

LESSON PLAN: 5

COURSE TITLE: MEDICATION TECHNICIAN

UNIT: II GENERAL PRINCIPLES

SCOPE OF UNIT:

This unit includes medication terminology, dosage, measurements, drug forms, transcribing physician's orders, packaging, storage and accountability.

INFORMATION TOPIC: II-5 OR DEMONSTRATION: II-5

DOSAGE, MEASUREMENTS, AND DRUG FORMS
(Lesson Title)

OBJECTIVES – THE STUDENT WILL BE ABLE TO:

Information:

1. List the measuring systems.
2. Demonstrate an understanding of equivalents used in different measurement systems.
3. Identify ten (10) drug forms from a drug display.

Demonstration:

4. Measure liquid medication accurately.

NOTE: This procedure is addressed under classroom activities and the written evaluation.

SUPPLEMENTARY TEACHING/LEARNING ITEMS:

1. Measuring equipment: oral dose syringes, medication spoons, medicine cups, and oral droppers.
2. Drug sample display.
3. HO 9: Roman Numerals.
4. HO 10: Calibrated Liquid Dose Measuring Devices.

INFORMATIONAL ASSIGNMENT:

Read Lesson Plan 5 prior to class and be prepared to discuss the information presented.

INTRODUCTION:

The metric system is the international standard of measurement for weight, volume, length, and temperature. It has replaced the apothecary system which is no longer used in formal drug literature or health care applications. The use of roman numerals (HO 9) has also been discontinued in healthcare settings. Household measurements are primarily used in the home. Familiarity with all systems provides another communication system for the health care team. The medication technician must also be able to identify drug forms.

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OUTLINE:

I. Measuring Systems

A. Metric system.

1. Basic units of measure include:
 - a. Meter – the basic unit for length or distance.
 - b. Gram – the basic unit for weight.
 - c. Liter – the basic unit for volume (liquids)
2. Prefixes.
 - a. Kilo – 1,000 (thousands).
 - b. Deci – 0.1 (tenths).
 - c. Centi – 0.01 (hundredths).
 - d. Milli – 0.001 (thousandths).
 - e. Micro – 0.000001 (millionths).
3. Basic units – length.
 - a. m – meter (about 39 inches).
 - b. cm – centimeter (1/100 of a meter). Note: 2.5cm equals 1 inch.
 - c. mm – millimeter (1/1,000 of a meter).
4. Basic units – weight.
 - a. kg – kilogram (equals 2.2 pounds).
 - b. g – gram (1/1,000 of a kilogram).
 - c. mg – milligram (1/1,000 of a gram).
 - d. mcg – microgram (1/1,000,000 of a gram).
 - e. mEq – milliequivalent (1/1,000 equivalent combined weight of atom); used for some drugs, (e.g., potassium)
5. Basic units – volume (liquid).
 - a. L – liter (slightly more than 1 quart).
 - b. mL – milliliter (1/1,000 of a liter)

- c. cc – cubic centimeter; equivalent in use to mL.

B. Household system.

1. Uses.
 - a. Home-bound patient taking liquid prescription medication.
 - b. Intake and output measurement.
 - c. Compresses.
 - d. Therapeutic baths.
2. Common measures and abbreviations.

CAUTION: VOLUME MAY VARY.

- a. Drop – gtt.
- b. Gallon – gal.
- c. Measuring cup – c.
- d. Ounce – oz.
- e. Pint – pt.
- f. Pound – lb.
- g. Quart – qt.
- h. Tablespoon – Tbsp.
- i. Teaspoonful – tsp.

C. Apothecary system - replaced by metric system and listed here for reference only.

1. Basic units – weight.
 - a. gr – grain.
 - b. oz – ounce.
 - c. lb – pound.

2. Basic units – volume (liquid).

- a. gtt – drop.
- b. oz – ounce.

II. Measurement System Approximate Equivalents

METRIC

HOUSEHOLD

Weight:

1 kg	2.2 lbs
30 g	1 oz

Volume:

1,000 mL (1 L)	1 qt (2 pt)
500 mL	1 pt (16 oz)
30 mL	1 oz/2 Tbsp
15 mL	1 Tbsp
5 mL	1 tsp
1 mL	15 drops

CAUTION: use only the dropper provided with the medication for an accurate dose.

III. Drug Dosage Forms

A. Oral solids.

1. Tablets.

- a. Enteric coated – dissolves in the small intestine rather than in the stomach.
- b. Film coated – coated to protect the drug or mask its taste.
- c. Scored – a tablet marked with a groove to assist in breaking it into smaller equal pieces.

- d. Sublingual – formulated to dissolve under the tongue for rapid systemic absorption through the mucous membranes.
 - e. Lozenges or troches – to be dissolved in the mouth for local effect on the mouth or throat.
 - f. Buccal – medication placed between the cheek and gum and allowed to dissolve.
2. Capsules.
- a. Powder or granule filled.
 - b. Liquid filled.
 - c. Gel filled.
3. Oral extended release forms.
- a. Multi-layer tablets – layers dissolve at different rate.
 - b. Diffusion, dissolution or osmotic systems – may have a drug core surrounded by a membrane, may have a wax matrix or may have coatings of various thicknesses (e.g., Plateau Caps, Sequels, Extentabs, Repetabs).
 - c. Spansules – contains beads with various coating thickness.
 - d. Abbreviations (often appear after drug name).
 - (1) TR – Timed release.
 - (2) ER – Extended release.
 - (3) CR – Controlled release.
 - (4) CD – Controlled dose.
 - (5) SR – Sustained release.

B. Oral liquids (HO 10).

- 1. Solution – one or more drugs in a solvent.
- 2. Syrup – drugs dissolved in water, sugar, and flavoring.
- 3. Elixir – drugs dissolved in alcohol and water with sweetening.
- 4. Tincture – drug dissolved in alcohol or alcohol and water.

5. Suspension – liquid preparation containing insoluble substance; must be shaken well prior to administration.
- C. Topical – for skin surface use.
1. Paste – stiff, ointment-like preparation with an oil or water base.
 2. Ointment – soft, water-insoluble with an oil base.
 3. Cream – soft, water soluble.
 4. Gel – very soft, very water soluble.
 5. Lotion – water suspension for external use.
 6. Patch – extended-release formula for system absorption.
 7. Solution – one or more drugs in a solvent.
 8. Aerosol – foam, powder, or solution in a pressurized container or manual pump. Foam may also be used rectally.
- D. Ophthalmic – sterile preparations for use in the eye.
1. Ointment.
 2. Solution.
 3. Suspension
- E. Otic – sterile preparation for use in the ear.
1. Solution.
 2. Suspension
- F. Nasal – preparation for use in the nose or on the nares.
1. Ointment.
 2. Solution – nose drops.
 3. Aerosol – nasal spray, pressurized container, or manual pump. For local use in the nose or system absorption through the nasal membrane; not to be inhaled into the lungs.
- G. Respiratory-administered into the respiratory tract.
1. Metered Dose Inhaler (MDI) pressurized container.

2. Powder inhaler – mechanical system for inhaling very fine powders for local effect in the lungs.
3. Nebulizer- changes liquid medicine into fine droplets (in aerosol or mist form) that are inhaled through a mouthpiece or mask

H. Vaginal

1. Suppository – drug in solid that melts or dissolves in the body.
2. Medicated douche – contains a drug for local effect.
3. Vaginal Ring/Cervical ring – non-biodegradable ring containing drug to be placed in the vagina.

I. Rectal.

1. Suppository – drug in solid that melts or dissolves in the body.
2. Medicated enema – contains a drug for local or systemic effect.

J. Powder/granule – drug in a powdered form for topical use or to be dissolved before oral use.

K. Injectable – drug in a water or oil solution for injection through the skin into the muscle (IM), vein (IV), or subcutaneous tissue.

L. Implant – non-biodegradable drug reservoir implanted beneath the skin for systemic absorption.

IV. Summary and Conclusion.

- A. Measuring systems.
- B. Measurement systems approximate equivalents.
- C. Drug dosage forms.

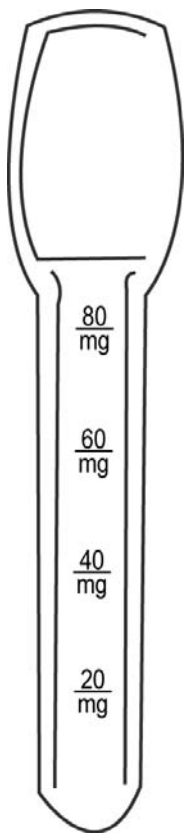
The next lesson is on transcribing physician's orders.

ROMAN NUMERALS

Roman numerals are used for reference only and are not to be used in medication orders.

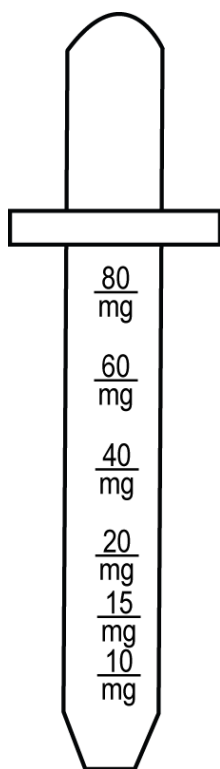
Arabic	Roman Numeral
1	I or i
2	II or ii
3	III or iii
4	IV or iv
5	V or v
6	VI or vi
7	VII or vii
8	VIII or viii
9	IX or ix
10	X or x

CALIBRATED LIQUID DOSE MEASURING DEVICES

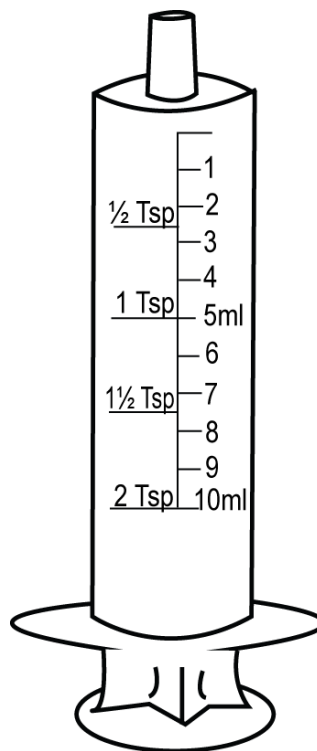


SPOON

Units are in milligrams. These must only be used for the specific product with which they are supplied or a dose error would occur.



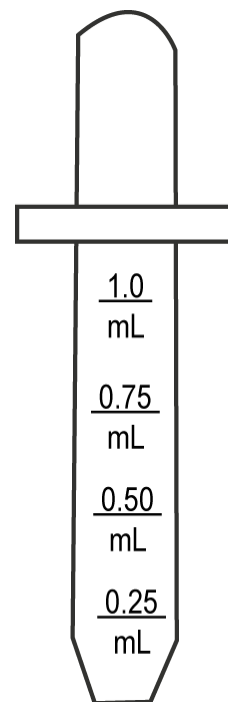
DROPPER



ORAL

SYRINGE

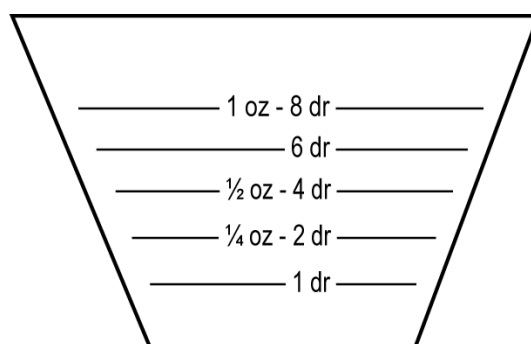
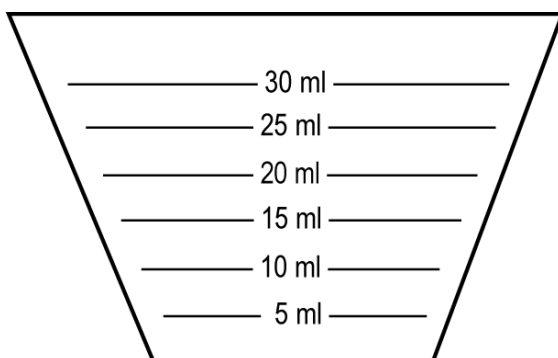
Units are milliliters. This type may be used with any medication provided that you know the volume of the dose to be given.



DROPPER

MEDICINE CUPS

Medicine cups are often graduated in metric, apothecary, and household units.



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EVALUATION ITEMS:

1. What are the three (3) measuring systems?
 - a.
 - b.
 - c.
2. Write the household equivalent of the following metric measurements.

Metric	Household
30 mL	
500 mL	
15 mL	
5 mL	

Write the metric equivalents to the following drug doses.

3. Milk of Magnesia 2 Tbsp = _____mL
4. Dilantin suspension (125 mg/5 mL) 1 tsp = _____mg
5. From a drug display, identify (10) forms of drugs.
 - A. _____
 - B. _____
 - C. _____
 - D. _____
 - E. _____
 - F. _____
 - G. _____
 - H. _____

I. _____

J. _____

Match the correct dose from the pictures to the following drug orders:

6. Potassium chloride 20 mEq/15 mL, 40 mEq dose = _____

7. Lanoxin elixir 0.05 mg/mL, 5 mL dose = _____

8. Furosemide 10 mg/mL, 40 mg dose = _____

9. Dilantin 125mg/5mL, 125 mg dose = _____

10. Haloperidol 2 mg/mL, 1 mL dose = _____

11. Milk of Magnesia, 1 tbsp dose = _____

12. Lorazepam 2 mg/mL, 2 mg dose = _____

