MedLab: VITAL SIGNS

AT A GLANCE

Students will become familiar with the field of health science by participating in six hands-on vital sign activities and applying what they learn to complete a patient diagnosis.

OBJECTIVES

Students will:

- Use various medical science techniques to accurately measure vital signs
- Identify the different components of a medical patient chart
- Diagnose a patient by analyzing vital signs and other symptoms

KEY VOCABULARY

vital signs, baseline vitals, body temperature, homeostasis, hyperthermia, fever, hypothermia, pulse, heart rate, respiratory rate, breathing sounds, clear breath, wheeze, stridor, stertor, crackle, stethoscope, systolic & diastolic blood pressure, hypertension, sphygmomanometer, oxygen saturation, pulse oximeter, patient chart, diagnosis, differential diagnosis

SUGGESTED GRADE LEVELS:

8—12

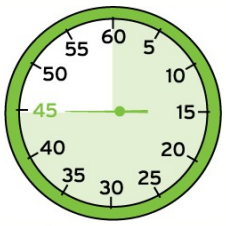
IL LEARNING GOALS

11.A; 12.A, B; 13.A, B; 22.A, B, C; 23.A, B; 24.B

NGSS MS-LS1, HS-LS1

PACE YOURSELF

TWO 45 MINUTE PERIODS



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ADVANCE PREPARATION

1. Determine how you want to divide your students: pairs for the Warm-Up and groups of 5 for the Activity.
2. Set up five Vital Sign stations: body temperature, heart rate, respiratory rate & breathings sounds, blood pressure, and oxygen saturation.
3. Make copies of the station instructions (one copy per station).
4. Make copies of the student worksheets (one copy of each per student).
5. Make copies of Patient Charts (two copies of each patient).

MATERIALS

Per Class:
Thermometer
Stethoscope
Blood pressure cuff
Pulse oximeter
Alcohol wipes
Instructions

Per Student:
Explore Your Own Vitals Worksheet
Patient Diagnosis Worksheet

Per Group:
Two Patient Charts

WHAT YOU NEED TO KNOW

A doctor's visit is a meeting between a patient and a physician designed to offer health advice or to treat symptoms of a health condition. When you go to the doctor's office, your vital signs are some of the first things your health professional will evaluate. **Vital signs** are clinical measurements that indicate the state of a patient's essential body functions. Vital signs are a quick and effective way to monitor a patient's condition. **Baseline vitals** are used to determine a person's typical state of health. A variation in baseline vitals may suggest a change in physiological functioning or alert the need for medical intervention. There are six vital signs that are standard in most medical settings: body temperature, heart rate (pulse), respiratory rate, breathing sounds, blood pressure, and oxygen saturation.

BODY TEMPERATURE

Body temperature is defined as the measurement between heat lost and heat produced by the body. Heat can be lost through perspiration (sweating), respiration (breathing) and excretion (waste); and heat can be produced by processes such as digestion and muscle contraction. Chemical reactions such as these aid the body in maintaining **homeostasis** – a narrow range of conditions a living things must maintain in order to be healthy and function efficiently—"an internal balance". A standard body temperature is approximately 98.6°F, or 37.0°C, although this may vary depending on age, weight, and activity level.

Figure 1: Oral temperature reading from a digital thermometer

aawellnessproject.org

Distinguishable variations in body temperature can represent abnormal health conditions. **Hyperthermia** is an elevated body temperature related to the body's inability to effectively release or reduce heat. The most common form of hyperthermia is a fever. A **fever** is the temporary increase in the body's temperature in response to infection, disease or illness. A fever is present when a body temperature is above 101˚F. **Hypothermia** is heat loss due to prolonged exposure to cold temperatures, which inhibits the body's ability to effectively retain or produce heat. Hypothermia is classified by a body temperature below 96˚F.

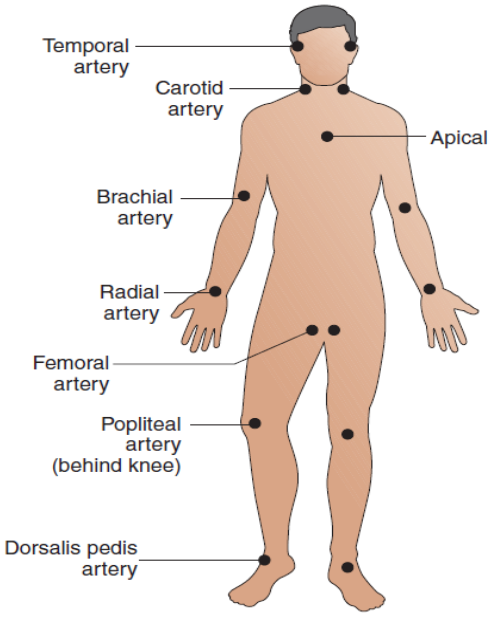
Body temperature is measured by a medical device called a **thermometer**. Typically, the body temperature is taken orally by placing a thermometer underneath the tongue; however rectal (in the rectum) and axillary (under the armpit) methods are used when obtaining temperatures for infants, young children or people who are unable or uncooperative with oral temperature measurements.

HEART RATE

The **pulse**, or **heart rate**, is the number of times the heart beats per one minute. The heart acts as a pump, which distributes blood throughout the body by way of the arteries. A pulse consists of two phases: contraction and relaxation. The combination of one contraction phase and one relaxation phase is equal to one heartbeat. A healthy adult should have a pulse that ranges from 60-100 heart beats per one minute; however this rate can vary during times of physical exercise, sleep, stress or illness.

A pulse can be detected from areas of the body where an artery is closest to the surface of the skin. By pressing down on these areas, one can feel the pulse and track the rate of the heart cycle. The most common pulse sites include the wrist (radial), neck (carotid), inner elbow (brachial) and heart (apical). A healthcare provider may

Figure 2: Various pulse sites on the body



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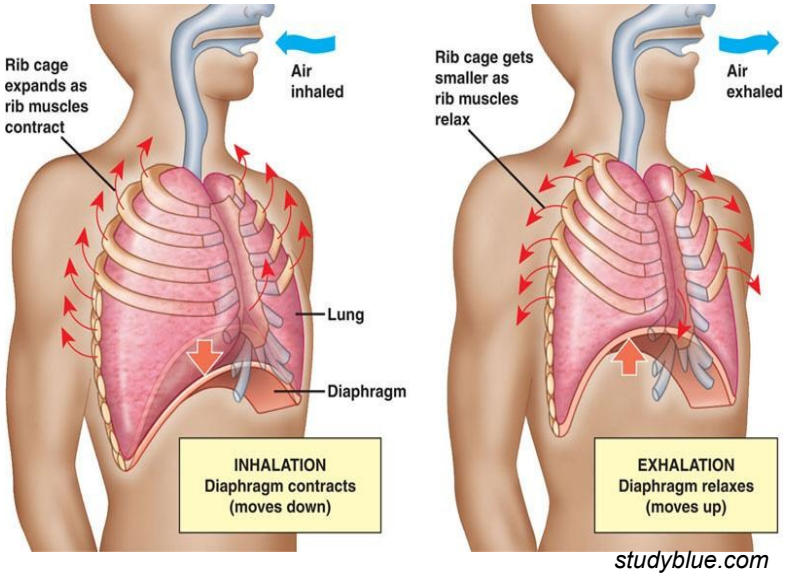
also check for other cues at the pulse sites, such as pulse rhythm and strength to evaluate the health of the patient.

RESPIRATORY RATE

A doctor may measure respiration, or breathing, by taking a **respiratory rate**: the number of breaths taken per one minute. Respiration is the process of taking in oxygen (inhaling) and expelling carbon dioxide (exhaling) from the lungs. One complete breath consists of two phases: inhalation and exhalation. A respiratory rate is measured when you are at rest, by simply counting the number of breaths in one minute. A healthy range is 12-20 breaths per minute.

Figure 3: Respiratory System response to inhalation and exhalation



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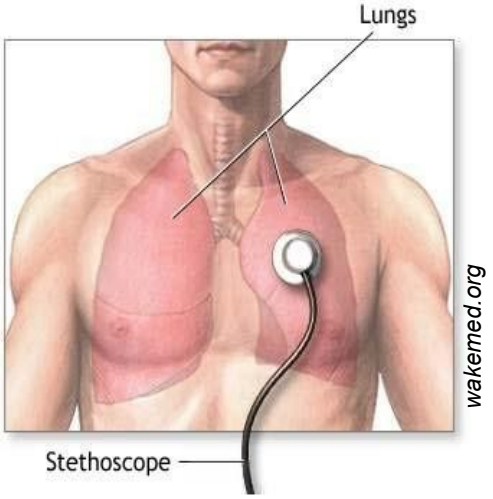
BREATHING SOUNDS

Breathing sounds refer to the specific sounds identified in the lungs when a person takes a breath. These sounds should be observed with a stethoscope and recorded when taking a patient's respiratory rate. The presence of altered breathing sounds may suggest some form of respiratory complications. The five common breathing sounds include: clear, wheeze, stridor, stertor and crackle. A **clear breath** is produced by the free-flow of air throughout an unobstructed respiratory tract (airway). A **wheeze** is a high-pitched sound produced by a narrowed or obstructed airway. They can be heard best during exhalation and are commonly associated with conditions such as asthma and emphysema. A **stridor** is a higher pitched "wheeze-like" sound heard when a person inhales; usually due to a blockage of air flow in the trachea or larynx. A stridor can be present as a result of laryngitis, tonsillitis or allergic reactions. A **stertor** is described as a snoring sound with heavy breathing heard during both inhalation and exhalation that usually arises from the vibration of fluid or blockage around the throat (pharynx). A stertor can be a result of conditions such as pneumonia or bronchitis. A **crackle** is a brief, discontinuous, rattling sound caused by the explosive opening of the small airways. Crackles are normally a result of inflammation or infection of the lung's airways and more common during the inhalation than exhalation. A crackle can also be a sign of pneumonia or chronic obstructive pulmonary disorder (COPD). A **stethoscope** is a medical instrument used to transmit internal body sounds to the ear of the listener. Using a stethoscope can assist a nurse or doctor with interpreting the difference between similar and faint breathing sounds.

Figure 4: Observation of breathing sounds



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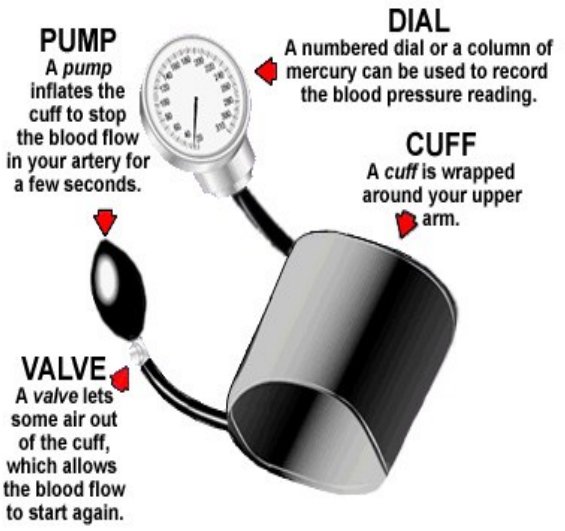
BLOOD PRESSURE

Figure 5: Parts of a manual sphygmomanometer



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When the heart beats, it pumps blood throughout the body to give it the energy and oxygen it needs. As the blood moves, it pushes against the sides of the blood vessels and the force of this pushing is the **blood pressure**. The top number is **systolic blood pressure**; the highest level the blood pressure reaches when the heart beats (contracts). The bottom number is **diastolic blood pressure**; the lowest level the blood pressure reaches as the heart relaxes between the beats. The standard range for systolic blood pressure is 90 to 120 mmHg and 60 to 80 mmHg for diastolic blood pressure. **Hypertension**, or high blood pressure, is indicated when systolic pressures are greater than 140 mm Hg and diastolic pressures are greater than 90 mm Hg. Common contributors of hypertension include: stress, anxiety, obesity and a high-sodium diet. **Hypotension**, or low blood pressure, is indicated when systolic pressures are lower than 100 mm Hg and diastolic pressures are lower than 60 mm Hg. Common contributors of hypotension include: blood loss, severe infection or allergic reaction, and hormonal imbalances. The medical device used to measure blood pressure is called a **sphygmomanometer** (pronounced sfig'-mo-ma-nom-e-ter); it is composed of an inflatable cuff to restrict blood flow and a mercury manometer to measure the pressure. A sphygmomanometer can be manual or digital device, depending on the preference of the healthcare provider.

OXYGEN SATURATION

Figure 6: Pulse Oximeter w/ monitor

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Oxygen saturation (SpO_2) is a measurement of the amount of oxygen carried by the red blood cells throughout the body. As blood is pumped from the heart into the body, it passes through the lungs where oxygen molecules bind to red blood cells. The percentage of red blood cells that are fully saturated with oxygen is called blood oxygen saturation. A standard blood oxygen saturation reading is between 95-100%.

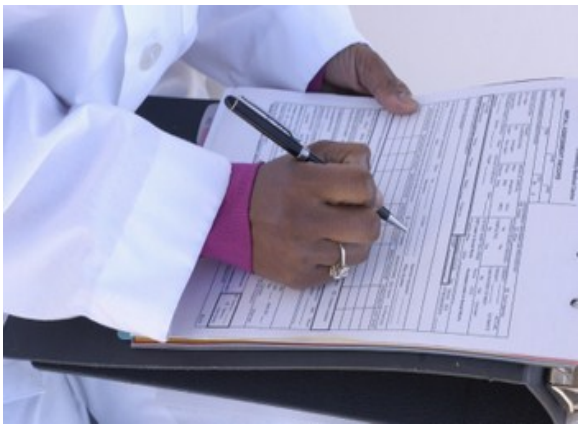
A SpO_2 reading is obtained through the use of a **pulse oximeter**. This is a small device that clips onto the patient's fingertip or ear lobe and shines two beams of light, one red and one infrared, through the skin of the patient. Oxygenated blood absorbs light at 660nm (red light), where deoxygenated blood absorbs light at 940nm (infra-red). The light beam enables the device to read small changes in the color of the patient's blood, which in turn provides an immediate estimate of blood oxygen saturation. The amount of light transmitted through the tissue is converted to a digital value representing the percentage of blood saturated with oxygen.

PATIENT RECORDS

One vital sign measurement alone cannot definitively diagnose a medical condition, but taken together, these six tests can help a doctor to determine if further exploration is needed to properly treat a patient.

A patient's vital signs are recorded and organized in the form of a patient chart. A **patient chart** is a confidential document that contains detailed and comprehensive information to serve as both a medical and legal record of an individual's clinical status, care, history, and treatment. Think of a patient chart as a database about the patient; the one source that has everything the healthcare team needs to return the patient to better health.

Figure 7: Medical information is documented on a Patient Chart



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While patient charts will vary depending on the type of medical facility and department (e.g., hospital vs. clinic, cardiology vs. pediatrics), each charting system contains a common set of components. These components are:

- **Patient information** consists of the patient's name, date of visit, contact info, occupation, employer, and insurance carrier.
- **Episodic information** includes the reason for the patient's visit; including specific symptoms and concerns.
- The **triage tag** is a result of the process for sorting patients into groups based on their need for or likely benefit from immediate medical treatment. Most groups are separated into one of four categories: minor, delayed, immediate, morgue.
- **Patient history** provides a subjective description of the patient's health and social history. It also contains information about the medical history of the patient's family.
- The **medical orders** component contains orders written by healthcare providers. These can be orders for tests, administration of medication, or procedures.
- The **lab/test results** section identifies the laboratory tests that were performed and the results of those tests. The test results usually contain the numeric or graphical results and a narrative that describes the examiner's findings.
- The **notes** section includes additional observations made by a healthcare provider, such as a physician or nurse, relating to the patient's care.
- The **care plans and discharge** component documents the treatment goals and plans for future care, as well as contains final instructions for the patient before the chart is closed and stored in Medical Records.

After obtaining a patient's vitals and completing components of the patient's chart, the medical staff will make a diagnosis to determine a patient's current state of health. A **diagnosis** is the medical decision determined after the healthcare team examines all the possible causes for a set of symptoms. In specific, a **differential diagnosis** is based on listing as many diseases or conditions that can possibly cause the presented symptoms, followed by a process of elimination, aiming to reach the point where only one disease or condition remains likely. The final result may also remain as a list of possible conditions, ranked in order of probability or severity. This diagnosis will determine if a patient must be admitted into the hospital for continuous care or has the flexibility administer treatment from their own homes.

During this lesson your students will be able identify the six major vitals signs, the medical instruments

used to obtain vital sign measurements, demonstrate the procedure for taking vital signs and review a medical patient chart. They will also have the opportunity to apply this content knowledge by acting as medical residents to make differential diagnoses of their own.

WARM UP

1. Use the attached PowerPoint to review the concept of vital signs; highlighting the six major vitals and exploring why they are monitored in medical settings.
2. After reviewing the PowerPoint, inform students that they will work in partners to measure each of their six vital signs: temperature, heart rate, respiratory rate, breathing sounds, blood pressure, and oxygen saturation.
3. Break students into pairs and divide those pairs equally amongst the six stations.
4. Now, distribute the Explore Your Own Vitals worksheet to each of your students.
5. Each pair will have five minutes at each station to collect and record their data. Every five minutes, your students will rotate to each station until all their vital signs have been recorded.

Temperature:

1. Move hair away from your forehead and make sure the area is clean and dry.
2. Place the sensor in the center of your forehead; be sure to keep the sensor flat for an accurate reading.
3. Press and release the power button but do not remove the sensor from your forehead.
4. Slowly move the thermometer across your forehead from the center to the temple. Wait for the confirmation beep before release.
5. Record the temperature on your student worksheet.
6. Clean the thermometer with an alcohol wipe.
7. Now, switch roles with your partner.
8. Remember to turn off your device.

Heart Rate/Pulse:

1. Have your partner place their arms to the side and bend their elbow. The palm of the hand should face upward.
2. Using your middle (long) and index (pointer) fingers, gently feel for the radial artery inside your partner's wrist. The radial artery is located on the inside of the wrist near the side of your thumb. *Note: If you have difficulty locating the radial pulse on your partner you can try to use the carotid (neck) pulse for a better reading. Place your index and middle finger on the base of their neck-directly under the connecting point of the jawbone and the skull.*
3. Count the number of beats for 30 seconds.
4. Multiply that number by 2.
5. Record the pulse rate on your student worksheet.
6. Now, switch roles with your partner.

Respiratory Rate:

1. Before you take your partner's respiratory rate, ask them to sit up straight with their neck and spine in alignment. Encourage them to relax and breathe normally.
2. Take the stethoscope and place the tips of the device in your ears.
3. Ask for consent to place the stethoscope on your partner's chest (close to the top of the heart).
4. Count the number of breaths your partner takes in 30 seconds. Remember, one complete breath consists of two phases: inhalation (chest cavity expands) and exhalation (chest cavity contracts). *Note: You can observe the respiratory rate with or without a stethoscope.*
5. Multiply that number by 2.
6. Record your respiratory rate on your student worksheet.
7. Clean the earpieces of the stethoscope with an alcohol wipe.
8. Now, switch roles with your partner.

Breathing Sounds:

1. Before you observe your partner's breathing sounds, ask them to sit up straight with their neck and spine in alignment. Encourage them to relax and breathe normally.
2. Take the stethoscope and insert the tips of the device in your ears.
3. Place the stethoscope on your partner's back- between the spine and shoulder blades.
4. Listen to your partner's breathing sounds for 30 seconds.
5. Record the type of breathing sounds you observed on your student worksheet (clear/obstructed). *Note: If you are able to distinguish the difference between obstructed airway sounds (i.e., wheeze, stritor, stertor, and crackle) specify that sound on your worksheet.*
6. Clean the earpieces of the stethoscope with an alcohol wipe.
7. Now, switch roles with your partner.

Blood pressure:

1. Have your partner roll up their sleeve, approximately five inches above their elbow.
2. Place the blood pressure cuff on the section of the arm approximately one and a half inches above their elbow. The arrow on the cuff should be centered on the inside of the arm and aligned with the middle finger. The tubing should also run down the inside of the arm.
3. Wrap the cuff firmly in place using the closure strip. Make sure the cuff is secure, but not too tight or uncomfortable.
4. Position your partner's arm so that it is supported and relaxed with the palm facing up.
5. Press the power button and allow the monitor to calculate the blood pressure.
6. Record your blood pressure results on your student worksheet.
7. Now, switch roles with your partner.

Oxygen Saturation (SpO_2):

1. Open the pulse oximeter clamp and insert your index finger with the fingernail facing upward (nail polish should be removed for an accurate reading).

2. Release the clamp and be sure to keep your hand stationary.
3. Turn on the pulse oximeter and wait 10 seconds for your reading.
4. Record your SpO_2 results on your student worksheet.
5. Now, switch roles with your partner.

ACTIVITY

During this activity, your students will explore common health conditions that a medical staff may treat in

- Headaches
- Severe allergic reactions
- Abdominal pain
- Trauma/Broken bones/Sprains
- Chest pain/Heart attack
- Difficulty breathing/Asthma attack
- Cuts and Contusions
- Upper respiratory infections/Cold/Flu
- Skin infections
- Unconsciousness

the Emergency Room. They will assume the roles of Medical Residents by evaluating patient charts, as-

	Conditions					
	Asthma	**Allergic Reaction**	**Cold/ Flu**	**Heart Attack**	**Skin Infections**	**Trauma/ Broken Bones**
Symptoms						
Temperature	Standard	Standard–Elevated	Elevated	Standard-Elevated	Elevated	Elevated
Heart Rate/ Pulse	Elevated	Elevated	Standard-Elevated	Low	Standard-Elevated	Elevated
Respiratory Rate	Elevated	Elevated	Standard-Elevated	Elevated	Standard-Elevated	Elevated
Breathing Sounds	Obstructed	Obstructed	Obstructed	Clear	Clear	Clear
Blood Pressure	Elevated	Low-Standard	Standard	Low	Elevated	Low
Oxygen Saturation	Low	Low	Low-Standard	Low	Low-Standard	Low
Other symptoms include	Anxiety and tightness in the chest, coughing	Tightness in the chest, nausea, hives, itching, or pain	Nausea with or without vomiting, runny nose, congestion, cough, chills, fatigue, aching muscles	Chest pain or pressure, sweating, nausea, lightheaded	Increased pain, swelling, redness or warmth around affected area. Drainage from affected area. Nausea, lightheaded, chills,	Out-of-place or misshapen limb or joint, swelling, bruising, bleeding, pain, numbness or tingling, inability to move limb
Onset of symptoms	Often immediately following physical activity	May occur after being outside or eating certain foods (peanuts, shellfish, etc.)	Occurs when exposed to bacteria and viruses	Often, but not always, occurs in later adulthood	Occurs when open wound is exposed to bacteria	Fall, motor vehicle accidents, direct blow, repetitive forces (like running)

sessing changes in standard vital sign measurements and completing a differential diagnosis for their patient.

Some of the most common reasons people go to the Emergency Room are (in no particular order):

The following chart highlights the changes in vital signs for six of the previously mentioned health conditions:

Each condition will not present itself the same way in every individual. Refer to the Teacher Guide for an explanation of why the vital signs were altered in the presence of these conditions. Please do not use this chart to self-diagnose. If you or your students are experiencing any symptoms, please see a doctor for an accurate diagnosis.

1. Use the attached PowerPoint to inform your students about a hospital Emergency Room Department, common health conditions presented in an ER and ways to assess a patient chart.

2. Write down the ten health conditions highlighted in the PowerPoint presentation on the classroom board. As a class, have your students brainstorm some of the symptoms that can be associated with each condition. As your students share their ideas make sure to write the symptoms on the board next to the corresponding condition. You do not need to write all of the symptoms down, just the ones that will assist students in making an accurate diagnosis. *Note: if you are limited on time, focus on the six health conditions presented in the chart rather than all ten.*

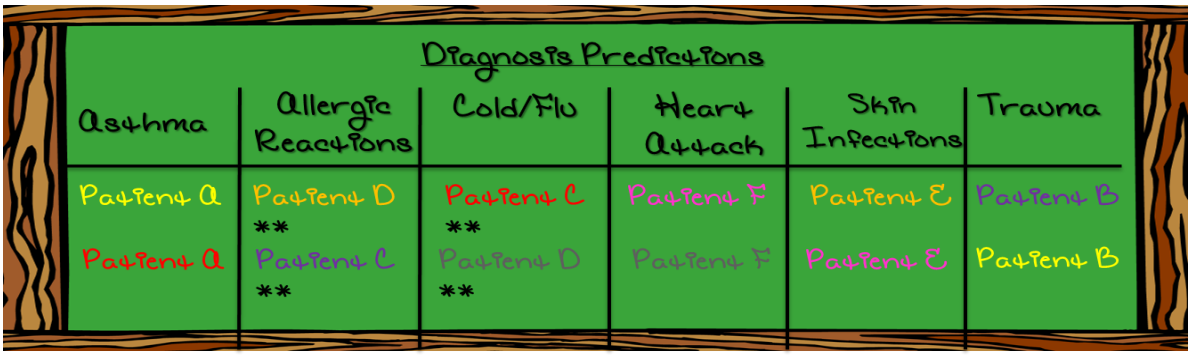
3. Divide your students into groups of five- present two patient charts to each group and give a *Patient Diagnosis Worksheet* to each student. Inform your students that each patient will have one of the following conditions: asthma, allergic reaction, cold/flu, heart attack, skin infection, or trauma/broken bone. *For example: Group 1– Patient A and B Group 2– Patient A and C Group 3– Patient B and C Group 4– Patient D and E Group 5– Patient D and F Group 6– Patient E and F.*

4. Make sure each group fills in today's date and the patient's age on their two charts.

5. Allow students to review the patient charts for 15 minutes. Explain that they will analyze the compo-

nents of the patient chart, particularly vital signs, symptoms and history to diagnose their patients.

6. While students are evaluating the patient charts, make six columns on the classroom board: asthma, allergic reaction, cold/flu, heart attack, skin infection, and trauma/broken bone.



7. Also, make sure to walk around the classroom to clear up possible health misconceptions you overhear your students discuss.
8. Have students record their findings on the *Patient Diagnosis Worksheet*.
9. At the end of the fifteen minutes, have a representative(s) from each group write the patient name in the column matching the predicted diagnosis.
10. After each group has written their selections on the board, discuss each condition by having the students explain the process they took to reach their final predictions. If two groups have different answers, encourage the entire class to share ideas and suggestions to make a final diagnosis. Remember to design questions from the information in the Teacher Guide as scaffolds to help students make conclusions.

CHECK FOR UNDERSTANDING

1. Why are vital signs important to monitor? *Vital signs are clinical measurements that indicate the state of a patient's essential body functions. A variation in baseline vitals may suggest a change in physiological functioning or alert the need for medical intervention.*
2. What are the six vitals signs highlighted in this lesson?
    - *Temperature: a measure of the balance between heat lost and heat produced by the body*
    - *Heart Rate/Pulse: the number of times the heart beats per one minute*
    - *Respiratory Rate: the number of breaths taken per one minute*
    - *Breathing Sounds: the specific sounds identified in the lungs when a person takes a breath*
    - *Blood Pressure: a measure of the force of circulating blood pushing against the walls of the blood vessels*
    - *Oxygen Saturation: a measure of the amount of oxygen carried by the red blood cells throughout the body*
3. What are the medical instruments used to measure each vital sign?
    - *Body temperature is measured by a medical device called a thermometer.*
    - *To hear the pulse and track the heart rate a stethoscope can be placed on areas of the body where an artery is closest to the surface of the skin. A stethoscope is a medical instrument used to transmit internal body sounds to the ear of the listener.*
    - *A respiratory rate is measured by visually observing the number of times a person takes a com-*

plete breath. Many times medical staff will simultaneously take the respiratory rate and evaluate breathing sounds. Breathing sounds are distinguished through the use of a stethoscope.

- *A pulse oximeter is a small device used to calculate the percentage of a person's oxygen saturation. The device shines two beams of light through the skin of the patient to calculate a digital value representing the percentage of blood saturated with oxygen.*

4. What is a patient chart? *A confidential document that contains detailed and comprehensive information to serve as both a medical and legal record of an individual's clinical status, care, history, and treatment.*
5. What section of the patient chart should be reviewed to determine a patient's reason for visit? *Episodic information*
6. What section of the patient chart should be reviewed to determine a patient's previous health conditions? *Patient history*
7. What section of the patient chart should be reviewed to determine a patient's treatment and future health regimen? *Care plans and discharge section*
8. What is a diagnosis? A diagnosis is the medical decision determined after the healthcare team examines all the possible causes for a set of symptoms.

Alternate Instructional Strategies

- If you are unable to purchase the necessary medical equipment for the Warm Up, continue the lesson with one of the following options.
    - Option 1: Have your students take some of their vitals outside of the classroom.
        - Temperature: use thermometer a from home
        - Blood Pressure: visit local pharmacies with free, public blood pressure monitors
            - ⇒ Here is a website to locate these pharmacies: http://www.lifeclinic.com/locator.aspx
        - Breathing sounds: listen to the various breathing sounds on-line
            - ⇒ Here are a few websites that provide sounds clips
            - http://www.wilkes.med.ucla.edu/lungintro.htm
            - http://www.practicalclinicalskills.com/heart-lung-sounds-reference-guide.aspx
            - http://www.cvmbs.colostate.edu/clinsci/callan/breath_sounds.htm
        - Oxygen Saturation: This is not measurable without the pulse oximeter or a blood draw. You can, however, test for low oxygen levels in the blood with a few simple tests in your classroom. High respiratory rates can indicate lower oxygen levels carried by the blood. For children 12-18-years-old, normal resting respiratory rates should be between 12-18 breaths per minute. There are other symptoms students can look for as well—shortness of breath after mild exertion (ie: 5-10 jumping jacks), "dusky" colored skin and nail beds, and bluish colored nostrils, lips, or eyelids.
    - Option 2: Select six student volunteers, one from each group, to get their vital sign measurements recorded by the school nurse. The nurse will take the vital signs and can provide you with an anonymous report (avoiding a HIPAA violation). Alternately, the nurse may provide each student with their results and they may share with the class if they are comfortable doing so. Allow the class to review and discuss the measurements. Also, allow the student volunteers to discuss their experience (i.e., conversations with school nurse, description of equipment used, etc.).
    - Option 3: After reviewing the Day 1 PowerPoint, skip the Warm-Up and proceed to the main activity.

- Before you begin the main activity, assign each group one of the six featured health conditions: asthma, allergic reaction, cold/flu, heart attack, skin infection, and trauma/broken bone. Allow your stu-

dents to investigate how vitals are altered in the presence of these conditions. Have each group present their findings to the class.

DIFFERENTIATED INSTRUCTION

* Follow the recommendations of any Individualized Education Programs (IEPs) that you may have for students in your classes.
* Simplify vocabulary for any students who may need it. Use “healthy” or “unhealthy” to relate what vital signs can tell us. (ie: a high temperature is unhealthy.) Use ‘breathing rate” for respiratory rate. Etc.
* Use recorded heartbeat sounds for students with touch sensitivities instead of asking them to use the stethoscope. These students may also take their own vitals instead of working with a partner.

EXETENSIONS

LANGUAGE ARTS

Throughout the lesson, the importance of the entire medical staff has been stressed. Each part of the team contributes in some way to a patient’s experience, diagnosis, treatment and recovery. Have your students research the differences between the following professions: Physician, Medical Resident, Physi-

GED/HS Diploma with or w/o Certification	Associate Degree with or w/o Certification	Bachelor Degree	Graduate Degree (add'l 1-2 yrs)	Graduate Degree (add'l 3 or more yrs)
Emergency Medical Technician	Acupuncturist	Cytotechnologist	Epidemiologist	Audiologist
Healthcare Interpreter	Clinical Laboratory Technician	Dietician	Medical Dosimetrist	Chiropractor
Medical Coder	Dental Hygienist	Health Administrator	Medical Illustrator	Dentist
Medical/Dental Assistant	Dietetic Technician	Kinesiotherapist	Nurse Practitioner	Forensic Pathologist
Nurses Aide	Licensed Practical Nurse	Medical Technologist	Occupational Therapist	Pharmacist
Pharmacy Technician	Paramedic	Perfusionist	Physician Assistant	Physical Therapist
Phlebotomist	Respiratory Therapist	Registered Nurse	Speech Language Pathologist	Physician

cian Assistant, Registered Nurse, Licensed Practical Nurse and Medical Assistant. Have students compare and contrast each type of schooling, as well as roles and responsibilities on the job.

MATH

Break students into five groups, each group representing one of the five vital signs (breathing sounds excluded). Provide each of those groups with the Class Vital Signs Worksheet. Remember, that all measurements are anonymous. Give students butcher or graph paper so they are able to create a visual of results to share with the class. Each group is only responsible for graphing the data of the vital sign they were assigned. This vital sign data is best displayed in the form of a bar or pie graph. Bar and pie graphs compare different groups or parts of a whole, where a line graph highlights numerical changes over a period of time. Other values to have students calculate include: mean, median, mode, range and percentage of students above or below standard measurements.

SCIENCE

There are many health science careers that your students can pursue with varying amounts of schooling and training. Have your students choose a career in which they are interested from the chart below and prepare a poster about what steps they would need to take to get there (college, vocational training, volunteer experience, etc.).

DIGITAL RESOURCES

- Explore Health Careers:
  http://explorehealthcareers.org/en/home
- Health-related information and activities for teachers and students:
  http://www.health.discovery.com/
- Listen to breathing sounds:
  http://www.wilkes.med.ucla.edu/lungintro.htm
  http://www.practicalclinicalskills.com/heart-lung-sounds-reference-guide.aspx
  http://www.cvmbs.colostate.edu/clinsci/callan/breath_sounds.htm
- Student-friendly information on anatomy and health:
  http://www.kidshealth.org
- Test your own vitals at these locations:
  http://www.lifeclinic.com/locator.aspx

RELATED EXHIBITS

YOU! The Experience: Giant Heart, Hamster Wheel