



King Saud University
Collage of Nursing
Medical Surgical Nursing depart

Application of Health Assessment

NUR 225

Module Five

Physical examination of Cardiovascular System





Outline:

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- **Cardiovascular System Landmarks (p 3).**
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 - **Heart (Precordium) inspection, palpation and auscultation (p 4 - 6)**
 - B. **Assessment of the peripheral Vascular System:**
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Nursing Assessment of the Cardiovascular

A. General guidelines for examine the cardiovascular system:

1. The cardiovascular system assessment includes the survey of the vascular structures in the neck: **carotid artery & jugular veins**. These vessels reflect the efficiency of the cardiac function.
2. Obtain baseline vital signs (pulse, respiration and blood pressure).
3. Proceed in a methodological approach so no area is omitted.
4. Assist the client to a low fowler position with head elevated (30-45 degrees), and stand at the client right side as possible. **This position allows for optimal inspection and facilitates palpation**
5. When examination a female client, gently displace the breast upward, or ask her to do so.
6. Note the general appearance of the client color & weight.

B. Physical Examination of the heart:

1. Obtain Health History about;

- ✓ **Presence of symptoms such as** fatigue, dyspnea, hypertension, chest pain, cyanosis, pallor, orthopnea, Edema, numbness, tingling.
- ✓ **Presence of other disease such as** diabetes, lung disease, endocrine disorder, obesity.
- ✓ **Family History:** heart disease, high cholesterol level, high blood pressure.
- ✓ **Life style habits (cardiac risk factors):** smoking, alcohol intake, eating habits, exercise, stress levels.
- ✓ **Medications:** antihypertensive, diuretics, anticoagulants (aspirin).

2. Prepare equipment;

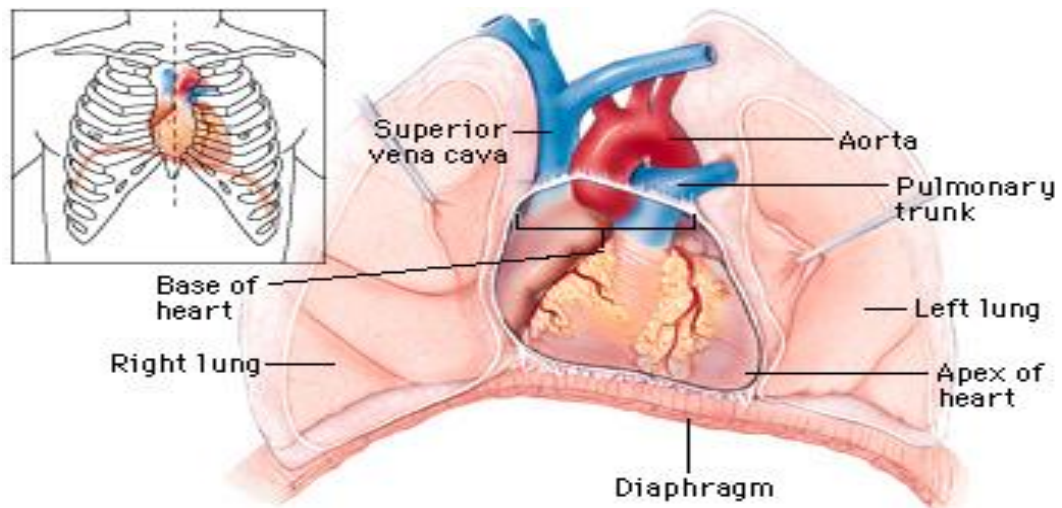
- ✓ Stethoscope.
- ✓ penlight
- ✓ Measuring tap
- ✓ Alcohol swabs.

3. Wash your hand & Prepare clients for the examination by;

- ✓ Explain the steps of the examination, and answer any questions the client may have. These actions will help to relieve client anxiety.
- ✓ Explaining that they will need to expose the anterior chest and privacy will be provided.
- ✓ Explain to the client that you will be listening to the heart in a number of places and that this does not necessarily mean that anything is wrong.
- ✓ Explain to the client that it is necessary to assume several different positions for this examination. **Patient positions will include:**
 - **Fowler position with head elevated (30-45).** during auscultation and palpation of the neck vessels and inspection, palpation, and auscultation of the precordium.
 - **left lateral position** for palpation of the apical impulse
 - **sitting-up and leaning-forward position** to auscultate for the presence of any abnormal heart sounds
 - **Sitting or dangling on the bedside** to assess peripheral.

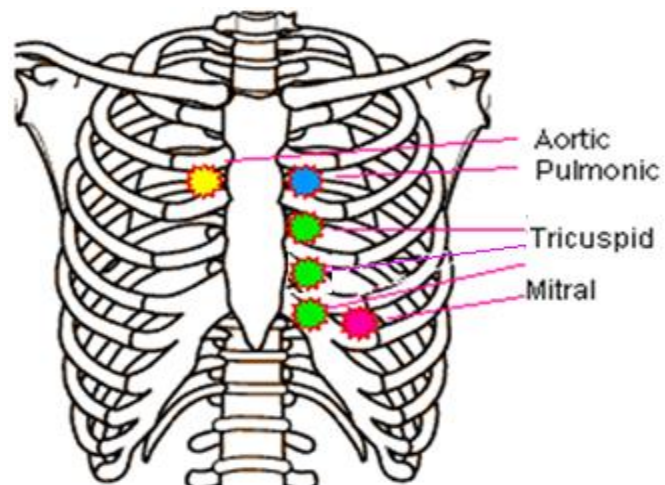
C. Cardiovascular System Landmarks:

- ✓ The heart extends from the 2nd to the 5th intercostal spaces & from the right border of the **sternum** to the left **midclavicular line**.
- ✓ Think of the heart as an upside – down triangle in the chest. The "Top" of the heart is the border **BASE**; the "bottom" is the **APEX** which points down to the left.



- ✓ The precordium, the area of the chest overlying the heart, is assessed in a systematic manner at the following anatomical landmarks:

- 1- Aortic area.
- 2- Pulmonic area.
- 3- Tricuspid area.
- 4- Apical area.
- 5- Epigastric area.

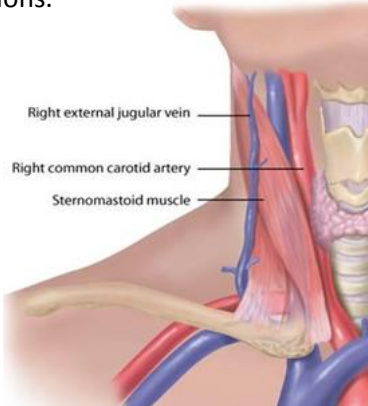

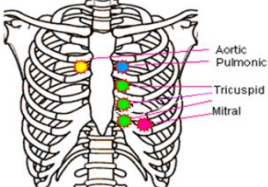




Remarks:

Aortic, Pulmonic, Tricuspid, Apical area are the sites on the chest wall where sounds produced by the valves are best heard. The sound radiates with the direction of blood flow. They are not over the actual anatomic location of the valves.

Techniques of examination

A. Assessment of the Cardiovascular System:

<i>Technique</i>	<i>Normal Findings</i>	<i>Abnormal Findings</i>
<p>1- Neck vessel</p> <p>Inspect the jugular vein for pulsation & distention</p> <ul style="list-style-type: none"> ✓ Inspect the jugular vein for pulsation & distention by standing on the right side of the client. ✓ The client should be in a supine position with the head elevated 30-45 degree. ✓ Ask the client to turn the head slightly to the left. ✓ Shine a tangential light source onto the neck if you need it, to increase visualization of pulsations.  <div style="border: 1px solid red; border-radius: 15px; padding: 5px; margin-top: 10px; background-color: #ffe6e6;"> <p>Be careful not to confuse pulsations of the carotid arteries with pulsations of the internal jugular veins.</p> </div>	<p>It is normal for the jugular veins to be visible when the client is supine, but The jugular venous pulse is not normally visible or distended with the client sitting upright.</p>	<p>Fully distended jugular veins with the client indicate increased central venous pressure, pulmonary hypertension.</p> 
<p>2- Heart (Precordium)</p> <p>A- Inspect pulsations.</p> <ul style="list-style-type: none"> ✓ Keep client in supine position with the head of the bed elevated 30-45 degree. Stand on the client's right side. ✓ Inspect the anterior chest following anatomical landmarks for pulsation and any abnormal pulsations. 	<p>The apical impulse may or may not be visible. If apparent, it would be in the mitral area.</p>	<p>other than the apical pulsation is considered abnormal and should be evaluated.</p> <p>Pulsations, which may also be called heaves or lifts.</p> <p>A heave or lift may occur as the result of an enlarged ventricle.</p>

Technique	Normal Findings	Abnormal Findings
<p>B- Palpate the apical impulse.</p> <ul style="list-style-type: none"> ✓ Remain on the client's right side and ask the client to remain supine. ✓ Use one or two finger pads to Palpate the anterior chest for pulsation beginning with the aorta and proceed downward to the apex of the heart.  <p><small>A Locate the apical impulse with the finger pads</small></p> <ul style="list-style-type: none"> ✓ palpate the apical impulse in the mitral. You may ask the client to roll to the left side to better feel the impulse using the palmar surface of your hand. ✓ Also, Palpate for abnormal pulsations or vibration in the apex of heart.  <p><small>B then palpate the apical impulse with the palmar surface</small></p>	<p>No pulsation should be present except for mitral area.</p> <p>The apical impulse is palpated in the mitral tap. Amplitude is usually small like a gentle tap.</p> <p>In obese clients or clients with large breasts, the apical impulse may not be palpable.</p> <p>No abnormal pulsations or vibrations are palpated in the areas of the apex,</p>	<p>The apical impulse may be impossible to palpate in clients with pulmonary emphysema.</p> <p>If apical impulse is more forceful suspect cardiac enlargement.</p> <p>A Thrill or a abnormal pulsations is usually associated with higher murmur.</p>
<p>C- Auscultation</p> <ul style="list-style-type: none"> ✓ place the diaphragm of the stethoscope on the chest wall beginning with the aortic area and proceed to the apex of the heart in a Z pattern. ✓ Auscultate for heart rate and rhythm. <ul style="list-style-type: none"> • If you detect an irregular rhythm, auscultate for a pulse rate deficit. • This is done by palpating the radial pulse while you auscultate the apical pulse. • Count for a full minute. <div style="border: 1px solid red; border-radius: 15px; padding: 10px; margin-top: 10px;"> <p>Note; Do not ask the client to hold his or her breath. Breath holding will cause any normal or abnormal result.</p> </div>	<p>Rate should be 60-100 b/m with regular rhythm.</p> <p>The radial and apical pulse rates should be identical.</p>	<p>Bradycardia (less than 60 b/m) or tachycardia (more than 100 b/m) May result in decreased cardiac output.</p> <p>A pulse deficit (difference between the apical and radial pulse) may indicate atrial fibrillation or atrial flutter.</p>

✓ **Auscultate to identify S1 and S2.**

- Auscultate the first heart sound S1 “Lub” and the second heart sound S2 “Dub”.
- Remember these two sounds make up the cardiac cycle of systole and diastole.
- S1 starts systole, and S2 starts diastole.

NORMAL CARDIAC CYCLE



✓ **Auscultate for extra heart sounds.**

- Roll the client towards the left side and listen with the bell at the apex for the presence of any extra heart sound (S3) (S4) or (murmurs).



Listening to heart sounds with the bell of the stethoscope.

- because some murmurs occur or subside according to the client’s position. auscultate in different positions which is a left lateral position by using the bell of the stethoscope and sitting-up and leaning-forward position by Asking the client to sit up and lean forward, and exhale.
- Use the diaphragm of the stethoscope and listen at the aortic and pulmonic area.



*In **the aortic** and **pulmonic** areas, **S2** is louder than S1.

* In **the tricuspid** area, **S1 and S2** are of almost equal in intensity.

* In **the mitral area**, **S1** is louder than S2.

Normally no extra heart sounds are heard.

S1 and S2 heart sounds are normally present.

S3 (ventricular gallop) heard with ischemic heart disease or restrictive myocardial disease.

EXTRA HEART SOUNDS - S3



S4 (atrial gallop) may be heard with coronary artery disease or cardiomyopathy


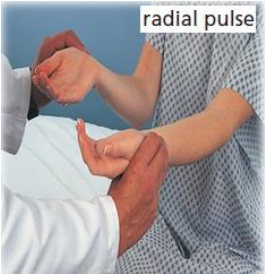
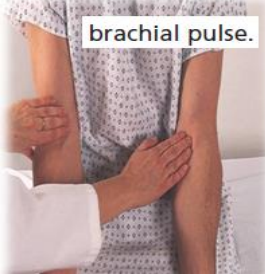


EXTRA HEART SOUNDS - S4



Murmur may be detected when the client assumes this position.

Murmurs (is a swishing sound caused by turbulent blood flow through the heart valves or great vessels).

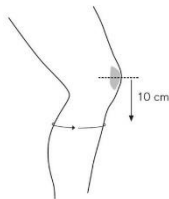
B. Assessment of the peripheral Vascular System:

Technique	Normal Findings	Abnormal Findings
<p>1- Arms</p> <p>A- Inspection</p> <ul style="list-style-type: none"> ✓ Lift the client's hands by your hands then turn them over. ✓ Inspect hands and arms color related to circulation. ✓ Inspect for lesions or ulcers.  <p>B- Palpation</p> <ul style="list-style-type: none"> ✓ By the dorsal of your hands, palpate the client's hands, and arms, and note the temperature. ✓ Palpate to assess capillary refill time. <ul style="list-style-type: none"> • This test indicates peripheral perfusion and reflects cardiac output. ✓ Palpate peripheral pulses bilaterally <ul style="list-style-type: none"> • (radial, ulnar, brachial) • comparing symmetrical the pulse rate, rhythm & force from side to side. • Grade the force on a (4-points scale).   	<p>Color varies depending on the client's skin tone, although color should be the same bilaterally</p> <p>free of lesions or ulcerations</p> <p>Skin is warm to the touch bilaterally.</p> <p>Capillary beds color returns in 2 seconds or less.</p>  <p>pulses are bilaterally strong (2+).</p>	<p>Cyanosis/pallor/ erythema</p> <p>Ulcers or lesions at pressure areas.</p> <p>A cool extremity may be a sign of arterial insufficiency</p> <p>Capillary refill time exceeding 2 seconds may indicate decreased cardiac output, shock, or hypothermia.</p> <p>Absent (0), Weak (+1) increased (+3), or Bounding (+4). (back to app II).</p>

2- Legs

A- Inspection

- ✓ Ask the client to lie supine. Then drape the groin area.
- ✓ Inspect skin color from the toes to the groin.
- ✓ Inspect for lesions or ulcers.
- ✓ Inspect the legs for unilateral or bilateral edema.
- ✓ Inspect both legs for size.
 - If the legs appear asymmetric, use a centimeter tape to measure size bilaterally.
 - Measure from the patella to the widest point in first leg.
 - use pen to ensure exact placement of the measuring tape.



- Measure the first leg circumference and record your finding.



- Then measure the other leg exactly at the same place by using same number of centimeter down from the patella.
- Compare your finding

B- Palpation

- ✓ **Palpate bilaterally for temperature of the feet and legs.**
 - Use the backs of your fingers.
 - Compare your findings in the same areas bilaterally.
 - Note location of any changes in temperature.



Color varies depending on the client's skin tone, although color should be the same bilaterally

free of lesions or ulcerations

free from edema

Calf circumferences are bilaterally equal.

Cyanosis/pallor/ erythema

Ulcers or lesions at pressure areas.

Presence of Edema

Calf circumferences are asymmetrical

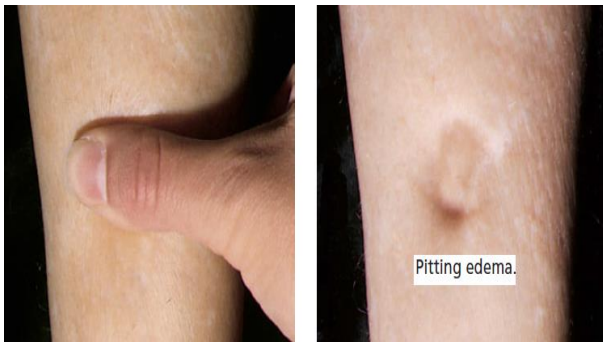
Toes, feet, and legs are equally warm bilaterally.

Generalized coolness in one leg or change in temperature from warm to cool as you move down the leg suggests arterial insufficiency.

Increased warmth in the leg may be caused by superficial thrombophlebitis (inflammation of the wall of a vein with associated thrombosis)

✓ **Palpate for edema.**

- If edema is noted during inspection, palpate the area.
- If not noted just firmly press the skin over the tibia
- Press the area with the tips of your thumb for 5 seconds then release.
- If the depression does not rapidly refill and the skin remains indented on release, pitting edema is present.
- If edema is present grade it on (4-point scale) (**back to Appendix .IV**).



✓ **Palpate to assess capillary refill time**

✓ **Palpate peripheral pulses bilaterally**

- femoral, popliteal, posterior tibial, dorsalis pedis.
- comparing symmetrical.



- ✓ If pulses in the legs are weak further assessment for arterial insufficiency which is called **(buerger's test)** is needed.

Absence of edema

pulses strong and equal bilaterally.

Bilateral edema usually indicates a systemic problem, such as congestive heart failure, or local causes such as prolonged standing or sitting (orthostatic edema).

Weak or absent pulses indicate partial or complete arterial occlusion.

✓ **To perform buerger's test follow the following**

- The client should be in a supine position.
- Have client raise one leg (or both) 30cm above heart level.
- As you support the client's legs, ask the client to wag the feet up and down for about 1 minute to drain off the venous blood.
- At this point, ask the client to sit up and dangle legs off the side of the examination bed.
- Note and compare the color of both feet and the time it takes for color to return.



***Repeat for arms & hands if needed.**

a pinkish color returns to the tips of the toes in 10 seconds or less.
The superficial veins on top of the feet fill in 15 seconds or less.

Return of pink color that takes longer than 10 seconds and superficial veins that take longer than 15 seconds to fill suggest arterial insufficiency.

Name of student _____

Student Number _____

The student nurse should be able to:

Performance criteria	Competency Level			Comment
	Done correctly (2)	Done with assistance (1)	Not done (0)	
Collect appropriate subjective data related to Cardiovascular system.				
Prepare required equipment. (Stethoscope, penlight, Measuring tap, alcohol swab)				
Introduce yourself				
Wash your hands & Explain procedure to patient.				
<ul style="list-style-type: none"> ➤ Position and drape client correctly, ➤ Assist the client to a low fowler position with head elevated (30-45 degree) . ➤ stand at the client right side 				
<u>Neck vessel</u>				
Inspection	Done correctly (2)	Done with assistance (1)	Not done (0)	Comment
Inspect the jugular vein for pulsation & distention <ul style="list-style-type: none"> ✓ standing on the right side of the client. ✓ The client should be in a supine position with the head elevated ✓ Ask the client to turn the head slightly to the left. ✓ Use light source if you need it, to increase visualization. 				
<u>Heart (Precordium)</u>				
Inspection	Done correctly (2)	Done with assistance (1)	Not done (0)	Comment
Inspect pulsations. <ul style="list-style-type: none"> ✓ Keep client in supine position with the head of the bed elevated ✓ Stand on the client's right side. ✓ Inspect the anterior chest following anatomical landmarks for pulsation and any abnormal pulsations. 				
<u>Palpation</u>				
Palpate the apical impulse. <ul style="list-style-type: none"> ✓ Remain on the client's right side and ask the client to remain supine. ✓ Use one or two finger pads to Palpate the anterior chest for pulsation beginning with the aorta and proceed downward to the apex of the heart. ✓ palpate the apical impulse in the mitral. ✓ ask the client to roll to the left side to better feel the impulse using the palmar surface of your hand. ✓ Palpate for abnormal pulsations or vibration in the apex of heart. 				

Auscultation	Done correctly (2)	Done with assistance (1)	Not done (0)	Comment
place the diaphragm of the stethoscope on the chest wall beginning with the aortic area and proceed to the apex of the heart in a Z pattern.				
Auscultate for heart rate and rhythm. ✓ If you detect an irregular rhythm, auscultate for a pulse rate deficit. <ul style="list-style-type: none"> ➤ This is done by palpating the radial pulse while you auscultate the apical pulse. ➤ Count for a full minute. 				
Auscultate to identify S1 and S2. ✓ Auscultate the first heart sound S1 “Lub” and the second heart sound S2 “Dub”. ✓ In the aortic and pulmonic areas, S2 is louder than S1. ✓ In the tricuspid area, S1 and S2 are of almost equal in intensity. ✓ In the mitral area , S1 is louder than S2.				
Auscultate for extra heart sounds. ✓ Roll the client towards the left side and listen with the bell at the apex for the presence of any extra heart sound (S3) (S4) or (murmurs). ✓ Ask the client to sit up and lean forward, and exhale. ✓ Use the diaphragm of the stethoscope and listen at the aortic and pulmonic area for murmurs.				
Peripherals examination				
Arms Inspection	Done correctly (2)	Done with assistance (1)	Not done (0)	Comment
Lift the client s hands by your hands then turns them over and compare symmetrically				
✓ Inspect hands and arms color related to circulation. ✓ Inspect for lesions or ulcers.				
Arms Palpation				
By the dorsal of hands, Palpate the client’s hands, and arms. compare symmetrically				
✓ Palpate to assess the temperature. ✓ Palpate to assess capillary refill time. ✓ Palpate peripheral pulses bilaterally <ul style="list-style-type: none"> • (radial, ulnar, brachial) • comparing symmetrical the pulse rate, rhythm & force from side to side. • Grade the force on a (4-points scale). 				

Legs Inspection	Done correctly (2)	Done with assistance (1)	Not done (0)	Comment
✓ Ask the client to lie supine. Then drape the groin area.				
✓ Inspect skin color from the toes to the groin.				
✓ Inspect for lesions or ulcers.				
✓ Inspect the legs for unilateral or bilateral edema.				
✓ Inspect both legs for size. <ul style="list-style-type: none"> • If the legs appear asymmetric, use a centimeter tape to measure size bilaterally. • Measure from the patella to the widest point in first leg. • use pen to ensure exact placement of the measuring tape. • Measure the first leg circumference and record your finding. • measure the other leg exactly at the same place by using same number of centimeter down from the patella. • Compare your finding 				
Legs Palpation				
✓ Palpate bilaterally for temperature of the feet and legs. <ul style="list-style-type: none"> • Use the backs of your fingers. • Compare your findings in the same areas bilaterally. • Note location of any changes in temperature. 				
✓ Palpate for edema. <ul style="list-style-type: none"> • If edema is noted during inspection, palpate the area. • If not noted just firmly press the skin over the tibia • Press the area with the tips of your thumb for 5 seconds then release. • If the depression does not rapidly refill and the skin remains indented on release, pitting edema is present. • If edema is present grade it on (4-point scale) 				
✓ Palpate to assess capillary refill time				
✓ Palpate peripheral pulses bilaterally <ul style="list-style-type: none"> • femoral, popliteal, posterior tibial, dorsalis pedis. • comparing symmetrical. 				
✓ If pulses in the legs are weak perform buerger's test The client should be in a supine position. <ul style="list-style-type: none"> • Have client raise one leg (or both) 30cm above heart level. • As you support the client's legs, ask the client to wag the feet up and down for about 1 minute to drain off the venous blood. • At this point, ask the client to sit up and dangle legs off the side of the examination bed. • Note and compare the color of both feet and the time it takes for color to return. *Repeat for arms & hands if needed				
Document your finding in the following chart.				

Total grade _____

Evaluated by: _____

Nursing health assessment documentation format
Cardiovascular system (adapted from KFSH & RC)

Instructions: Circle or fill in the blanks with actual physical assessment findings. WNL=Within Normal Limits for age.

1-Pt. Identification data:

Name:.....Age.....Sex..... Occupation..... Marital status.....
 Tel/Address.....

II-General Survey :

Physical appearance _WNL , abnormalityBody structure _WNL, abnormality.....
 Mobility _WNL, abnormality.....Behavior _WNL, abnormality.....

III-Present History :

A-Chief ComplaintP.....
 P.....Q.....R.....
 R.....S.....T.....
 T.....T.....T.....
 Associated symptoms.....Medications:.....
 B-Current health :

IV-Past medical history:

- Heart problem Rheumatic fever Murmurs Arterial disease
- Varicosities Phlebitis Lung disease D.M.
- Heart Attack Heart failure Others (specify).....

Physical Examination:

Anterior chest: WNL Pulsation..... Vibration.....
Skin abnormality.....
 PMI: location Size durationamplitude.....
 Heart sounds: S1,S2 murmurs diastolic refill.
 Apical Pulse : regular irregular rate.....

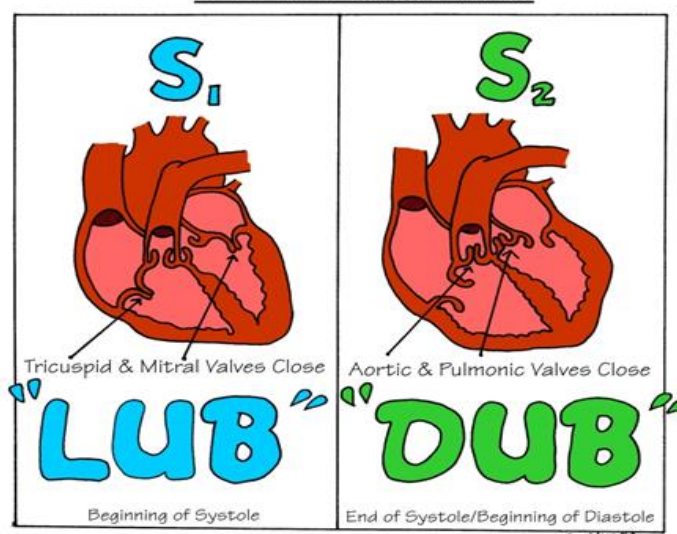
Fill in the blacks with actual physical assessment findings:

Peripheral examination	Hands		Feet	
	Right	Left	Right	Left
Skin color				
Nail beds color				
Capillary refill				
Temperature				
Texture				

Peripheral examination	Hands		Feet	
	Right	Left	Right	Left
Turgor				
Lesion				
Swelling				
Hair distribution				
Clubbing				
Size				
Edema grade				
Calf circumference				
Venous pattern				
Radial /Pedal pulse				
Palpable				
Rate				
Rhythm				
Vessel wall				
Volume				
Force grade				
Burger's test				
Color return				
Venous refill				

HEART SOUNDS

Appendix I:



Appendix II: grading pulse volume:

Grade	Description
0	Absent : No pulse
1	Weak : Thread, and difficult to palpate ; it may fade in & out & is easily obliterated with pressure , thus, light palpation is necessary. Once located it is stronger than scale 1 pulse.
2	Normal: Easily palpable, full, doesn't fade, and not easily obliterated with pressure.
3	Increased : Easily palpable and stronger than the normal pulse.
4	Bounding: Very strong, easily palpable, not obliterated with pressure it may indicate a disease in some cases.

Appendix III: Evaluating tissue perfusion:

Assessment Criterion	Normal Finding	Abnormal findings	Possible health problems
Skin color	Pink	Cyanotic Pallor(increase with limb elevation Dusky red when lowered). Brown pigmentation around the ankles.	Venous insufficiency Arterial insufficiency
Skin temperature	Not excessively warm or cold.	Cool	Arterial insufficiency
Edema	Absent	Marked edema mild or server	Venous insufficiency Arterial insufficiency
Skin texture	Resilient , moist	Thin and shiny or thick, waxy, shiny and fragile, with reduced hair and ulceration.	Venous or arterial insufficiency

Arterial adequacy test	Original color returns to normal in 10sec. veins fills in about 15 sec.	Delayed color return or mottled appearance , delayed venous filling , marked redness of arms or legs.	Arterial insufficiency
Capillary refill test	Immediate return	Delayed	Arterial insufficiency
Peripheral pulse	Easily palpable	No pulse , decreased or absent	Arterial insufficiency

Appendix IV: four point scale for grading edema:

Grade	Description
+1	Mild pitting, slight indentation , no observable swelling.
+2	Less than 5mm
+3	5-10mm
+4	More than 10mm



- 0+ No pitting edema
- 1+ Mild pitting edema. 2 mm depression that disappears rapidly.
- 2+ Moderate pitting edema. 4 mm depression that disappears in 10–15 seconds.
- 3+ Moderately severe pitting edema. 6 mm depression that may last more than 1 minute.
- 4+ Severe pitting edema. 8 mm depression that can last more than 2 minutes.

For further reading go back to

Chapter 21 & 22 in “ health assessment in nursing” , 5th edition, (Janet R. Weber, 2014)