**High Plains Technology Center**

**Health Careers**

**Learning Activity Packet (LAP) for Electrocardiograph Technician**

**Related unit of instruction:**

EKG Management

**Approximate Completion time:**

15 hours

**Rationale for the Lap:**

This LAP is designed to help the student set up and operate an electrocardiogram machine.

**Criteria for successful completion:**

By the end of this LAP the student will

1. Read and turn in work sheets for Chapters 1 – 12 in Ellis’ EKG Plain and Simple, 2nd Edition book.
2. Pass the tests for each chapter.

**Learning Objective:**

Coronary Anatomy & Physiology Chapter 1  
  
1. State the location of the heart and it normal size.  
2. Name the walls and layers of the heart.  
3. Name all the structures of the heart.  
4. Track the flow of blood through the heart.  
5. State the oxygen saturation of the heart’s chambers.  
6. Describe the function and location of the heart valves.  
7. Describe the relationship of the valves to heart sounds.  
8. List the great vessels and the chamber into which they empty or from which they arise.  
9. State what occurs in each phase of the cardiac cycle.  
10. Relate the effects of diastole and systole to the EKG.  
11. Name and describe the function of the coronary arteries.  
12. Differentiate between the two kinds of cardiac cells.  
13. Describe the sympathetic and parasympathetic nervous system.  
14. Describe the *fight-or-flight* and *rest-and-digest* responses.

*Electrophysiology Chapter 2*

1. Define the terms polarized, depolarization and repolarization and relate them to contraction and relaxation.
2. Describe and label the phases of the action potential.
3. Define transmembrane potential.
4. Draw and explain the P wave, QRS complex, T wave and U wave.
5. Explain where the PR and ST segments are.
6. Define the absolute and relative refractory periods and the implication of each.
7. Be able to label, on a rhythm strip, all the waves and complexes.
8. Explain the delineations of EKG paper. How many seconds in a small block and big block? How many small blocks in one minute? How many big blocks in a minute?
9. On a rhythm strip, determine if the PR, QRS and QT intervals are normal or abnormal.
10. Name the waves in a variety of QRS complexes.
11. Define pacemaker.
12. List the different pacemakers of the heart and their inherent rates.
13. Track the cardiac impulse from the sinus node through the conduction system.
14. Define the four characteristics of cardiac cells.
15. Describe the difference between escape and usurpation.
16. Label a rhythm strip as being representative of either escape or usurpation.
17. Define arrhythmia.
18. Tell what happens in each of the following scenarios:  
    When the sinus node fails

When the sinus node and atria both fail

When the sinus node, atria and AV node all fail

*Lead Morphology and Placement Chapter 3*

1. Define electrode.
2. Describe the difference between and electrocardiograph and an electrocardiogram.
3. Name the bipolar leads and state the limbs that compose them.
4. Name the unipolar augmented leads.
5. Explain what augmentation does to the EKG.
6. Explain Einthoven’s law.
7. Draw and label Einthoven’s triangle.
8. Name the leads composing the hexiaxial diagram.
9. Describe the location of the precordial leads.
10. Name the two leads most commonly used for continuous monitoring in the hospital.
11. Explain the electrocardiographic truths.
12. Describe the normal QRS complex deflections in each of the 12 leads on an EKG.

*Technical Aspects of the EKG Chapter 4*

1. Identify the control features of an EKG machine and describe the functions of each.
2. Describe what a galvanometer does.
3. Differentiate between macroshock and microshock.
4. Describe and identify on a rhythm strip the different kinds of artifact.
5. Correctly tell how to troubleshoot artifact.
6. Name the rhythms that can be mimicked by artifact.
7. Tell how to differentiate between artifact and the real thing.
8. Correctly identify artifact versus rhythm.
9. Explain the purpose of telemetry monitoring.

*Calculating Heart Rate Chapter 5*

1. Define heart rate.
2. Calculate the heart rate on a variety of strips, using the different methods.
3. Differentiate between the three types of rhythm regularity.
4. Tell what kind of heart rate to calculate for the different kinds of rhythm regularity.

*How to Interpret a Rhythm Strip Chapter 6*

1. Use the five steps to interpret a variety of rhythms.

*Rhythms Originating in the Sinus Node Chapter 7*

1. State the criteria for each of the sinus rhythms.
2. Using the five steps, correctly interpret a variety of sinus rhythms on single- and double-lead strips.
3. State the adverse effects for each of the sinus rhythms.
4. State the possible treatment for the sinus rhythms.

*Rhythms Originating in the Atria Chapter 8*

1. State the criteria for each of the atrial rhythms.
2. Using the criteria and other rhythm analysis tools, correctly interpret a variety of atrial rhythms.
3. State the adverse effects for each rhythm.
4. State the possible treatment for each rhythm.

*Rhythms Originating in the AV Junction Chapter 9*

1. State the criteria for each junctional rhythm.
2. Differentiate between high, low, and midjunctional.
3. Correctly identify the junctional rhythms using the criteria and the rhythm strip analysis tools.
4. State the adverse effects of each junctional rhythm.
5. State the possible treatment for the junctional rhythms.
6. State which junctional rhythms occur mostly because of escape and which imply usurpation.

*Rhythms Originating in the Ventricles Chapter 10*

1. State the criteria for each of the ventricular rhythms.
2. Using the criteria and the other rhythm analysis tools, correctly identify ventricular rhythms on a variety of strips.
3. State the adverse effects for each ventricular rhythm.
4. State the possible treatment for the ventricular rhythms.

*AV Blocks Chapter 11*

1. State the criteria for each type of AV block.
2. State whether the block is at the AV node or the bundle branches.
3. Identify each type of AV block using the criteria and the rhythm strip analysis tools.
4. State the adverse effects for each type of AV block.
5. State the possible treatment for each type of AV block.

*Rhythm Practice Strips Chapter 12*

1. Correctly identify the rhythms.
2. Identify any weak areas for further study.