

Animal Survival *Checklist*

Water and Waste (* = Credit outcomes)

1. Mammals **gain** water through **drinking, food** and through chemical reactions called **respiration**.
2. Mammals **lose** water through **sweat, urine, breathing** and **faeces**.
3. Daily water gain is **balanced** by daily water loss.
4. The **kidneys** are the main organs for **regulating the water content** in a mammal.
5. The **renal artery** carries blood to the kidneys for filtering and the **renal vein** carries filtered blood out of the kidneys.
6. Urine passes down the **ureter** to the **bladder** where it is stored before elimination from the body.
7. Blood is **filtered** in the kidneys which **removes excess water** and the poisonous waste **urea** from the blood. Urea is eliminated in the urine.
8. Useful substances such as glucose are **reabsorbed** in the kidney.
- 9.* Blood entering the **glomerulus**, which sits in a cup-shaped structure called the **Bowman's capsule**, is under pressure and materials are forced out of the blood in a process called **ultrafiltration**. Blood cells and large molecules such as proteins remain in the bloodstream.
As the **filtrate** passes along the **tubule** glucose, water and vitamins are reabsorbed into the **blood capillaries** surrounding the tubules.
The liquid which reaches the collecting duct contains water and urea. This forms the main part of **urine** which now passes down the **ureter** into the **bladder**.
- 10.* Urea is formed in the liver from the breakdown of excess amino acids. It is carried in the plasma of the blood via the renal artery to the kidney.
- 11.* A **hormone** called **ADH** (antidiuretic hormone) controls the volume of urine produced by the kidneys. It is released from the **pituitary gland in the brain** and travels in the bloodstream to the kidney tubules where it makes them **more permeable** to water. When water intake is high the brain releases **less** ADH which results in **less** water being reabsorbed in the kidneys.
When sweating or salt intake is high the brain releases **more** ADH which results in **more** water being reabsorbed in the kidneys.

12. Death can result if kidneys are damaged or diseased due to the build up of poisonous wastes. **Kidney machines** can take over the job of damaged kidneys while the patient waits to receive a **kidney transplant**.

- 13.* Kidney machines need constant attention to maintain **sterile** conditions and require the patient to be connected to them for **many hours each week**. Kidney transplants rely on a suitable **donor** being found whose tissue type is suitably close to the patient otherwise **rejection** will occur. Donor kidneys **do not meet demand**.