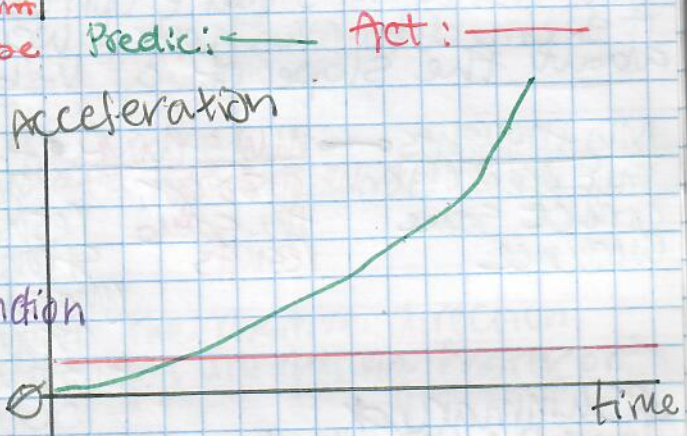
Gas and Breaks Lab

using fansarts we predicted V-t graphs, and because the movement of Acceleration Graphs.

Scenario 1: fancart moving in positive direction.

scenario:
Cart moved in positive direction getting faster & faster.

Prethinking
my thoughts were that the V-t graph would definitely be rising going more & more positive.
for the Acceleration time graph I thought that it would be more 'exponential' (note: coach doesn't want us using exponential because we use it wrong) which was WRONG!



Conclusions/evidence

the graph 1 (V-t) was perfect
the graph 2 (A-t) was NOT.
I graphed an exponential function and that was WRONG

my thoughts

my thoughts were that if velocity was getting faster and faster then the graph would start increasing like crazy for Acceleration. I concluded that I was right for the V-t graph, but not for the A-t graph.

Predict — Act —

my group

my group predicted correctly! causing them to get the same results as the actual graph.

the class

as far as I know, the class ALL got these same results, so we had STRONG evidence.

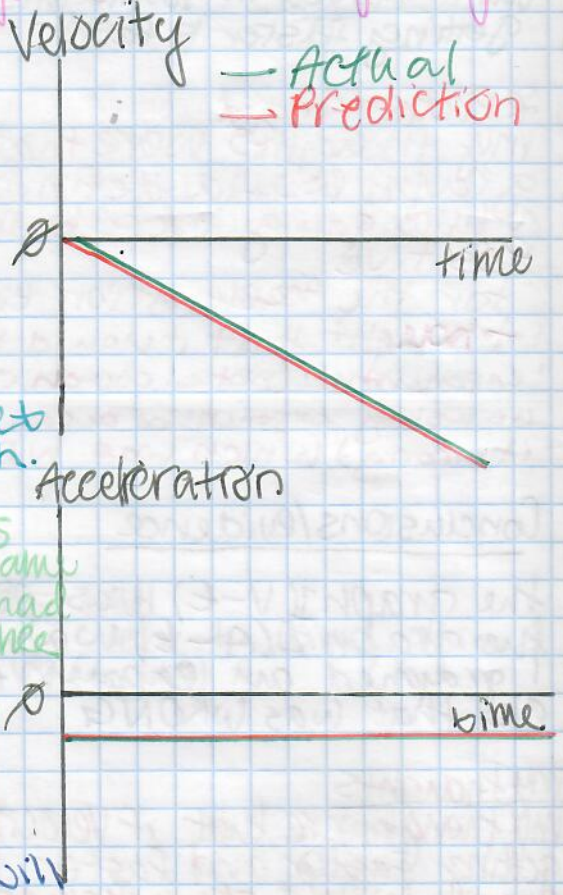
Summary:
Summary is that as velocity changes at a constant [illegible] is the same and not changing.

* Misconception! * I thought of Acceleration time graphs as a position time graph, which is why my graph looked like half a parabola.

* first to 5:5

* I have no questions.

Scenario 2: moving in negative direction getting faster



* Prethinking *
Well, seeing my previous data led me to believe that this experiment would be the opposite, which led me to think that "the slope of a V-t graph is Acceleration".

* Conclusions/evidence *
My predictions were correct and it seemed to me that I was correct about the slope of a V-t graph.

My thoughts — my prediction correct some evidence

My group also got the same results

the class got the same results, we had strong evidence (making an assumption on this one)

* Summary *
When the velocity time graph has a negative slope, Acceleration will be negative.

* Misconception! *
"If you are traveling in the positive direction you will ALWAYS have a positive acceleration" ... NO! untrue. If you are slowing down in the positive direction, then what? Well, the graph will have a negative slope.

first to 5:5

I have no questions.

Scenario 3: Pushing fan away from Motion Detector, But is Blowing in the opposite direction (Making it slow down and go the other way)

Rethinking
my thoughts are that if the fan goes in the positive direction but is gradually slowing down, then it would be a negative slope, with velocity becoming less and less, getting closer and closer to 0, and then stopping for an instant, then getting faster and faster in the negative direction, leaving us with a negative Acceleration.

Conclusion/evidence
my predictions were correct! this gave me the conclusion that Slope of a V-t is directly tied to Acceleration.

Me thoughts	My groups	The class
the graph did as I thought it should the was some evidence	I believe that we both got the same results so more evidence	(we ALL got the same data, Strong evidence!

Summary
it doesn't matter if you are going in the positive direction or negative direction, it matters if you are getting faster or slower that ties to Acceleration.

misconception
this is what I addressed in my last misconception, it is about the slope of the v-t graph, not about direction.

fist to five

*I have no questions

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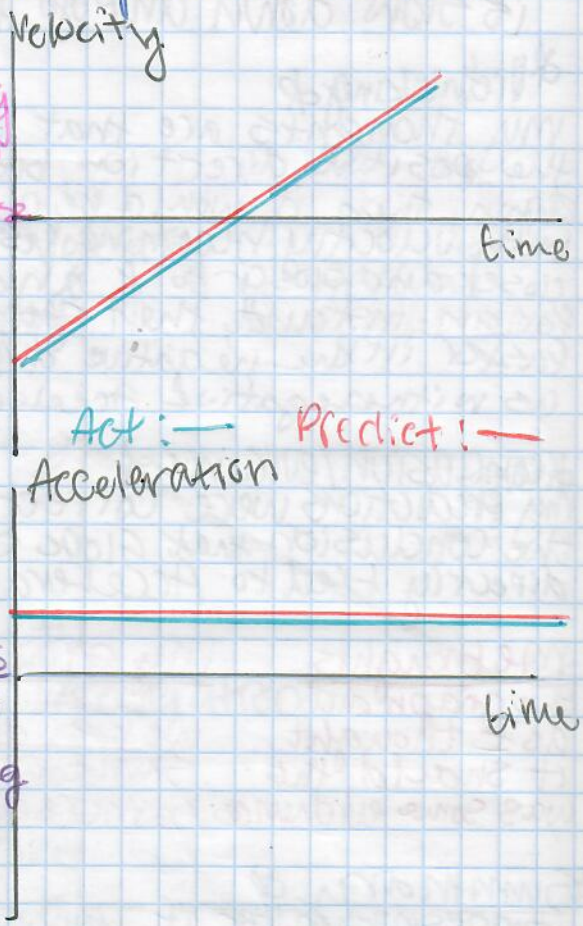
SCENARIO 4: Starting far away from motion detector going in negative direction, slowing down, then stopping, starts moving again in positive direction.

Prethinking
If we move in a negative direction but slowing down then our velocity gets closer and closer to 0 leaving us with a positively sloped line on our V-t graph. Now because we stop for an instant and then start traveling in the positive direction getting faster and faster. overall this would give an overall positively sloped V-t graph, making Acceleration (+).



Conclusions/Evidence
We ran the experiment and we got what we thought!

My results were correct some evidence.

My Groups thoughts were right, and also got the same results.

The Class got these too! We had strong evidence!

Summary
It doesn't matter what direction the object is traveling, but the direction the graph (V-t) is travelling.

Misconceptions
I think that if you understand that the slope of a velocity time graph is Acceleration, then you will be fine.

Fist to 5: 5

I have no questions.

NOTES ON Velocity time VS Acceleration time

① Is Acceleration related to Velocity?

→ Well, considering that it doesn't matter if you are traveling in positive or negative directions, then I would say no to the physical part.

BUT

→ yes it is! it might not be related to velocity in a physical sense, but mathematically we know that the slope of a velocity time graph is ACCELERATION.

So if...

Velocity is (+) and is getting MORE (+) then Acceleration will be (+) if
Velocity is (+) and getting less (+) then Acceleration will be (−)

And vise versa!

if Velocity is (−) and is getting more (−), then Acceleration will be (−) if
Velocity is (+) and getting less (−), then Acceleration is (+)

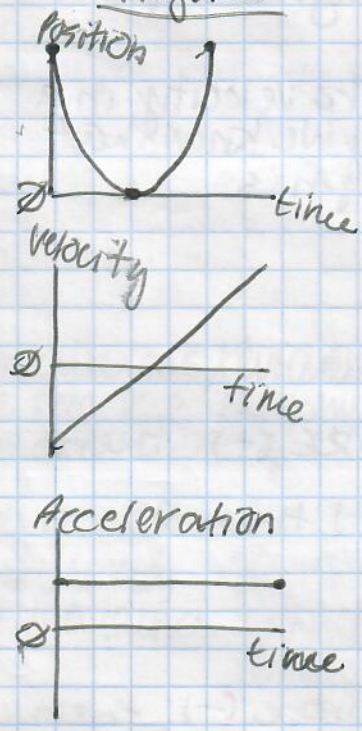
IT ALL DEPENDS ON Where the graph is going!

One small assumption we make is that if the slope of a Velocity time graph remains constant, then we will get Horizontal Acceleration graphs.

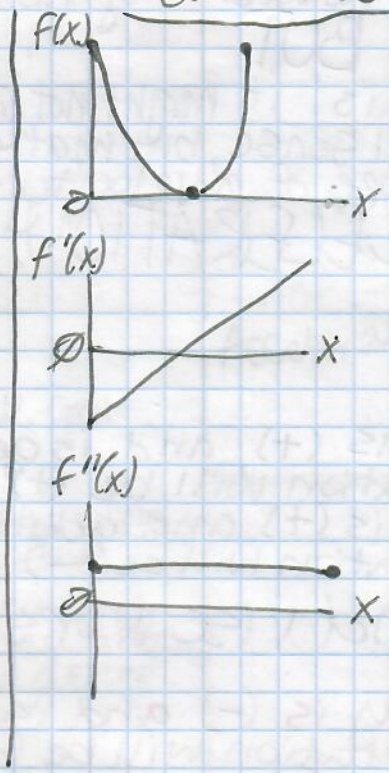
PHYSICS AND CALCULUS COME TOGETHER!!!

We were asked to graph a position time graph and an acceleration time graph based on a velocity time graph:

Physics



Calculus



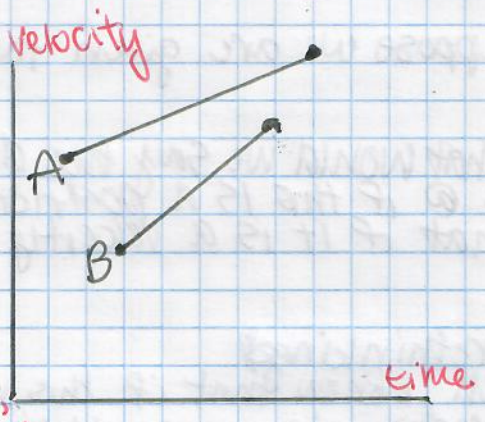
these graphs are the same they are just labelled differently.

Sometimes you have to find the other graphs by just knowing the info given on one graph and how they behave.

Just an AHA kinda moment.
Really cool stuff.

Tipers: Velocity & Acceleration

Scenario 1: student says:
B is going faster because it has steeper slope.



Rethinking

My initial thought was that A is faster because of the velocity being greater, and I was Right! B might have the greater Acceleration, but it's velocity is NOT greater... yet.

Conclusions/Evidence

One I can say that:

I had these thoughts. My group had these thoughts. The class had these thoughts.

We came to the concensus that A was faster than B because the velocity was greater.

Summary

if an objects velocity is greater than another objects velocity, then it is going faster than it.
objects with faster acceleration have a steeper slope.

misconceptions

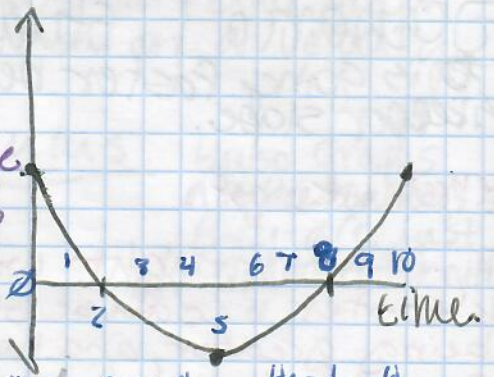
obviously the student in the scenario had the biggest misconception thinking that steeper slope meant greater velocity.

fist to 5: 5

I have no questions.

Scenario: Interpreting graphs from different perspectives.

Suppose we are given this graph:



What would we say the direction change is @ if this is a position time graph? What if it is a velocity time graph?

Rethinking
Well, I knew that if this was a position time graph, that the direction change would happen @ 5 seconds because that is where the graph changes from (-) slope to (+) slope, for the velocity time graph, I said that it would change directions @ 2 & 8 seconds. the reason this happens is because the horizontal axis is Ø velocity and direction changes depending on which side the velocity ends up on (+ or -)

Conclusions/evidence
I have to say that my evidence was that I, my group, and my class thought the same thing!

misconceptions
the misconceptions would be if you accidentally mixed up the difference between velocity and position graphs.

* 5/5 (fist to 5)

* I have no questions.