NC DEPARTMENT OF
HEALTH AND
HUMAN SERVICES
Division of Health Service Regulation

State-approved Curriculum
Nurse Aide I Training Program

MODULE AA
Measurement

Teaching Guide
2024 Version 1.1

North Carolina Department of Health and Human Services
Division of Health Service Regulation
North Carolina Education and Credentialing Section

Module AA – Measurement
Teaching Guide

Objectives

1. Define vital signs and measurement skills nurse aides perform.
2. List equipment needed to measure temperature, pulse, respirations, blood pressure, height, weight, and intake and output of fluids.
3. Compare and contrast the various thermometers used to measure temperature.
4. Label components of equipment used to measure blood pressure, height, and weight.
5. Identify normal findings for temperature, pulse, respirations, and blood pressure.
6. Locate sites used to measure temperature, pulse, respirations, and blood pressure.
7. Explain how to use equipment that measures temperature, pulse, respirations, blood pressure, height, weight, intake of fluids, and output.
8. Differentiate units of measurement nurse aides use during the care of residents – millimeters of mercury (mm Hg), degrees Fahrenheit, ounces, milliliters (mL), cubic centimeters (cc), inches, and feet.
9. Convert ounces to milliliters and inches to feet/inches.

Advance Preparation – In General

- Review curriculum and presentation materials
- Add examples or comments in Notes Section
- Set up computer/projector
- Establish Internet connection

Supplies

- Laminated computer paper, dry erase pens, paper towels
- Laminated poster paper, brad, homemade needle
- Graduated specimen container display – multiple graduated specimen containers, fake urine, index cards
- Plastic medication cups, 1 per student
- Output display – catheter bag, emesis basin, urinal, graduated specimen container
- Corrugated poster board, scissors, laminated pictures from magazines, paper plates
- 1½-foot sections of the 3” diameter and 9½” circumference-sized swim noodles (the larger of the two sizes work better); 1 section per 2 students
- Thermometers of various types
- Blood pressure cuffs of various sizes
- Student and Teaching Stethoscopes
- Physician Mechanical Beam Scale

Handouts

- **#AA9 Analog Watch**
- **#AA24 Fahrenheit Temperature**
- **#AA28 Pulse Sites**

- **#AA49 Blood Pressure and Factors of Select Examples of People**
- **#62AA Aneroid Blood Pressure Manometer**
- **#AA66 Aneroid Blood Pressure**
- **#AA95: Weight and Height**
- **#AA114-1 Intake Calculations**
- **#AA114-2 Let's Make a Chart**
- **#AA125 Urine Output**

Instructional Resources/Guest Speakers- Optional

Advance Preparation – Teaching Tips

- **#AA9 Analog Watch:** Optional handout to incorporate into classroom instruction if needed for further training of those lacking experience using an analog watch.
- **#AA10 Video Analog Clock:** Great video to help students struggling to learn how to tell time with an analog watch. How to Tell Time on an Analog Clock | Basic Life Skills, https://www.youtube.com/watch?v=p5gXD70Fubc .
- **#AA14 Thermometer Display:** Create a display of a variety of thermometers and include equipment required for each.
- **#AA30 Videos Playing a Variety of Heartbeat Rates and Rhythms:** Familiarize self with the following videos playing a variety of heartbeat rates and rhythms and determine which you would like to play:
  HEARTBEAT Sound Effect [High Quality] indicate what is being heard will be felt when checking a regular pulse https://www.youtube.com/watch?v=rTna_f379ug
  Irregular Heart Beat Sound Effect indicate what is being heard will be felt when checking an irregular pulse https://www.youtube.com/watch?v=ZigEgnpsY9U
  Irregular Heartbeat indicate what is being heard will be felt when checking an irregular pulse https://www.youtube.com/watch?v=LFKjM32MHG0
- **#AA32 Counting Pulse 30 Seconds and Multiplying Times 2:** You may want to describe the process of counting pulse rate for 30 seconds and multiplying by 2 if pulse is regular; and to count pulse rate for a full minute if pulse is abnormal. Stress importance of following facility policy and procedure for counting pulse
- **#AA39 Counting Respirations 30 Seconds Times 2:** You may want to describe the process of counting respirations for 30 seconds and multiplying by 2 if respirations are regular; and to count respirations for a full minute if respirations are irregular. Stress importance of following facility policy and procedure for counting respirations.
- **#AA55 Website About Stethoscope:** Familiarize self with the following web site: *Anatomy of a Clinician Stethoscope*: https://www.adctoday.com/node/7886
- **#AA65 Aneroid Blood Pressure Manometer Interactive Strategy:** Enlarge a copy of the aneroid blood pressure manometer, create a needle that attaches with a brass fastener, affix to corrugated poster board, and use for demonstration in class.
- **#AA71 Clockwise and Counterclockwise:** Introduce the concepts of clockwise and counterclockwise, pointing out the small clocks on slides #69 and #70.

- **#AA86 Video About the Physician Mechanical Beam Scale, Height Portion:** Familiarize self with the following video: *LearningTools: Reading Height Measurements on a Physician Mechanical Beam Scale* to reinforce components of and determining height: https://www.youtube.com/watch?v=XeBhvbm5yrI
- **#AA90 The Kilogram:** Introduce the kilogram (kg) as a metric measurement of weight and as a frame of reference, 1 kilogram = 2.2 pounds.
- **#AA95 Video About the Physician Mechanical Beam Scale, Weight Portion:** Familiarize self with the following video: *LearningTools: Reading Weight Measurements on a Physician Mechanical Beam Scale* to reinforce components of and determining weight: https://www.youtube.com/watch?v=b6G88qVl3m8
- **#AA98-1 Use of mL Instead of cc in Health Care:** The Institute for Safe Medication Practices has included cc (the abbreviation for cubic centimeter) on its *List of Error-Prone Abbreviations, Symbols, and Dose Designations.*
- **#AA98-2 The Milliliter:** Pass around a medicine cup or a syringe with 1 milliliter of colored water for students to view.
- **#AA98-3 Video About the Milliliter and Cubic Centimeter:** Familiarize self and show video, *Understanding mL (milliliter), Liter, & Cubic Centimeter* to explain the milliliter and cubic centimeter: https://www.youtube.com/watch?v=luDoyp2G-YM
- **#AA99 Pass Around the Graduated Specimen Container:** Pass around an empty, clean graduated specimen container for students to view.
- **#AA113 Pass Around the Little Plastic Medicine Cup:** Pass around a 30 mL medicine cup with both a 1 ounce and a 30 mL marking for students to view OR provide each student with their own 30 mL medicine cup to keep.
- **#AA118 Devices That Collect Output Display:** Create a display of a variety of devices that collect urine output either with or without fake body fluids.
- **#AA123 Fake Urine in Graduated Specimen Containers Display:** Create an output display of graduated specimen containers with varying amounts of fake urine; either include the amounts for each on index cards in front of each graduated specimen container OR require students to measure the fake urine individually or in pairs.
- **#AA129 Creating Food Intake Trays:** Use corrugated poster board and cut out several pieces the size of trays. Cut out and laminate pictures of foods from magazines or product boxes to create simulated foods reflecting various states of consumption. Using paper plates, place meals with laminated foods reflecting percentages of food intake on them. Create meal trays with corrugated poster board and plates of food for students to evaluate and assign percentages of intake for each.

Advance Preparation – Activities

- **#AA10 What Time Is It:** Look at the analog clock on Slide 10. What time is it? Hint: 8:0___ 3rd line between 0 and 5 (8:03 and 23 seconds).
- **#AA24 Fahrenheit Temperature:** Duplicate **Handout #24AA** for each student. Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.
- **#AA28 Pulse Sites:** Duplicate **Handout AA28** for each student. Determine whether this activity will be used as an in-class assignment, homework

assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.

- **#AA49 Blood Pressure and Factors of Select People:** Goes with power point slides #49, #50, and #51. Duplicate **Handout AA49** for each student**.** Distribute to students and instruct to follow verbal instructions.
- **#AA59 Meet the Stethoscope:** Distribute stethoscopes/alcohol wipes. You may want to jot down the tasks on the dry-erase board.
- **#AA60 Aneroid Versus Android:** Be aware of the pronunciation of aneroid and do not mix it up with the word android. An android has several meanings, (1) a robot with a human appearance and (2) a type of smartphone.
- **#AA62 Aneroid Blood Pressure Manometer Interactive Strategy:** Use as a resource when describing the aneroid blood pressure manometer and how to determine the blood pressure value. In addition to using the handout as a teaching strategy, duplicate copies of the aneroid blood pressure manometer, laminate them, and use during class. Distribute dry erase pens and napkins for use by the students. Call out blood pressures and require students to mark both the systolic and diastolic pressures. Walk around the room and determine how students did. Repeat several times with different values. Collect the laminated dials and dry erase pens for use in subsequent classes.
- **#AA65 Hearing and Seeing Blood Pressure Readings:** Familiarize self with two required videos, *Reading Blood Pressure and LearningTools: Blood Pressure Basics - Audio-Visual Coordination Skills*: https://youtu.be/oioFVbsiwEk?si=byLYZUzq7Drfczgi and https://www.youtube.com/watch?v=bHXvhOQ0hYc,
- **#AA66 Aneroid Blood Pressure:** Duplicate **Handout #66AA** for each student**.** Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.
- **#AA74 Working with the Inflation Bulb and the Air-release Valve:** Beforehand, cut swim noodles in 1½-foot sections. Swim noodles come in 2 sizes; the larger of the 2 sizes works better. Demonstrate how to place the BP cuff on the swim noodle, how to inflate the bulb, and how to deflate the bulb in a slow, controlled manner. Pair students, distribute a swim noodle, and a BP cuff to each pair. Ask students to take turns placing the BP cuff on the swim noodle and taking the BP cuff off the swim noodle. Next, after placing the BP cuff on the swim noodle (keep it there), take turns using the inflation bulb and air-release valve inflate the cuff and deflate the cuff in a slow, controlled manner.
- **#AA95 Weight and Height:** Duplicate **Handout #AA95** for each student. Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.
- **#AA107 Explaining Fractions of a Whole:** Familiarize self with one required video, *Finding a Fraction of a Number*: https://www.youtube.com/watch?v=MUVC3llPw_w and one required web site, *Unit 10, Section 3: Fractions of Quantities:* https://www.cimt.org.uk/projects/mepres/book7/bk7i10/bk7_10i3.htm

- **#AA114-1 Intake Calculation:** Duplicate **Handout #AA114a** for each student. Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.
- **#AA114-2 Let's Make a Chart:** Duplicate **Handout #AA114b** for each student. Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.
- **#AA125 Urine Output:** Duplicate **Handout #AA125** for each student. Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.

Module AA – Measurement
Definition List

Afebrile – without a fever

Analog Watch – a watch that has moving hands and is typically marked from numbers 1 through 12.

Aneroid Manometer – that part of the sphygmomanometer (BP cuff) that includes the dial that indicates the systolic and diastolic pressures during blood pressure checks.

Apical Pulse – a pulse point located over the heart.

Arteries – blood vessels that carry blood with oxygen and nutrients away from the heart and to the cells.

Blood pressure – the amount of force exerted by the blood against the walls of the artery.

Body temperature – how much heat is in the body and balances the heat created by the body and heat lost to the environment.

Brachial Pulse – pulse points located in the crooks of the elbows typically used during blood pressure checks.

Carotid Pulse – pulse points located on both sides of the neck.

Catheter Bag – collection device for urine that is connected to an indwelling (Foley) catheter which drains the bladder.

Centigrade – metric scale used to measure temperature, expressed in degrees.

Commode Hat (or specimen pan) – a plastic collection container placed under a commode lid, used when resident has bathroom privileges and is on output and/or has a urine or stool specimen ordered.

Cubic Centimeter (or cc) – a unit of measure in the metric system used to count the volume of anything (including fluids); is equal to 1 milliliter.

Diaphragm –the part of the stethoscope located on the chest-piece used to listen to the presence or absence of brachial artery blood flow during blood pressure check.

Diarrhea – frequent passage of loose, watery stools (bowel movements)

Diastole – the resting phase of the heart when the heart fills with blood; the bottom number of a blood pressure reading (diastolic)

Emesis Basin – a plastic, shallow basin shaped like a kidney that fits against the resident's neck and collects body fluids when a resident is nauseated and during mouthcare.

Eupnea – normal breathing

Exhale – when carbon dioxide is expelled out of the nose and the mouth from the lungs.

Expiration – also called exhalation and involves the breathing out of carbon dioxide through the nose and mouth, the chest falls.

Fahrenheit – scale used to measure temperature, expressed in degrees.

Febrile – with a fever

Fever – an elevated temperature

Fluid Balance – fluid intake roughly equals fluid output.

Food Intake – comparison of the amount of food eaten by a resident at mealtimes with the amount of food provided.

Gastric Suction Material – stomach contents that are suctioned out using a nasogastric tube.

Graduated Specimen Container – an accurate measuring device for fluids used in a health care setting.

Heart – the pump of the cardiovascular (circulatory) system consisting of four chambers.

Height Rod – the device used on a standing scale that measures a resident's height (or tallness)

Inhale – when air (or oxygen) is pulled in through the nose and down into the lungs.

Intake (input) – the amount of fluid taken in by the body.

Intake and Output (I&O) – used to evaluate fluid balance whereby intake and output are measured and documented.

Inspiration – also called inhalation and involves the breathing in of oxygen through the nose; chest rises.

Kilogram – a unit of measure in the metric system used to determine weight.

Lungs – elastic, spongy, cone-shaped air-filled structures involved and the location where the exchange of oxygen and carbon dioxide occurs.

Milliliter (mL) – a unit of measure in the metric system used to count fluids; is equal to 1 cubic centimeter.

Millimeters of Mercury – (mm Hg) the unit of measure for blood pressure

Objective – information collected by the nurse aide's senses.

Orthostatic Hypotension – abnormal low blood pressure occurring when the resident suddenly stands up; resident complains of weakness, faintness, dizziness, and seeing spots.

Output – the amount of fluid lost from the body.

Pain – Pain is whatever the resident says it is and response to pain varies from resident to resident.

Pedal Pulse – pulse points located in the top of the feet and used to check circulation of the leg.

Pulse – is the beat of the heart felt at an artery, as a wave of blood passes through the artery; is the numbers of heart beats per minute.

Pulse Force – the strength of the pulse and should be easy to feel.

Pulse Rate – the number of heart beats (or pulses) per minute

Pulse Rhythm – the regularity of the heart beats (pulses) and should be the same interval between beats.

Radial Pulse – pulse points located in the wrists, which are used most often, easy to reach, easy to find, and used for routine vital signs.

Respiration – the process that supplies oxygen to the cells and removes carbon dioxide from cells.

Respiratory rate (or respirations) – the number of inspirations (inhalations) a person takes in a minute.

Sphygmomanometer – also known as the BP cuff; is the equipment used to check a person's blood pressure.

Stethoscope – instrument used to listen to heart sounds, lung sounds, and the brachial pulse during blood pressure checks.

Subjective – information provided by the resident.

Systole – the working phase of the heart when the heart is pumping blood to the body; the top number of a blood pressure reading (systolic)

Temporal Pulse – a pulse point located in the temples of the head

Temporal Thermometer – a thermometer that measures heat from skin over the forehead, specifically over temporal artery.

Thermometer – a device used to check a resident's temperature.

Tympanic Thermometer – a thermometer that uses the ear as the site to check a resident's temperature.

Urinal – a plastic, elongated device used by an individual to urinate into, particularly when confined to bed or on measured output.

Vital Signs – (also called TPR & BP) include the measurement of temperature, pulse, respiration, and blood pressure that show how well vital organs are functioning.

Vomitus – food and fluids ejected from the stomach via the esophagus and mouth.

Module AA – Measurement	
(S-1) Title Slide **(S-2, 3, & 4) Objectives** 1. Define vital signs and measurement skills nurse aides perform. 2. List equipment needed to measure temperature, pulse, respirations, blood pressure, height, weight, and intake and output of fluids. 3. Compare and contrast the various thermometers used to measure temperature. 4. Label components of equipment used to measure blood pressure, height, and weight. 5. Identify normal findings for temperature, pulse, respirations, and blood pressure. 6. Locate sites used to measure temperature, pulse, respirations, and blood pressure. 7. Explain how to use equipment that measures temperature, pulse, respirations, blood pressure, height, weight, intake of fluids, and output. 8. Differentiate units of measurement nurse aides use during the care of residents – millimeters of mercury (mm Hg), degrees Fahrenheit, ounces, milliliters (mL), cubic centimeters (cc), inches, and feet. 9. Convert ounces to milliliters and inches to feet/inches.	
Content	**Notes**
(S-5) Vital Signs Vital signs show how well vital organs are functioning – heart and lungs, plus the regulation of temperature • Include temperature, pulse, respiration, and blood pressure. • May also be called TPR & BP	
(S-6) The 5th Vital Sign – Pain • Facilities may consider pain the 5th vital sign because it is considered as important as the other vital signs • Whereas other vital signs are objective (collected by the nurse aide's senses), pain is different because it is subjective and reported to health care provider by the resident • Pain is whatever the resident says it is and response to pain varies from resident to resident • Will learn more about pain later in the course in Module V	
(S-7) Why Check Vital Signs – Importance • Changes in vital sign measurements can indicate that resident's condition is worsening • Can reflect how body is responding to medication and/or treatment • The value of a vital sign may be the basis for a medication that the nurse gives to the resident • Accuracy when taking vital signs is crucial; never guess, if unsure ask for help • Report abnormal vital signs immediately to the nurse and per facility policy.	
(S-8) Equipment Needed for Vital Signs • Blood pressure cuff • Stethoscope	

• Non-mercury glass thermometers, oral and rectal • Physician Beam Scale for height and weight • Digital thermometer • Electronic thermometer • Tympanic thermometer • Notepad • Pen • Analog watch	
(S-9) Analog Watch- Part of Equipment for Vital Signs • Definition – a watch that has moving hands and is typically marked with from numbers 1 through 12 • It has an hour hand, minute hand, and second hand • The nurse aide uses the secondhand to count respirations and pulse rate **Teaching Tip**: Every class population is different and brings different educational needs regarding use of the analog watch. Younger students may have only used digital watches or cellular phones to tell time. These students will not be able to use these devices while in lab, clinical, or during the NNAAP skills component. **Teaching Tip #AA9 and HANDOUT #AA9:** (Optional) Incorporate into classroom instruction if needed for further training of those lacking experience using an analog watch.	
(S-10) How to Use an Analog Watch for Vital Sign Procedures • Identify what number the second hand is on • Second, while watching the second hand, start counting the vital sign you want to know and stop counting the same number when second hand returns to that number • More practice to come when we learn how to check pulse and respirations **Activity #AA10:** Look at the analog clock on Slide 10. What time is it? Hint: 8:0___ 3rd line between 0 and 5 (8:03 and 23 seconds). **Teaching Tip #AA10 Video Analog Watch:** Great video to help students struggling to learn how to tell time with an analog watch. How to Tell Time on an Analog Clock | Basic Life Skills.	
(S-11) Body Temperature Defined – amount of heat created by the body; balance between the amount heat produced and the heat lost • It is typically stable • Produced – created in the body when cells use food for energy • Lost to the environment – through skin, breathing, urine, and stool • Helps to identify immune system issues like infections or viruses.	

Module AA – Measurement	
• May indicate problems of the body temperature control system in the brain • Helps to determine response to medical treatment such as oral medications or intravenous antibiotics • Common terms used to describe temperature includes- having a fever or febrile, not having a fever or afebrile • A thermometer is the instrument used to obtain body temperature • Body temperature is measured in degrees Fahrenheit or degrees Centigrade	
(S-12) Factors Affecting Temperature • Age (older person has lower temperature than younger) • Illness (typically increases with infection) • Stress (causes an increase) • Environment (dependent upon humidity and temperature) • Exercise (causes an increase) • Time of day (lowest in the morning; higher in afternoon and evening)	
(S-13) Sites for Checking Temperature • Important to check with a nurse or care plan to see what type of thermometer is used – Mouth (oral) – Rectum (rectal) – most accurate; never let go of rectal thermometer while checking temperature. – Armpit (axilla) – least accurate – Ear (tympanic) – Temporal artery (forehead)	
(S-14) Types of Thermometers • Digital – oral, rectal, axillary • Electronic – oral, rectal, axillary • Tympanic – ear • Temporal – forehead • Non-mercury, liquid-filled glass (oral – green tipped) • Non-mercury, liquid-filled glass (rectal – red tipped) **TEACHING TIP #AA14: Thermometer Display** Display a variety of thermometers and include equipment required for each.	
(S-15) Temperature Values • Oral – Baseline – 98.6ºF – Normal range – 97.6ºF to 99.6ºF • Rectal – Baseline – 99.6ºF	

Module AA – Measurement	
– Normal range – 98.6ºF to 100.6ºF • Axillary – Baseline – 97.6ºF – Normal range – 96.6ºF to 98.6ºF	
(S-16) Temperature Values • Tympanic membrane – Baseline – 98.6ºF – Normal range – 97.6ºF to 99.6ºF • Temporal – Baseline – 98.6ºF – Normal range – 97.6ºF to 99.6ºF	
(S-17) Digital Thermometer • Oral, rectal, or axillary • Displays results digitally and is quick, within 2 – 60 seconds, and beeps or flashes when done • Battery-operated • Requires a disposable sheath	
(S-18) Electronic Thermometer • Oral, rectal, or axillary • Has oral (blue tipped) and rectal (red tipped) probes; for axillary temperature use oral (blue tipped) thermometer. • Displays results digitally and is quick, within 2 – 60 seconds, and beeps or flashes when done • Battery-operated and stored in recharging device. • Requires a probe cover	
(S-19) Tympanic Thermometer • Ear • Registers temperature in seconds • May need extra practice to operate accurately	
(S-20) Temporal Thermometer • Measures heat from skin over the forehead, specifically over temporal artery • Done by a stroke or scan over the area • Registers within 3 seconds • Noninvasive	
(S-21) Non-mercury, Liquid-filled Glass Thermometers • Oral, rectal, or axillary • Color-coded – Either blue or green for oral – Red for rectal • Takes a long time to register – 3 to 10 minutes based on site	

- Held at the stem of the thermometer and read at eye level
- The nurse aide must read the thermometer after it registers the temperature; held at stem; read at eye level
- Most health care providers use the Fahrenheit scale to measure temperature, even though both Fahrenheit and Celsius values are typically seen on thermometer

(S-22) Using Non-mercury, Liquid-filled Glass Thermometer to Check Body Temperature

- Thermometer
- Sheath
- Gloves
- Watch
- Pen
- Notepad
- Alcohol wipe
- Water soluble lubricant (rectal temperature only)

(S-23) Reading the Non-mercury, Liquid-filled Glass Thermometer

- For Fahrenheit readings:
  - The long line represents 1 degree
  - The short line represents two tenths (2/10) of a degree

(S-24) Example of an Oral Temperature Reading

Temperature of 102.8^{o}F

ACTIVITY #AA24: Fahrenheit Temperature
Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute handout to students and instruct to use accordingly.

(S-25) When NOT to Take an Oral Temperature
The resident

- Is unconscious
- Had recent facial or mouth surgery
- Had a recent injury to face
- Has sores, redness, and/or mouth pain.
- Is confused or agitated
- Has a history of seizures
- Is using oxygen
- Is mouth-breather
- Has a feeding tube

(S-26) When NOT to Take a Rectal Temperature
The resident

- Has diarrhea
- Has rectal problem

- Has heart disease
- Recent rectal surgery
- Is confused or agitated

(S-27) Pulse

- The beat of the heart felt at an artery, as a wave of blood passes through the artery
- Pulse rate – is the number of heartbeats (or pulses) per minute.
- Pulse rhythm – is the regularity of the heart beats (pulses) and should be the same interval between beats
- Pulse force – is the strength of the pulse and should be easy to feel

(S-28) Pulse Sites

- Temporal
- Carotid – never check pulse rates on both carotid arteries at the same time
- Apical – over the heart and taken with a stethoscope
- Brachial – typically used during blood pressure checks
- Radial – used most often, easy to reach, easy to find, used for routine vital signs
- Pedal – used to check circulation of the leg

ACTIVITY AA28: Pulse Sites

Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct students to identify and label the temporal, carotid, brachial, radial, and pedal pulses.

(S-29) Radial Pulse Site

- Typically used to take pulse during routine vital signs checks.
- Does not expose resident
- Located on the thumb side of wrist
- First 2 or 3 fingers used; never use thumb

(S-30) Pulse Values

- Normal pulse for adults
  - Rate = between 60 and 100 beats per minute
  - Regular
  - Strong
  - Abnormalities are covered in Module H

TEACHING TIP #AA30: Various Videos Playing a Variety of Heartbeat Rates and Rhythms

Preview the following videos and determine if any/all would augment classroom instruction:

Module AA – Measurement	
Play video, *HEARTBEAT Sound Effect [High Quality]* and indicate what is being heard will be felt when checking a regular radial pulse https://www.youtube.com/watch?v=rTna_f379ug Play video, *Irregular Heart Beat Sound Effect* and indicate what is being heard will be felt when checking an irregular radial pulse https://www.youtube.com/watch?v=ZigEgnpsY9U Play video, *Irregular Heartbeat* and indicate what is being heard will be felt when checking an irregular radial pulse. https://www.youtube.com/watch?v=LFKjM32MHG0	
(S-31) Counting Pulse – Equipment • Watch with a second hand • Notepad/assignment sheet and pen	
(S-32) Pulse – Checking Pulse and Documentation • The nurse aide counts pulse rate for 60 seconds (1 minute) • While watching the second hand of an analog watch, the nurse aide starts counting and stops counting on the same number • Document on the resident's record if the pulse falls within the range of 60 and 100 and is regular and strong • Document on the resident's record and notify the nurse if pulse is abnormal **TEACHING TIP #AA32: Counting Pulse 30 Seconds and Multiplying Times 2** You may want to: • Describe the process of counting pulse rate for 30 seconds and multiplying by 2 if pulse is regular; and to count pulse rate for a full minute if pulse is abnormal. • Stress importance of following facility policy and procedure for counting pulse.	
(S-33) Checking Pulse – Example #1 • The nurse aide begins counting pulse rate when the second hand is on 4 and stops counting pulse when the second hand lands on 4 • A nurse aide counts a pulse rate of 82 in 60 seconds • 82 is the number the nurse aide would document	
(S-34) Checking Pulse – Example #2 • Nurse aide begins counting pulse rate when the second hand is on 10 and stops counting pulse when the second hand lands on 10 • Nurse aide counts a pulse rate of 109 in 60 seconds • 109 is the number the nurse aide would document • Nurse aide would notify the nurse. Why?	
(S-35) Respiration	

Module AA – Measurement	
• Is the process that supplies oxygen to the cells and removes carbon dioxide from cells • Involves – Inspiration (inhalation) – breathing in oxygen through nose; chest rises – Expiration (exhalation) – breathing out of carbon dioxide through nose and mouth; chest falls • Each respiration involves one inspiration and one expiration. • Respiratory rate (or respirations) – is the number of inspirations/exhalations a person takes in a minute	
(S-36) Respiratory Values – Normal • Called eupnea • Rate is between 12 and 20 breaths per minute • Regular, quiet, with both sides of chest rising and falling equally	
(S-37) Checking Respirations – Equipment • Analog watch with a second hand • Notepad/assignment sheet and pen	
(S-38) Respirations – Observation and Documentation • The nurse aide counts respiratory rate (respirations) for 60 seconds (1 minute) • For respiratory rate, recall that 1 respiration equals 1 inspiration (chest rising) and 1 expiration (chest falling) • While watching the second hand of an analog watch, the nurse aide starts counting and stops counting on the same number • Document on the resident's record if the respirations – Fall within the range of 12 and 20 – Regular, quiet, with both sides of chest rising and falling equally • Document on the resident's record and notify the nurse if respirations are abnormal	
(S-39) Stealth Respirations • Merriam Webster Dictionary defines stealth as "cautious, unobstructive, and secretive way of moving or proceeding intended to avoid detection" • Check respirations right after checking pulse (without moving hand from wrist) so resident does not realize respirations are being counted; tend to change pattern if resident is aware it is being checked **TEACHING TIP #AA39: Counting Respirations 30 Seconds Times 2** You may want to:	

Module AA – Measurement	
• Describe the process of counting respirations for 30 seconds and multiplying by 2 if respirations are regular; and to count respirations for a full minute if respirations are irregular. • Stress importance of following facility policy and procedure for counting respirations.	
(S-40) Checking Respirations – Example #1 • Nurse aide begins counting respirations when the second hand is on 4 and stops counting respirations when the second hand lands on 4 • Nurse aide counts 16 chest rises/16 chest falls in 60 seconds • 16 is the number the nurse aide would document	
(S-41) Checking Respirations – Example #2 • Nurse aide begins counting respirations when the second hand is on 10 and stops counting respirations when the second-hand lands on 10 • Nurse aide counts 24 chest rises/chest falls in 60 seconds • 24 is the number the nurse aide would document • Nurse aide would notify the nurse. Why?	
(S-42) Blood Pressure (1) • Blood pressure – is the amount of force exerted by the blood against the walls of the artery – Top number is the systolic pressure and the pressure when the heart contracts and pumps blood out – Bottom number is the diastolic pressure when the heart rests as the heart fills with blood	
(S-43) Blood Pressure (2) • Important indicator of health status; shows how well heart is working • Can change from minute to minute depending on: – The activity of the resident (for position, BP is higher lying in bed than seated in chair or standing, for exercising, BP increases) – Lifestyle choices (BP increases with smoking and drinking; BP higher if resident is overweight and decreases as weight is lost; BP may be high if resident eats a high salt diet) – Reaction to stressful events (BP increases with anxiety, emotional responses, and stress) – Acute injury or emergency (a blood volume decrease from injury will decrease BP; BP increases with pain) – Medications (raises or lowers BP depending on the medication)	
(S-44) Factors that Affect Blood Pressure	

- Genetics
- Age (BP increases with age)
- Gender (women's BP usually lower)
- Race

(S-45) Blood Pressure Site
- The brachial artery and the upper arm are sites most often used by the nurse aide when checking blood pressure

(S-46) Blood Pressure Value
- Measured in millimeters of mercury (mmHg).
- Recorded as a fraction, for example 120/80.
  - Top number is systolic
  - Bottom number is diastolic
  - Pronounced as 120 over 80

(S-47) Blood Pressure Values
- Normal blood pressure ranges for adult
  - Systolic (top number) – 90 mm Hg to 119 mm Hg.
  - Diastolic (bottom number) – 60 mm Hg to 79 mg Hg.
- Document on record
- If above 120/80 document on the record and notify the nurse
- Abnormalities will be covered in Module H

(S-48) Using What You Have Learned
Evaluate the health of individuals on the next 3 slides.

ACTIVITY #AA49: Blood Pressure and Factors of Select Examples of People
Distribute Activity **#AA49 Worksheet** to students. Activity goes along with S-49, S-50, and S-51. Read the following instructions: **"**As I describe each example featured in this activity, answer questions for each based on personal factors and blood pressure readings. For numbers 1 – 4, write specific information for each individual. For numbers 5 – 14, place a check if the specific factor applies to the example. If a factor is not included in the description of the example, imply that it is not present."

(S-49) Blood Pressure Example #1
- BP = 116/72
- A 64-year-old female
- Weighs 130 pounds
- She has finished baking an apple pie
- She doesn't smoke or drink

ACTIVITY AA49: Example #1 Scenario
What can you say about Example #1's blood pressure? What are factors in Example #1's life that affect her blood pressure?

Answers: Blood Pressure is normal. Example #1 is female, is standing up, is calm, is not overweight, and she doesn't smoke or drink.

(S-50) Blood Pressure Scenario for Example #2

- BP = 162/86
- A 72-year-old male
- Weighs 260 pounds
- He is eating a couple of hot dogs and potato chips for lunch and is on his 4th beer
- He just sent his son to the store for cigarettes

ACTIVITY #AA49: Example #2's Scenario
What can you say about Example #2's blood pressure? What are factors in Example #2's life that are currently affecting his blood pressure?

Answers: Blood Pressure is high. Example #2 is male, is overweight, is inactive (sent son to store) is eating a high salt meal, he smokes, and drinks.

(S-51) Blood Pressure Scenario for Example #3

- BP = 180/94
- A 22-year-old male
- Weighs 170 pounds
- He just wrecked his brand new truck
- He has a broken leg
- He is on a stretcher in the back of an ambulance

ACTIVITY #AA49: Example #3's Scenario
What can you say about Example #3's blood pressure? What are factors in Example #3's life that are currently affecting his blood pressure?

Answers: Blood Pressure is high. Example #3 is lying down. Example #3 is stressed and is hurting.

(S-52) Checking Blood Pressure

- The nurse aide uses three senses simultaneously when checking a resident's blood pressure:
  - Seeing – watches the needle's movement in relation to the numbers on the manometer
  - Hearing – using the stethoscope, listens for sounds indicating changes in blood flow in the brachial artery
  - Touching – controls the inflation and deflation of the cuff using the thumb and index finger

(S-53) Checking Blood Pressure - Equipment

- Stethoscope
- Sphygmomanometer, also known as a blood pressure cuff (hereafter referred to as BP cuff)
- Alcohol wipes
- Notepad/assignment sheet and pen

(S-54) Stethoscope

- Instrument used to listen to heart and lung sounds
- For blood pressure checks, used to listen to sounds in brachial artery
- May be single-head (with diaphragm only) or dual-head (with diaphragm and bell)

(S-55) Stethoscope – Parts

- Ear pieces
- Binaurals
- Rubber or plastic tubing
- Chest-piece (with diaphragm or diaphragm/bell)

TEACHING TIP AA55: Website About Stethoscope

Show website, *Anatomy of a Clinician Stethoscope* and reinforce the parts of the stethoscope: https://www.adctoday.com/node/7886 .

(S-56) Stethoscope – Ear Pieces

- To prevent infection, always clean before use and after use with an alcohol wipe
- Insert ear pieces into ears so that they point forward toward the nose
- Should fit snugly in ears to block out noise

(S-57) Dual-head Stethoscope – Diaphragm

- Before using dual-head stethoscope to take blood pressure determine which side of chest-piece is active
- To check blood pressure, diaphragm needs to be active

(S-58) Two Ways to Check for an Active Diaphragm

- After inserting ear pieces into ears, tap diaphragm lightly to determine if tap is heard; if tap not heard, rotate chest-piece at tubing, and repeat the tap
- If chest-piece has an indicator dot, rotate chest-piece so indicator dot is closed

(S-59) Diaphragm Concepts

- To prevent infection, always clean before use, between residents, and after use with an alcohol wipe
- Warm diaphragm with hand before making contact with resident
- To use diaphragm, apply enough pressure to make a seal against the brachial artery at the crook of the elbow

ACTIVITY #AA59: Meet the Stethoscope

After placing students in pairs and distributing stethoscopes/alcohol wipes, instruct them to take turns:

- Identifying the parts of the stethoscope.
- Rotating the chest piece while observing the indicator dot opening and closing (if dual-head chest-piece).
- Examining ear pieces and practicing putting ear pieces in ears ensuring that ear pieces are cleaned between students with alcohol wipes.
- Determining whether diaphragm is active by inserting ear pieces into the ear and tapping diaphragm lightly to determine if tap is heard; if tap not heard, rotate chest-piece at the tubing, and repeat the tap (if dual-head chest-piece).
- Noting whether the indicator dot is opened or closed when diaphragm is active (if dual-head chest-piece).

Note: You may want to jot down the tasks on the dry-erase board. Be sure to wander around the room checking for progress.

(S-60) BP Cuff

- Two types
  - Electronic (digital)
  - Manual (aneroid)

TEACHING TIP AA60: Aneroid Versus Android

Be aware of the pronunciation of aneroid and do not mix it up with the word android. An android has several meanings, (1) a robot with a human appearance and (2) a type of smartphone.

(S-61) Electronic Type

- No stethoscope
- After BP cuff is placed on arm, button is pressed causing cuff to inflate/deflate automatically
- BP reading is displayed

(S-62) Aneroid BP Cuff – Parts

- Manometer
- Cuff with bladder
- Inflation bulb with air-release valve
- Tube from cuff to manometer
- Tube from cuff to the handheld inflation bulb

ACTIVITY AA62: Aneroid Blood Pressure Manometer

Distribute **Handout AA62** to class. Use as a resource when describing the aneroid blood pressure manometer and how to determine the blood pressure value. In addition to using the handout as a teaching strategy, you may want to duplicate copies of the aneroid blood pressure manometer, laminate them, and use them during class. Distribute dry erase pens and napkins for use by the

students. Call out blood pressures and require students to mark both the systolic and diastolic pressures. Walk around the room and determine how students did. Repeat several times with different values. Collect the laminated dials and dry erase pens for use in subsequent classes.

(S-63) Manometer (1)

- Marked with long and short lines and has a needle
  - The long lines mark 10 mm Hg
  - The short lines mark 2 mm Hg
- Watch the needle as the cuff deflates while listening for sounds through stethoscope

(S-64) Manometer (2)

- The long lines equal 10 mm Hg
- The short lines equal 2 mm Hg
- If the needle lands between 2 lines at the point that the systolic sound is heard, or the sound is no longer heard (diastolic), then the number value is rounded up to the next 2 mm Hg; odd numbers are not recorded/reported when using a manual BP cuff

(S-65) Manometer (3)

- When checking blood pressure, you will be watching the needle as it drops from a higher number to a lower number, so you will be counting backwards

ACTIVITY #65AA: Hearing and Seeing Blood Pressure Readings
Show the two videos, *Reading Blood Pressure and Learning Tools: Blood Pressure Basics - Audio-Visual Coordination Skills* to assist students to make the leap from lecture and handout to actually hearing sounds/seeing the movement of the manometer needle.

https://youtu.be/oioFVbsiwEk?si=byLYZUzq7Drfczgi

https://www.youtube.com/watch?v=bHXvhOQ0hYc

TEACHING TIP #AA65: Aneroid Blood Pressure Manometer Interactive Strategy
You may want to enlarge a copy of the aneroid blood pressure manometer, create a needle that attaches with a brass fastener, affix to corrugated poster board, and use for demonstration in class.

(S-66) Example of Blood Pressure Reading

- Systolic is 150 mm Hg
- Diastolic is 88 mm Hg
- BP is written down as 150/88
- BP is pronounced as “150 over 88”

ACTIVITY #AA66: Aneroid Blood Pressure

Module AA – Measurement	
Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute **Handout AA66** Pages 1 and 2 to students and instruct to use accordingly.	
(S-67) Cuff (1) • After wrapping the cuff around the bare upper arm, – The cuff inflates and puts pressure on the brachial artery – As cuff deflates, BP is determined	
(S-68) Cuff (2) • Cuff sizes come in child, small (circumference of arm is 7-9 inches), regular (circumference of arm is 9-13 inches), and extra-large (circumference of arm is 13-17 inches) • Important to choose correct size because a too big or too small cuff can impact accuracy of reading	
(S-69) Cuff (3) • Typically has 1 or 2 arrows (left arm/right arm) on cuff which align with brachial artery • Cuff positioned/wrapped at least an inch above the elbow • Cuff or stethoscope should not be placed over clothing	
(S-70) Tubing • Made of rubber • Two tubes connect the: – (#1) Cuff to the manometer and – (#2) Cuff to the handheld inflation bulb	
(S-71) Inflation Bulb with the Air-release Valve (1) • To inflate cuff, turn air-release valve clockwise to close valve; then squeeze the bulb; remember thumb goes up, needle goes up **TEACHING TIP #AA71: Clockwise and Counterclockwise** Introduce the concepts of clockwise and counterclockwise, pointing out the small clocks on slides #69 and #70.	
(S-72) Inflation Bulb with the Air-release Valve (2) • To deflate cuff and open valve, turn air-release valve counterclockwise with the thumb and index finger in a slow and controlled manner; remember thumb goes down, needle goes down	
(S-73) Inflation Bulb with the Air-release Valve (3) • Inflate cuff to between 160 mmHg to 180 mmHg • If beat is heard immediately, deflate the cuff; wait 30 – 60 seconds; inflate cuff to no more than 200 mmHg	
(S-74) Inflation Bulb with the Air-release Valve (4)	

- Goal: learn how to inflate the cuff and how to deflate the cuff in a slow, controlled manner
  - Place the BP cuff on the swim noodle (keep it there)
  - Using the inflation bulb and air-release valve, take turns inflating the cuff and deflating the cuff in a slow, controlled manner

ACTIVITY #AA74: Working with the Inflation Bulb and the Air-release Valve

Beforehand, cut swim noodles in 1½-foot sections. Swim noodles come in 2 sizes; the larger of the 2 sizes works better. Demonstrate how to place the BP cuff on the swim noodle, how to inflate the bulb, and how to deflate the bulb in a slow, controlled manner.

Pair students distribute a swim noodle, and a BP cuff to each pair. Ask students to:

- Take turns placing the BP cuff on the swim noodle and taking the BP cuff off the swim noodle
- Next, after placing the BP cuff on the swim noodle (keep it there), take turns using the inflation bulb and air-release valve:
  - Inflate the cuff and
  - Deflate the cuff in a slow, controlled manner

(S-75) Blood Pressure - Tips

- Do not take blood pressure on an arm with an IV, dialysis shunt, or another medical device in place
- Avoid taking blood pressure on a side that has been injured or burned, is paralyzed, has a cast, or has had a mastectomy
- Do not place blood pressure cuff over clothes (10-40 mm Hg increase)
- Make sure resident has an empty bladder (10-15 mm Hg increase)
- Limit conversation during the procedure (10-15 mm Hg increase)
- Support the arm at heart level (10 mm Hg increase)
- Make sure resident's back is supported and legs not dangling from bed or examining table (5-10 mm Hg increase)
- Make sure legs are not crossed (2-8 mm Hg increase)

(S-76) Orthostatic Hypotension

- Defined – abnormal low blood pressure that occurs when the resident suddenly stands up; complaints of feeling weak, dizzy, faint and seeing spots before the eyes
- May be a complication from being on bed rest
- Nurse aide may be asked to take an orthostatic blood pressure measurement; process includes:
  - BP checked while lying down, record in notepad

– Have resident sit up, wait 2 minutes, check BP, record in notepad – Have resident stand up, wait 2 minutes, check BP, record in notepad – Record and report findings to nurse • Throughout process, nurse aide should check to see if resident is feeling weak, dizzy, faint, or seeing spots	
(S-77) Height and Weight – Overview • Both height and weight are measured on admission to the facility. • Units of measure – Height may be measured using feet and inches or just inches, per facility policy; centimeters typically are not used – Weight may be measured using pounds or kilograms, per facility policy • After admission – Height typically not measured again – Weight measured per facility policy or per doctor's order; as directed by nurse and care plan – daily, weekly, monthly	
(S-78) Physician Mechanical Beam Scale (1) • Used for measuring height and weight. • For residents who cannot stand, measure – Height in the bed using a tape measure and ruler – Weight using a chair, wheelchair, bed, or mechanical lift, as directed by the nurse or care plan	
(S-79) Physician Mechanical Beam Scale (2) • Balance beam with upper and lower poise bars • Weight indicators • Balance bar and window • Height rod with upper and lower sections • Head piece – resting and active • Scale platform • Pillar and pillar head	
(S-80) Height Component – Head Piece • Becomes active when extended upward in preparation for measuring the resident's height • Lowered and placed on resident's head and height measured • Becomes at rest when flat and low against height rod	
(S-81) Height Component – Rod (1) • 2 Units of measure – Inches – Centimeters • 2 sections	

– Movable upper section – Non-movable lower section	
(S-82) Height Component – Rod (2) • Movable upper section – Raised or lowered to adjust to resident's height – "Read height here" area is the location of the weight value if resident's height is located in this section – Numbers increase from top to bottom • Non-movable lower section – Height read in lower section if resident's height is located in this area – Numbers increase from bottom to top	
(S-83) Measuring the Height (1) • When measuring in feet and inches using height rod – Long lines represent inches – Shorter lines represent ¼ inch each; increments include ¼, ½, ¾ • Read height to the nearest ¼ inch	
(S-84) Measuring the Height (2) • How tall is the resident? – Resident's height is 68 inches.	
(S-85) Converting Inches into Feet /Inches • There are 12 inches in 1 foot • To convert inches to feet and inches, divide the number of inches by 12 • The quotient is the feet and the remainder (if there is one) is the inches	
(S-86) Height in Feet and Inches • Resident's height is 68 inches • How does the nurse aide convert 68 inches to feet and inches? – 1 foot = 12 inches – Divide 68 inches by 12 inches. – Quotient = 5, remainder = 8 – Answer = 5 feet, 8 inches **TEACHING TIP #AA86: Video About the Physician Mechanical Beam Scale, Height Portion** Show video, *Learning Tools: Reading Height Measurements on a Physician Mechanical Beam Scale with Height Rod* to reinforce components of and determining height with the Physician Mechanical Beam Scale: https://www.youtube.com/watch?v=XeBhvbm5yrI.	

Module AA – Measurement	
(S-87) Weights of Residents in Long-term Care Facilities • In general, standards of practice in long-term care facilities recommend weighing resident on admission or readmission (to establish a baseline weight), weekly for the first 4 weeks after admission, and at least monthly thereafter to help identify and document trends such as weight loss or gain • Crucial that weight is obtained accurately and consistently so comparisons along time are more reliable – Facility-wide scales should be calibrated and functioning appropriately – A consistent process for weighing residents should be in place	
(S-88) Weights – Consistent Process • Weigh the resident: – Wearing a similar type of clothing – At approximately the same time of the day (preferably before breakfast) – Using the same scale • Either consistently wearing or not wearing orthotics or prostheses	
(S-89) Accurate Weights – Importance • Weight is one of the parameters that reflects the resident's nutritional status • Fluid loss or retention can cause short-term weight changes; abrupt weight changes along with change in food intake are signs of fluid and electrolyte imbalance • Weight loss may be an important indicator of a change in the resident's health status or sign of malnourishment • If significant weight loss is noted, health care team reviews for possible causes	
(S-90) Weight Component- Balance Beam • Has 2 poise bars – the upper bar and the lower bar • May include pounds only or pounds on the top part of each bar and kilograms on the bottom part of each bar; may have interchangeable pound and kilogram bars **TEACHING TIP #AA90: The Kilogram** Introduce the kilogram (kg) as a metric measurement of weight and as a frame of reference, 1 kilogram = 2.2 pounds	
(S-91) Upper Poise Bar • Long lines represent pounds • Short lines represent ¼ pounds each; increments include ¼, ½, ¾	
(S-92) Lower Poise Bar • Single lines represent increments of 50 pounds	

- Grooves located along the top of the lower bar align with weight increments

(S-93) Weight Indicators

- Both upper and lower bars have movable weight indicators.
- The weight indicator for the lower bar fits into the groove as weight is obtained

(S-94) Balance Bar and Balance Window

- Always ensure that the balance bar is floating freely and in the center of the window when upper/lower bars are set on 0 (zero) and resident is not standing on scale
- If balance bar is off-center and/or touching the window when upper and lower bars are set to 0 and resident is not standing on scale, do not weigh resident and notify the nurse

(S-95) Reading the Weight

- To determine weigh, add the value for the lower bar to the value for the upper bar

100 pounds + 38 pounds = 138 pounds

TEACHING TIP #AA95: Video About the Physician Mechanical Beam Scale, Weight Portion
Show video, *Learning Tools: Reading Weight Measurements on a Physician Mechanical Beam Scale* to reinforce components of and determining weight with the Physician Mechanical Beam Scale: https://www.youtube.com/watch?v=b6G88qVl3m8.

ACTIVITY #AA95: Weight and Height
Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute **Handout #AA95** to students and instruct to use accordingly.

(S-96) Measuring Intake and Output

- Intake (also called input) – the amount of fluid taken in by the body
- Output – the amount of fluid lost from the body
- Intake and output are typically seen together and commonly abbreviated I&O
- For fluid balance to occur fluid intake roughly equals fluid output

(S-97) Intake and Output

- Ordered by the doctor, found on the care plan, and by the directive from the nurse
- Typically calculated at the end of each shift and totaled every 24-hours
- Documented on a facility-specific form in the appropriate column
- Calculations and totals based on the milliliter (mL)

(S-98) The Milliliter (mL)

Module AA – Measurement	
• A unit of measurement in the metric system • Fluids measured using the milliliter (mL) • Another unit of measure used in health care is called the cubic centimeter (cc); however, nurse aides should use the abbreviation, mL instead of cc when documenting volume of fluid. • 1 milliliter is equal to 1 cubic centimeter • Most people are familiar with the teaspoon; there are 5 mL in a teaspoon **TEACHING TIP #AA98-1: Use of mL Instead of cc in Health Care** The Institute for Safe Medication Practices has included cc (the abbreviation for cubic centimeter) on its *List of Error-Prone Abbreviations, Symbols, and Dose Designations.* **TEACHING TIP #AA98-2: The Milliliter** Pass around a medicine cup or a syringe with 1 milliliter of colored water for students to view. **TEACHING TIP #AA98-3: Video About the Milliliter and Cubic Centimeter** Show video, *Understanding mL (milliliter), Liter, & Cubic Centimeter* to explain the milliliter and cubic centimeter: https://www.youtube.com/watch?v=luDoyp2G-YM	
(S-99) The Graduated Specimen Container • Accurate measuring device for fluids when resident is on I&O • Even though graduated specimen container is marked in ounces, plus milliliters (mL) or cubic centimeters, fluid for I&O is measured and documented in mL • Measure fluid at eye-level on a flat surface • If both intake and output are to be measured with the graduated specimen container, two separate graduated specimen containers are used and labeled **TEACHING TIP AA99: The Graduated Specimen Container** Pass around an empty, clean graduated specimen container for students to view.	
(S-100) Units of Measure for the Graduated Specimen Container • The C.C. (cubic centimeter) side of the measurement scale is used in health care • Recall 1 C.C. on the graduated specimen container = 1 milliliter (mL) • Shortest line represents either 25 cc/mL or 75 cc/mL. • Longest lines represent multiples of 50 cc/mL.	
(S-101) Fluids Considered as Intake • Liquids the resident drinks • Semi-liquid foods are eaten	

- Other fluids include intravenous (IV) fluids and tube feedings the nurse is responsible for maintaining and measuring

(S-102) Fluids – Liquids

- Water
- Milk
- Coffee
- Tea
- Juices
- Soups
- Soft drinks

(S-103) Fluids – Semi-liquid Foods

- Milkshakes
- Ice cream
- Sherbet
- Custard
- Pudding
- Gelatin
- Popsicles

(S-104) Determining Oral Fluids as Intake

- To determine intake, nurse aide must know serving sizes of facility specific containers
  - Typically found on the I&O sheet
  - Nurse aide will eventually know serving sizes of containers without needing to refer to I&O sheet as resource
- Two methods to measure intake of oral fluids.
  - Measures – using a designated graduated specimen container, the nurse aide measures the amount of fluid left in the container and subtracts that amount from the total amount the container holds
  - Using fractions – knowing the amount in milliliters that a serving container holds, the nurse aide uses fractions to calculate how much fluid the resident drank based on the amount of fluid left in the container
- Follow facility policy and/or procedure when determining intake of fluids during and between meals

(S-105) Typical Serving Sizes of Liquids

- Water glass = 240 mL
- Tea glass = 180 mL
- Juice glass = 120 mL
- Milk carton = 240 mL
- Coffee cup = 240 mL
- Soft drink can = 360 mL
- Gelatin = 120 mL

- Soup bowl = 180 mL
- Ice chips = 1/2 amount of mL in container

(S-106) Determining Intake – Example

- The nurse aide knows that the glass with the resident's apple juice holds 240 mL of fluid
- Using the graduated specimen container and measuring the apple juice left in the glass, the nurse aide notes that the resident did not drink 120 mL of apple juice
- Subtracting 120 mL of apple juice, the resident didn't drink from the number of mL the glass holds
- The nurse aide determines the resident drank 120 mL of apple juice.

(S-107) Determining Intake Using Fractions

- To determine fluid intake using fractions, the nurse aide needs a basic understanding of fractions in relation to a whole, which is 1.
- The entire bar is = 1 and includes
  - 4 equal parts or 4 fourths
  - 2 equal parts or 2 halves
  - 3 equal parts or 3 thirds

ACTIVITY #AA107: Explaining Fractions of a Whole

Show the video, *Finding a Fraction of a Number* to introduce or re-introduce the students to fractions of whole numbers as they learn a method to determine fluid intake:
https://www.youtube.com/watch?v=MUVC3llPw_w.

Once the students are feeling comfortable working with fractions, allow them to practice in class together or at home using *Unit 10, Section 3: Fractions of Quantities:*
https://www.cimt.org.uk/projects/mepres/book7/bk7i10/bk7_10i3.htm.

(S-108) Determining Intake Using Fractions

- 2/3 of 240 mL of coffee
  - The 2 – numerator tells the number of parts the resident drank
  - The 3 – denominator tells the number of parts that were originally in the container
  - The 240 – amount of fluid served to resident

(S-109) Determining Intake Using Fractions

- 2/3 of 240 mL of coffee
- 240 mL in the resident's coffee cup
- Resident drank 2/3 cup of coffee
- Resident drank 160 mL of coffee

(S-110) Determining Intake Using Fractions

- 1/2 of 240 mL of coffee
- 240 mL in the resident's coffee cup

Module AA – Measurement	
• Resident drank 1/2 cup of coffee • Resident drank 120 mL of coffee	
(S-111) Recall Determining Intake Using Fractions • 2/3 of 240 mL of coffee – The 2 – numerator tells the number of parts the resident drank – The 3 – denominator tells the number of parts that were originally in the container – The 240 – amount of fluid served to resident	
(S-112) Determining Intake Quickly Using Fractions • 2/3 of 240 mL of coffee – Determine what 1 part of total coffee equals by dividing the total mL amount of coffee (240) by 3 = 80 – Resident drank 2 of the 3 parts of the coffee, so multiply 80 (which is 1 part) by 2 because the resident drank 2 of the 3 parts = 160 – The resident drank 160 mL of the coffee	
(S-113) Milliliters and Ounces • A common conversion in health care is changing (or converting) ounces to milliliters • 1 ounce = 30 mL • To convert ounces to milliliters, simply multiply the number of ounces by 30 **TEACHING TIP #AA113: Little Plastic Medicine Cup** A plastic medication cup would be a great visual for students to pass around in class as it would demonstrate the equivalence of 30 mL and 1 ounce. An added strategy would be to provide each student with a medication cup to keep.	
(S-114) Conversion Problem – Apple Juice • 8 fluid ounces of apple juice in the glass • 1 fluid ounce = 30 milliliters (mL) • 8 x 30 milliliters (mL) = 240 milliliters (mL) • 240 mL of apple juice in the glass **ACTIVITY #AA114-1: Intake Calculations** Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly. **ACTIVITY #AA114-2: Let's Make a Chart** Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.	

You could also make this a team activity and assign each team a row of the chart. Bring students together and check/complete the chart.	
(S-115) Milliliters (mL) and Cubic Centimeters (cc) • Devices in health care are often marked in cubic centimeters (cc) • A common conversion is changing (or converting) cc to milliliters (mL) • 1 cubic centimeter (cc) = 1 milliliter (mL) • To convert cc to mL, simply use the exact number measured	
(S-116) Conversion Problem – Grape Juice • 120 cubic centimeters (cc) of grape juice in the glass • 1 cc = 1 milliliter (mL) • 120 mL of grape juice in the glass	
(S-117) Fluids Considered as Output • Urine • Vomit • Diarrhea • Wound drainage • Gastric suction material	
(S-118) Devices Used to Collect Output • Graduated specimen container • Catheter bag • Urinal • Commode hat • Emesis basin **TEACHING TIP #AA118: Devices That Collect Output Display** Display a variety of devices that collect output either with or without fake body fluids.	
(S-119) Foley Catheter Bag • Connected to indwelling (Foley) catheter which drains bladder of urine • Emptied into a measuring device at end of shift (or sooner, if full) • Measurement done using measuring device instead of catheter bag; measurement markings are not as accurate as a graduated specimen container	
(S-120) Urinal • A plastic, elongated device, angled at the top and used by individuals to urinate into, particularly when confined to bed or on measured output • Meant for single-resident use	

• As a measuring device, it is marked in ounces and cc (same as mL), with 100 cc (mL) increments marked lines and 50 cc (mL) unmarked lines between	
(S-121) The Commode Hat (or Specimen Pan) • A plastic collection container placed under the commode lid • Used when resident has bathroom privileges and – Is on output and/or – Has a urine or stool specimen been ordered? • As a measuring device, it is marked in ounces and cc (same as mL) and has a grooved edge allowing for ease of emptying into the commode • Important for resident to not put toilet paper into the hat/pan, but into the commode	
(S-122) The Emesis Basin • A plastic, shallow basin shaped like a kidney that fits against the resident's neck and collects bodily fluids • Used – During mouthcare – When a resident is nauseated – As a measuring device, it is marked in ounces and cc (same as mL), with 100 cc (mL) increments	
(S-123) Measuring Urine Example #1 • Long line = 200 cc (mL) • Short line = 25 cc (mL) • Amount = 225 cc (mL) • Document = 225 mL **TEACHING TIP #AA123: Urine in Graduated Specimen Containers Display** Display several graduated specimen containers with varying amounts of fake urine for students to observe. You may choose to place a card in front of the graduated specimen containers, with the amounts of fake urine included or not include the cards and require students to measure the fake urine individually or in pairs.	
(S-124) Measuring Urine Example #2 • Long line = 500 cc (mL) • Amount = 500 cc (mL) • Document = 500 mL	
(S-125) Measuring Urine Example #3 • Long line = 300 cc (mL) • Short line = 25 cc (mL) • Amount = 325 cc (mL) • Document = 325 mL	

Module AA – Measurement	
ACTIVITY #125AA: Urine Output Determine whether this activity will be used as an in-class assignment, homework assignment, or as a quiz grade. Distribute to students and instruct to use accordingly.	
(S-126) Importance of Identifying Meal Intake • Identifying intake of meals accurately is important in identifying the resident at risk for or already experiencing impaired nutrition • Food intake is one of the factors that reflects the resident's nutritional status • Poor food intake at meals or changes in food intake that persists for multiple meals may indicate an underlying problem or illness and should be reported to the nurse • Much of a resident's daily fluid intake comes from meals; when resident has decreased appetite, this can result in fluid/electrolyte imbalance	
(S-127) Identifying Food Intake • The nurse aide compares the amount of food that was eaten with the amount of food served • To measure food intake, the nurse aide needs a basic understanding of percentages in relation to a whole, which is 100%.	
(S-128) Understanding Percentages of a Whole • The entire circle = 100% and includes 4 equal parts • Each 25% is ¼ of the whole. • 25% + 25% = 50% (or ½ of the whole) • 25% + 25% + 25% = 75% (or ¾ of the whole)	
(S-129) Identifying and Documenting Food Intake • Follow facility procedure regarding identifying and recording food intake, for example: – Listing exact food that was eaten (all of chicken, all green beans, ½ of mashed potatoes, ¼ of biscuit, all of pie) – Using specific words (all, good, fair, poor, refused) – Using percentages of food eaten (100%, 75%, 50%, 25%, 0%) **TEACHING TIP #AA129: Creating Food Intake Trays** Use corrugated poster board and cut out several pieces the size of trays. Cut out and laminate pictures of foods from magazines or product boxes to create simulated foods reflecting various states of consumption. Using paper plates, place meals with laminated foods reflecting percentages of food intake on them. Create meal trays with corrugated poster board and plates of food for students to evaluate and assign percentages of intake for each.	
(S-130) Sample Meals	

Module AA – Measurement	
• Breakfast consists of 2 eggs, 2 slices of bacon, fried apples, grits, biscuit, coffee, and apple juice • Lunch consists of 4 grilled chicken tenders, mashed potatoes, broccoli, a corn muffin, coffee, and water	
(S-131) Resident Ate 0% of Meals (Refused) Refused meal completely or ate only one or two bites of each item	
(S-132) Resident Ate 25% of Meals (Poor) Ate about 25% of entrée or 50% of one item	
(S-133) Resident Ate 50% of Meals (Fair) About 50% of food has been eaten (for example, 50% of entrée and 25% of a vegetable)	
(S-134) Resident Ate 75% of Meals (Good) Most of meal has been eaten, but a large part of one item or two items have been left (for example, 25% of entrée or 75% of a vegetable not eaten)	
(S-135) Resident Ate 100% of Meals (All) All of meal has been eaten except for a small amount of food (for example, less than 25% of a vegetable has not been eaten)	

Handout #AA9 Analog Watch

A watch that has moving hands and is typically marked with numbers 1 – 12.

It has an hour hand, minute hand, and second hand.

The nurse aide uses the second hand to count respirations and pulse rate.

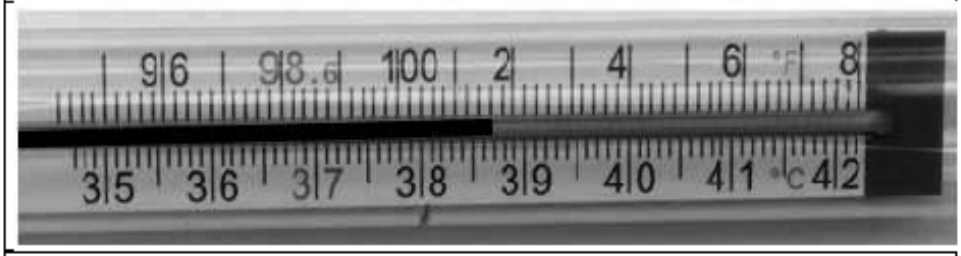
If you are counting respirations or pulse rate for 60 seconds, while watching the second hand, start counting and stop counting on the same number.

Do not wait until the second hand lands on the 12 to start counting. Just remember which number you started with when you count.

Number Start	Number Stop	Number Start	Number Stop
1	1	7	7
2	2	8	8
3	3	9	9
4	4	10	10
5	5	11	11
6	6	12	12

Handout #AA24 Fahrenheit Temperature

#1



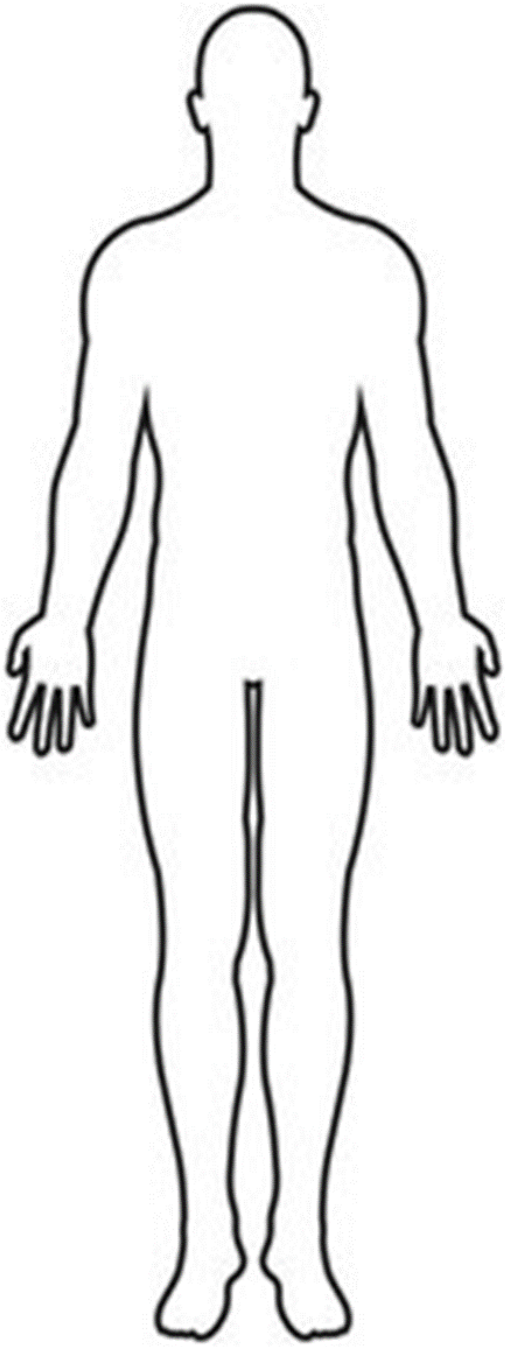
- What is the oral Fahrenheit temperature? _____
- Based on the oral temperature reading, the resident is:
  - ____ afebrile
  - ____ febrile
- Will you:
  - ____ notify the supervisor
  - ____ document the temperature
  - ____ both

#2

- What is the rectal Fahrenheit temperature? _____
- Based on the rectal temperature reading, the resident is:
  - ____ afebrile
  - ____ febrile
- Will you:
  - ____ notify the supervisor
  - ____ document the temperature
  - ____ both

Handout #AA28 Pulse Sites

Identify and label the temporal, carotid, apical, brachial, radial, and pedal pulses.

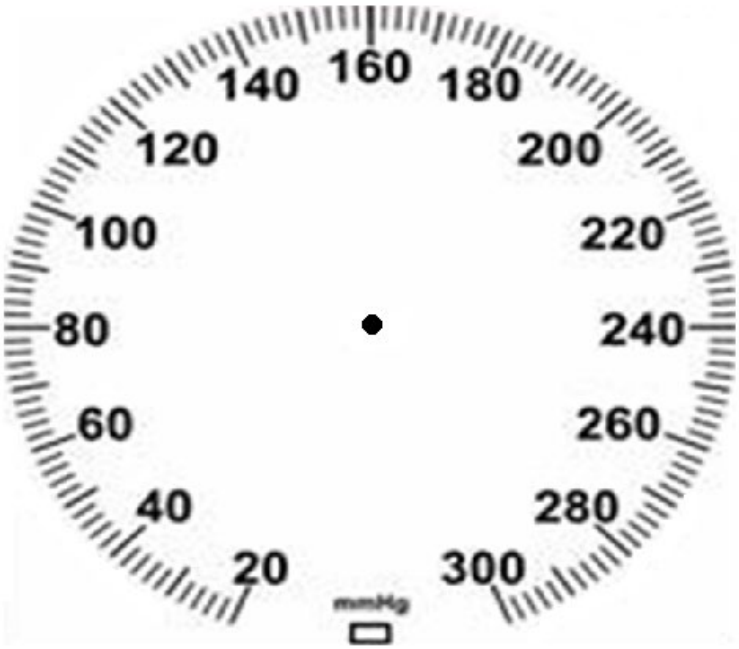


Handout #AA49 Blood Pressure and Factors of Select Examples of People

For numbers 1 – 4, write specific information for each example. For numbers 5 – 14, place a check if the specific factor applies to the example. If a factor is not included in the description of the example, imply that it is not present.

Specific Factors	Example #1	Example #2	Example #3
1. Blood pressure			
2. Age			
3. Gender			
4. Weight			
5. Lying down now?			
6. Exercising now?			
7. Smokes?			
8. Drinks alcohol?			
9. Overweight?			
10. High salt diet?			
11. Stressed now?			
12. Anxious now?			
13. Injured now?			
14. Pain now?			

Handout #62AA Aneroid Blood Pressure Manometer



- **Long lines mark 10 mm Hg**
- **Short lines mark 2 mm Hg**

If the needle lands between 2 lines at the point that the systolic sound is heard or the sound is no longer heard (diastolic), then the number value is rounded up to the next 2 mm Hg; odd numbers are not recorded/reported when using a manual BP cuff

When checking blood pressure, you will be watching the needle as it drops from a higher number to a lower number, so you will be counting backwards.

Measured in millimeters of mercury (mm Hg),

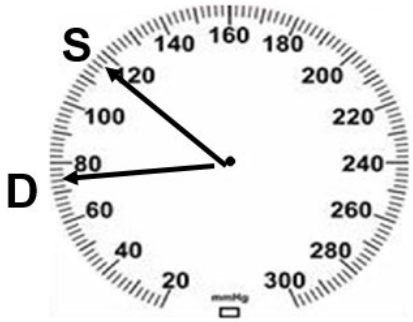
Recorded as a fraction.

120 (systolic)
80 (diastolic)

Pronounced “120 over 80”

Handout #AA66 Aneroid Blood Pressure

#1

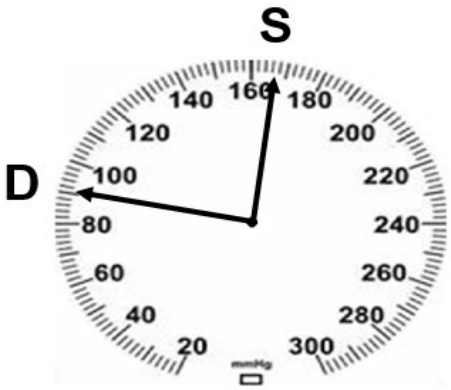


What is the blood pressure?

Is the blood pressure normal?
____ yes
____ no

You will:
____ notify the supervisor
____ document the blood pressure
____ both

#2

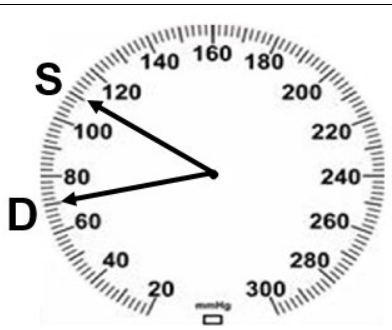


What is the blood pressure?

Is the blood pressure normal?
____ yes
____ no

You will:
____ notify the supervisor
____ document the blood pressure
____ both

#3

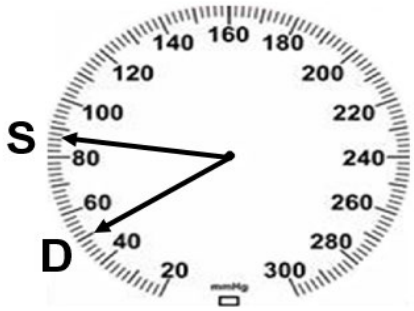


What is the blood pressure?

Is the blood pressure normal?
____ yes
____ no

You will:
____ notify the supervisor
____ document the blood pressure
____ both

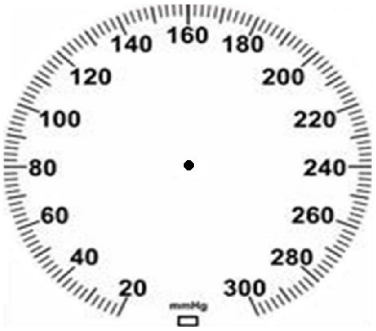
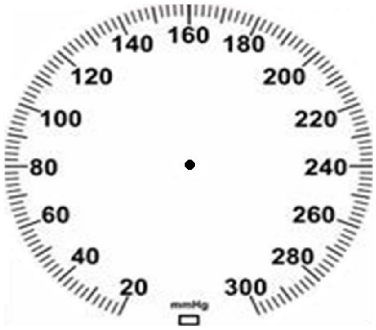
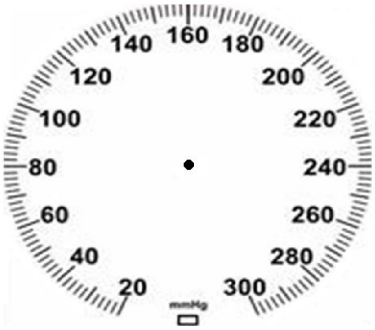
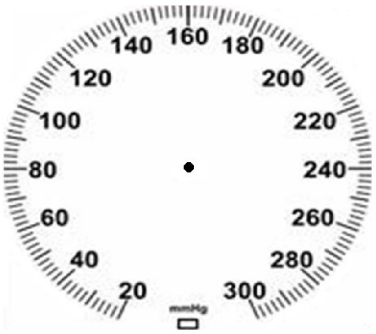
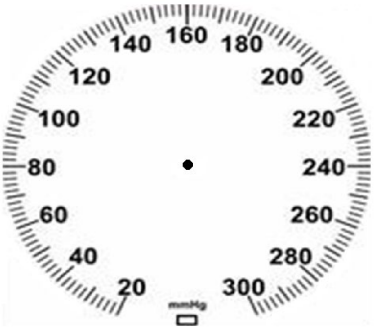
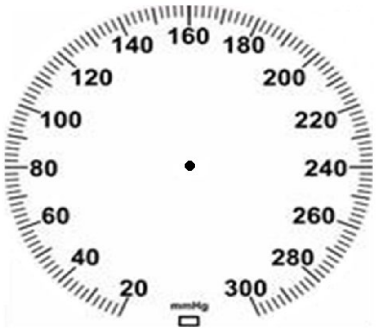
#4



What is the blood pressure?

Is the blood pressure normal?
____ yes
____ no

You will:
____ notify the supervisor
____ document the blood pressure
____ both

#5  	#6 
Draw the following blood pressure value, labelling systolic with an S and diastolic with a D: 134/82	Draw the following blood pressure value, labelling systolic with an S and diastolic with a D: 122/74
#7  	#8 
Draw the following blood pressure value, labelling systolic with an S and diastolic with a D: 146/90	Draw the following blood pressure value, labelling systolic with an S and diastolic with a D: 90/60
#9  	#10 
Draw the following blood pressure value, labelling systolic with an S and diastolic with a D: 180/96	Draw the following blood pressure value, labelling systolic with an S and diastolic with a D: 96/64

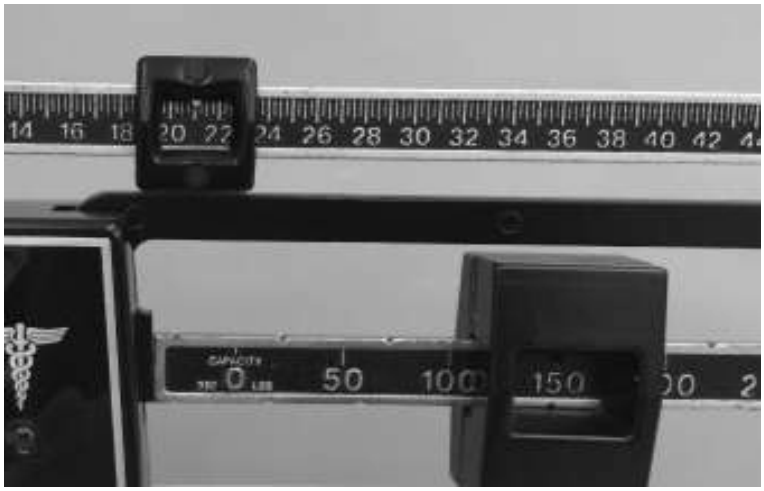
Handout #AA95: Weight and Height

#1 Weight

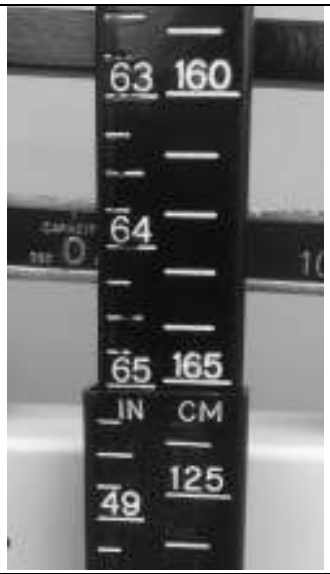
Write the resident's weight in pounds. _____ Show calculation:
#2 Weight

Write the resident's weight in pounds. _____ Show calculation:

#3 Weight

Write the resident's weight in pounds. _____ Show calculation:
#4 Weight

Write the resident's weight in pounds. _____ Show calculation:

#1 Height

Write the resident's height in inches _____ Write the resident's height in feet and inches _____ Show calculation:
#2 Height

Write the resident's height in inches _____ Write the resident's height in feet and inches _____ Show calculation:

#3 Height

Write the resident's height in inches _____

Write the resident's height in feet and inches _____

Show calculation:

#4 Height

Write the resident's height in inches _____

Write the resident's height in feet and inches _____

Show calculation:

Handout #AA114-1 Intake Calculations

Using the following serving sizes of containers common in health care facilities, determine intake for the fluids listed below. Use fractions.

• Water glass = 240 mL • Tea glass = 180 mL • Juice glass = 120 mL • Milk carton = 240 mL	• Coffee cup = 240 mL • Soft drink can = 360 mL • Gelatin = 120 mL • Soup bowl = 180 mL

Located on Meal Tray	Show Fraction Here	Intake in mL
The resident drank 1/2 of his orange juice. How many mL of orange juice did the resident drink?		
The resident ate 1/3 of his tomato soup. How many mL of soup did the resident eat?		
The resident drank 2/3 of his coffee. How many mL of coffee did the resident drink?		
The resident ate 3/4 of his gelatin. How many mL of gelatin did the resident drink?		
The resident drank 1/4 of his tea. How many mL of tea did the resident drink?		

Using the following serving sizes of containers common in health care facilities, determine intake for the fluids listed below. Use clean, labeled graduated specimen container to measure.

• Water glass = 240 mL • Tea glass = 180 mL • Juice glass = 120 mL • Milk carton = 240 mL	• Coffee cup = 240 mL • Soft drink can = 360 mL • Gelatin = 120 mL • Soup bowl = 180 mL

Located on Meal Tray	Show Subtraction Here	Intake in mL
The resident drank part of his orange juice. The nurse aide measured 45 mL in graduated specimen container that resident didn't drink. How many mL of orange juice did the resident drink?		
The resident drank part of his coffee. The nurse aide measured 100 mL in graduated specimen container that resident didn't drink. How many mL of coffee did the resident drink?		
The resident drank most of his water. The nurse aide measured 80 mL in graduated specimen container that resident didn't drink. How many mL of water did the resident drink?		

Activity #AA114-2 Let's Make a Chart

Using fractions, let's make a chart. The serving sizes of common containers found in health care facilities are listed along the side of the chart. The amounts of fluid drunk/eaten are listed across the chart. You will write in the amount in mL that was drunk in the appropriate box. I will do the first one for you. 1/4 of 120 mL was drunk, which equals 30 mL. I did not include my work in the example, but you need to. Work out your fractions below.

• Water glass = 240 mL • Tea glass = 180 mL • Juice glass = 120 mL • Milk carton = 240 mL	• Coffee cup = 240 mL • Soft drink can = 360 mL • Gelatin = 120 mL • Soup bowl = 180 mL

	1/4	**1/2**	**3/4**	**1/3**	**2/3**
120 mL	30 mL				
180 mL					
240 mL					
360 mL					

Activity #AA125 Urine Output

#1 Urine	#2 Urine
	
Amount in milliliters	Amount in milliliters
#3 Urine	#4 Urine
	
Amount in milliliters	Amount in milliliters