Robotic Guard Dog

You are the head security guard at the Gold Depository and are responsible for the security of millions of dollars of gold.

Unfortunately, your prized guard dog Butch has become friends with a chihuahua. All he wants to do is wear pink tutus and listen to Taylor Swift. That is not going to scare any burglars.

Build a robotic guard dog that can be used to guard the gold bullion and protect the nation's treasures.

⚡ This challenge contains optional elements using the EPro8 Electronics Starter Kit.

Construction	
Criteria	Construct a dog with a body approximately 700mm tall and 1.3m long. The dog must have four legs, a tail, jaws (with teeth) and three other "dog" features. Attach a collar with a "scary" dog name.
Hint	You can clamp paper onto the aluminium using the blue joiners.

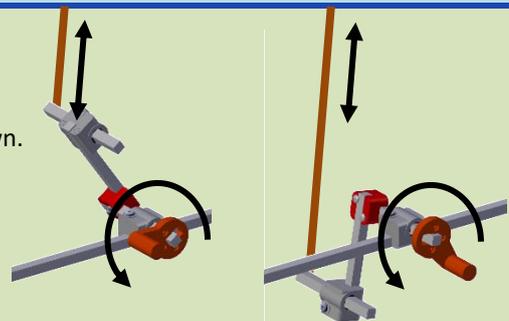| Jaws	
Criteria	The bottom jaws open and shut. A rope runs from the jaw to the middle of the dog. When the rope is pulled DOWN the bottom jaw closes. When the rope is released the bottom jaw drops.
Hint	Connect rope from the bottom jaw and through pulleys to the middle of the dog. Pulling on the rope will lift the jaw.

Wagging Tail	
Criteria	The tail is attached using an axle. A rope runs from the tail to the middle of the dog. When the rope is pulled DOWN the tail wags to the left. When the rope is released the tail wags to the right.
Hint	Use rubber bands to spring load the tail. Connect rope from the tail and through pulleys to the middle of the dog. Pulling on the rope will pull the tail in one direction. The rubber bands will make it spring in the other direction.

Crank Handle Operated	
Criteria	Turning a crank handle pulls on the rope up and down. This makes the tail wag from side-to-side and the jaws go up and down.
Hint	Build a basic cam mechanism using two axles connected by a short shaft. Rotating the first axle makes the rope pull up and down. Tie both ropes to the crank handle.

Motorised Guard Dog	
Criteria	Replace the crank handle with a motor. Pushing a button causes the tail to wag from side to side and the jaws to go up and down.

Motorised Operation (Simulator)	
Criteria	Use the online electronics simulator (code **RGDG**). The crank handle is motorised. When a button is pressed the tail wags side-to-side and the jaws open and close. When the jaw is open the dog barks (the buzzer sounds). When the jaw is closed the dog is not barking.

Intruder Alert	
Criteria	A laser beam runs along the bottom of the screen. When the beam is broken the dog's tail wags, the jaws open and shut, and the dog barks.

After you have attempted this challenge, watch the tutorial to see our solution at www.EPro8Challenge.co.nz/Tutorial and enter the Challenge Code **RGDG**.