

Module 7: Weights and Measures

Minimum Number of Theory Hours: 1

Recommended Theory Hours: 1

Recommended Clinical Hours: 1

Statement of Purpose:

The purpose of this unit is to introduce a measuring system for weight, length, and volume used by nursing assistant in the clinical setting.

Terminology:

1. Centimeter
2. Fluid ounce (fl oz.)
3. Foot (ft.)
4. Gallon (gal)
5. Gram
6. Greenwich
7. Household system
8. Inch (in)
9. Kilogram (Kg)
10. Liter
11. Meter (M)
12. Metric system
13. Military time (or international time)
14. Milliliter (ml)
15. Millimeter (mm)
16. Ounce (oz.)
17. Pint (pt.)
18. Pound (lb.)
19. Quart
20. Tablespoon (Tbsp.)
21. Teaspoon (tsp.)
22. Yard (yd.)

Patient, resident, and client are synonymous terms referring to the person receiving care

Performance Standards (Objectives):

Upon completion of one (1) hour of class plus homework assignments and one (1) hour of clinical experience, the learner will be able to:

1. Define key terminology
2. Identify units of measurement used in the household and metric systems for weight, length, and volume
3. Identify and describe equipment commonly used by the Nurse Assistant for measuring weight, length, height, and volume
4. Convert common measurements between the household and metric systems
5. Measure and record weight, height, and volume using the metric and household systems
6. Convert between standard time and military time (24 hour clock)

References:

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Content Outline	Recommended Teaching Strategies and Assignments	Clinical Demonstration/ Method of Evaluation
<p>Objective 1 Define Key Terminology. A. Review the terms listed in the terminology section B. Spell the listed terms accurately C. Pronounce the terms correctly D. Use the terms in their proper context</p>	<p>A. Lecture/Discussion B. Games: word searches, crossword puzzles, Family Feud, Jeopardy, bingo, spelling bee, hangman, and concentration C. Encourage use of internet, medical dictionary, and textbooks D. Create flashcards E. Handout 7.1a- Weights and Measures Crossword F. Handout 7.1b- Weights and Measures Crossword- KEY</p>	<p>A. Have students select five words from the list of key terminology and write a sentence for each defining the term B. Administer vocabulary pre-test and post-test C. Uses appropriate terminology when charting and reporting to licensed personnel</p>
<p>Objective 2: Identify units of measurement used in the household and metric systems for weight, height, and volume. A. U.S. Customary weights and measurements (household) 1. Weight – ounce (oz) and pound (lb) 2. Length – inch (in), feet (ft), yard (yd), mile (mi) 3. Volume – fluid ounce (fl oz), pint (pt), quart (qt), gallon (gal), teaspoon (tsp), tablespoon (Tbsp) B. International weights and measurements (metric) 1. Weight - gram (gm), kilogram (kg) 2. Length - millimeter (mm), centimeter (cm), meter (M) 3. Volume - milliliter (ml), liter (L)</p>	<p>A. Lecture/Discussion B. Flash cards of terms and abbreviations C. Show examples of equipment used to measure weight, length, and volume</p>	<p>A. Written test B. Correctly identify metric and household measuring equipment and the units of measure for each</p>

<p>Objective 3: Identify and describe equipment commonly used by the Nurse Assistant for measuring weight, length, and volume (see module 8).</p> <p>A. Volume measuring equipment</p> <ol style="list-style-type: none"> 1. Graduated cylinders (metric and household) <ol style="list-style-type: none"> a. Marked with lines and numbers b. Usually marked in ounces and milliliters c. Measuring cups and spoons (household) d. Serving containers <p>B. Length measuring equipment</p> <ol style="list-style-type: none"> 1. Yardstick 2. Tape measure 3. Standing scale with measuring rod <ol style="list-style-type: none"> a. Marked in fractions of inches, feet b. Marked in centimeters <p>C. Weight measuring equipment</p> <ol style="list-style-type: none"> 1. Scales <ol style="list-style-type: none"> a. Marked in ounces, pounds, grams, and kilograms b. Can be electronic or digital 2. Types of scales <ol style="list-style-type: none"> a. Standing <ol style="list-style-type: none"> 1) Used for patient/resident who can stand unassisted and not hold onto scale 2) Patient/resident must be steady on feet b. Wheelchair <ol style="list-style-type: none"> 1) Used for patient/resident who cannot stand unassisted 2) Weigh unoccupied wheelchair, then weigh patient/resident in wheelchair and subtract wheelchair weight from total weight c. Mechanical lift <ol style="list-style-type: none"> 1) Cloth sling to hold patient/resident and a hydraulic lift to raise and lower 2) Weigh sling and any linen first, then subtract 	<p>A. Lecture/Discussion B. Show examples of equipment used to measure weight, length, and volume</p>	<p>A. Written test B. Correctly identify metric and household measuring equipment and the units of measure for each</p>
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<p>d. Bed scale</p> <ol style="list-style-type: none"> 1) Used for patient/resident who is on bed rest or unable to be in a chair or ambulate 2) Weigh any linens first then subtract linens from total weight 3) Patient's/resident's body must not be touching mattress <p>e. Chair-used for patient/resident who cannot stand unassisted</p>		
<p>Objective 4: Convert common measurements between the household and metric systems.</p> <p>A. Weight (wt) 1 Kg = 2.2 pounds (lb)</p> <p>B. Length 1 inch = 2.5 centimeters (cm)</p> <p>C. Volume</p> <ol style="list-style-type: none"> 1. 1 ounce = 30 milliliters (ml) 2. 1 cup = 240 ml = 8 ounce (oz) 3. 1 pint = 500 ml 4. 1 quart = 1000 ml = 1 liter (L) 5. 1 teaspoon (tsp) = 5ml 6. 1 tablespoon (Tbsp) = 15 ml 	<p>A. Lecture/Discussion</p> <p>B. Handout 7.4- Lab Activity Practice Worksheet</p> <p>C. Have students make flashcards of equivalents and additional abbreviations</p> <p>D. Assign workbook exercises for homework</p>	<p>A. Written test</p> <p>B. Identify instances in which conversion between household and metric systems is required</p>
<p>Objective 5: Measure and record weight, length, and volume using metric and household systems.</p> <p>A. Procedure for measuring weight on a standing scale</p> <ol style="list-style-type: none"> 1. Prior to beginning procedure, make sure the scale is balanced at zero 2. Place paper towel on platform 	<p>A. Lecture/Discussion</p> <p>B. Handout 7.5- Fluid Measurement Lab Activity</p> <p>C. Provide sample trays to</p>	<p>A. Written test</p> <p>B. Record accurately all measurements on appropriate facility forms</p>

<ol style="list-style-type: none"> 3. Help patient/resident step onto center of the scale 4. Read the scale when in balance to the nearest quarter pound (or tenth of kilogram) 5. Help patient/resident off the scale 6. Clean and return equipment 7. Record measurement using correct abbreviation for unit of measurement <p>B. Procedure for measuring length</p> <ol style="list-style-type: none"> 1. Length is also measured as height 2. A measuring tape can be used for a patient/resident who is stooped, contracted, or in bed <ol style="list-style-type: none"> a. Measure all segments b. Add all measurements together to find total height 3. Measuring a patient's/resident's height using an upright scale <ol style="list-style-type: none"> a. Assist the patient/resident to remove their slippers b. Raise the height rod on the upright scale c. Assist the patient/resident to stand on the scale platform, arms at sides d. Have the patient/resident turn around and face away from the scale e. Lower the height measurement rod until it rests on patient's/resident's head f. Record the height, reading is made at the moveable point of the ruler g. Assist patient/resident off the platform and put slippers back on h. Record measurement using correct abbreviation for unit of measurement <p>C. Procedure for measuring volume</p> <ol style="list-style-type: none"> 1. Pour liquid into graduate container 2. Place container on flat surface 3. Read at eye level 4. Use measurement at lowest level of liquid surface 5. Record measurement using correct abbreviation for unit of measurement 	<p>calculate fluid intake</p> <ol style="list-style-type: none"> D. Correctly measure and record weight of two classmates using two different types of scales E. Correctly measure height of two classmates, one standing and one simulating contractures F. Manual Skills 7.5a- Measures and Records Weight of Ambulatory Patient/resident G. Manual Skills 7.5b- Weighing the Patient/resident in Bed H. Manual Skills 7.5c- Measuring Weight of Patient/resident in Wheel Chair I. Manual Skills 7.5d- Measuring the Patient's/resident's Height Using an Upright Scale J. Manual Skills 7.5e- Measuring Height of Patient/resident in Bed 	
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<p>D. General guidelines when measuring volume, length, and weight</p> <ol style="list-style-type: none"> 1. Always use safety precautions for patient/resident and self <ol style="list-style-type: none"> a. Be familiar with how to use measuring equipment before the patient/resident is involved (i.e. scales) b. Make sure equipment is functioning correctly 2. Wash hands before, after, and as needed when doing any procedure 3. Wear gloves when handling body fluids and dispose of fluids correctly 4. Balance scale before assisting patient/resident onto scale 5. Have the patient/resident urinate before weighing 6. It is best to weigh patient/resident at the same time of day, using the same scale, and with the same linen or similar clothing 7. Know if patient/resident is to be weighed with or without shoes 8. Have at least one additional person helping when using mechanical lifts 9. Clean equipment and return it to appropriate location 10. Record findings on appropriate form(s) 11. Report any changes in findings to appropriate person 12. Be aware of how the patient/resident tolerates the procedure 		
<p>Objective 6 Convert between standard time and military time (24-hour clock)</p> <p>A. Systems of telling time</p> <ol style="list-style-type: none"> 1. Standard <ol style="list-style-type: none"> a. A.M. = morning, midnight to noon b. P.M. = evening, noon to midnight <p>B. Military (24-hour clock)</p> <ol style="list-style-type: none"> 1. Four digits 2. No colons 3. Do not use A.M. or P.M. 4. Starts one minute after midnight (0001) and ends at midnight 24 hours later (2400) 5. Noon is 1200 	<p>A. Lecture/Discussion B. Handout 7.6- Military/ (24 Hour Clock)</p>	<p>A. Written test B. Demonstrates correct use of military and standard time</p>

Sample Test: Module 7- Weights and Measures

1. Match the correct household unit of measure to the correct metric units:

- A. ounce _____ 30 milliliters (ml)
- B. inch _____ 500 milliliters (ml)
- C. pint _____ 1000 milliliters (ml)
- D. foot _____ 30 centimeters (cm)
- E. quart

2. What would be the correct military time if the clock reads 3:00 p.m. in Greenwich time:

- A. 1200
- B. 1500
- C. 1600
- D. 0300

3. When measuring liquid volume with a graduated cylinder, the Nurse Assistant should do all of the following except:

- A. Pour liquid into the graduated cylinder
- B. Place graduated cylinder on a flat surface
- C. Read at eye level
- D. Read measurement at highest level of liquid surface

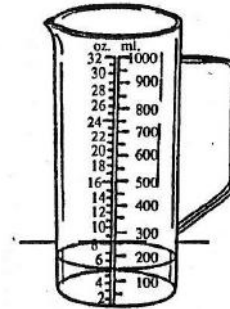
4. Match the correct military time to the correct Greenwich time:

- A. 1945 _____ 7:45 A.M.
- B. 1235 _____ 3:25 P.M.
- C. 0745 _____ 12:35 P.M.
- D. 1525 _____ 7:45 P.M.
- E. 0035

5. A patient/resident weighing 165 pounds is on a reduced calorie diet. The goal is to lose 2 pounds every week. Which of the following weights would meet the goal after one week?
- A. 167 pounds
 - B. 165 pounds
 - C. 164 pounds
 - D. 163 pounds
6. If a person on I&O drinks 12 ounces of milk, the Nurse Assistant should mark on the client's record an intake of:
- A. 30 ml.
 - B. 90 ml.
 - C. 240 ml.
 - D. 360 ml.

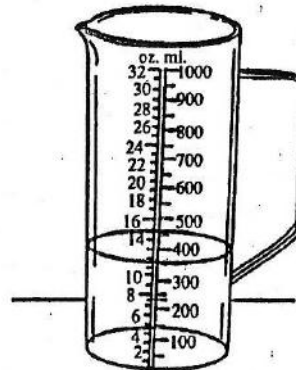
7. How many milliliters are in this graduate?

- A. 5
- B. 11
- C. 150
- D. 350



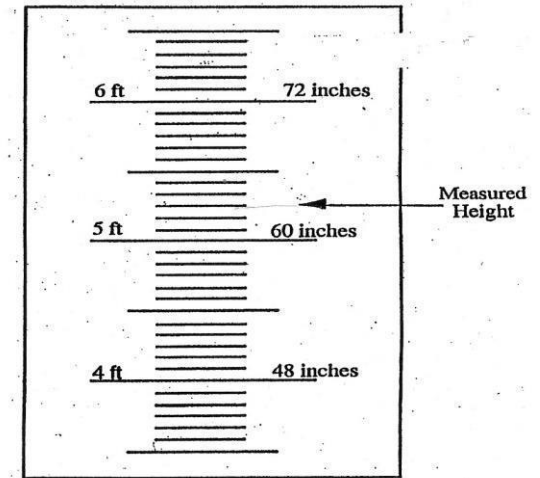
8. How many milliliters (ml) are in the graduate?

- A. 5
- B. 10
- C. 150
- D. 350



9. The Nurse Assistant measured the height of a patient/resident. Using drawing to the right, what is the patient's/resident's height?

- A. 60 inches
- B. 5 ½ feet
- C. 5 feet 3 inches
- D. 4 feet, 13 inches



10. The Nurse Assistant is measuring intake and output for a patient/resident who drank 8 ounces of milk. What should the Nurse Assistant record?

- A. 500 ml.
- B. 120 ml.
- C. 240 ml.
- D. 250 ml.

11. A patient/resident is to be repositioned at 6:00 pm. Using military time, the Nurse Assistant repositions the patient/resident at:

- A. 0600
- B. 1200
- C. 1800
- D. 2100

12. Your patient/resident ate the following items for lunch: ½ cup string beans, 3 oz. fish, 6 oz. milk, 2 oz. Jello. What was his fluid intake?

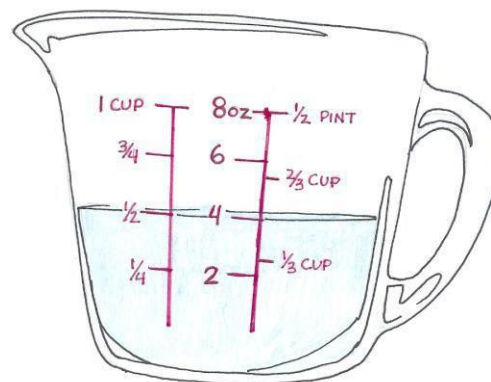
- A. 120 ml.
- B. 240 ml.
- C. 300 ml.
- D. 330 ml.

13. The clock shows 10:32 am. In 24-hour clock time, this is:

- A. 10:32
- B. 1032
- C. 2232
- D. 10:32 am

14. How many milliliters (ml) of fluid are in the cup?

- A. 30 ml.
- B. 60 ml.
- C. 90 ml.
- D. 120 ml.



Sample Test Answers: Module 7

1. A - 30 milliliters (ml)
B - 500 milliliters (ml)
C - 1000 milliliters (ml)
D - 30 centimeters (cm)
2. B
3. D
4. C - 7:45 A.M.
D - 3:25 P.M.
B - 12:35 P.M.
A - 7:45 P.M.
5. D
6. D
7. C
8. D
9. C
10. C
11. C
12. B
13. B
14. D

MANUAL SKILL: Measures and Records Weight of Ambulatory Client (using portable upright scale)
(see module 8)

EQUIPMENT:

Paper towel
Portable upright scale

BEGINNING STEPS:

1. Wash hands
2. Knock and pause before entering the patient's/resident's room
3. Introduce self
4. Identify patient/resident
5. Explain procedure speaking clearly, slowly, and directly, maintaining face-to-face contact whenever possible
6. Gather equipment, if applicable
7. Provide for privacy with a curtain, door, or screen
8. Apply gloves (standard precautions)

SKILL STEPS:

1. Assist the patient/resident to use the bathroom.
2. Take the patient/resident to the scale or bring the scale to the patient's/resident's room.
3. Provide for privacy.
4. Place a paper towel on the platform of the scale.
5. Balance the scale. When the weights are at zero, the balance bar's pointer should be floating at zero.
6. Assist the patient/resident to remove robe and slippers.
7. Assist the patient/resident to stand on center of the scale platform.
8. Move the large weight to the closest estimated patient/resident weight on the balance bar.
9. Move the small weight to the right until the balance bar's pointer hangs free halfway between the upper and lower bar guides (at the zero point).
10. Record the weight.
11. Assist the patient/resident off the platform.
12. Assist the patient/resident to put on robe and slippers.
13. Return equipment or return patient/resident to room as indicated.

ENDING STEPS:

1. Clean and return equipment and supplies, if applicable
2. Remove gloves (without contaminating self) into waste container and wash hands
3. Position patient/resident comfortably
4. Place call light within reach
5. Lower bed to safe position for the patient/resident
6. Leave room neat
7. Wash hands
8. Document
9. Report abnormal findings to licensed nurse

MANUAL SKILL: Weighing the Patient/resident in Bed
(see module 8)

EQUIPMENT:

Overbed scale

BEGINNING STEPS:

1. Wash hands
2. Knock and pause before entering the patient's/resident's room
3. Introduce self
4. Identify patient/resident
5. Explain procedure speaking clearly, slowly, and directly, maintaining face-to-face contact whenever possible
6. Gather equipment, if applicable
7. Provide for privacy with a curtain, door, or screen
8. Apply gloves (standard precautions)

SKILL STEPS:

1. Check scale sling for frayed area or poorly closing straps.
2. Take scale and mechanical lift to patient's/resident's bedside.
3. Set scale to zero.
4. Balance scale to include weight of sling, straps, and linen prior to positioning patient/resident in sling.
5. Provide for privacy.
6. Assist the patient/resident to use the bedpan.
7. Lock bed wheels.
8. Raise bed to comfortable working level for Nurse Assistant.
9. Lower side rail on Nurse Assistant's side. Make sure side rail on other side is up and locked.
10. Turn patient/resident away from the Nurse Assistant.
11. Place the sling folded lengthwise under the patient/resident.
12. Turn the patient/resident toward Nurse Assistant and position sling so that the patient/resident rests centered within the sling.
13. Turn and position patient/resident onto his or her back (supine position).
14. Attach suspension straps to sling. Check that all attachments are securely in place and hook points facing outward, away from patient's/resident's body.
15. Position frame over bed with base legs in the maximum open position.

16. Lock frame.
17. Attach suspension straps to frame.
18. Position patient's/resident's arms inside straps.
19. Slowly raise sling so patient's/resident's body is not touching the bed.
20. Adjust weights to balance scale.
21. Record weight.
22. Reposition sling over center of bed.
23. Slowly lower the patient/resident onto the bed.
24. Take off hooks and straps.
25. Turn patient/resident toward Nurse Assistant and remove sling.

ENDING STEPS:

1. Clean and return equipment and supplies, if applicable.
2. Remove gloves (without contaminating self) into waste container and wash hands.
3. Position patient/resident comfortably.
4. Place call light within reach.
5. Lower bed to safe position for the patient/resident.
6. Leave room neat.
7. Wash hands.
8. Document.
9. Report abnormal findings to licensed nurse.

MANUAL SKILL: Weighing the Patient/resident in a Wheelchair
(see module 8)

EQUIPMENT:

Overbed scale

BEGINNING STEPS:

1. Wash hands.
2. Knock and pause before entering the patient's/resident's room.
3. Introduce self.
4. Identify patient/resident.
5. Explain procedure speaking clearly, slowly, and directly, maintaining face-to-face contact whenever possible.
6. Gather equipment, if applicable.
7. Provide for privacy with a curtain, door, or screen.
8. Apply gloves (standard precautions).

SKILL STEPS:

1. Weigh empty wheelchair.
2. Take wheel chair to patient/resident and assist patient/resident into wheel chair.
3. Take patient/resident to scale with wheel chair platform.
4. Provide for privacy.
5. Roll wheel chair with patient/resident onto platform.
6. Lock wheels of wheel chair.
7. Adjust weights to balance scale.
8. Record weight.
9. Return patient/resident to bed as necessary.

ENDING STEPS:

1. Clean and return equipment and supplies, if applicable.
2. Remove gloves (without contaminating self) into waste container and wash hands.
3. Position patient/resident comfortably.
4. Place call light within reach.
5. Lower bed to safe position for the patient/resident.
6. Leave room neat.
7. Wash hands.
8. Document after subtracting weight of wheelchair from total weight.
9. Report abnormal findings to licensed nurse.

MANUAL SKILL: Measuring the Height of Patient/resident Using an Upright Scale
(see module 8)

EQUIPMENT:

Portable upright scale

BEGINNING STEPS:

1. Wash hands.
2. Knock and pause before entering the patient's/resident's room.
3. Introduce self.
4. Identify patient/resident.
5. Explain procedure speaking clearly, slowly, and directly, maintaining face-to-face contact whenever possible.
6. Gather equipment, if applicable.
7. Provide for privacy with a curtain, door, or screen.
8. Apply gloves (standard precautions).

SKILL STEPS:

1. Take the patient/resident to the scale or bring the scale to the patient's/resident's room.
2. Provide for privacy.
3. Place a paper towel on the platform of the scale.
4. Assist the patient/resident to remove their slippers.
5. Raise the height rod.
6. Assist the patient/resident to stand on the scale platform, arms at side.
7. Have the patient/resident turn around and face away from the scale.
8. Lower the height measurement rod until it rests on the patient's/resident's head.
9. Record the height. The reading is made at the movable point of the ruler.
10. Assist the patient/resident off the platform.
11. Assist the patient/resident to put on their slippers.

ENDING STEPS:

1. Clean and return equipment and supplies, if applicable.
2. Remove gloves (without contaminating self) into waste container and wash hands.
3. Position patient/resident comfortably.
4. Place call light within reach.
5. Lower bed to safe position for the patient/resident.
6. Leave room neat.
7. Wash hands.
8. Document.
9. Report abnormal findings to licensed nurse.

MANUAL SKILL: Measuring the Height of a Patient/resident in Bed

(see module 8)

EQUIPMENT:

Pencil
Tape measure

BEGINNING STEPS:

1. Wash hands.
2. Knock and pause before entering the patient's/resident's room.
3. Introduce self.
4. Identify patient/resident.
5. Explain procedure speaking clearly, slowly, and directly, maintaining face-to-face contact whenever possible
6. Gather equipment, if applicable.
7. Provide for privacy with a curtain, door, or screen
8. Apply gloves (standard precautions)

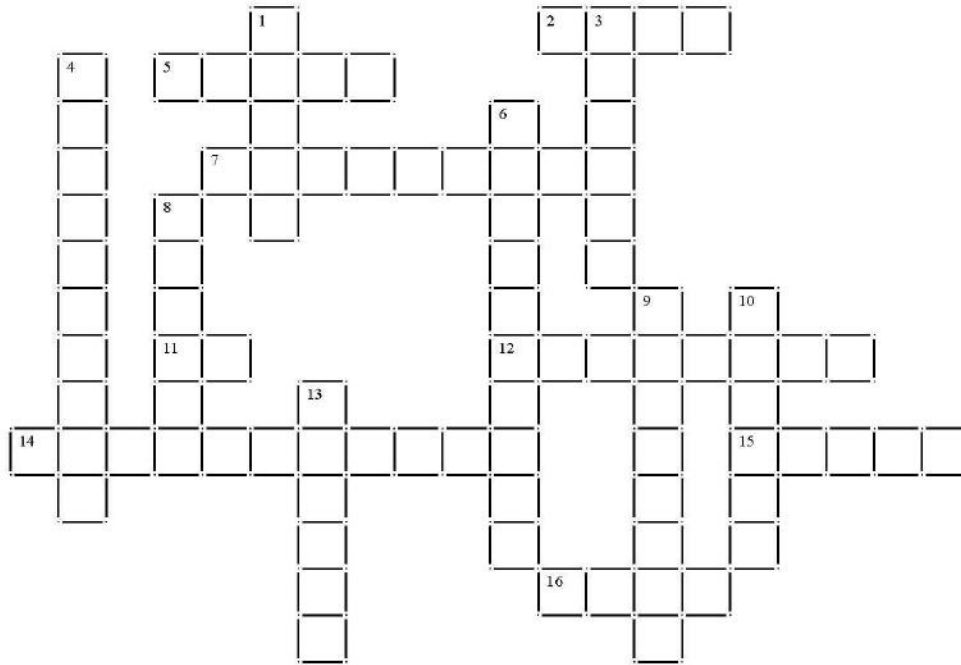
SKILL STEPS:

1. Lower side rail on your side.
2. Position patient/resident on his or her back (supine position) and remove pillow.
3. Draw a small pencil mark at the top of the patient's/resident's head on the sheet. If the patient/resident is stooped over or contracted, measure the patient's/resident's body in segments and total the measurements.
4. Make a second pencil mark even with the patient's/resident's heels.
5. Position the patient/resident on his/her side with his/her back toward the CNA.
6. Using the tape measure, measure the distance between the two marks.

ENDING STEPS:

1. Clean and return equipment and supplies, if applicable.
2. Remove gloves (without contaminating self) into waste container and wash hands
3. Position patient/resident comfortably.
4. Place call light within reach.
5. Lower bed to safe position for the patient/resident.
6. Leave room neat.
7. Wash hands.
8. Document.
9. Report abnormal findings to licensed nurse.

Weights and Measures Crossword



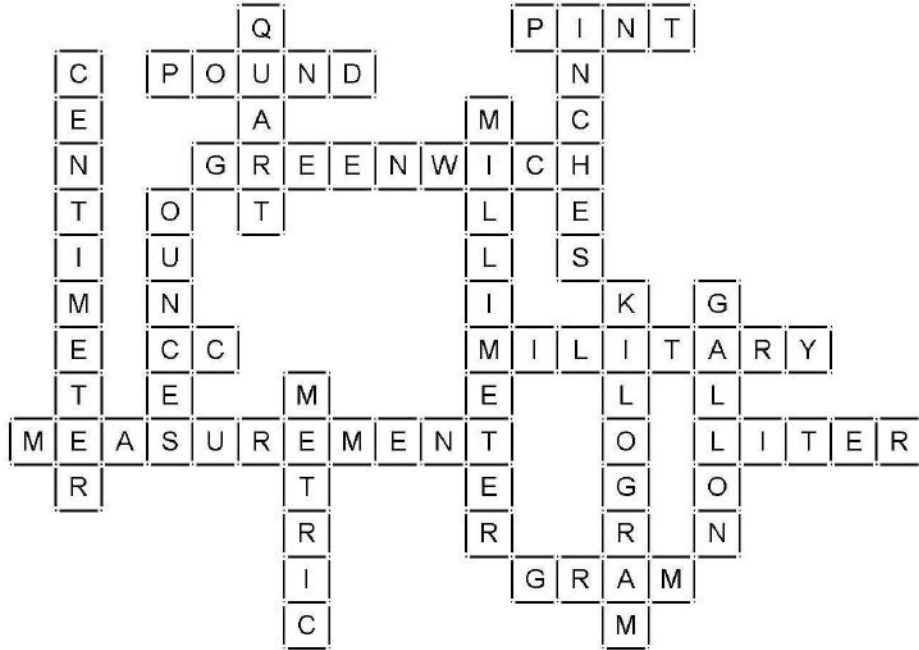
ACROSS

- 2 Two cups equal a ____.
- 5 Sixteen ounces equal one ____.
- 7 Traditional time.
- 11 Short for cubic centimeter.
- 12 System of telling time in which 1:00pm is 1300 hours.
- 14 The size of something.
- 15 Metric system measure that is about equal to one quart.
- 16 Basic unit of weight in the metric system.

DOWN

- 1 Two pints equal one ____.
- 3 Measurement; 12 ____ makes a foot.
- 4 A unit of measurement 1/100.
- 6 One thousandth of a liter.
- 8 Sixty cc's equals two ____.
- 9 Equal to 1000 grams.
- 10 Four quarts equal one ____.
- 13 The international system of measurement.

Weights and Measures Crossword



Lab Activity/Practice Worksheet:

Med cup #1 --	_____ml
	_____teaspoon
Med cup #2 --	_____tablespoon
	_____ml
Measuring cup --	_____ounces
Coffee cup	_____ml
Urine cup --	_____ml
Plastic graduate	_____measure
	_____ounces
Urinal	_____ounces
	_____ml
Catheter drainage bag – measure in the bag itself, then empty and measure.	_____ml
	_____ml

Fluid Measurement Handout:

Metric weight – 1 Kg = 2.2 lbs.

Metric height -- 1 cm = .39 inches.

1 inch = 2.5 cm

1cc = 1ml

1 ounce = 30 ml

1 teaspoon = 5 ml

1 tablespoon = 15 ml

1 cup = 8 ounces = 240ml

1 pint = 16 ounces = 500ml

1 quart = 32 ounces = 1000 ml

1 liter = 1000ml

a.m. = morning

p.m. = evening

wt. = weight

ht. = height

cc = cubic centimeter

Kg = kilogram

Lb. = pound

L = liter

h.s. = hour of sleep

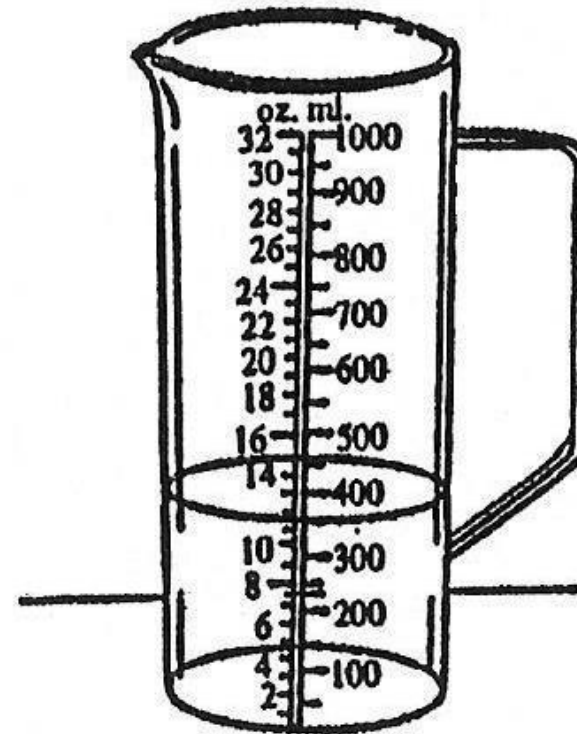
oz. = ounce

tbsp. = tablespoon

tsp. = teaspoon

amt. = amount

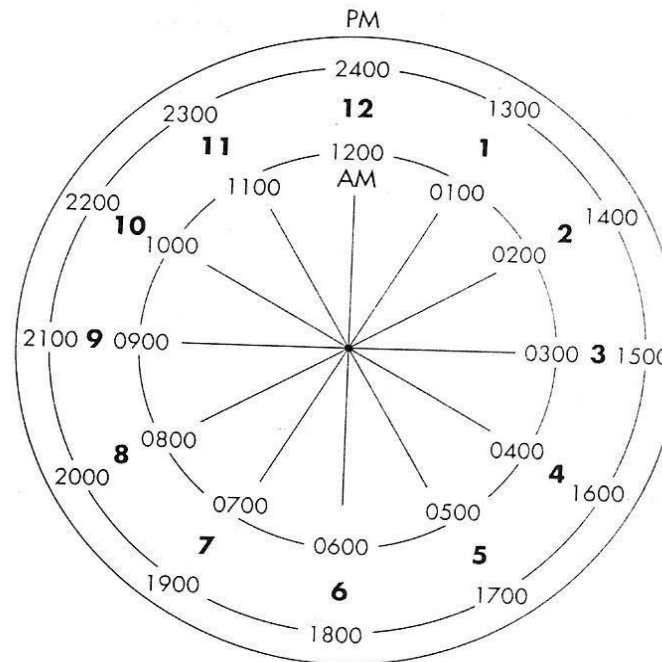
gtt = drop



MILITARY/24 HOUR TIME CLOCK

Using a different color pen show the time on the clock face. Then convert the regular time into military time (number 1 is shown as an example).

1. 8:20 a.m. = 0820 (example)
2. 11:47 a.m. = _____
3. _____ = 1430
4. 5:15 p.m. = _____
5. 9:10 p.m. = _____
6. _____ = 2400
7. _____ = 1200



Correct answers should read:

1. 8.20 a.m.= 0820
2. 11:47 a.m.= 1147
3. 2:30 p.m.= 1430
4. 5:15 p.m.= 1715
5. 9:10 p.m.= 2110
6. Midnight (12 a.m.) = 2400
7. 12:00 p.m. (noon) = 1200