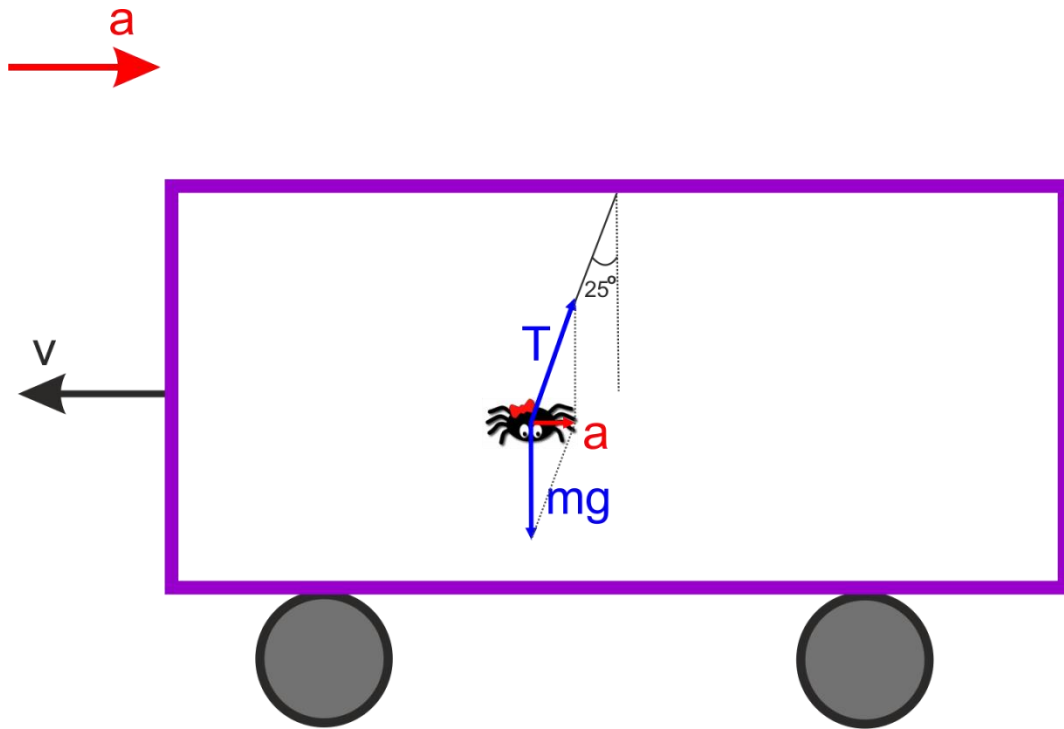


Answer on Question #82186 Physics / Mechanics | Relativity

When a car decelerates, a spider, hanging from a length of webbing, shifts forward to create a 25 degree angle with the vertical. The spider has a mass of 10 grams. Using this information, what is the deceleration of the vehicle?

Solution:



The Newton's second law gives

$$ma = mg + T$$

In projections on the axes

$$ma = T \sin 25^\circ$$

$$0 = mg - T \cos 25^\circ$$

Finally

$$a = g \tan 25^\circ = 9.81 \times \tan 25^\circ = 4.57 \text{ m/s}^2$$

Answer: 4.57 m/s²