

		
Mars, here we come ...		
NAME: Lennart Vandenbroecke	NAME: Jasna Peck	
NAME: Hercule Thiers	NAME: Tessa Libbrecht	
SCHOOL / CLASS: 3wetC	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? **The weight will decrease**

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.
- 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

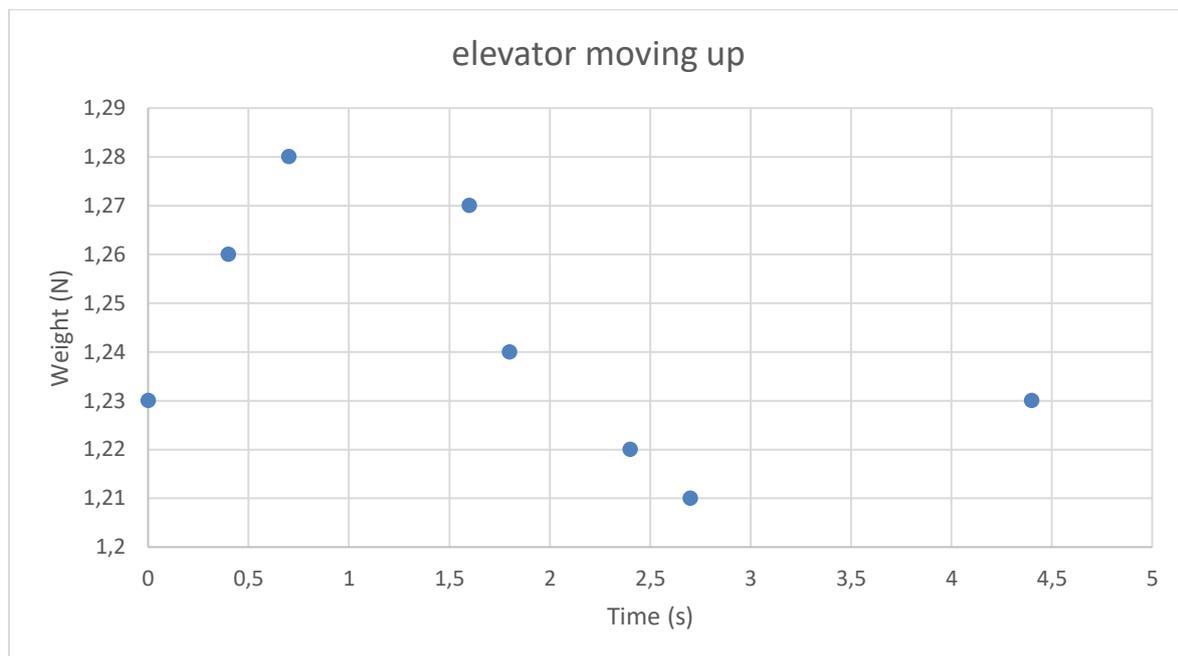
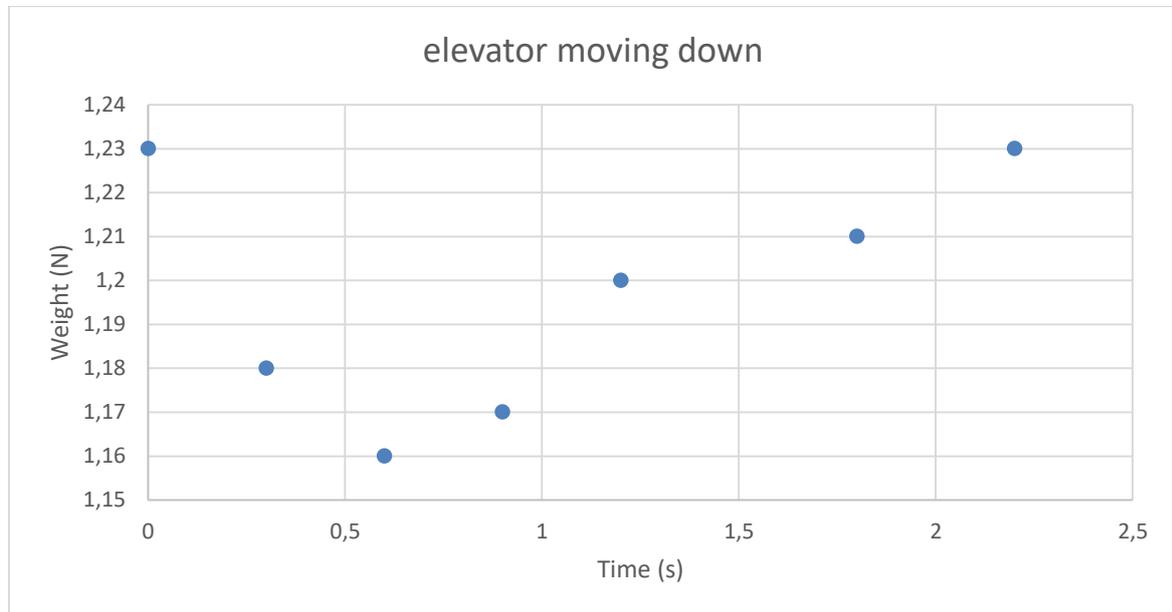
Time (s)	Mass on the balance (kg)	Weight (N)
0.0	0.125	1.23
0.4	0.128	1.26
0.7	0.131	1.28
1.6	0.130	1.27
1.8	0.126	1.24
2.4	0.124	1.22
2.7	0.123	1.21
4.4	0.125	1.23

SITUATION 2: elevator moving down

Time (s)	Mass on the balance (kg)	Weight (N)
0.0	0.125	1.23
0.3	0.120	1.18
0.6	0.118	1.16
0.9	0.119	1.17
1.2	0.122	1.20
1.8	0.123	1.21
2.2	0.125	1.23

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- ❖ 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.



CONCLUSIONS

- If a lift accelerates up, the weight will **Increase**
- If a lift moves up on the same speed, the weight will **Stay the same**
- If a lift slows down while moving up, the weight will **Decrease**
- What happens when the elevator moves down?

The weight will decrease;

REFLECTION

- How do you explain the conclusions?

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.

How do you notice this without standing on a balance?

You feel it when you stand in the elevator that you go up or down but you don't feel it when the elevator moves with a constant velocity.

So you feel your weight is more or less or stay the same.

Compare your results with the results in the other school. Which school has the fastest elevator?