Method:

1. Set up the track on a flat, elevated surface, and place the kart on it with no additional weights. Clamp the pulley at one of the ends of the track. Tie kart and one weight together with 1.75m of rope.
2. Position the kart and weight so the kart is on the track and the weight is hanging just over the edge of the track, with the rope going through the pulley. Hold onto the kart so it is not pulled off the track. Place mats where the weight will fall. Adjust the distance from the ground to the bottom of the hanging weight to 0.46m, this is the drop height.
3. Connect the detector to the laptop and then set it up behind the kart. Record the distance between the detector and the kart.
4. Let go of the cart, while starting the detector and stopwatch. Stop the stopwatch as the weight hits the floor. Ensure the kart does not hit the pulley.
5. Reset the kart to its starting position where the pulling weight is just over the pulley and the stopwatch and detector.
6. Repeat for 3 trials.
7. Increase the weight of the kart by adding 1 weight on the kart.
8. Repeat steps 4-7 up to 5 weights being added to the kart.
9. Log the time taken for the weight to fall.

Controlled Variables:

* Rope length: 1.75m
* Detector distance from Kart’s starting position: 0.40m
* Height of weight drop: 0.46m
* Initial Kart weight: 0.6kg
* Force applied by falling weights: 0.49 N

Materials:

* 6 \* 0.05kg weights, one for hanging over the end of the track
* Kart (Measure the weight of your kart beforehand)
* Pulley
* Track
* Motion/velocity detector
* Connector device (to link detector and laptop)
* Laptop
* Stopwatch
* Rope
* Mats for cushioning the fall of the weight