

*Tale of Two Kitties* is a 1942 cartoon famous for first introducing Tweety Bird; Babbit and Catstello are two cats who are trying to catch Tweety Bird. In this clip, Catstello finds himself atop a ladder, while Babbit is at the bottom. About 24 seconds in the clip, Babbit is supporting Catstello's weight on this long beam. With some estimates of the Catstello's mass and the length of the ladder, your students can use the balance of torques to calculate the force required from Babbit to support Catstello.

Catstello is a fairly large cat, so let's assume he weighs about 20 pounds, which is equivalent to about 10 kg. (Ask your students about how these two measurements are different. A pound is a measurement of weight while kilogram is a unit of mass.) The length of the pole (at 0:24) is about 20 feet or 6 meters; also, assume that Babbit's grip on the pole is about 1 meter from the end.

Now, to calculate the torques,

$$\Sigma\tau = \tau_{Catstello} - \tau_{Babbit} = 0$$

$$\Sigma\tau = F_{w,Catstello}(r_B) \sin 60^\circ - F_{Babbit}(r_B) = 0$$

$$\Sigma\tau = (10 \text{ kg})(9.8 \frac{\text{m}}{\text{s}^2})(6 \text{ m}) \sin 60^\circ - F_{Babbit}(1 \text{ m}) = 0$$

Then, solving for the force Babbit must exert:

$$F_{Babbit} = 500 \text{ N}$$

which is equivalent to 100 pounds of force. Quite a feat for a cat!

