

		
<h2>Mars, here we come ...</h2>		
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SCHOOL / CLASS: De Bron 3WETa	MARKS: /...	
EXPERIMENT:changing of weight in elevator		

RESEARCH QUESTION

- Why do astronauts think that they weigh more or less when their spacecraft starts and lands.
- How does the weight of somebody or something change in a moving elevator?
- Which elevator moves the quickest, the one in Cesena or the one in Tielt?

HYPOTHESIS (indicate the correct answer)

If the elevator accelerates going up, the weight will *increase* / **decrease** / ~~stay the same~~.

If the elevator moves with a constant velocity, the weight will *increase* / ~~decrease~~ / **stay the same**.

If the elevator slows down while moving up, the weight will **increase** / ~~decrease~~ / ~~stay the same~~.

What will happen when the elevator moves down? It's just the reverse.

MATERIAL

- People balance
- Elevator
- Camera and chronometer

OPERATION OF THE EXPERIMENT

- Go in the elevator on the ground floor and stand on the balance.
- Let the elevator move up until the third floor and look what happens with the weight. Record the balance while the elevator is moving.

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- Repeat this for moving down.

THE RESULTS:

- ❖ doing the experiment
 - Go in the elevator on the ground floor and stand on the balance.
 - Read the mass on the balance and calculate the weight.
 - Let the elevator move up to the third floor. Start the chronometer and the camera.
 - Record the balance and the chronometer at the same time.
 - Do the same while moving down (from third floor to ground floor)
- ❖ Complete both tables (elevator moving up – elevator moving down). Write down the time and corresponding weight (f.i. every 30 seconds, choose a suitable interval yourself)

SITUATION 1: elevator moving up

Time (s)	Mass on the balance (kg)	Weight (N)
0,00	0,415	4,071
5,00	0,414	4,061
10,00	0,415	4,071
15,00	0,415	4,071
20,00	0,413	4,052
25,00	0,392	3,846
30,00	0,417	4,091
35,00	0,415	4,071

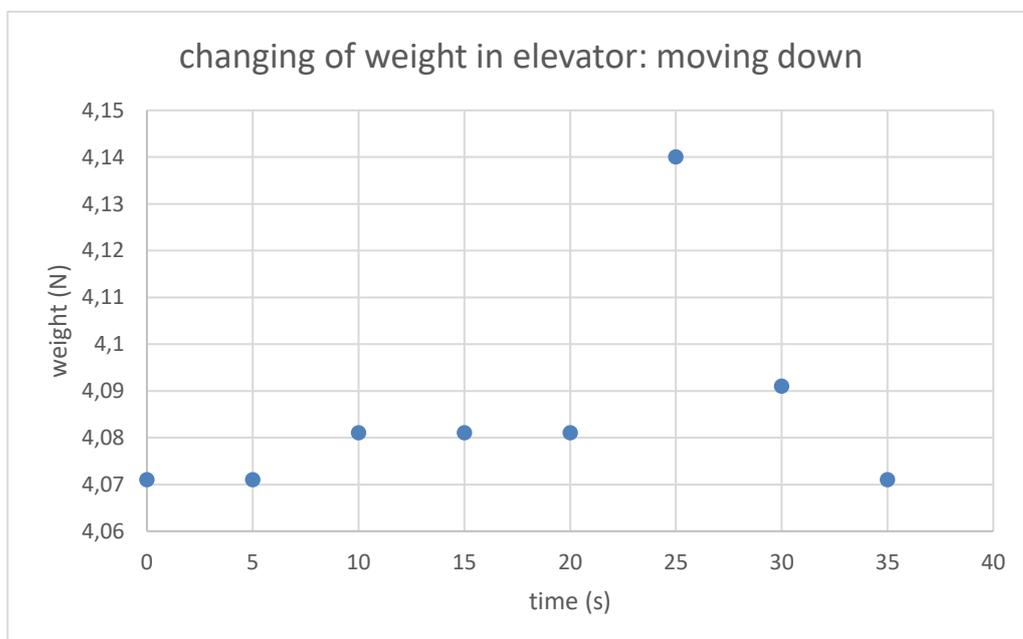
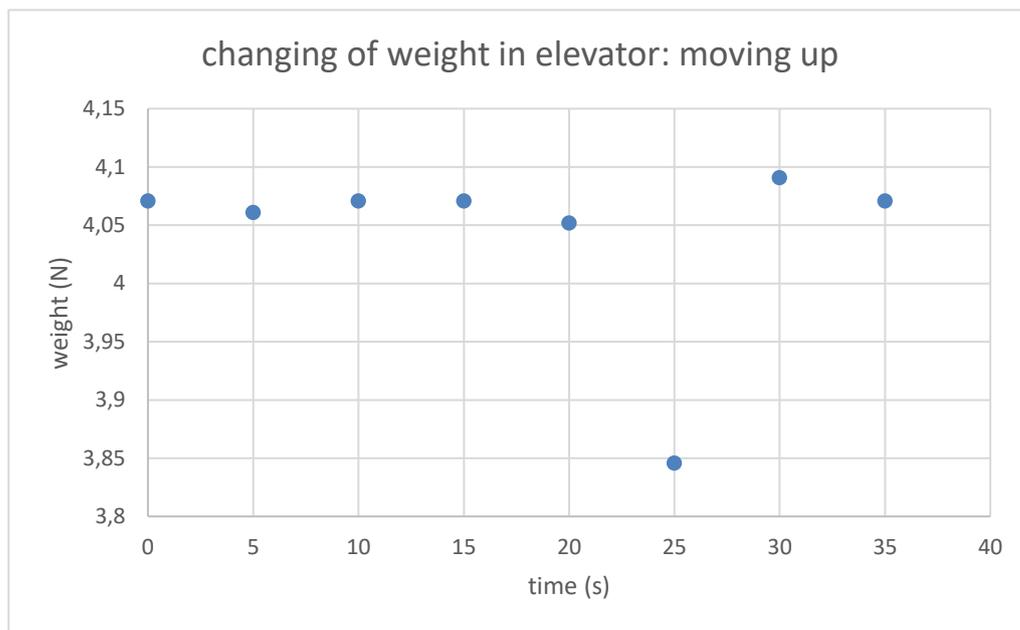
SITUATION 2: elevator moving down

Time (s)	Mass on the balance (kg)	Weight (N)
0,00	0,415	4,071
5,00	0,415	4,071
10,00	0,416	4,081
15,00	0,416	4,081
20,00	0,416	4,081
25,00	0,422	4,140

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30,00	0,417	4,091
35,00	0,415	4,071

- ❖ Make graphs (excel) of the weight (F_g) in function of the time in the moving elevator. Make a graph for each situation. Copy the graphs in this document.



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CONCLUSIONS

- ~ The elevator starts going up: your weight wil increase.
- ~ The elevator starts going down: your weight wil decrease.

REFLECTION

How do you explain the conclusion?

- ~ By going up, the elevator pushes you up and so the force you exert on your support is bigger .
- ~ By going down, the elevator doesn't push you up, so the force you exert on your support is smaller.

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- How do you notice this without standing on a balance?
 - ~ When the lift starts to go up then you have the feeling that you are pulled down. If the lift is on the brakes you go up exactly.
 - Compare your results with the results in the other school. Which school has the fastest elevator?

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