**Dr. Camilla Walck, IB Biology Princess Anne High School**

**Design Modeling**: Test grade creation of product to show mastery of Excretory System

For the excretory system concepts you will create your own method of showing me you have mastered the learning targets outlined in 11.3 (exocrine system). You are required to create a model of the kidney and nephron in any format you choose. You can show mastery of the other objectives within your modeling or within a separate creation.

ALL Understandings and Application / Skills bulleted in 11.3 must be mastered with evidence given that shows mastery of the learning objectives.

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| --- | --- | --- | --- | --- |
| ***Understanding*** | ***Complete (4-5)*** | ***Partial (2-3)*** | ***Not at all (0-1)*** | ***Comments*** |
| Outline osmoconformers and osmoregulators | Concepts fully explained | Concepts partially explained | Little explanation of concepts |  |
| Explain the Malpighian tubule system in insects | Concepts fully explained | Concepts partially explained | Little explanation of concepts |  |
| Compare the composition of blood in the renal artery and renal vein | Concepts fully explained | Concepts partially explained | Little explanation of concepts |  |
| Explain ultrafiltration in the glomerulus and Bowman’s capsule (include details of the cells involved) | Full explanation with details of cells involved (podocytes; fenestrated capillaries) | Partial explanation – missing some info or missing details of podocytes/fenestrations | Little explanation of process of and/or no info on podocytes/fenestrations |  |
| Outline active transport in the proximal tubule identifying substances actively reabsorbed | Fully outlined with identification of molecules moved by active transport | Outlined process but no evidence of exact molecules moved by active transport / process not outlined | Limited knowledge of process and molecules involved. |  |
| Explain how the Loop of Henle helps in the production of hypertonic urine | Full explanation including the relative solute concentration – relates to osmosis | Partial explanation with some reference to why/how but not completely explained | Limited evidence of the process and role of solute distribution in osmosis due to the location of the Loop of Henle |  |
| Outline the role of ADH in the kidney | Full explanation of the role and target of ADH | Partial explanation of the role of ADH / target | Limited explanation or lack of role/target of ADH |  |
| Compare the types of nitrogenous waste products to evolution | All 3 types compared and related to evolution with examples of organisms | All 3 types compared but no organisms or missing some info | Incomplete comparison and/or missing organisms |  |
|  |  |  |  |  |
| ***Application and Skill*** | ***Complete (4-5)*** | ***Partial (2-3)*** | ***Not at all (0-1)*** | ***Comments*** |
| Outline the consequences of dehydration and over hydration | Concepts fully explained | Concepts partially explained | Limited explanation of concepts |  |
| Explain the treatment of kidney failure by hemodialysis or kidney transplant | Complete explanation with symptoms/process of treatment/outcome | Partial explanation missing some info or not fully explained | Limited explanation of processes or missing symptoms/treatment/outcome |  |
| Outline what urinary tests can detect | Concepts fully explained including all molecules tested | Concepts partially explained/missing or incorrect molecules | Limited explanation of concepts/no evidence of molecular knowledge |  |
| *Create a model of the human kidney* | Fully labeled / with all parts and renal artery/vein | Partially labeled main parts and vessels or with some incorrect labels | Incomplete / incorrect labels – no evidence of vessels |  |
| *Create a model of the nephron showing all processes / locations* | All parts and processes labeled and explained – models processes | Missing some parts/ processes but can explain most of the physiology | Limited knowledge of parts/processes or missing labels / incorrect labels |  |
| Explain how ultrasound treatment can aid in the removal of kidney stones | Concept fully explained | Concept partially explained | Little explanation of concept |  |

Your presentation of knowledge will be presented with the aid of your creative model of the kidney and nephron. You will present individually and you will be asked (randomly chosen) to explain the concepts from 11.3.

A maximum of 70 points will come from the evidence of mastery of all concepts as outlined in the rubric. The remaining 30 will be based on your models and use of the kidney and nephron to show mastery of concepts. The models can be of any format as long as you create them.

Total Points earned: \_\_\_\_\_\_\_\_\_\_\_\_\_\_