



OVERVIEW

BIG IDEA

Vital signs are measurable indicators of the current state of our body.

OBJECTIVE

2.9 Use a vital signs table to identify and describe normal and abnormal vital signs.

AGENDA

1. Team Scenario
2. 4 Common Vital Signs
3. High, Low, or Normal Scenarios
4. Assessment

HOMEWORK

Measure and record your heart rate and respiratory rate at various intervals, before, during, and after exercise. What changes did you notice?

LESSON 2.9

Vital Signs

SUMMARY:

This lesson will provide students with a basic foundation in the 4 common vital signs: pulse, respiration rate, blood pressure, and temperature. They will begin by assessing their own background knowledge and applying it to an emergency scenario. Next, they will read about each vital sign and study tables of the normal value ranges broken down by age group. For practice, they will assess people of varying ages in four scenarios to determine if their vital signs are high, low, or normal. A similar format for assessment will follow along with a homework assignment to take their own pulse and respiratory rate before, during, and after exercise.



UNIT 2: NUTRITION & FITNESS LESSON 2.9

Vital Signs

Obj. 2.9: Use a vital signs table to identify and describe normal and abnormal vital signs.

DO NOW

Answer the following questions based on your background knowledge:

1. What signs would you look for to know if someone was alive?
2. If you knew a person was alive, but were not sure if they were healthy or not, what signs would you look for?
3. When you go the doctor, what are some of the things they measure at the beginning of the visit?

DISCUSS

In a small group, discuss the following scenario and determine what you would do step-by-step:
(Note: You are not expected to have any medical background. Just think and make inferences!)

You are a paramedic team responding to a call. You arrive at the scene to find a woman who has a gunshot wound to the leg. As you approach her she is lying on the ground with her eyes closed and a pool of blood is forming around her leg. What are the steps you would take to ensure she is alive and getting the proper emergency care before she arrives at the hospital?

DO NOW: Students will most likely name pulse and breathing. These are the two main indicators of life. The ABC's are used to assess an unconscious person: A = Airway, B = Breathing, C = circulation. Students may be less likely to mention blood pressure or pulse. That's okay, because these vital signs are taken later once airway, breathing, and circulation is established.

DISCUSS: Any answers are acceptable; this is just a thinking exercise. Allow small groups to share answers aloud, if time permits. One way to do this is to have the first team present, and each subsequent group only explains what they would do differently. Instruct them to focus on major differences.



There are four standard vital signs that medical professionals use to monitor and assess patients: **(1) Pulse; (2) Respiratory Rate; (3) Blood Pressure; and (4) Temperature.** As you read about each one, familiarize yourself with normal value ranges for children and adults. You do **not** need to memorize these tables, but as you encounter patients in case studies you should be familiar with the numbers and be able to quickly check the normal values.

(1) Pulse

Pulse is the expansion of an artery due to the beating of the heart. It is usually measured at the radial artery in the wrist, but can also be measured in several other places including the neck, elbow, and foot. A stethoscope can be used to listen to the heartbeat directly. Pulse is recorded as beats per minute. Heart rate can be elevated when a person is frightened, stressed, sick, is overheated, or has exerted themselves physically. A person's heart rate may be normally lower or higher based on weight, fitness level, and a variety of other factors. Normal pulse rates are listed in the table below:

Pulse	
Descriptors: regular, irregular, strong or weak	
Adult	60 to 100 beats per minute
Children - age 1 to 8 years	80 to 100
Infants - age 1 to 12 months	100 to 120
Neonates - age 1 to 28 days	120 to 160

Vital sign tables accessed from: <http://www.prohealthsys.com/>

(2) Respiratory Rate

Humans must take in oxygen and remove carbon dioxide to survive. If the brain is deprived of oxygen, cells will die within minutes. Respiratory rate is the number of breaths taken per minute. It varies with age, activity level, illness, stress, and a variety of other factors. Respiratory rate can indicate whether a person may be experiencing problems with their breathing or airway due to many different reasons. Normal respiratory rates are listed in the table below:

Respirations	
Descriptors: normal, shallow, labored, noisy, Kussmaul	
Adult (normal)	12 to 20 breaths per minute
Children - age 1 to 8 years	15 to 30
Infants - age 1 to 12 months	25 to 50
Neonates - age 1 to 28 days	40 to 60

Vital sign tables accessed from: <http://www.prohealthsys.com/>

(3) Blood Pressure

Blood pressure is an indirect measure of the contraction and relaxation pressures of the ventricles (lower chambers) of the heart. Blood pressure is really two numbers. The high number, systolic pressure, measures the contracting of the heart. The lower number, diastolic pressure, measures resting of the heart. Blood pressure is usually measured on the left arm using an electronic sphygmomanometer. Elevated blood pressure (hypertension) is a common risk factor for other chronic diseases, especially heart disease. Low blood pressure (hypotension) is also possible. The table below lists normal blood pressure ranges:

NEW INFO: These are the common vitals taken in a clinical setting. A paramedic would actually look for a slightly different set of vitals: pulse (rate & pattern), respirations (rate & pattern), blood pressure, skin condition (color, temperature, condition..), and pupils.

PULSE: How to check pulse: **Use your fingers when finding a pulse.** Don't use your thumb when finding it, as it has its own pulse.

Find the radial pulse. This is also known as the pulse on the inside of the wrist. Use the pads of two fingers. Place these just below the wrist creases at the base of the thumb. Press lightly until you feel a pulse (blood pulsing under your fingers). If necessary, move fingers around until you feel the pulse.

Find the carotid pulse. To feel a pulse on the side of the neck, place two fingers, preferably your index and middle finger, in the hollow between the windpipe and the large muscle in the neck. Press lightly until you feel a pulse. (From <http://www.wikihow.com/Check-Your-Pulse>)

RESP. RATE: **Observe the rise and fall of the victim's (or patient's) chest and count the number of respirations out loud for one full minute.** One respiration consists of one complete rise and fall of the chest, or the inhalation and exhalation of air. (From: <http://www.wikihow.com/Measure-and-Record-Respiratory-Rate>)

BLOOD PRESSURE: Taking blood pressure requires a sphygmomanometer (blood pressure cuff) and is a bit more complex. For more information on how to take blood pressure, look online. One step-by-step tutorial can be found at: <http://www.webmd.com/hypertension-high-blood-pressure/monitoring-blood-pressure>



Blood pressure

	Systolic	Diastolic
Adult	90 to 140 mmHg	60 to 90 mmHg
Children - age 1 to 8 years	80 to 110 mmHg	
Infants - age 1 to 12 months	70 to 95 mmHg	
Neonates - age 1 to 28 days	>60 mmHg	

Vital sign tables accessed from: <http://www.prohealthsys.com/>

(4) Temperature

The body normally keeps its internal temperature within a very narrow range. When the body is fighting an infection, temperature rises. Fever, the rise in the body's temperature set-point, is one cause of an elevated temperature. Another is hyperthermia, the inability of the body to use thermoregulation to get rid of excess body heat or keep the body cool in an environment of excessive heat. The normal body temperature range is listed below:

Temperature: 97.8 - 99.1 degrees Fahrenheit / average 98.6 degrees Fahrenheit



For each of the patients below, state whether each of their vital signs are **high, low, or normal**.

1. A female infant spikes a 102.1 degree Fahrenheit fever. When she is taken to the emergency room, her heart rate is 124 beats/min, respirations are 38 breaths/min and her blood pressure is 85/60.
2. A 21-year-old athlete runs track in college. He visits the doctor for a routine physical and his vital signs are taken as: pulse: 54 beats/min, respiratory rate: 12 breaths/min, blood pressure: 120/80.
3. An eighty-three-year-old man has a history of heart disease and diabetes. In his assisted living home, a nurse monitors his vitals daily. Today he has a temperature of 98.8 deg F, a pulse of 102 beats per minute, a respiratory rate of 15 breaths per minute, and a blood pressure of 140/90.
4. An six-year-old girl develops a sore throat, but still begs her mom to let her go outside. Her mom, a trained nurse, agrees as long as her vitals are normal. Her temperature is 99.5 deg F, her blood pressure is 100/70, her pulse is 76 beats per minute her respiratory rate is 20 breaths per minute.

TEMPERATURE:

Using a digital thermometer: You can use a digital thermometer in three ways: Oral (in the mouth), Rectal (in the bottom), or Axillary (under the arm)

Taking your temperature orally with a digital thermometer: Wash your hands with soap and warm water. Use a clean thermometer, one that has been washed in cold water, cleaned with rubbing alcohol, and then rinsed to remove the alcohol. Do not eat or drink anything for at least five minutes before you take your temperature. You should keep your mouth closed during this time. Place the thermometer tip under the tongue. Hold the thermometer in the same spot for about 40 seconds. Readings will continue to increase and the F (or C) symbol will flash during measurement. Usually, the thermometer will make a beeping noise when the final reading is done. If you are keeping track, record the temperature and the time. Rinse thermometer in cold water, clean it with alcohol, and rinse again.

(From: http://my.clevelandclinic.org/symptoms/fever/hic_how_to_take_your_temperature.aspx)

THINK Answers:

1. Temp: High; Pulse: High (slightly); Resp: Normal; BP: Normal
2. Pulse: Low (slightly; but this can be normal for an athlete); Resp: Normal; BP: Normal
3. Temp: Normal; Pulse: High (slightly); Resp: Normal; BP: High
4. Temp: Normal; Pulse: Low (slightly); Resp: Normal; BP: Normal



For the following vital signs, write HIGH, LOW, or NORMAL:

1. Pulse of 65 beats per minute in a 34-year-old female: _____
2. Respiratory rate of 18 breaths per minute in a 6-month-old baby: _____
3. Temperature of 99.8 deg F in a 15-year old male: _____
4. Blood pressure of 86/42 in a 7-year-old female: _____
5. Pulse of 85 beats per minute in a 3-day-old newborn: _____
6. Respiratory rate of 26 breaths per minute in a 74-year-old male: _____
7. Temperature of 101.4 deg F in an 80-year-old female: _____
8. Blood pressure of 150/100 in a 45-year-old male: _____



Record your pulse and respiration rate in the following activity;

1. Locate a timer. Practice recording your pulse and respiration rate for one minute each.
Pulse: Use the pads of two fingers. Place these just below the wrist creases at the base of the thumb. Press lightly until you feel a pulse (blood pulsing under your fingers). If necessary, move fingers around until you feel the pulse.
Respiratory Rate: Count the breaths you take in one minute. One inhaled plus one exhaled counts as one total breath.
2. Record your pulse and respiratory rate at 4 intervals below:

	Pulse (beats/minute)	Respiratory Rate (breaths/minute)
Rest		
After 1 min. of exercise (ex: jumping jacks, sit-ups, push-ups, jogging in place)		
After 5 min. of same exercise		
5 minutes <u>after</u> exercise (at rest)		

3. Describe what happened to your pulse and respiratory rate. Why did this happen?

ASSESS Answer Key:

1. Normal; 2. Low; 3. Normal; 4. Low (diastolic only); 5. Low; 6. high; 7. High; 8. High

HOMEWORK: The purpose of this homework is for students to practice taking the basic vital signs that do not require any equipment. It will also give them a sense of one of the factors that affects these vitals (exercise) and how the vital changes with that factor.