

4.1 – Homeostasis	
Homeostasis	Maintenance of a <b>constant internal environment</b> in response to <b>changes in internal and external environments</b> .
Stimulus	A <b>change in the environment</b> , e.g. <b>temperature change, blood glucose</b> .
Receptor	<b>Detects a stimulus</b> , e.g. <b>temperature receptors in the skin</b> .
Co-ordination centre	<b>Processes information and coordinates a response</b> , e.g. <b>brain, spinal cord</b> .
Effector	A <b>muscle or gland</b> that carries out the <b>response</b> .
Negative feedback	When a <b>change</b> occurs, negative feedback <b>automatically</b> causes a <b>corrective mechanism</b> to <b>reverse the change</b> .
4.2 – Nervous System	
Nervous system	Made up of the <b>central nervous system</b> or <b>CNS (brain and spinal cord)</b> and <b>neurones</b> -> <b>responds to our surroundings quickly</b> .
Neurones / nerve cell	<b>Specialised cells of the nervous system</b> -> carry electrical impulses. <b>Long axon</b> and many <b>branches (dendrites)</b> .
Sensory neurones	Carry <b>impulses from receptors to the CNS</b> .
Relay neurones	Found in the <b>CNS</b> . Carry <b>impulses from sensory to motor neurones</b> .
Motor neurones	Carry <b>impulses from the CNS to effectors</b> .
Synapses	<b>Gap between two neurones</b> . An electrical impulse meets the synapse then <b>chemicals called neurotransmitters diffuse</b> across the <b>gap</b> .
Reflexes	<b>Rapid, unconscious responses</b> to a <b>stimulus</b> -> can <b>prevent injury</b> .
Reflex arc	<b>Stimulus</b> -> <b>receptor</b> -> <b>sensory neurone</b> -> <b>relay neurone</b> -> <b>motor neurone</b> -> <b>effector</b> -> <b>response</b>
Reactions	<b>Reactions are different to reflexes</b> as they are <b>conscious actions</b> (e.g. catching a ball).
Required practical: Reaction times	Measured using <b>simple ruler drop test</b> . Different <b>variables</b> such as the <b>effect of caffeine</b> can be investigated.

4.3 – Endocrine System	
Hormones	<b>Chemical messengers</b> that travel in the <b>blood</b> .
Glands	<b>Organs that secrete hormones</b> .
Pituitary gland	Makes <b>many hormones</b> -> control many other <b>glands</b> .
Pancreas	Makes <b>insulin and glucagon</b> -> controls <b>blood sugar</b> .
Thyroid	Makes <b>thyroxin</b> -> controls <b>basal metabolic rate</b> .
Adrenal gland	Makes <b>adrenaline</b> -> controls <b>'fight and flight'</b> response.
Ovaries (female)	Makes <b>oestrogen</b> -> <b>puberty, menstrual cycle</b> .
Testes (male)	Makes <b>testosterone</b> -> <b>puberty, sperm production</b> .
4.4 – Control of Blood Glucose	
Glucose too high	<b>Insulin</b> converts <b>glucose</b> -> <b>glycogen</b> . Stored in <b>muscle and liver cells</b> .
Glucose too low	<b>Glucagon</b> converts <b>glycogen</b> -> <b>glucose</b> . Released into <b>blood</b> .
Type 1 diabetes	<b>Pancreas does not produce insulin</b> .
Type 2 diabetes	<b>Pancreas produces insulin</b> but cells do <b>not respond</b> .
4.5 – Menstrual Cycle and Contraception	
Menstrual cycle	<b>28 day cycle</b> . Day <b>1</b> -> <b>uterus lining shreds (menstruation)</b> . Day <b>14</b> -> <b>release of egg (ovulation)</b> .
Oestrogen (ovaries)	<b>Uterus lining thickens</b> . <b>Inhibits FSH, stimulates LH</b> .
Progesterone (ovaries)	<b>Maintains uterus lining</b> . Remains <b>high</b> during <b>pregnancy</b> .
FSH (pituitary gland)	Causes an <b>egg to mature</b> in the <b>ovaries</b> .
LH (pituitary gland)	Stimulates <b>release of an egg from ovaries (ovulation)</b> .
Hormonal contraception	<b>Oral contraceptives, contraceptive implant, injections and skin patch</b> .
Non-hormonal contraception	<b>Barrier methods (condoms, diaphragm), spermicidal agents, IUDs, abstaining from sex, surgical sterilisation</b> .

## GCSE Science

### Biology B5 – Homeostasis and Response

