

# Train Set

## Apparatus

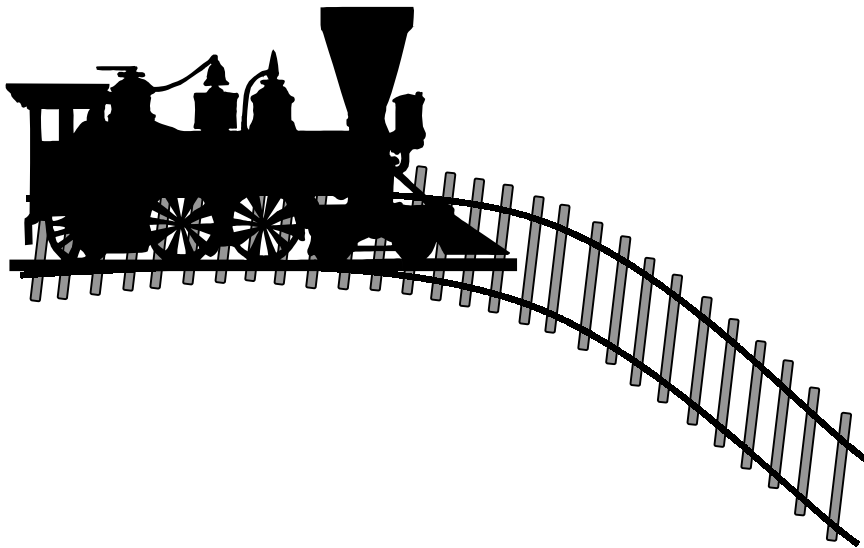
toy train set with variable speed controller and track laid out straight

## Action

The students choose a positive and negative direction along the track. They then use the speed controller to move the train along the track with positive and negative velocities, and positive and negative accelerations.

## The Physics

To move with a positive velocity the train must be moving in the positive direction. To move with a positive acceleration the velocity of the train must be increasing. This will be the case if it is getting faster while moving in the positive direction, or slowing down while moving in the negative direction. To have a negative velocity and a positive acceleration is the second case; slowing down while moving in the negative direction.



## Accompanying sheet

### Train Set

The train can only move in one dimension.  
Choose a convention to label the positive and negative directions.

Use the controller to vary the velocity and acceleration of the train.

Can you move the train from one point to another point  
such that it has a negative velocity and a positive acceleration?