

HOW DO THE BODY SYSTEMS OF A BIRD HELP IT FLY?

BODY SYSTEM	MODIFICATION FOR FLIGHT
INTEGUMENTARY /BODY	1.WINGS & FEATHERS =light weight & sturdy -provide lift & hold body heat 2.STREAMLINED BODY to decrease wind resistance in flight 3.PREEN GLAND- keeps feathers in shape for flight 4.THIN SKIN-less weight
SKELETAL	1.BONES ARE HOLLOW- make them less dense 2.BONES ARE FUSED -to make them sturdy 3.FURCULA - stabilizes shoulders during flight 4.STERNUM- anchor flight muscles 5.PYGOSTYLE- supports tail for steering/braking
MUSCULAR	1. PECTORALIS muscles are HUGE to move wings
DIGESTIVE	1.FAST/EFFICIENT system- fuels endothermic metabolism for more energy 2.TWO PART STOMACH-proventriculus & gizzard separates functions to move food through faster 3.CROP-allows eating when stomach is full; stores next batch so always ready to digest 4.COLIC CAECA- help break down plants 5. <u>LONG</u> SMALL INTESTINE- absorbs more nutrients to provide flying energy 6. <u>SHORT</u> LARGE INTESTINE- less water absorbed so weigh less
ENDOCRINE	1.THYROID GLAND- controls FAST burning of glucose for energy 2.PANCREAS- Insulin/glucagon maintain blood sugar to provide energy for flight muscles 3.ENDOTHERMIC metabolism provides enough energy for extended activity

RESPIRATORY	1.MOST EFFICIENT RESPIRATORY SYSTEM- gets most oxygen possible to run muscles 2.AIR SACS- allow oxygen in lungs on both INHALE & EXHALE 3.AIR SACS extend into bones = less dense 4.ALVEOLI- increase gas exchange for more O_2
CIRCULATORY	1.LARGE HEART- pumps more nutrients/ O_2 to run flight muscles 2.TWO LOOPS- most efficient/fastest system 3.FOUR (4) CHAMBERS =total separation of high/low oxygen blood 4.FAST HEART RATE- pumps more blood faster
REPRODUCTIVE	1.OVARY/OVIDUCT only on one side =less weight 2.OVIPAROUS- eggs laid outside= less weight 3.GONADS enlarge during breeding season/ shrink rest of time = less weight
EXCRETORY	1.Changes nitrogen waste to URIC ACID -needs less water to dilute so weigh less 2. NO URINARY BLADDER for storage-weigh less 3. Urine released as it is made-weigh less
NERVOUS	1.LARGER BRAIN than same size reptile/amphibian 2.BIGGER CEREBRUM- allows more higher thinking & problem solving during navigation 3.BIGGER OPTIC LOBES/COLOR VISION improved vision for navigation 4.BIGGER CEREBELLUM- muscle control/balance for flying 5.CONCENTRATION of IRON in brain- acts as compass to find way