> is a measure of how long something is.
<b>Measure</b>	To <b>measure</b> is to ascertain the extent, size, capacity, etc., of something, especially by comparison with a standard unit.
<b>Standard Unit</b>	<p>A <b>standard unit</b> is a unit that is generally agreed upon as a basis of comparison. For example, an "hour" is a standard unit of time that is agreed upon all over the world.</p> <p>A <b>nonstandard unit</b> is a unit that is not so agreed upon. For example, we can use the duration one breath as a non-standard unit of time.</p>
<b>Time</b>	<b>Time</b> is the interval between two successive events. Time passes as events occur. It will be hard to get a sense of time if no event is occurring.
<b>Uniform Unit</b>	A unit must be used in a <b>uniform</b> manner for two or more measurements to be comparable. In other words, the same unit must be used the same way before the resulting measurements could be compared.
<b>Unit</b>	<p>A <b>unit</b> is what we count one at a time. When we count one cookie at a time then each cookie is a unit. When we count a "box of 10 cookies" at a time then each box is a unit. The word UNIT comes from a Latin word "<i>unitus</i>" which means "one."</p> <p>The <b>unit</b> used in measurement is a small but definite amount of what is being measured. For example, to measure lengths, a small but definite amount of length called an "inch" is used as a unit. When "12 inches" is used as a unit, it is called a "foot."</p>
<b>Weight</b>	<b>Weight</b> is a measure of how light or heavy something is.