

LESSON 5-3 Physical Examination of Urine

Student Performance Guide

LESSON 5-3 Physical Examination of Urine

Worksheet

LESSON 5-4 Chemical Examination of Urine

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LESSON 5-5 Microscopic Examination of Urine Sediment

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LESSON 5-5 Microscopic Examination of Urine

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LESSON 5-5 Microscopic Examination of Urine

Routine Urinalysis Report Form

LESSON 5-6 Urine Pregnancy Tests

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LESSON 5-3 Physical Examination of Urine

Name _____ Date _____



1. Practice the procedure for performing a physical examination of urine following the step-by-step procedure and using the worksheet.
2. Demonstrate your understanding of this lesson by:
 - a. Completing a written examination successfully, and
 - b. Performing the procedure for the physical examination of urine satisfactorily for the instructor. All steps must be completed as listed on the instructor's Performance Check Sheet.

Consult manufacturers' directions before using instruments or performing tests.

gloves
hand disinfectant
puncture-proof container for sharps
clear plastic conical centrifuge tubes
test tube rack
fresh urine sample
dropping pipet
refractometer or urinometer
distilled water
urinalysis report form or worksheet
soft tissue or soft paper towels
biohazard container
10% chlorine bleach solution or other surface disinfectant
urine control solutions

Record in the comment section any problems encountered while practicing the procedure (or have a fellow student or the instructor evaluate your performance).

S = Satisfactory
U = Unsatisfactory

You must:

S **U** **Comments**

1. Wash hands and put on gloves
2. Assemble equipment and materials
3. Obtain a fresh urine specimen. If specimen has been refrigerated, allow it to reach room temperature before proceeding with tests
4. Record the specimen identification on the worksheet (or report form)
5. Mix the urine gently by swirling and pour approximately 10 mL into a clear, conical centrifuge tube

You must:	S	U	Comments
6. Observe the color of the urine (straw, yellow, red, etc.) and record on the worksheet			
7. Notice the odor of the urine. If unusual, record in comment section			
8. Observe and record the appearance or transparency of the urine (clear, slightly cloudy, turbid)			
9. Measure the specific gravity using both the refractometer and urinometer: a. Refractometer <ol style="list-style-type: none"> (1) Place one drop of distilled water on the glass plate of the refractometer and close gently (2) Look through ocular and read the specific gravity from the scale. For water, the specific gravity should read 1.000. (If it does not, calibrate with the screwdriver provided with the refractometer) (3) Wipe the water from the glass plate, place one drop of urine control solution on the plate and close gently (4) Look through the ocular, read the specific gravity from the scale, and record the control value (5) Clean the glass plate with disinfectant and dry with a soft tissue (6) Repeat steps 9a3–9a5 with a urine specimen, recording result 			
b. Urinometer <ol style="list-style-type: none"> (1) Pour 40–50 mL of distilled water into the glass cylinder (approximately three-fourths full) (2) Insert urinometer gently, with spinning motion (3) Read the specific gravity from the scale on the stem of the urinometer as it stops spinning and record (Specific gravity of water should be 1.000) (4) Rinse equipment and dry with laboratory tissue and repeat 9b1–9b3 with urine specimen, recording result 			
10. Discard urine sample properly (or save specimen for chemical examination, Lesson 5-4)			
11. Disinfect and clean equipment and return to proper storage			
12. Clean work area with disinfectant			
13. Remove and discard gloves appropriately			
14. Wash hands with hand disinfectant			
<i>Evaluator Comments:</i>			
Evaluator _____ Date _____			

Worksheet

Name _____ Date _____

Specimen I.D. _____

1. Appearance (transparency): _____ clear clear
_____ hazy (slightly cloudy)
_____ cloudy (turbid)
_____ other
describe _____
2. Color: _____ straw to amber
3. Specific gravity: _____ 1.005–1.030

Comment: _____

Student Performance Guide

LESSON 5-4 Chemical Examination of Urine

Name _____ Date _____



1. Practice the procedure for performing a chemical examination of urine following the step-by-step procedure.
2. Demonstrate your understanding of this lesson by:
 - a. Completing a written examination successfully, and
 - b. Performing the procedure for the chemical examination of urine satisfactorily for the instructor. All steps must be completed as listed on the instructor's Performance Check Sheet.

Consult reagent package inserts for manufacturers' specific instructions before performing tests

gloves
hand disinfectant
fresh urine samples
urine control solutions (normal and abnormal)
reagent strips with color chart

paper towels or laboratory tissues
stopwatch or timer
reagent strip reader (optional)
clear, conical graduated centrifuge tubes
forceps
centrifuge
heat-resistant test tubes, 13 x 100 mm and 16 x 125 mm
test tube clamp
dropping pipets
distilled water
20% sulfosalicylic acid (or 3%)
Clinitest® tablets
Acetest® tablets
Ictotest® tablets and absorbent pads
test tube racks
worksheet
urinalysis report forms
10% chlorine bleach solution or other surface disinfectant
biohazard container
protective eyewear
puncture-proof sharps container

Record in the comment section any problems encountered while practicing the procedure (or have a fellow student or the instructor evaluate your performance).

S = Satisfactory
U = Unsatisfactory

You must:

S U **Comments**

1. Wash hands with disinfectant and put on gloves
2. Assemble equipment and materials
3. Obtain urine specimen and urine control solutions. If specimen has been refrigerated, allow it to reach room temperature before proceeding

You must:**S U****Comments**

4. Perform reagent strip test:
 - a. Dip reagent strip into urine sample, moistening all pads
 - b. Remove strip from urine immediately and tap to remove excess urine; blot edge on absorbent paper towels. Begin timing as strip is withdrawn from urine
 - c. Observe reagent pads and compare colors to color chart at appropriate time intervals
 - d. Record results on urinalysis worksheet
 - e. Discard reagent strip into biohazard container
 - f. Repeat 4a–4e using urine-control solution(s)
5. Perform sulfosalicylic acid test for protein (usually performed only if protein is positive by reagent strip method):
 - a. Centrifuge 5 mL of urine
 - b. Place 4 mL of clear supernatant (from 5a) into a test tube
 - c. Add three drops of 20% sulfosalicylic acid (or add 4 mL of 3% sulfosalicylic acid)
 - d. Mix thoroughly and estimate the amount of turbidity after ten minutes
 - e. Record results on worksheet as negative, trace, 1+, 2+, 3+, or 4+
6. Perform Clinitest® for reducing substances:
 - a. Place a 16 x 125 mm test tube into a test-tube rack
 - b. Place five drops of urine into the test tube
 - c. Place ten drops of distilled water into the test tube
 - d. Drop a Clinitest® reagent tablet into the urine-water mixture using forceps
 - e. Observe color while allowing tablet to effervesce or boil until boiling stops and without touching the test tube
 - f. Wait fifteen seconds, shake test tube gently using test tube clamp, and compare color to color chart (tube will be hot and opening should be pointed away from your face)
 - g. Record results on worksheet as negative, 1/4%, 1/2%, 3/4%, 1%, or 2% or more
 - h. Repeat 6a–6g using urine-control solution(s)
7. Perform Acetest® for ketones:
 - a. Place an Acetest® tablet on a clean piece of white paper towel or filter paper
 - b. Place one drop of urine on top of the tablet
 - c. Compare color of tablet to color chart at thirty seconds
 - d. Record results on worksheet as negative or positive
 - e. Repeat 7a–7d using urine-control solution(s)

Worksheet

Name _____ Date _____

Specimen I.D. _____

Chemical Examination

A.

pH	_____	5.5-8.0
Protein	_____	negative, trace
Glucose	_____	negative
Ketone	_____	negative
Bilirubin	_____	negative
Blood	_____	negative
Urobilinogen	_____	0.1–1.0 EU/dL
Nitrite	_____	negative
Leukocyte esterase	_____	negative
Specific gravity	_____	1.005–1.030

Confirmatory Test Results

(circle result)

B. Protein (sulfosalicylic acid)	negative	trace	1+	2+	3+	4+
Reducing substances (Clinitest®)	negative	1/4%	1/2%	3/4%	1%	2% or more
Ketones (Acetest®)	negative	positive				
Bilirubin (Ictotest®)	negative	positive				
Other _____	_____					

Student Performance Guide

LESSON 5-5 Microscopic Examination of Urine Sediment

Name _____ Date _____



1. Practice preparing and examining urine sediment following the step-by-step procedure.
2. Demonstrate your understanding of this lesson by:
 - a. Completing a written examination successfully, and
 - b. Performing the procedure for preparing and examining urine sediment satisfactorily for the instructor. All steps must be completed as listed on the instructor's Performance Check Sheet.

Follow instructions on the package insert for the system being used

gloves

urine controls

hand disinfectant
fresh urine samples
centrifuge
microscope
worksheet (urinalysis report form)
10–20% chlorine bleach solution or other surface disinfectant
biohazard container
puncture-proof biohazard container for sharp objects
stopwatch or timer (if centrifuge lacks timer)
visuals depicting various components of urine sediment or prepared slides of urinary sediment
commercial standardized urine system or the following materials:
– microscope slides
– cover glasses
– disposable pipets
– conical graduated centrifuge tubes

Record in the comment section any problems encountered while practicing the procedure (or have a fellow student or the instructor evaluate your performance).

S = Satisfactory
U = Unsatisfactory

You must:

S U **Comments**

1. Wash hands and put on gloves. Assemble equipment and materials
2. Practice microscopic identification of urine sediment using urine-control solutions
3. Obtain a urine sample
4. Pour 10–15 mL of well-mixed urine into a clean conical centrifuge tube (or tube from standardized system)

You must:**S U****Comments**

5. Place filled tube in centrifuge, insert balance tube, and close lid (centrifuge must be balanced)
6. Centrifuge at 1500–2000 rpm for five minutes
7. Remove tube from centrifuge after rotor stops spinning
8. Pour off supernatant urine, leaving approximately 0.5 mL of urine in tube (follow system instructions if applicable)
9. Resuspend urine sediment by tapping the bottom of the tube
10. Place one drop of resuspended urine onto a clean glass slide or into chamber provided with the system
11. Place coverslip over drop of urine if using glass slide
12. Place slide on microscope stage and focus using low-power (10X) objective and lowered condenser
13. Scan ten to fifteen low-power fields, count the number of casts per field, and record the average
14. Identify the type(s) of casts present and record
15. Rotate the high-power (40X) objective into position (raise condenser if necessary)
16. Scan ten to fifteen fields on high power
17. Count the number of RBC, WBC, and epithelial cells per high-power field and record the average for each
18. Observe the sample for the presence of microorganisms, crystals, or mucus, and record if present. If crystals are present, identify type
19. Complete the urinalysis report form or worksheet
20. Discard specimen tube and pipet appropriately; avoid aerosol formation
21. Discard slide in puncture-proof biohazard container
22. Clean and return equipment to proper storage
23. Clean work area with surface disinfectant
24. Remove and discard gloves appropriately
25. Wash hands with hand disinfectant
26. Use unlabeled illustrations or pre-prepared slides of urine sediment provided by the instructor to identify components of sediment not seen on slides.

Evaluator Comments:

Evaluator _____ Date _____

Worksheet

Name _____ Date _____

Specimen I.D. _____

Microscopic Examination

WBC:	_____ / HPF	0–4
RBC:	_____ / HPF	rare
Epithelial cells:	_____ / HPF	occasional (higher in females)
Casts:	_____ / LPF	occasional, hyaline
Type:	_____	
Yeasts:	negative 1+ 2+ 3+ 4+	negative
Bacteria:	negative 1+ 2+ 3+ 4+	negative
Mucus:	negative 1+ 2+ 3+ 4+	negative to 2+
Crystals:	_____ none seen _____ present	
Type:	_____	
Other:	_____	

Routine Urinalysis Report Form

Name _____ Date _____

Specimen I.D. _____

1. Physical Examination

Transparency: _____ clear clear
_____ hazy (slightly cloudy)
_____ cloudy

Color: _____ straw to amber

Specific gravity: _____ 1.005–1.030

2. Chemical Examination

A. Reagent Strip

pH _____ 5.5–8.0

Protein _____ negative, trace

Glucose _____ negative

Ketone _____ negative

Bilirubin _____ negative

Blood _____ negative

Urobilinogen _____ 0.1–1.0 E.U./dL urine

Bacteria (nitrite) _____ negative

Leukocyte esterase _____ negative

B. Confirmatory Test Results (circle results)

Protein (sulfosalicylic acid):	negative	trace	1+	2+	3+	4+
Reducing substances (Clinitest®):	negative	1/4%	1/2%	3/4%	1%	2% or more
Ketones (Acetest®):	negative	positive				
Bilirubin (Ictotest®):	negative	positive				

3. Microscopic Examination

WBC: _____ / HPF 0-4

RBC: _____ / HPF rare

Epithelial cells: _____ / HPF occasional (higher in females)

Casts: _____ / LPF occasional, hyaline

Type present: _____

Crystals: _____ none seen
_____ present
(type) _____

Amorphous deposits: _____ none seen
_____ present

Yeasts: (circle result) negative 1+ 2+ 3+ 4+ negative

Bacteria: (circle result) negative 1+ 2+ 3+ 4+ negative

Mucus: (circle result) negative 1+ 2+ 3+ 4+ negative to 2+

Other: (circle result) _____

Tech/Student _____

Date _____

Student Performance Guide

LESSON 5-6 Urine Pregnancy Tests

Name _____ Date _____



1. Practice performing an immunological test for pregnancy following the step-by-step procedure.
2. Demonstrate your understanding of this lesson by:
 - a. Completing a written examination successfully, and
 - b. Performing the pregnancy test procedure satisfactorily for the instructor. All steps must be completed as listed on the instructor's Performance Check Sheet.

The procedures given are general. Always consult and follow the manufacturer's instructions for the kit being used.

gloves
hand disinfectant
urine specimen
stopwatch
surface disinfectant (10% chlorine bleach solution)
biohazard container
hCG negative urine control
hCG positive urine control
pregnancy test kit—EIA or slide test: pregnancy test kits should include slide or test unit, dispensers, reagents, etc.

Record in the comment section any problems encountered while practicing the procedure (or have a fellow student or the instructor evaluate your performance).

S = Satisfactory
U = Unsatisfactory

You must:

S **U** **Comments**

1. Wash hands and put on gloves
2. Perform a modified EIA for hCG, following the manufacturer's instructions
 - a. Obtain test kit materials, reagents, and urine specimen
 - b. Apply urine to the test unit using the dispenser provided
 - c. Wait appropriate time interval (use stopwatch to time test)
 - d. Apply first reagent/antibody to test unit using dispenser provided
 - e. Rinse unreacted reagent from unit after appropriate time
 - f. Apply color reagent/substrate to test unit
 - g. Observe color development after appropriate time interval
 - h. Stop reaction
 - i. Record results. Always consult manufacturer's package insert to interpret test results
 - j. Repeat steps 2a–i using both positive and negative urine controls

You must:	S	U	Comments
3. Perform an agglutination inhibition test for hCG, following the manufacturer's instructions (if test is not available, go to step 4) a. Obtain slide test kit, reagents, and urine specimen b. Place one drop of antiserum in the center of the circled area of slide c. Dispense one drop of urine beside the drop of antiserum d. Mix urine and antiserum with stirrer provided e. Rock the slide in a figure-eight motion for the appropriate time, usually one to two minutes (use stopwatch to measure time) f. Apply one drop of well-mixed indicator particles to mixture on slide g. Mix indicator particles with antiserum-urine mixture and spread the mixture over the entire circled area of the slide using a stirrer h. Rock slide slowly in a figure-eight motion for the appropriate time (usually one to two minutes) i. Observe slide for agglutination at the end of the time interval and record the results (no agglutination = positive; agglutination = negative) j. Repeat steps 3a–3i using positive and negative urine controls			
4. Disinfect reusable equipment by soaking in 10% chlorine bleach solution a minimum of ten minutes. Wash and rinse thoroughly			
5. Discard disposable supplies in biohazard container			
6. Dispose of specimen as instructed			
7. Clean work area with surface disinfectant			
8. Remove gloves and discard in biohazard container			
9. Wash hands with hand disinfectant			
<p><i>Evaluator Comments:</i></p> <p>Evaluator _____ Date _____</p>			