Sample Question Set Based on Bloom's Taxonomy

Urinary Final Unit Test: Scenario: Kidney stones

Bruce Randall is a 53-year-old white male who owns a welding and machine shop. On August 10th, he was called to a job on the town square. He was asked to weld a steel structure on top of a roof that had a southern exposure. Temperatures on the roof approached 103 degrees. In the alley behind, a crew was freshly blacktopping the road surface; hot blacktop material exceeds 300 degrees F. Because he was doing physical labor on a hot day, Bruce drank water and sports drinks that afternoon.

Two days later, Bruce experienced pain in the middle of his back. The pain became agonizing and Bruce left work to check in with his doctor. In the next four days, Bruce spent a night in the hospital and passed 3 kidney stones. Bruce was asked to do a 24-hour collection of urine in an attempt to catch the stones. Determination of the cause of the stone is much enhanced if the composition of the stone can be established. Bruce had never had a kidney stone before, so this was a new experience. He joined the 10% of Americans who have at least one kidney stone in their life time.

1. Bruce's kidney stone was formed in the renal pelvis and is on its way to the bladder. In between, it passes through the
   a. Urethra
   b. Ureter
   c. Nephron
   d. Renal pyramids

2. After several excruciating hours, Bruce's kidney stone enters the bladder. It will pass out of the body during micturation. The stone will
   a. be in with the urine until the urine amount reaches about 300 ml, the bladder walls stretches and triggers nervous impulses, initiating the emptying reflex.
   b. be held in the urethra until the urine amount reaches about 50 ml, the superior bladder sphincter will then open, allowing urine to pass out of the body.
   c. emptying the bladder is a purely involuntary reflex, so the kidney stone will pass out of the body whenever the urge occurs, signaled by the brain.
   d. Both a and c are true.

3. In order for a kidney stone to form, the urine must be very concentrated. This happens in the nephron. Which description below best reflects the structure of a nephron?
   a. A nephron is a series of tubules that gather waste from the surrounding capillaries via osmosis and diffusion. The making of urine is a passive process, so the waste materials slowly leach into the tubules.
   b. A nephron starts with the proximal tubule because proximal means nearer to, and is followed by the collecting tubule which collects all of the urine from the proximal tubule, then ends with a Bowman's capsule that sends the urine to the renal pelvis.

c. A nephron is made of a glomerulus (cluster of capillaries), surrounded by a Bowman's capsule like a balloon around a fist, ending in a series of tubules that loop away from and back toward the renal cortex.
d. A nephron starts with a glomerulus which is attached directly to a loop of Henle. In the loop of Henle, the urine gets much more dilute, which is essential or too many solutes would be lost to the collecting tubule.

4. When Bruce first entered the hospital in the late afternoon, a urine sample was taken. His specific gravity was 1.035 and his urine output in the last 24 hours was 600 ml. The color of the urine was deep yellow and there were some red blood cells found. Choose the best explanation that takes into account the data provided.
   a. Bruce was drinking water all day and was well hydrated. The specific gravity of plain water is 1.000 and since the specific gravity of Bruce's urine is only 1.035, his urine was pretty dilute. Urine is expected to be a deep yellow color.
   b. Bruce was well hydrated and had a normal urine output. A little bit of blood in the urine is normal and should not cause worry. Specific gravity is not a relevant measurement to access kidney stone formation.
   c. Bruce was not well-hydrated. The urine output was low, even though the specific gravity reading was well within normal limits. The color was like an early morning sample so would be normal.
   d. Bruce was dehydrated. The specific gravity reading was on the high end of normal, indicating concentrated urine. Urine output was barely high enough to remove the daily nitrogenous waste. The deep yellow indicated concentrated urine late in the day which is unusual. Red blood cells should not have been there.

5. Suppose Bruce was asked to drink lots of water (2-3 quarts) when he entered the hospital. What action would you expect in the nephron?
   a. The glomerulus would filter the extra fluid and more effluent would enter the Bowman's capsule. The amount of urine being processed in the tubules would increase and urine volume controls would increase the output. The stones would be moved through the ureter by the increased pressure of urine behind them.
   b. The increased water consumption would be filtered through the nephron, but in the collecting tubule, much of the water would be reabsorbed back into the blood stream. There would be increased amounts of glucose lost to the urine due to the increased amount of blood filtered.
   c. Sensing the extra amounts of consumed water, the posterior pituitary gland would produce much less anti-diuretic hormone (ADH), so the permeability of the tubules in the nephron would change appropriately.
   d. Both a and c are correct.

6. Knowing Bruce had healthy kidneys prior to this incident, what would you recommend as a kidney stone prevention plan for Bruce in the future? Choose the best answer.
   a. Reduce the amount of fluids consumed. The less the kidneys have to process, the healthier they will remain. Reduced fluids will also put less pressure on the capillaries around the convoluted tubules, so they will remain healthy longer.
   b. Increase the amount of fluids consumed. The more dilute the urine, the less likely crystals will precipitate out and cling to the walls of the kidney.
   c. Eat more, especially foods containing salt and calcium. The extra salt and calcium will trigger the homeostatic mechanisms that control the permeability of the convoluted tubules.
   d. Request medication from your doctor. Stone formation can readily be controlled by medication and taking pills is easier than modifying your diet or fluid intake.

Source: Presenter

Bloom's Question Stems

Comprehension		
Useful Verbs	Sample Question Stems	Potential Activities and Products
explain interpret outline discuss distinguish predict restate translate compare describe	Can you write in your own words...? Can you write a brief outline...? What do you think could have happened next...? Who do you think...? What was the main idea...? Who was the key character...? Can you distinguish between...? What differences exist between...? Can you provide an example of what you mean...? Can you provide a definition for...?	Cut out or draw pictures to show a particular event. Illustrate what you think the main idea was. Make a cartoon strip showing the sequence of events. Write and perform a play based on the story. Retell the story in your words. Paint a picture of some aspect you like. Write a summary report of an event. Prepare a flow chart to illustrate the sequence of events. Make a coloring book.

Application		
Useful Verbs	Sample Question Stems	Potential Activities and Products
solve show use illustrate construct complete	Do you know another instance where...? Could this have happened in...? Can you group by characteristics such as...? What factors would you change	Construct a model to demonstrate how it will work. Make a diorama to illustrate an important event. Make a scrapbook about the areas of study.

examine classify	if...? Can you apply the method used to some experience of your own...? What questions would you ask of...? From the information given, can you develop a set of instructions about...? Would this information be useful if you had a ...?	Make a paper-mache map to include relevant information about an event. Take a collection of photographs to demonstrate a particular point. Make up a puzzle game using the ideas from the study area. Make a clay model of an item in the material. Design a market strategy for your product using a known strategy as a model. Dress a doll in national costume. Paint a mural using the same materials. Write a textbook about... for others.

Analysis		
Useful Verbs	Sample Question Stems	Potential Activities and Products
analyze distinguish examine compare contrast investigate categorize identify explain separate advertise	Which events could have happened...? If ... happened, what might the ending have been? How was this similar to...? What was the underlying theme of...? What do you see as other possible outcomes? Why did ... changes occur? Can you compare your ... with that presented in...? Can you explain what must have happened when...? How is ... similar to ...? What are some of the problems of...? Can you distinguish between...? What were some of the motives behind...? What was the turning point in the game? What was the problem with...?	Design a questionnaire to gather information. Write a commercial to sell a new product. Conduct an investigation to produce information to support a view. Make a flow chart to show the critical stages. Construct a graph to illustrate selected information. Make a jigsaw puzzle. Make a family tree showing relationships. Put on a play about the study area. Write a biography of the study person. Prepare a report about the area of study. Arrange a party. Make all the arrangements and record the steps needed. Review a work of art in terms of form, color and texture.

Synthesis		
Useful Verbs	Sample Question Stems	Potential Activities and Products
create	Can you design a ... to ...?	Invent a machine to do a specific task.

invent compose predict plan construct design imagine propose devise formulate	Why not compose a song about...? Can you see a possible solution to...? If you had access to all resources how would you deal with...? Why don't you devise your own way to deal with...? What would happen if...? How many ways can you...? Can you create new and unusual uses for...? Can you write a new recipe for a tasty dish? Can you develop a proposal which would...	Design a building to house your study. Create a new product. Give it a name and plan a marketing campaign. Write about your feelings in relation to... Write a TV show, play, puppet show, role play, song or pantomime about...? Design a record, book, or magazine cover for...? Make up a new language code and write material using it. Sell an idea. Devise a way to... Compose a rhythm or put new words to a known melody.

Evaluation		
Useful Verbs	Sample Question Stems	Potential Activities and Products
judge select choose decide justify debate verify argue recommend assess discuss rate prioritize determine	Is there a better solution to... Judge the value of... Can you defend your position about...? Do you think ... is a good or a bad thing? How would you have handled...? What changes to ... would you recommend? Do you believe? Are you a ... person? How would you feel if...? How effective are...? What do you think about...?	Prepare a list of criteria to judge a ... show. Indicate priority and ratings. Conduct a debate about an issue of special interest. Make a booklet about 5 rules you see as important. Convince others. Form a panel to discuss views, e.g. "Learning at School." Write a letter to ... advising on changes needed at... Write a half yearly report. Prepare a case to present your view about...

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