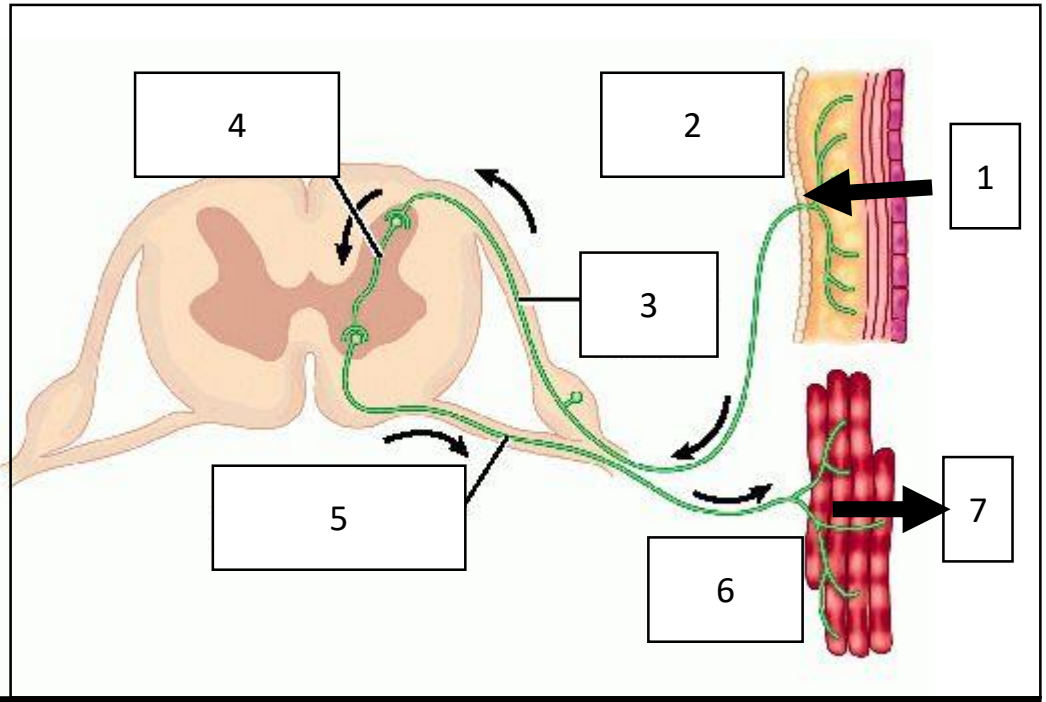
Biology Topic 5: Homeostasis and response

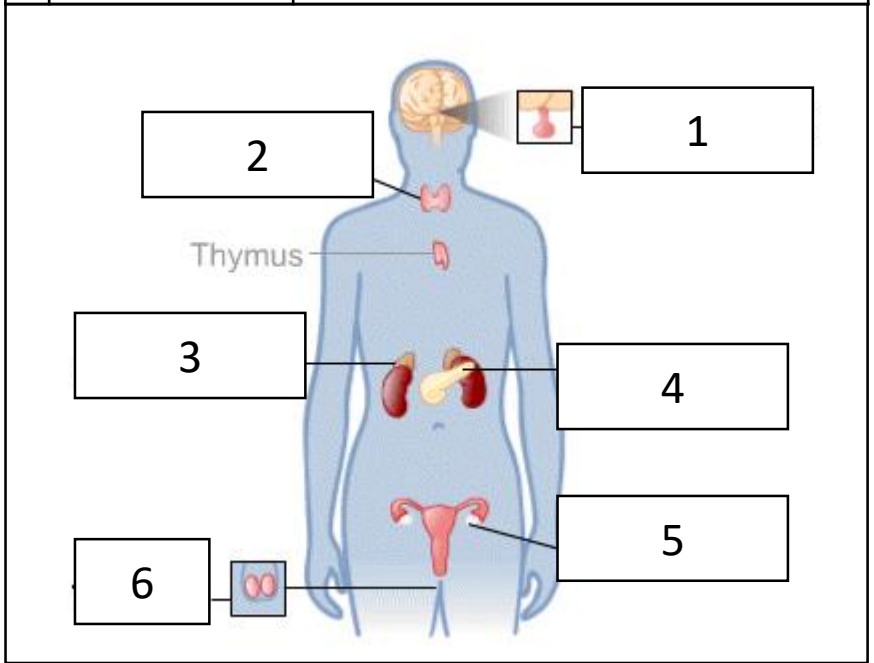
1. Keywords	
Homeostasis	The regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes.
Optimum conditions	The perfect conditions for an organism to survive and grow. E.g. blood glucose level, body temperature and water level.
Nervous response	Uses electrical signal in nerves to make fast changes
Chemical response	Uses hormones in the blood to make changes.
Reflex arc	A nervous response that is fast and automatic for protection. Does not involve the conscious brain.
CNS	(Central nervous system) The brain and the spinal chord
Neurone	Nerve cell. Carries an electrical signal from one end to the other



2. Nervous system: Reflex arc							
No.	1	2	3	4	5	6	7
Section	Stimulus →	Receptor →	Sensory neurone →	Co-ordinator →	Motor neurone →	Effector →	Response
Definition	A change to the environment that triggers a nervous response	A cell which detects a specific stimulus	A neurones which carries electrical signal from receptor to CNS	The area that receives and processes the information	Neurone that connects the CNS to the effector	The organ that creates the correct response form the stimulus	The effect of the stimulus. Often designed to prevent injury
Example	Touching a flame	Pain receptor in skin	Sensory neurone	Relay neurone	Motor neurone	Muscle gland	Movement

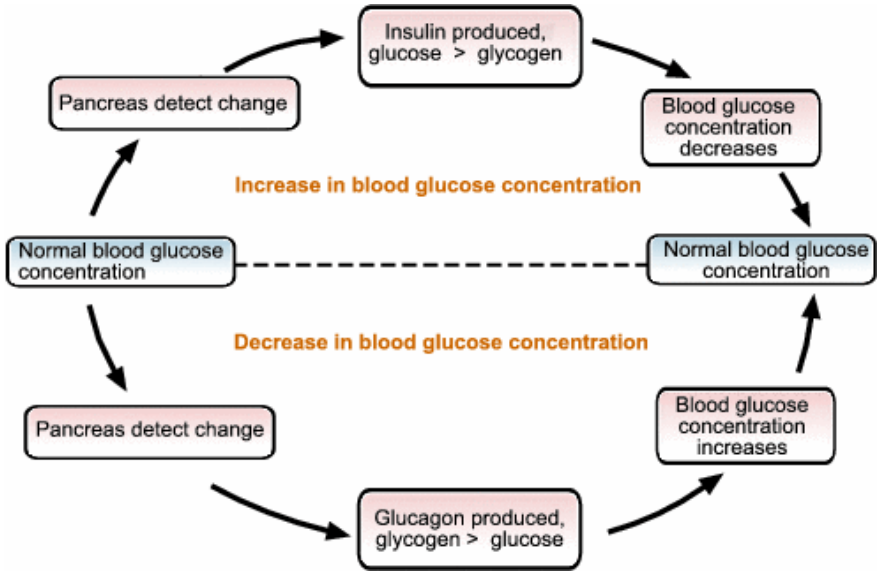
8. Hormonal control: Endocrine system	
Endocrine system	A chemical response where glands secrete hormones into the blood which make changes around the body
Glands	Special tissues designed to produce specific chemical (hormones)
Secrete	Release

9. Major glands on the body		
1	Pituitary gland	The 'master gland' makes hormones which affect other glands causing them to secrete hormones
2	Thyroid gland	Controls metabolism
3	Adrenal gland	Makes adrenalin
4	Pancreas	Controls blood sugar levels
5	Ovary	Produces female sex hormones
6	Testes	Produce male sex hormone



10. Control of blood glucose levels	
Type 1 diabetes	When the pancreas is damaged from infection and cannot make insulin. Needs injections to treat
Type 2 diabetes	When poor diet and obesity cause body cells to not respond to insulin anymore. Treated with diet and exercise
Insulin	Hormone made in pancreas that reduces glucose levels in the blood
glycogen	The long term store of sugar in the body. Made in the liver

11. Control of blood glucose continued (HT ONLY)	
Glucagon	A hormone which reduces blood glucose concentration by turning it into glycogen



16. Contraception	
Type	How it works
Oral (the pill)	Stops FSH so no egg released
Injection/implant	Release progesterone which prevents egg maturation for months or years
Barrier (condoms)	Prevent sperm and egg meeting
Intrauterine (the coil)	Prevents embryo implanting
Spermicides	Kill sperm
Abstinence	Not having sex
Surgical (vasectomy/hysterectomy)	Surgically sterilising the adult permanently

17. Hormones in fertility (HT ONLY)	
Fertility drugs	Drugs which stimulate the production and release of eggs. Eg FSH and LH
IVF (in vitro fertilisation)	The process of creating an embryo in the lab when couples struggle to conceive a baby

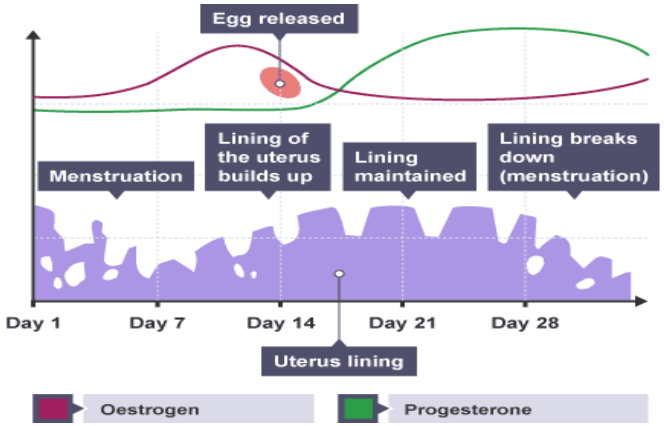
Stages of IVF:

1. FSH and LH stimulate production of many eggs
2. Eggs are harvested and fertilised by fathers sperm in a lab
3. Fertilised eggs grow in lab
4. A few embryos are implanted into mother womb

Possible consequences of IVF	Physical and emotional fatigue Low success rate Risk of multiple births simultaneously

14. Reproductive hormones		
Hormone	Made in	Function
Testosterone	Testes	Creates male sexual changes at puberty including sperm production
Oestrogen	Ovary	Creates female sexual changes at puberty including ovulation
Follicle stimulating hormone (FSH)	Pituitary gland	Causes egg to mature in ovary
Luteinising hormone (LH)	Pituitary gland	Causes egg to be released by ovary
Progesterone	Ovary	Maintains lining of womb

15. Menstrual cycle (HT ONLY)



18. Negative feedback (HT ONLY)	
Negative feedback	A system where the product reduces the stimulus to return the change to normal levels
Adrenalin	Fight or flight hormone. Increases heart rate and boosts blood supply of oxygen and glucose
Thyroxine	Controls metabolic rate and affects growth and development. Controlled by negative feedback.