

Introduction to Infant Vital Signs Curriculum

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About the Author



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Sarah Schulze is a board-certified pediatric nurse practitioner. She earned her BSN from Indiana State University in 2011 and her MSN from University of Illinois at Chicago in 2014. As an RN, she has experience in a variety of settings including critical care, surgery, and pediatrics. As an NP she has worked in primary care pediatrics and adolescent mental health. Her special interests include breastfeeding, nutrition, and adolescent mental health. She has extra certifications as a lactation counselor and a pediatric mental health specialist.

Introduction to Infant Vital Signs

This curriculum and accompanying Infant Vital Signs Trainer will help participants learn about the measurement of infant vital signs and the meaning of the results according to the American Academy of Pediatrics.

Curriculum Structure

The *Introduction to Infant Vital Signs* curriculum is composed of the following parts. Approximate times are included.

Lesson	Title	Approximate Time
One	FOCUS: Part 1 – Focus on Pediatric Differences	10 minutes
One	FOCUS: Part 2 – Focus on Terminology	10 minutes
One	LEARN: Introduction to Infant Vital Signs Slide Presentation	20 minutes
One	REVIEW: Practice and Assessment of Taking Infant Vital Signs	35 minutes
	Total	1½ hours

Lesson Structure

Each lesson begins with a Lesson Overview, Lesson Objectives and a Lesson at a Glance table which lists the lesson activities, materials required, suggested preparation steps, and approximate class time.

Lesson Sections

The actual lesson follows the overview, which will contain some of the sections described below.

FOCUS

Every lesson begins with a FOCUS activity intended to capture participants' attention. This may be in the form of a small or large class discussion, a game, a review of previous lesson information, or a demonstration. During this activity, participants are introduced to the topic of the lesson.

LEARN

The LEARN activity in each lesson varies in its presentation mode. It may be a slide presentation, group activity, or demonstration.

REVIEW

The majority of lessons end with a REVIEW activity intended to briefly review the lesson's key messages or main points.

Lesson One – Introduction to Infant Vital Signs

Lesson Overview

In this lesson, participants will learn about the measurement of infant vital signs and the meaning of the results according to the American Academy of Pediatrics.

Pre-Lesson Knowledge

- Basic knowledge of gathering adult vital signs
- Familiarity with artery locations for detecting a pulse
- Understanding that normal infant vital signs may vary from an adult's

Lesson Objectives

After completing this lesson, participants will be able to:

- Demonstrate where to locate the apical impulse or other locations to assess infant heart rate
- Explain the signs of increased work of breathing and how to assess infant respiratory rate and effort
- Explain the differences in locations for gathering a temperature on an infant
- Outline differences in normal infant heart and respiratory rate compared to those of adults
- Explain why infant heart and respiratory rate must be counted for a full minute
- Demonstrate understanding of and ability to adapt to an infant's developmental stage

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS – Part 1	• <i>Introduction to Infant Vital Signs (Focus on Pediatric Differences)</i> worksheet • <i>Introduction to Infant Vital Signs (Focus on Pediatric Differences)</i> Instructor Resource	1. Print/photocopy <i>Introduction to Infant Vital Signs (Focus on Pediatric Differences)</i> worksheet (one per participant)	10 minutes
FOCUS – Part 2	• <i>Introduction to Infant Vital Signs (Focus on Terminology)</i> worksheet • <i>Introduction to Infant Vital Signs (Focus on Terminology)</i> Instructor Resource	1. Print/photocopy <i>Introduction to Infant Vital Signs (Focus on Terminology)</i> worksheet (one per participant)	10 minutes
LEARN	• <i>Introduction to Infant Vital Signs</i> slide presentation • Infant Vital Signs Trainer	1. Prepare <i>Introduction to Infant Vital Signs</i> slide presentation for viewing	20 minutes
REVIEW	• <i>Introduction to Infant Vital Signs Check-Off</i> (instructor resource) • <i>Introduction to Infant Vital Signs Check-Off</i> • Vital Signs Trainer • Stethoscopes • <i>Introduction to Infant Vital Signs Test</i> • <i>Introduction to Infant Vital Signs Test – Answer Key</i>	1. Print/photocopy <i>Introduction to Infant Vital Signs Check-Off</i> (one per participant) 2. Get the supplies ready for the lesson 3. Print/photocopy <i>Introduction to Infant Vital Signs Quiz</i> (one per participant)	35 minutes

Lesson One – Introduction to Infant Vital Signs

FOCUS: Part 1 – Understanding Pediatric Differences

10 minutes

Purpose:

To help participants develop awareness of the differences in pediatric assessment data compared to adults.

Materials:

- *Introduction to Infant Vital Signs (Focus on Pediatric Differences) Instructor Resource*
- *Introduction to Infant Vital Signs (Focus on Pediatric Differences) worksheet*

Facilitation Steps:

1. Distribute the *Introduction to Infant Vital Signs (Focus on Pediatric Differences) worksheet* prior to or at the start of the class.
2. Have the *Introduction to Infant Vital Signs (Focus on Pediatric Differences) Instructor Resource* page available.
3. Have participants read through the information and complete the worksheet.
4. Have participants pair up upon completion and share answers.

Introduction to Infant Vital Signs (Focus on Pediatric Differences) Instructor Resource

Scenario: *The CNA is floating to pediatrics for the day and is asked to collect vital signs on a 9-month-old infant in room 6. The nurse delegating this task instructs the CNA to count heart rate and respirations for a full minute.*

Consider what you know about infants and reflect on the following questions:

What differences would you expect to encounter during this assessment as compared to collecting vital signs on an adult?

- *Normal ranges for HR and RR are much higher than an adult*
- *Rectal temperatures are commonly collected on infants*
- *Infants are much less likely to be cooperative or follow direction during an assessment*

What areas of their care would be the same?

- *Normal ranges for infant temperature are the same as for adults*
- *The need to identify yourself and explain the procedure is still there (just speak to the caregiver as well)*
- *Proper technique and documentation are still necessary*

Why might you need to count heart rate and respiratory rate for a full minute each?

- *Infant heart rate and breathing patterns are variable, whereas adults are more constant. The most accurate rate is gathered over a full minute.*

How can you approach this child to reduce the amount of crying and distress they experience?

- *9-month-olds are likely to experience stranger anxiety. Approach the infant slowly and calmly, allow them to sit on caregiver's lap and touch the equipment before you begin. Offer a distraction such as feeding (from caregiver via bottle or breast), a toy, bubbles, etc.*

Name: _____ Class: _____

Introduction to Infant Vital Signs

(Focus on Pediatric Differences)

Scenario: The CNA is floating to pediatrics for the day and is asked to collect vital signs on a 9-month-old infant in room 6. The nurse delegating this task instructs the CNA to count heart rate and respirations for a full minute.

Consider what you know about infants and reflect on the following questions:

What differences would you expect to encounter during this assessment as compared to collecting vital signs on an adult?

What areas of their care would be the same?

Why might you need to count heart rate and respiratory rate for a full minute each?

How can you approach this child to reduce the amount of crying and distress they experience?

Lesson One – Introduction to Infant Vital Signs

FOCUS: Part 2 – Terminology Exercise

10 minutes

Purpose:

To help participants understand proper documentation of pediatric vital signs.

Materials:

- *Introduction to Infant Vital Signs (Focus on Terminology) worksheet*
- *Introduction to Infant Vital Signs (Focus on Terminology) Instructor Resource*

Facilitation Steps:

1. Distribute the *Introduction to Infant Vital Signs (Focus on Terminology) worksheets* prior to or at the start of the class.
2. Have the *Introduction to Infant Vital Signs (Focus on Terminology) Instructor Resource* available for reference.
3. Have participants read through the information and complete the worksheet.
4. Have participants pair up upon completion and share answers.

Name: _____ Class: _____

Introduction to Infant Vital Signs (Focus on Terminology)

Review the following scenarios and then answer the questions below.

Violet is an 8-month-old infant hospitalized with RSV. Her HR is 135, RR rate 75 with intercostal retractions, and rectal temp of 101.3.

This child's heart rate is (circle one): WNL Tachycardic Bradycardic

The respiratory rate is: Tachypneic Bradypneic Apneic

This child's retractions are located: Above the sternum Below the ribs Between the ribs

This child: Febrile Hypothermic Afebrile

Benjamin is a 1-month-old at the pediatrician's office for a well visit. His apical HR is 104, RR 34, and temporal temp of 97.2. His abdomen is moving up and down gently with each breath.

This child's heart rate is (circle one): WNL Tachycardic Bradycardic

The respiratory effort is: Non-labored Labored

This child: Febrile Hypothermic Afebrile

A temperature for a child this age should be checked rectally: Always Never If ill or febrile

Introduction to Infant Blood Pressure (Focus on Terminology) – Instructor Resource

Review the following scenarios and then answer the questions below.

Violet is an 8-month-old infant hospitalized with RSV. Her HR is 135, RR rate 75 with intercostal retractions, and rectal temp of 101.3.

This child's heart rate is (circle one):	WNL	Tachycardic	Bradycardic
The respiratory rate is:	Tachypneic	Bradypneic	Apneic
This child's retractions are located:	Above the sternum	Below the ribs	Between the ribs
This child:	Febrile	Hypothermic	Afebrile

Benjamin is a 1-month-old at the pediatrician's office for a well visit. His apical HR is 104, RR 34, and temporal temp of 97.2. His abdomen is moving up and down gently with each breath.

This child's heart rate is (circle one):	WNL	Tachycardic	Bradycardic
The respiratory effort is:	Non labored	Labored	
This child:	Febrile	Hypothermic	Afebrile
A temperature for a child this age should be checked rectally:	Always	Never	If ill or febrile

Lesson One – Introduction to Infant Vital Signs

LEARN: Introduction to Infant Vital Signs Slide Presentation

20 minutes

Purpose:

Participants will receive a thorough introduction to infant vital signs and the proper procedure and documentation surrounding it.

Materials:

- *Introduction to Infant Vital Signs* slide presentation
- Infant Vital Signs Trainer
- Stethoscope

Facilitation Steps:

1. Share the following information with participants as you show the slide presentation.

Slide 1: Introduction Slide

Slide 2: In addition to blood pressure (BP) (covered in another lesson) and SPO2, the main infant vital signs are heart rate (HR), respiratory rate (RR), and temperature. BP and SPO2 are not always necessary, but these three are required for nearly all clinic or hospital visits involving infants.

Slide 3: To take infant vital signs, you will need a stethoscope, a watch with a second hand, and a thermometer. The type of thermometer varies depending on which route you intend to take the temperature (more on that later).

Slide 4: Newborns and very young infants These young babies have a startle reflex that can occur with loud noises or sudden movements. Unswaddling a baby and moving them around can cause them to startle and cry. They also have not completely regulated their temperature in the first few days of life and may get cold easily.

3-9 months

These infants are social and will smile socially. They do not yet fear people they do not know.

They begin to grab at things in front of them and will put objects in their mouths.

9-12 months

These infants have stranger anxiety and may fear unfamiliar people, place, or activities.

Slide 5: Newborns and very young infants

- For younger infants, try to keep them loosely swaddled or covered and only expose necessary areas of skin at a time. Always warm your stethoscope as well.
- Allow a caregiver to hold them to keep them from startling.
- Offer feeding or pacifier to help soothe and distract them.

3-9 months

- Talk to them and give them an opportunity to be social. You may want to offer them something to hold onto, like a toy or tongue depressor, so they don't grab onto your stethoscope.
- Offer distractions like a toy or bubbles, feeding or a snack is appropriate too.

9-12 months

- Allow them to sit on a caregiver's lap. Approach them slowly and allow them to see you are not threatening. Sit on their level rather than standing above them.
- Allow them an opportunity to touch or play with your stethoscope or lightly touch it on their leg or arm so they can see it is not painful.
- Offer distractions like toys, bubbles, or snacks if appropriate.

Slide 6: The most accurate location to take an infant's pulse is over the apical impulse, auscultating with a stethoscope. The apical impulse in infant's is located at the 4th intercostal space, midclavicular line.

Introduction to Infant Vital Signs

Pulses can also be palpated on infants over the brachial, femoral, radial, and pedal locations.

Slide 7: Whether auscultating or palpating, the pulse should be counted for a full minute in infants, as irregular heart rates are common, and the rate may speed up or slow down during that minute.

- Normal heart rate range is much faster than adults and slows slightly as the infant gets older.
- Newborn to 1 month: 70-190 bpm
- 1 to 11 months: 80-160 bpm
- 12+ months: 80-120 bpm
- Higher than normal rate is tachycardia
- Lower than normal rate is bradycardia

Slide 8: Have the infant lie back in a comfortable position, ideally on an exam table or caregiver's lap. Watch the chest rise and fall for each respiration. If you are having trouble keeping track of each respiration, it may be helpful to place your hand lightly on the infant's abdomen and feel the rise and fall while you watch the chest.

Like heart rate, infant respiratory rate may be irregular (called periodic breathing). They may quickly breathe a few times and seem to hold their breath for a few seconds at other times. To get an accurate respiratory rate, you must count for a full minute.

- Normal respiratory rate for infants is 30-60 breaths per minute
- Tachypnea: faster than normal respiratory rate
- Bradypnea: slower than normal respiratory rate
- Apnea: long periods of not breathing at all

Slide 9: In addition to respiratory rate, you should assess **respiratory effort**, or how hard the infant is working to breathe.

Accessory muscle use is a sign of distress, where infants use the muscle of the neck and chest wall to try and expand the lungs and pull more air in. This appears as retractions, or skin pulling inward around or between the ribs.

Retractions are often visible above the sternum (suprasternal), between the ribs (intercostal), or below the ribs (subcostal).

Another sign of respiratory distress in infants is nasal flaring, where the nostrils are opening widely as the infant breathes.

An infant's abdomen typically moves up and down gently with each breath as well, but excessive or forceful abdominal movement while breathing is a sign of respiratory distress.

Slide 10: Infant temperature can be taken in 3 main locations, temporal, axillary, or rectal.

Temporal temperatures are the fastest method and typically very accurate. A forehead scanner is held over the temporal artery and reports a temperature in seconds.

Axillary temperatures may be used if a temporal thermometer is not available, however it is often difficult to keep a thermometer in place in an infant's axilla and this method is not as accurate as temporal or rectal.

Rectal temperatures are the most accurate and the gold standard of measuring temperature in ill or febrile infants. A rectal temperature is often necessary to verify a fever detected with an axillary or temporal thermometer. It is not needed on well children as it can be uncomfortable or distressing to infants and caregivers. Lubricate the probe before inserting 0.5-1 inch into the rectum.

Rectal thermometers should be designated by color and/or with a label and **ONLY** used for rectal temps. Axillary and oral thermometers should not be used for rectal temps and vice versa.

Slide 11: Normal body temperature is an average of 98.6 F (37 C). But really, a normal temperature can be somewhere within a few degrees of that, most within 97-99 F.

Body temperature can even fluctuate throughout the day, usually lowest in the morning and peaking in the afternoon.

Fever, or abnormally high body temperature, is anything greater than 100.4 F (38 C) and is often a sign of illness/infection. Fever should usually be verified with a rectal temp in infants, particularly those <3 months old.

Slide 12: Always include how a vital sign was collected (Apical pulse, route of temp) and a

Introduction to Infant Vital Signs

description of breathing pattern (nonlabored,
any retractions and their location, nasal flaring,
etc.)

Lesson One – Introduction to Infant Vital Signs

REVIEW: Practice and Assessment of Taking Infant Vital Signs

30 minutes

Purpose:

Participants will practice taking vital signs on Trainers, models, or trainers and then complete a test to assess mastery.

Materials:

- *Introduction to Infant Vital Signs Check-Off Instructor Resource*
- *Introduction to Infant Vital Signs Check-Off*
- Infant Vital Signs Trainer
- Stethoscope
- *Introduction to Infant Vital Signs Test*
- *Introduction to Infant Vital Signs Test – Answer Key*

Facilitation Steps:

1. Give participants the *Introduction to Infant Vital Signs Check-Off*.
2. Access the *Introduction to Infant Vital Signs Check-Off Instructor Resource* page. Following the steps on the check-off page, demonstrate taking vital signs on the Infant Vital Signs Trainer. Refer to the Quick Start Guide for more information on use.
3. Students should properly document this on their *Introduction to Infant Vital Signs Check-Off* handout.
4. Hand out the *Introduction to Infant Vital Signs Test* to participants. Give them a couple of minutes to complete it.
5. Have participants self-check or peer check the answers as you share them from the Answer Key.

Introduction to Infant Vital Signs Check-Off (Instructor Resource)

PART ONE: Demonstrate how to use the training tool to take vital signs using the following steps:

1.	Gather appropriate equipment	
2.	Knock, enter room and approach infant in developmentally appropriate way	
3.	Identify yourself with name and title (student nurse, medical assistant, nurse aide, etc.)	
4.	Wash your hands with sanitizer or soap/water	
5.	Identify patient by asking the caregiver for name and date of birth; state that you would verify this information with a medical record	
6.	Explain the procedure to the patient's caregiver and ask if they have any questions	
7.	Verbalize that the patient would be positioned appropriately (held on a caregiver's lap, calm)	
Heart Rate		
8.	Locate the apical impulse at the 4 th intercostal space, midclavicular line	
9.	Place the diaphragm of your stethoscope over the apical impulse and count the heartbeat for a full minute	
Respiratory Rate		
10.	Watch the infant's chest rise and fall, placing a hand lightly on the abdomen if needed	
11.	Observe the respiratory effort for any accessory muscle use, retractions, or nasal flaring	
12.	Count the respirations for a full minute	
Temperature		
13.	Choose a route to take the infant's temperature and gather the appropriate thermometer for the route	
14.	Place the thermometer over the temporal artery, in the client's axilla, or apply lube and insert 0.5-1 inch into the rectum	
15.	Remove once temperature has been recorded	
16.	Ask your patient's caregiver if they have any questions	
17.	Wash your hand with sanitizer or soap/water	
18.	Document the blood pressure below Date: Time: Blood Pressure:	
	Score:	

Introduction to Infant Vital Signs

Optional:

PART TWO: Have participants practice on the model until they are comfortable with the procedure. You may give the patient a name and medical scenario. The trainer includes 16 scenarios to choose from.

PART THREE: Have each participant perform the activity with the model up to four times. Make sure each attempt setting has a patient name, date of birth and scenario. Evaluate the participants' ability to complete vital signs using the above steps. May score via points or satisfactory/unsatisfactory.

Example patient: Andrew W, DOB 4/21/21, 4 months old, presents for a well-baby exam.

Name: _____ Class: _____

Introduction to Infant Vital Signs Check-Off

1.	Gather appropriate equipment	
2.	Knock, enter room and approach infant in developmentally appropriate way	
3.	Identify yourself with name and title (student nurse, medical assistant, nurse aide, etc.)	
4.	Wash your hands with sanitizer or soap/water	
5.	Identify patient by asking the caregiver for name and date of birth; state that you would verify this information with a medical record	
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Temperature		
13.	Choose a route to take the infant's temperature and gather the appropriate thermometer for the route	
14.	Place the thermometer over the temporal artery, in the client's axilla, or apply lube and insert 0.5-1 inch into the rectum	
15.	Remove once temperature has been recorded	
16.	Ask your patient's caregiver if they have any questions	
17.	Wash your hand with sanitizer or soap/water	
18.	Document the blood pressure below Date: Time: Blood Pressure:	
	Score:	

Introduction to Infant Vital Signs

Use the model as your patient to take vital signs. Your instructor will give you patient information.

Patient Initials: _____

Date: _____

Time: _____

HR: _____

RR: _____

Temp: _____ Route: _____

Patient Initials: _____

Date: _____

Time: _____

HR: _____

RR: _____

Temp: _____ Route: _____

Patient Initials: _____

Date: _____

Time: _____

HR: _____

RR: _____

Temp: _____ Route: _____

Name: _____ Class: _____

Introduction to Infant Vital Signs Test

Select the best answer to the following multiple-choice questions:

1. You are collecting an apical pulse on a 10-month-old infant. You determine the heart rate to be 150bpm. How would you interpret this measurement?
 - a. Tachycardic
 - b. Bradycardic
 - c. Within normal limits
 - d. Needs to be collected again
2. Where is the most accurate location to collect an infant's heart rate?
 - a. Brachial artery
 - b. 4th intercostal space, midclavicular line
 - c. Radial artery
 - d. 5th intercostal space, midclavicular line
3. When collecting a respiratory rate on a 6-month-old, which of the following is the correct method for the CNA to use?
 - a. Count for 15 seconds and multiply by 4
 - b. Count for 6 seconds and multiply by 10
 - c. Count for 60 seconds
 - d. Count for 120 seconds
4. Which location should an infant's temperature be taken if they are suspected to be febrile?
 - a. Axillary
 - b. Temporal
 - c. Rectal
 - d. Oral
5. Before assessing a 2-week-old infant, the nurse should remember which important detail of this stage of development?
 - a. Stranger anxiety
 - b. Startle reflex
 - c. Separation anxiety
 - d. Mouthing objects

Introduction to Infant Vital Signs Test – Answer Key

Select the best answer to the following multiple-choice questions:

1. You are collecting an apical pulse on a 10-month-old infant. You determine the heart rate to be 150bpm. How would you interpret this measurement?
 - a. Tachycardic
 - b. Bradycardic
 - c. Within normal limits**
 - d. Needs to be collected again
2. Where is the most accurate location to collect an infant's heart rate?
 - a. Brachial artery
 - b. 4th intercostal space, midclavicular line**
 - c. Radial artery
 - d. 5th intercostal space, midclavicular line
3. When collecting a respiratory rate on a 6-month-old, which of the following is the correct method for the CNA to use?
 - a. Count for 15 seconds and multiply by 4
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 - c. Count for 60 seconds**
 - d. Count for 120 seconds
4. Which location should an infant's temperature be taken if they are suspected to be febrile?
 - a. Axillary
 - b. Temporal
 - c. Oral
 - d. Rectal**
5. Before assessing a 2-week-old infant, the nurse should remember which important detail of this stage of development?
 - a. Stranger anxiety
 - b. Startle reflex**
 - c. Separation anxiety
 - d. Mouthing objects

Sources

Kliegman, R. (2020). *Nelson Textbook of Pediatrics* (Edition 21.). Philadelphia, PA: Elsevier.