Orientation Question:
Physics

The atmosphere of Krypton has a refractive index η (the speed of light is $v << c$). While flying through the atmosphere horizontally at a speed of $v/2$, Superman observes a rod falling at a constant speed. An observer in the ground frame sees the rod fall vertically, collide elastically with the ground, and move upwards. This is shown in Fig. 1. Using diagrams, describe the motion of the rod (including the collision) as seen by Superman.

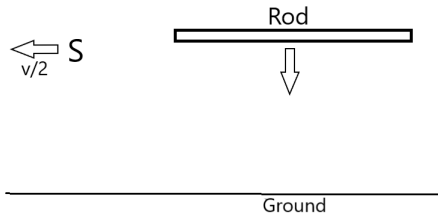

Figure 1: As seen by an observer on the ground. S denotes Superman.

Later, while standing on the ground, he observes a thin square sheet moving along a path (labelled l) at speed $3v/4$ as shown in Fig. 2.

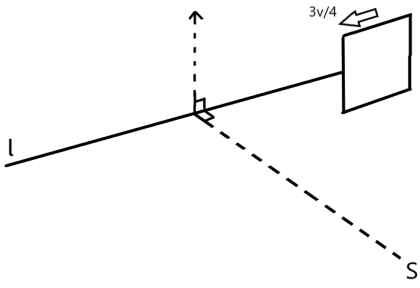

Figure 2: Sheet moving parallel to the path. S denotes Superman.

Describe what Superman sees in the following two cases:

(A) The sheet is oriented parallel to the path. (the face of the sheet is oriented towards superman).

(B) The sheet is oriented perpendicular to the path.

The centre of the sheet is at eye-level to Superman.
Note: Superman being Superman, can make observations with infinite precision. Effects due to time dilation, length contraction, or Doppler effects are negligible.