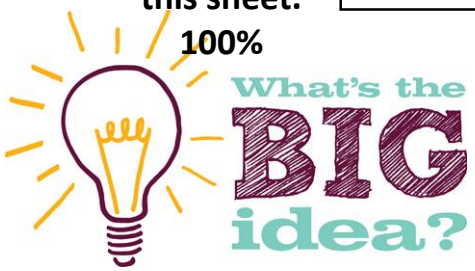
You need to know the content of this sheet. 100%

100% Sheet
CONTROL SYSTEMS



Organisms
Organisms are organized on a cellular basis and require a supply of energy or materials.

HOMEOSTASIS: A CONSTANT INTERNAL ENVIRONMENT
The conditions inside the body must be controlled within narrow limits. This is called homeostasis. These conditions include water content, ion content, body temperature and blood glucose concentration. The body has many control systems, these can be split into two main systems: the nervous system (electrical signals) and the endocrine system (a chemical control system).

The nervous system:
Reflex arc:
Stimulus – receptor – coordinator – effector – response

Receptors detect changes and are always a sense organ. Effectors bring about change and are always muscles/ glands.

Sensory neurons carry messages to a coordinator
Motor neurones carry messages to an effector
Relay neurons are found in the coordinator (brain/ spinal cord)

Synapses:

Small gaps between nerves , chemicals (neurotransmitters) diffuse across the gap to carry the signal into the next neuron.

Endocrine control:
Know the location and function of the following glands: adrenal, pituitary, ovary, testes, thyroid and pancreas.

Blood glucose concentration:

The pancreas and insulin

The *pancreas* monitors and controls the concentration of *glucose* in the blood. It produces a hormone called *insulin*. Insulin causes glucose to move from the blood into cells. It lowers the blood glucose concentration if it has become too high. This can happen after eating a meal that is rich in carbohydrates (for example, sweets, potatoes, bread, rice or pasta).

Diabetes is a disease where the concentration of *glucose* in the blood is not controlled properly by the body. In **type 1 diabetes**, the *pancreas* does not produce enough *insulin*. This can lead to high levels of glucose in the blood, which can be fatal.

THIS SHEET HAS TWO SIDES

The menstrual cycle and contraception:

Hormones in the menstrual cycle

The menstrual cycle in women is a recurring monthly process in which the lining of the uterus (the womb) is prepared for pregnancy. Hormones are secreted by the ovaries and pituitary gland.

Follicle stimulating hormone, FSH

The hormone FSH is secreted by the pituitary gland. FSH makes two things happen: it causes an egg to mature in an ovary and it stimulates the ovaries to release the hormone oestrogen.

Oestrogen and LH

The hormone oestrogen is secreted by the ovaries. Oestrogen makes two things happen:

it stops FSH being produced - so that only one egg matures in a cycle
it stimulates the pituitary gland to release luteinizing hormone (LH), which triggers ovulation (the release of the mature egg from the ovary).

Contraception:
The oral contraceptive, commonly known as **the pill**, greatly reduces the chances of mature eggs being produced. It contains oestrogen or progesterone (another hormone). These hormones inhibit the production of FSH, which in turn stops eggs maturing in the ovaries

Condoms:

Provide a barrier against pregnancy and infection.

IUD:

Prevents implantation of an embryo

Injection/ patch: slow release of progesterone which inhibits eggs becoming mature

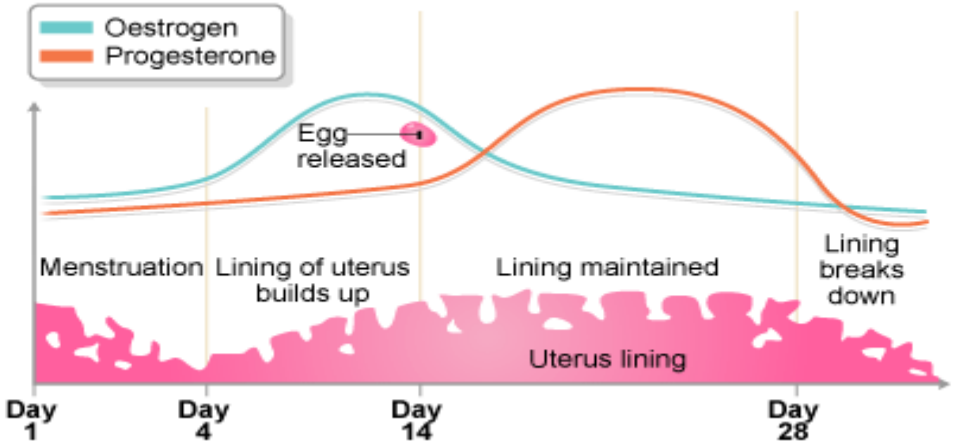
Spermicide: kills sperm

Abstinence: avoiding sexual intercourse. Only 100% effective method.

Controlling fertility:

IVF involves giving women FSH and LH to encourage the production and maturation of eggs.

Describe what is happening in the graph below – link the names and amounts of each hormone to the processes occurring in the reproductive system.



Explain how fertility drugs can help to make a woman pregnant or prevent pregnancy form occurring:

What system are hormones part of?

What type of tissue secretes hormones?

Name 6 endocrine glands in humans, for each state their location and what they secrete in the body:

Describe the reflex arc for touching something hot.

What is a synapse? How does it affect the speed of an impulse?

Construct a negative feedback cycle below showing how blood glucose is controlled and maintained at a constant level in the body. Include the names and functions of the hormones involved.