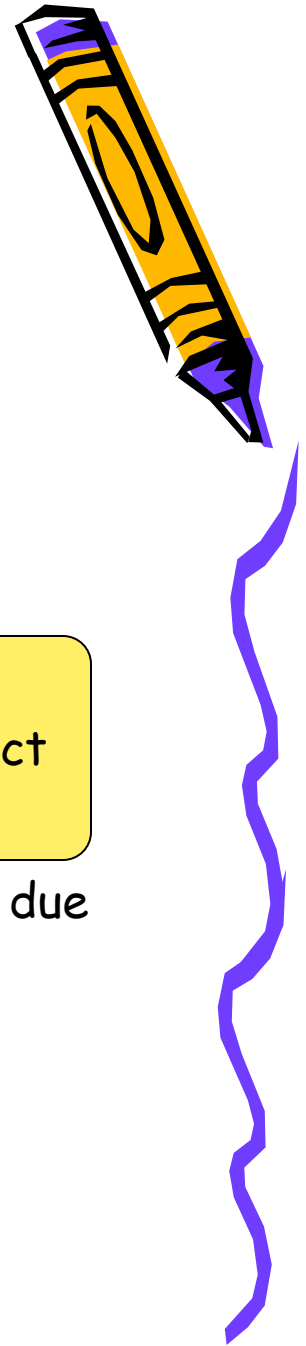
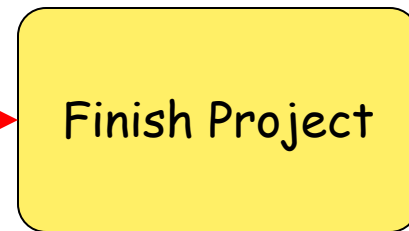
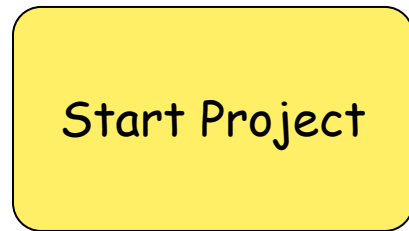


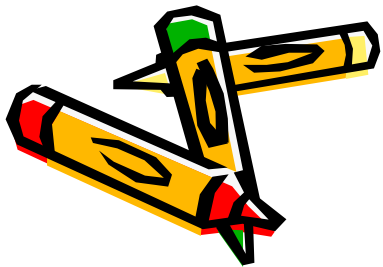
How to Plan a Project



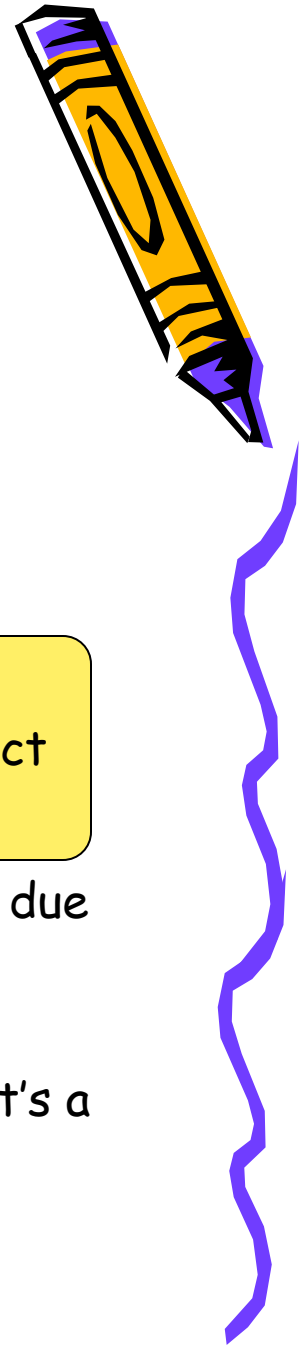
Date assigned



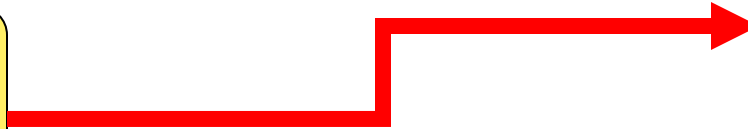
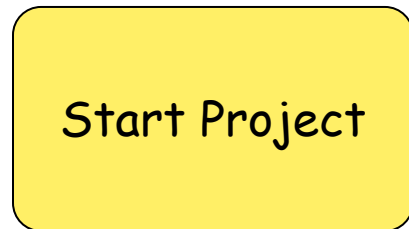
Date due



How to Plan a Project



Date assigned

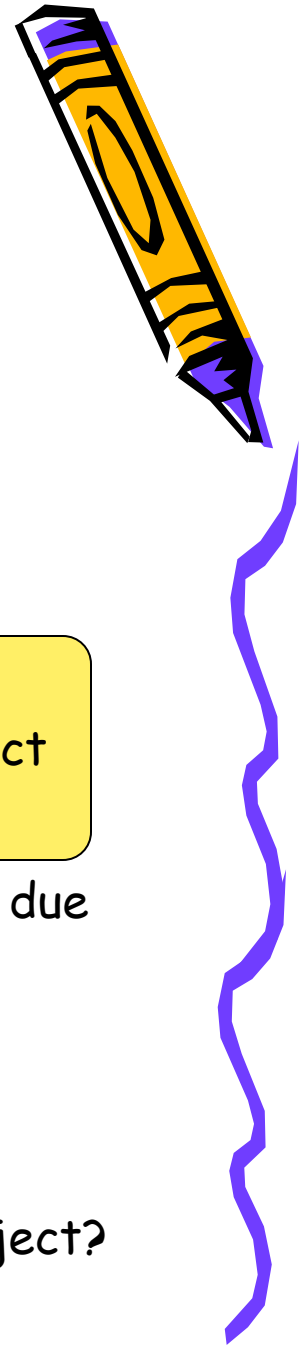


Date due

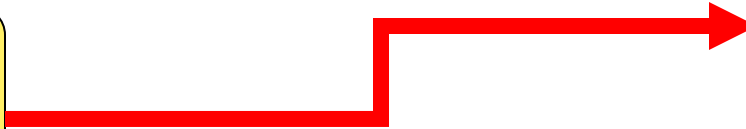
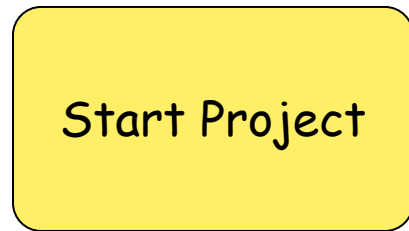
OK for doing, say, a problem set, but what if it's a more complicated project?



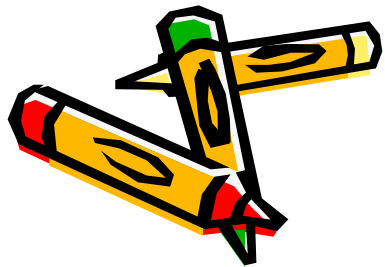
How to Plan a Project



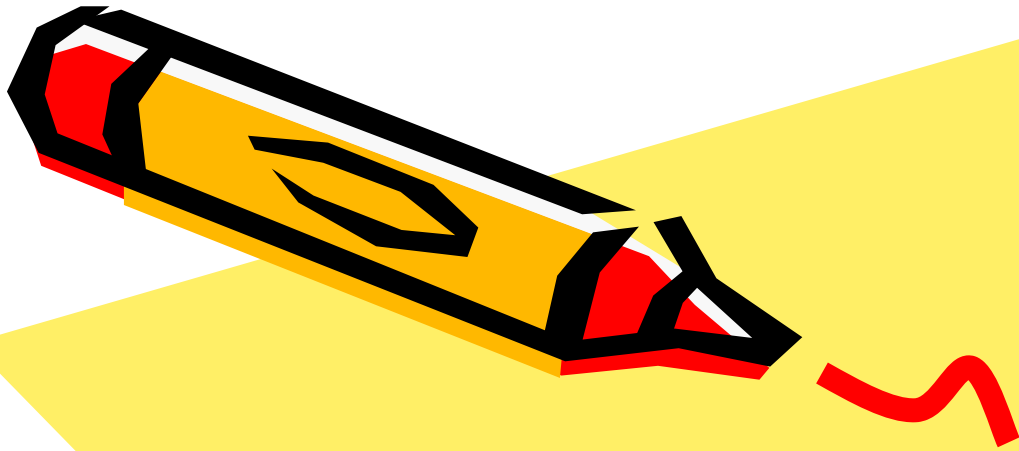
Date assigned



Date due



...Say, a term-long design project?



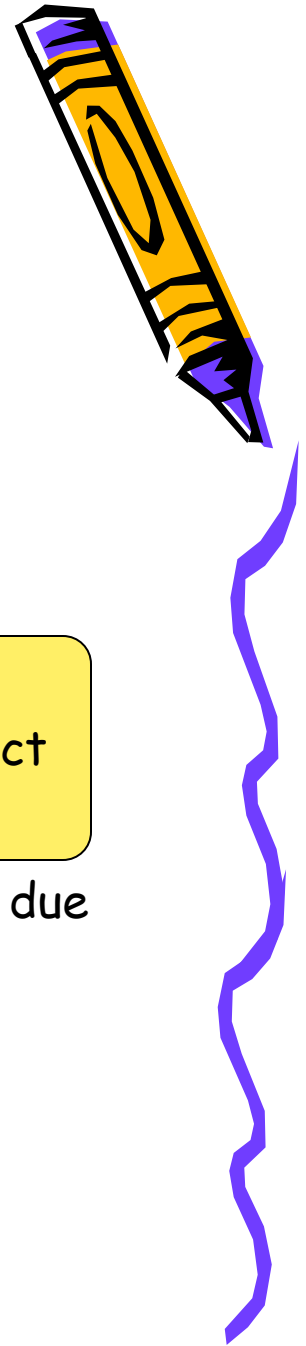
Project Planning

Or

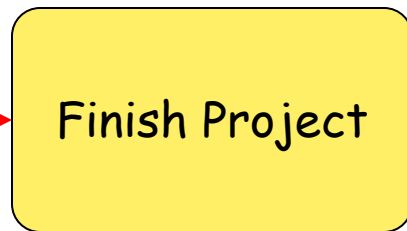
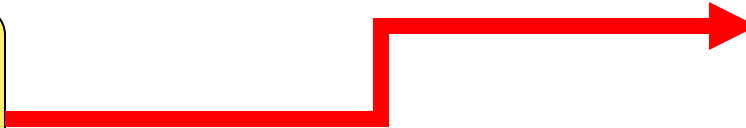
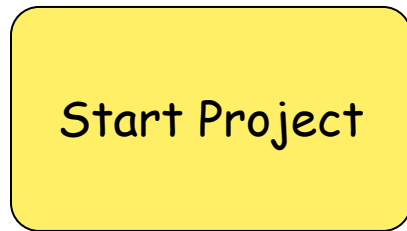
Just because it's planned doesn't mean it isn't creative!



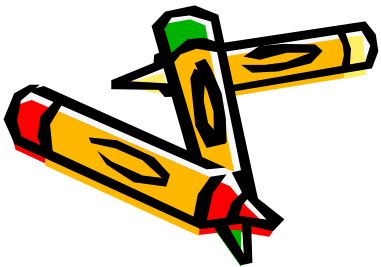
How to Plan a Project



Date assigned



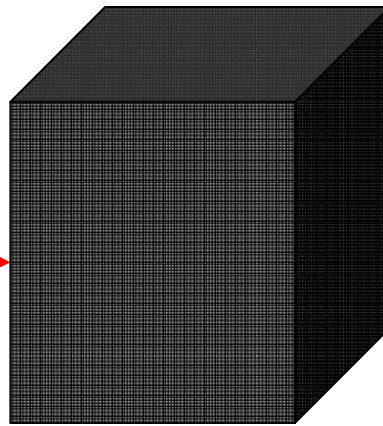
Date due



How to Plan a Project

Date assigned

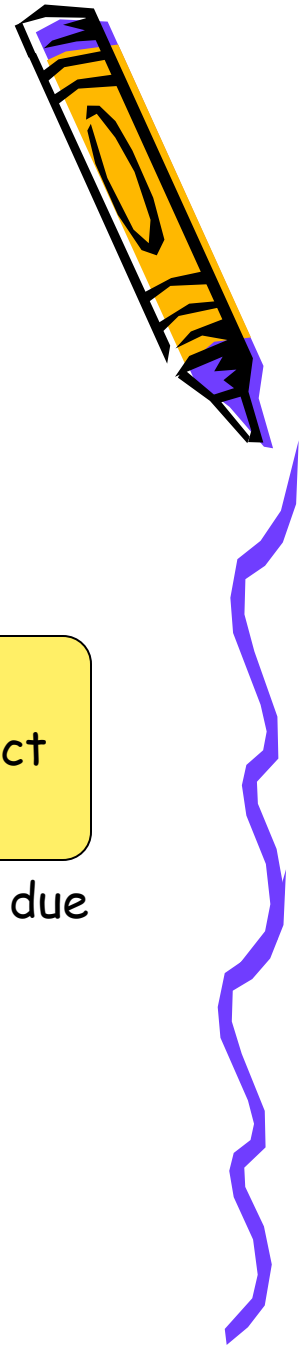
Start Project



Finish Project

Date due

What's the Stuff in the Middle?



Wrong*

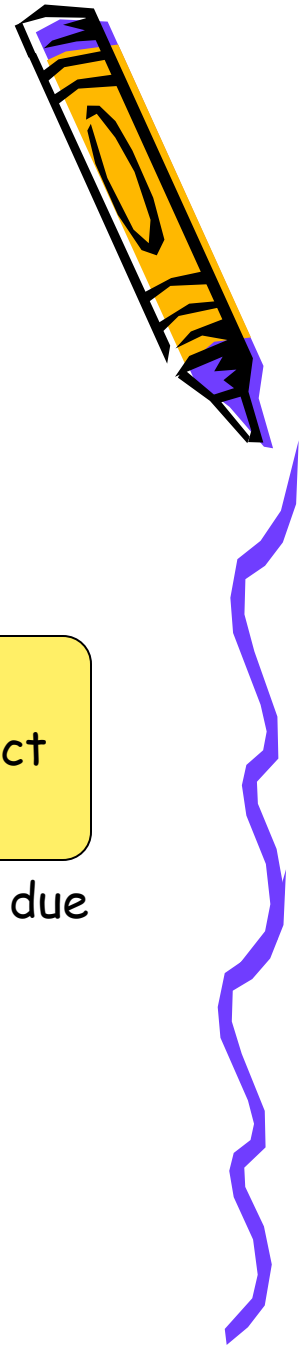
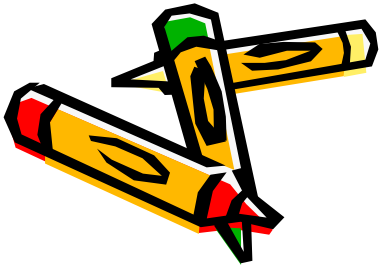
Date assigned

Start Project

Here a
miracle
occurs...

Finish Project

Date due



Wrong*

Date assigned

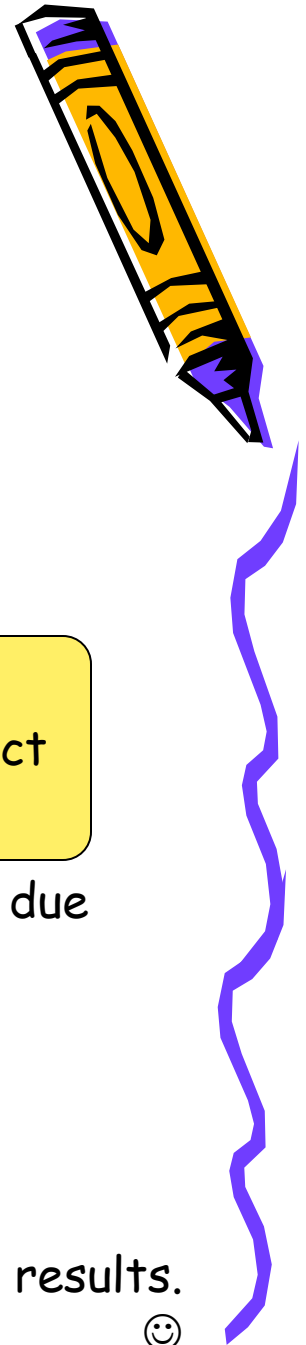
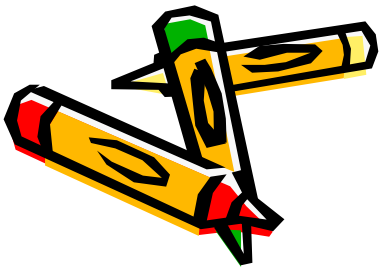
Start Project

Here a
miracle
occurs...

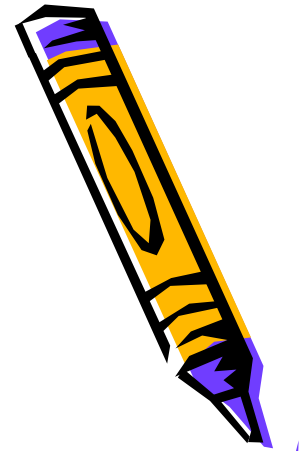
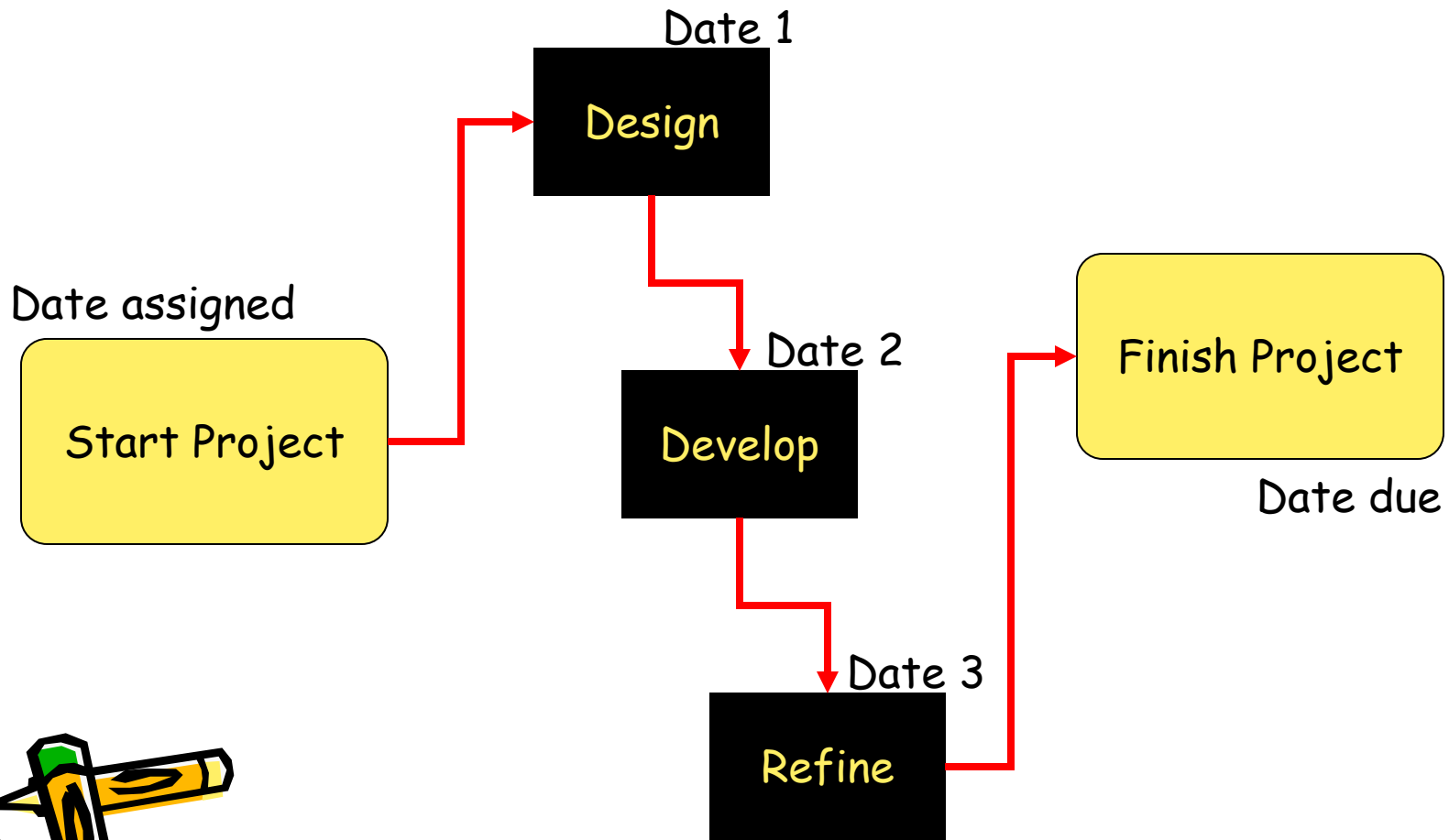
Finish Project

Date due

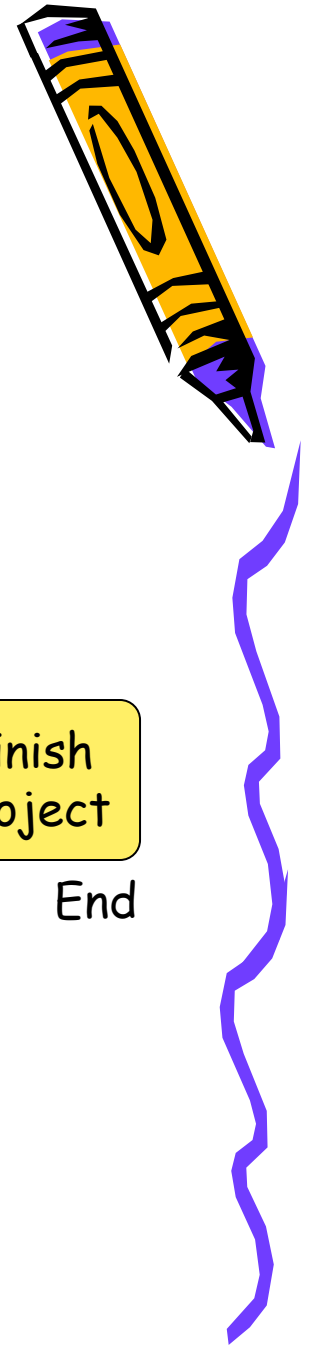
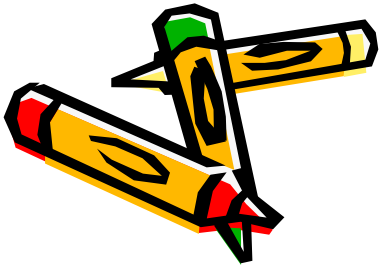
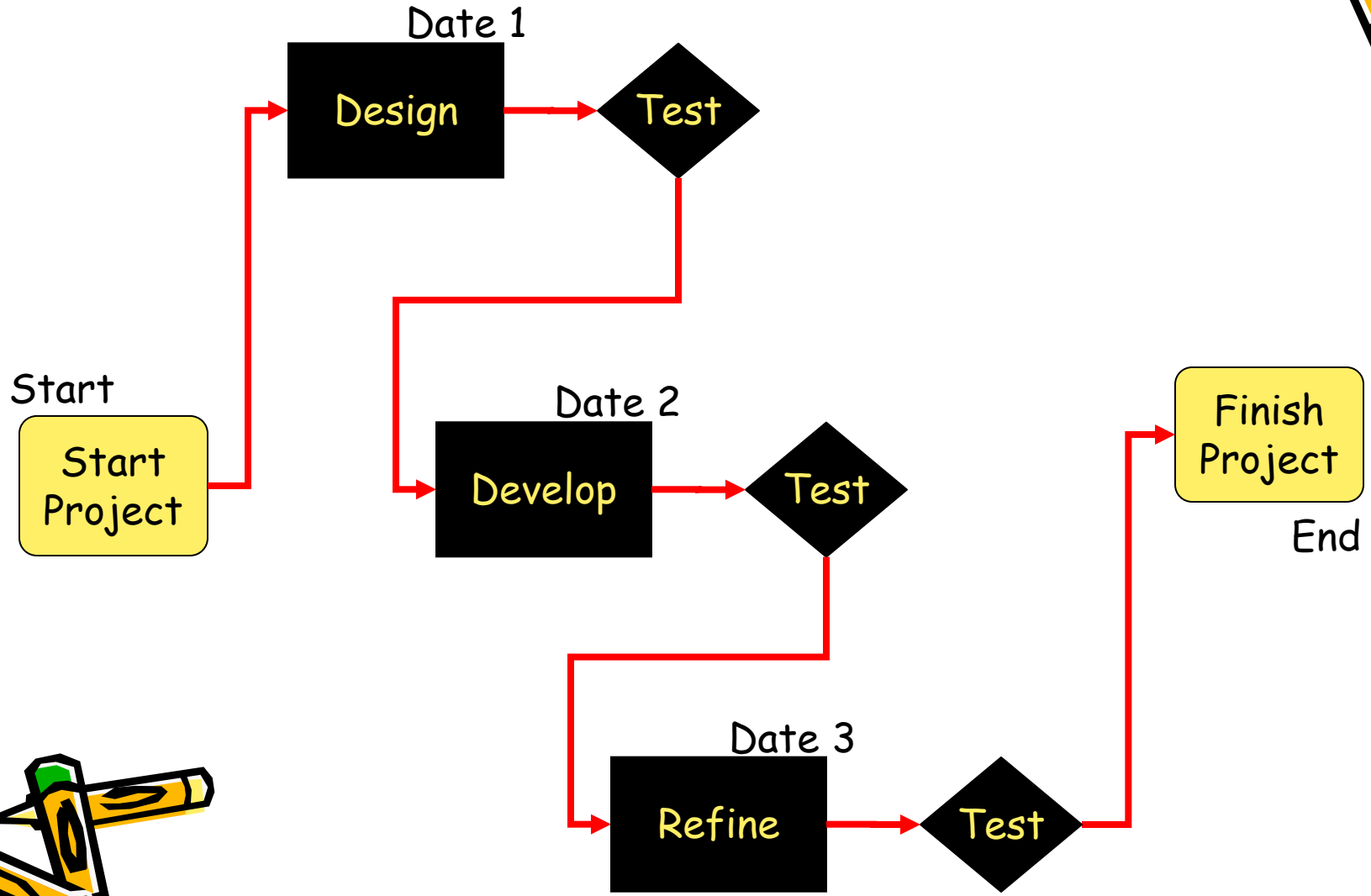
*Unless you like ulcers and suboptimal results.



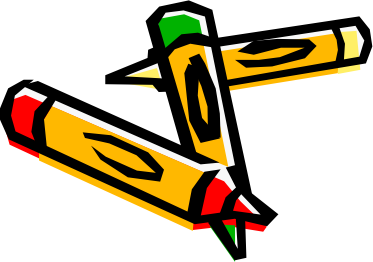
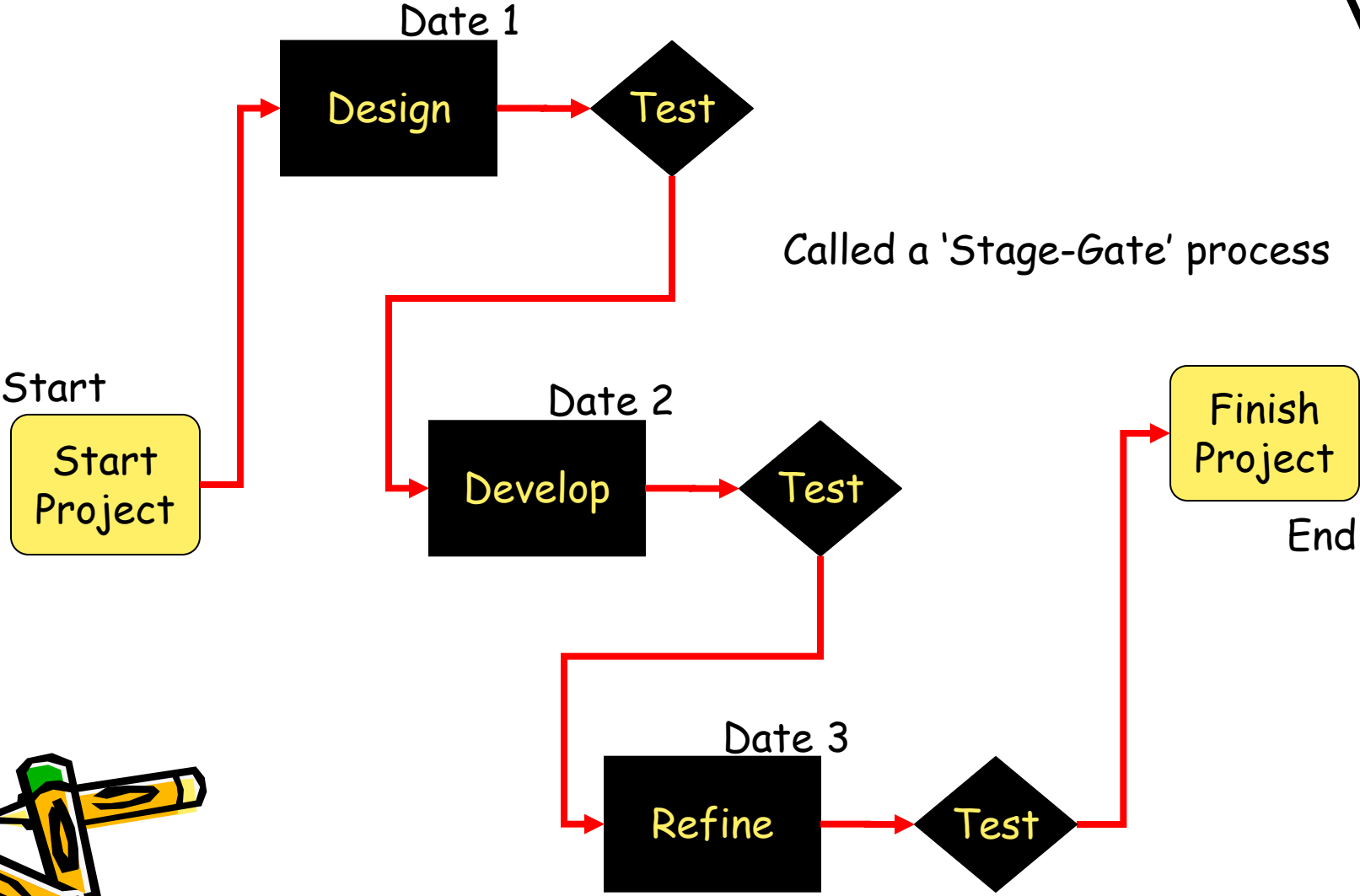
Better



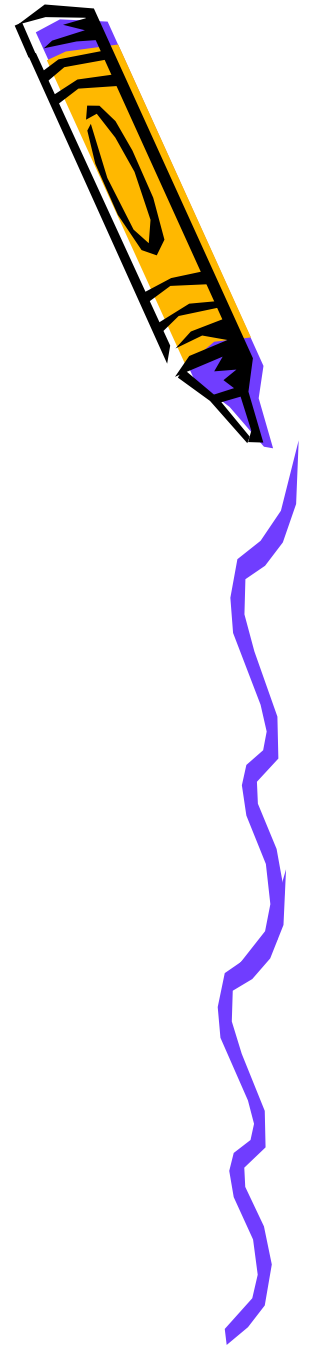
Best



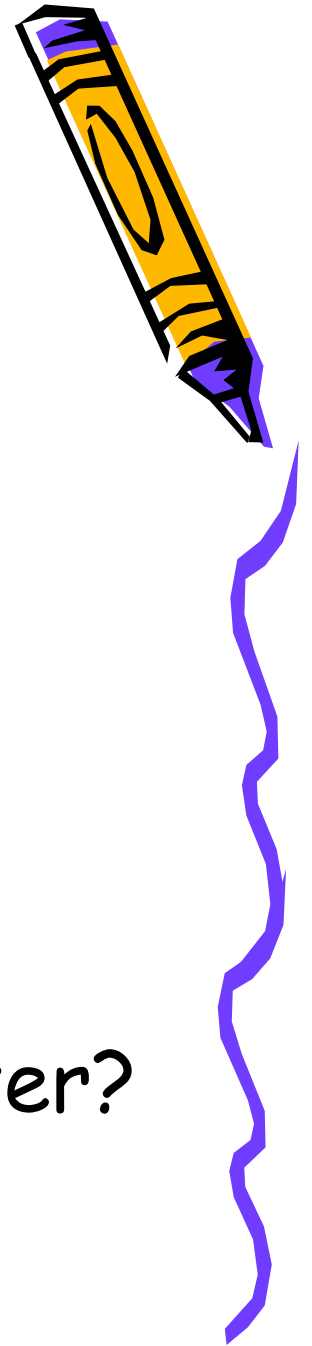
Best



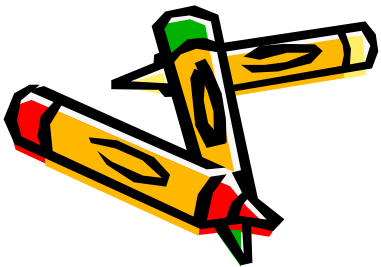
OK, so it's more complicated...



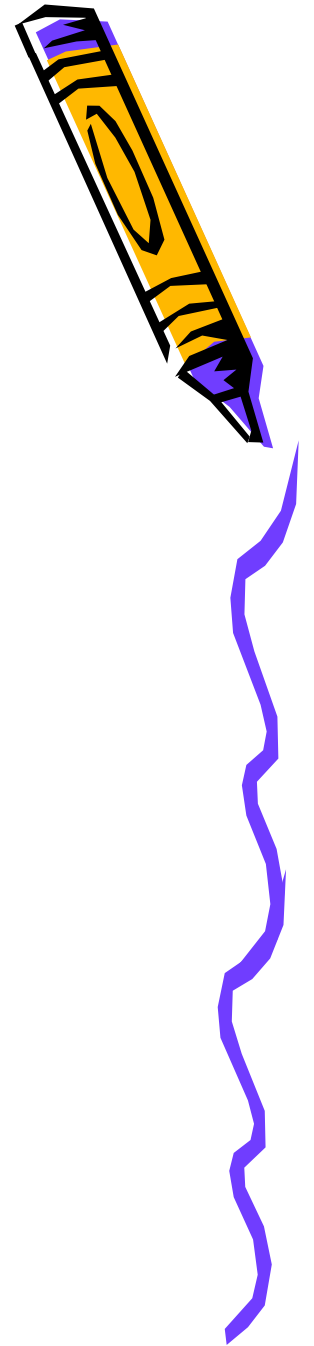
OK, so it's more complicated...



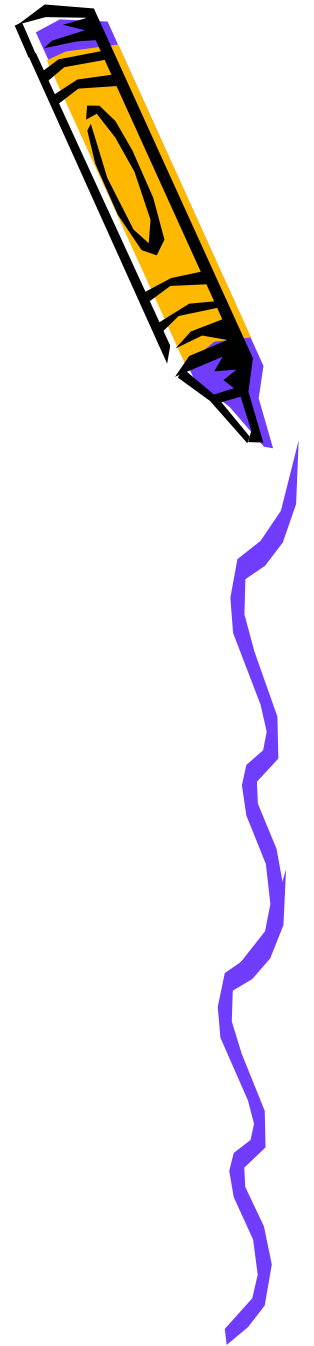
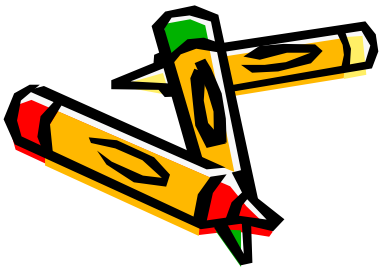
Why does that make it better?



More complicated isn't better...

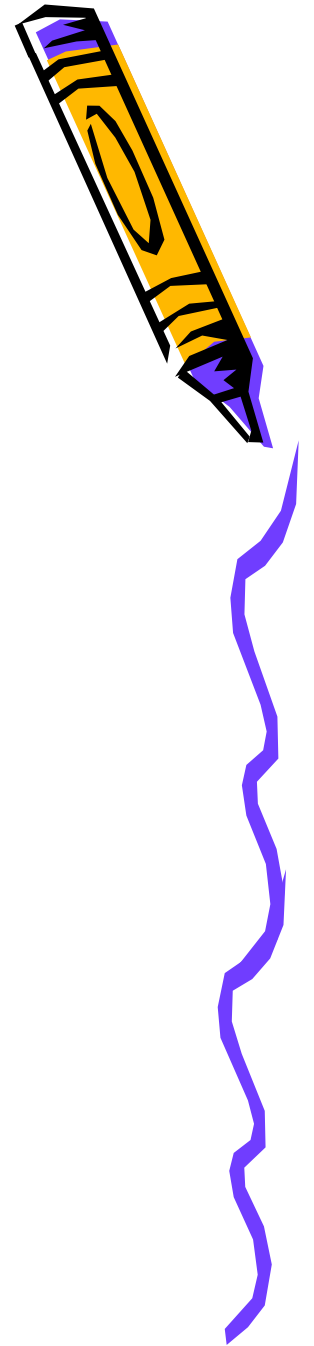


... better planned is better!

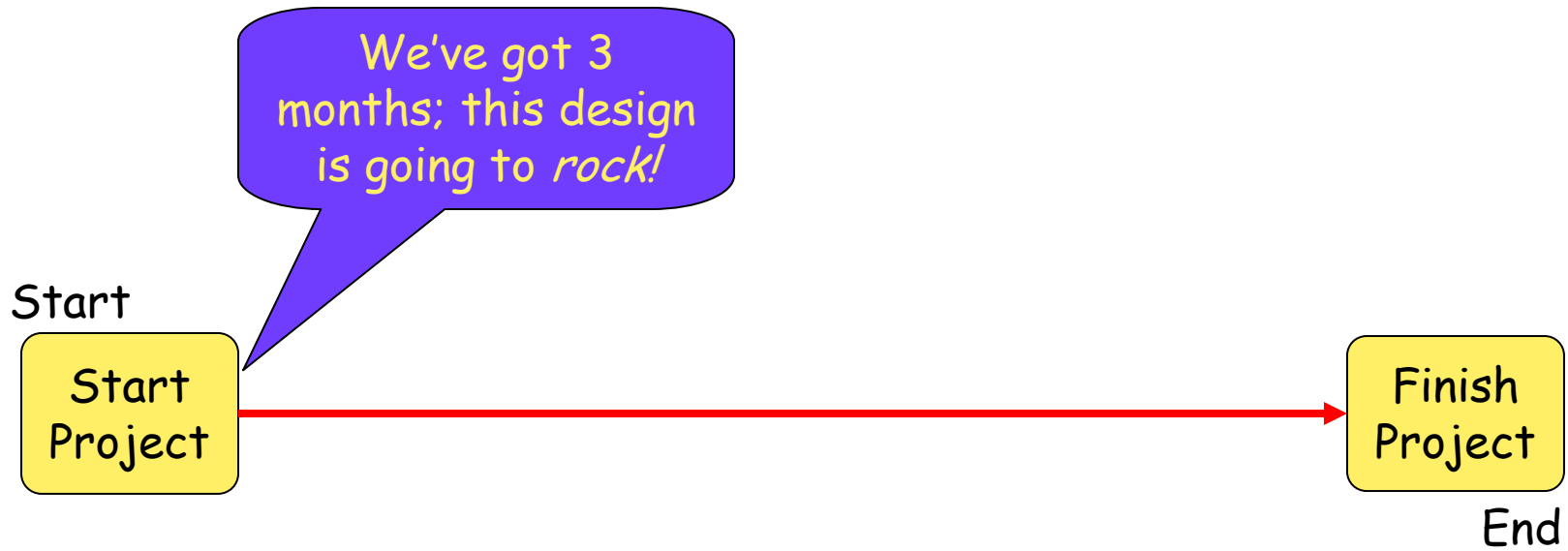
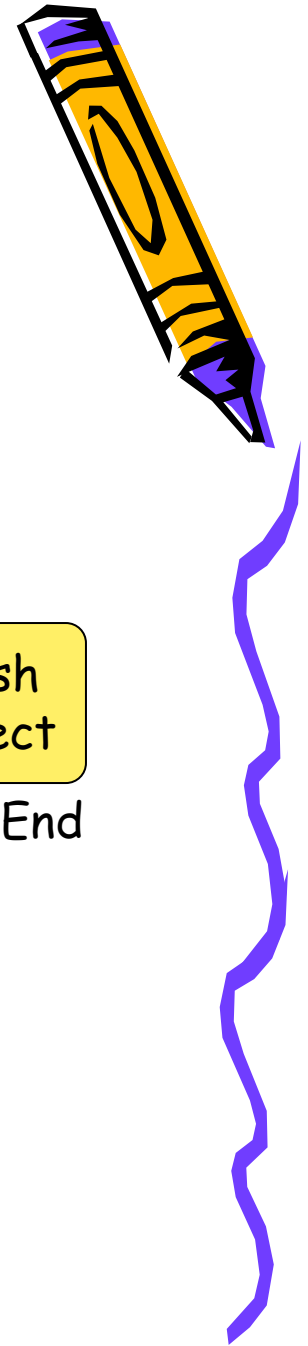


Why?

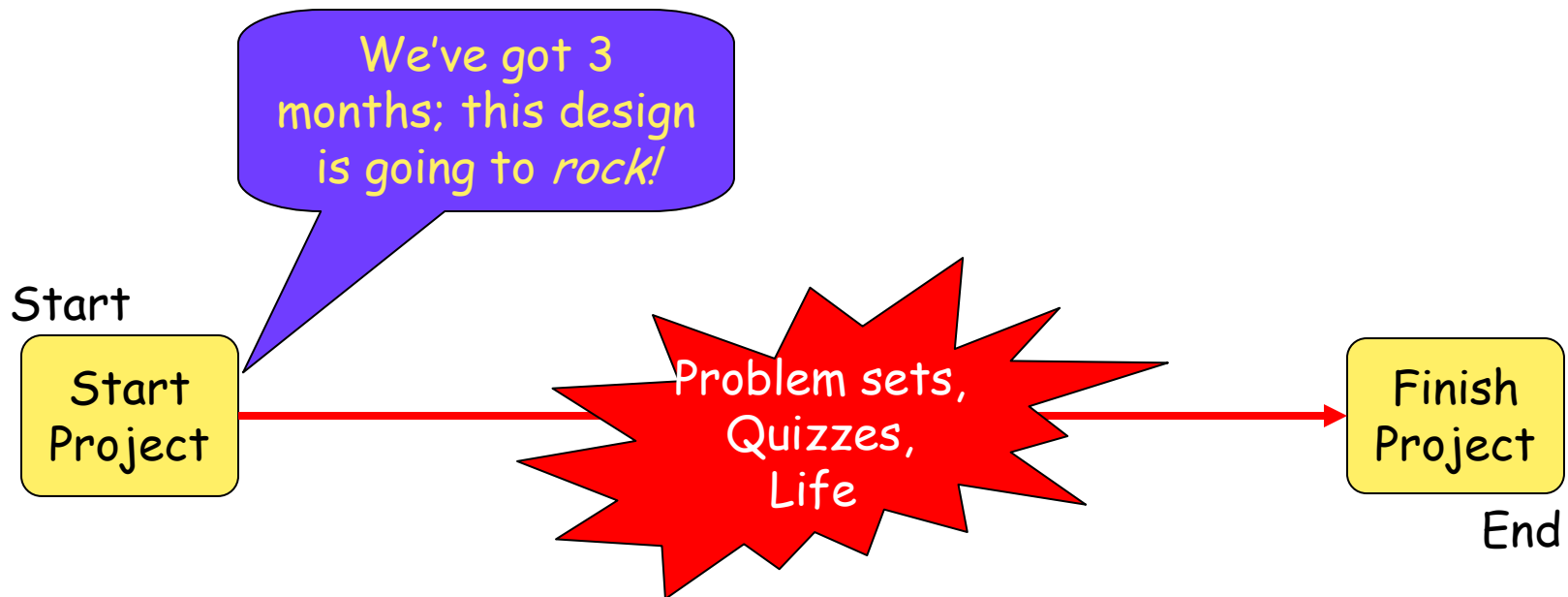
- You can be more realistic
- You can be better prepared
- Your team can coordinate their efforts better
- The result is more likely to please the customer



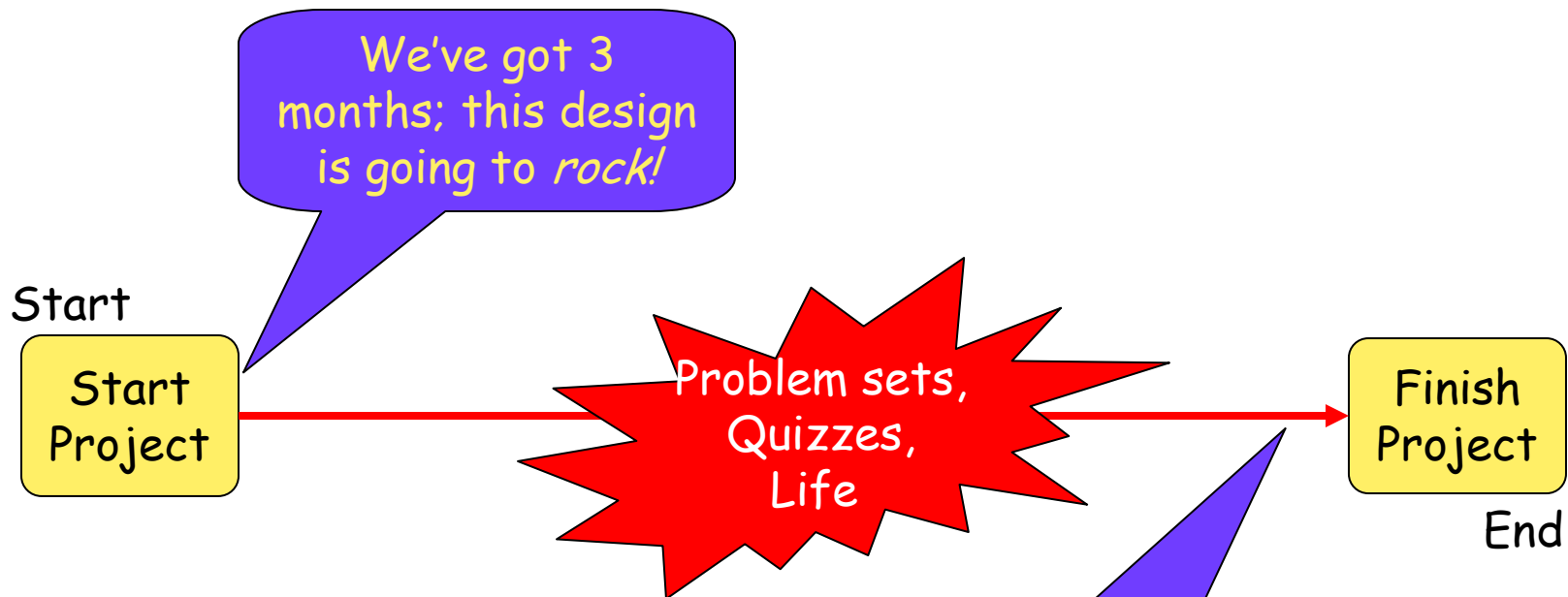
Being Realistic - Laid Back



Being Realistic - Laid Back

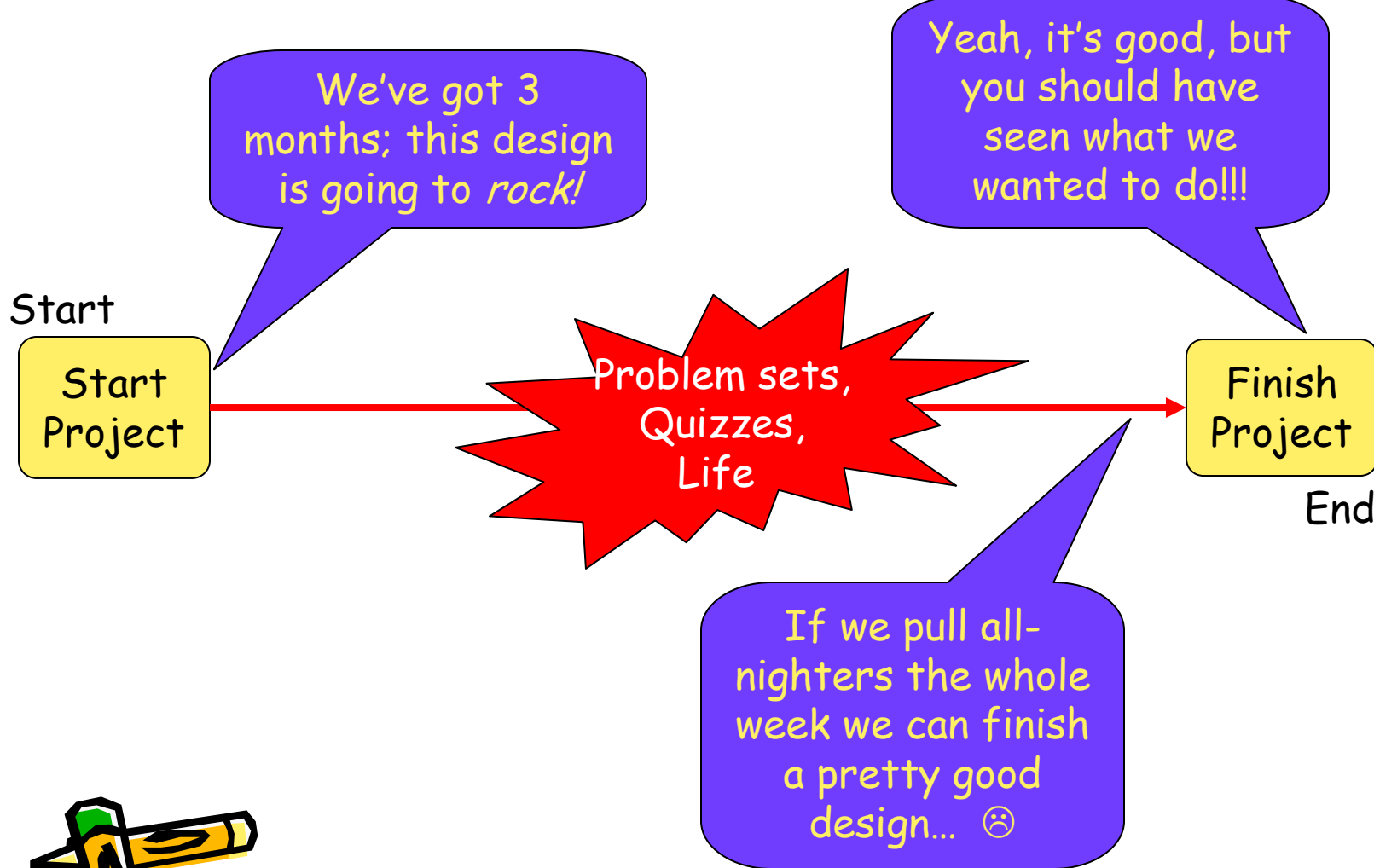


Being Realistic - Laid Back



If we pull all-nighters the whole week we can finish a pretty good design... ☹️

Being Realistic - Laid Back



Being Realistic - Planned Approach

Start

Start Project

Design Stage/Gate

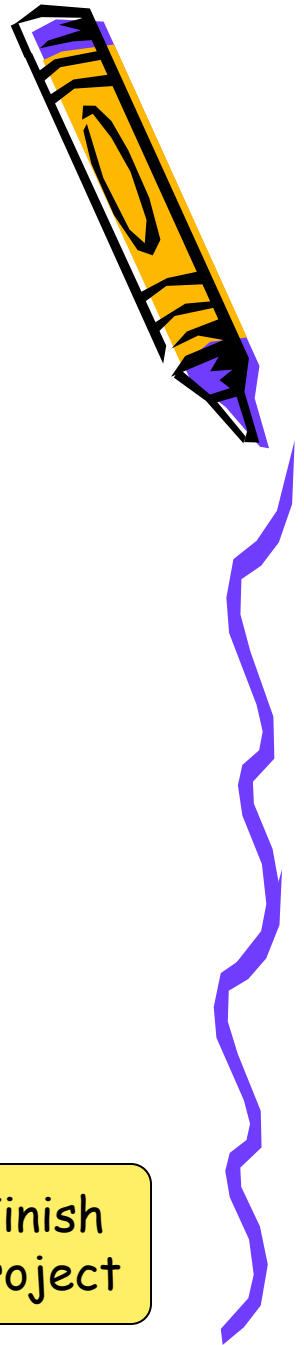
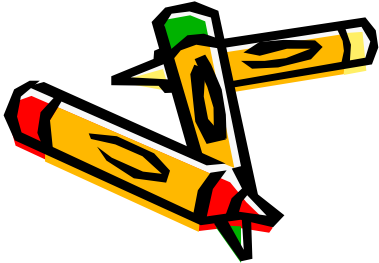
Here's when other classes need attention, here's where we need to focus on the design.

Problem sets, Quizzes,

Develop Stage/Gate

Refine Stage/Gate

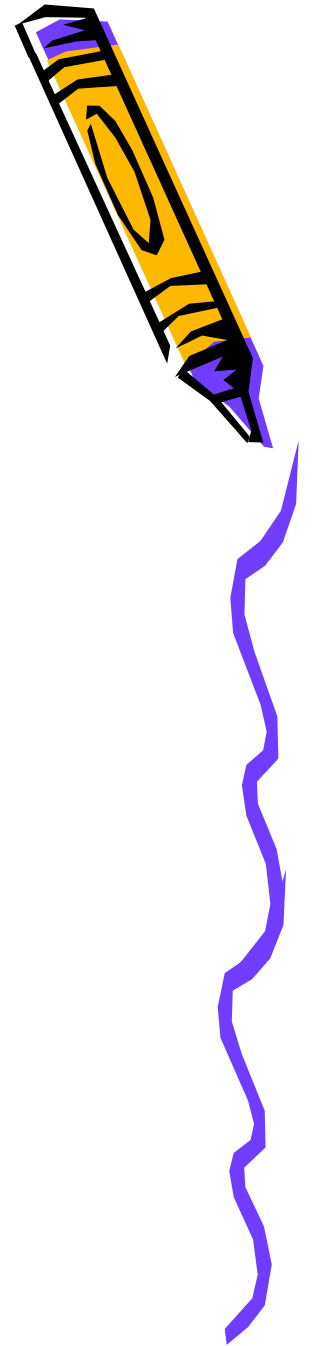
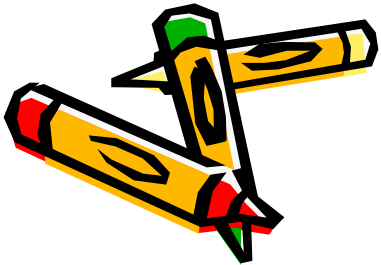
Finish Project



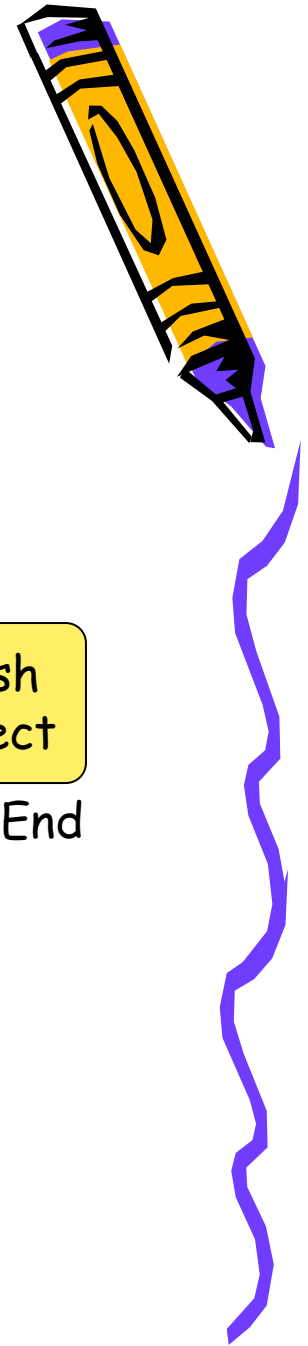
In other words, life fits around the project, not vice versa.

Why?

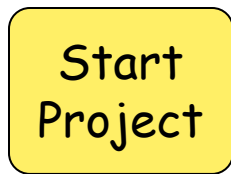
- You can be more realistic
- You can be better prepared
- Your team can coordinate their efforts better
- The result is more likely to please the customer



Being Prepared - Laid Back



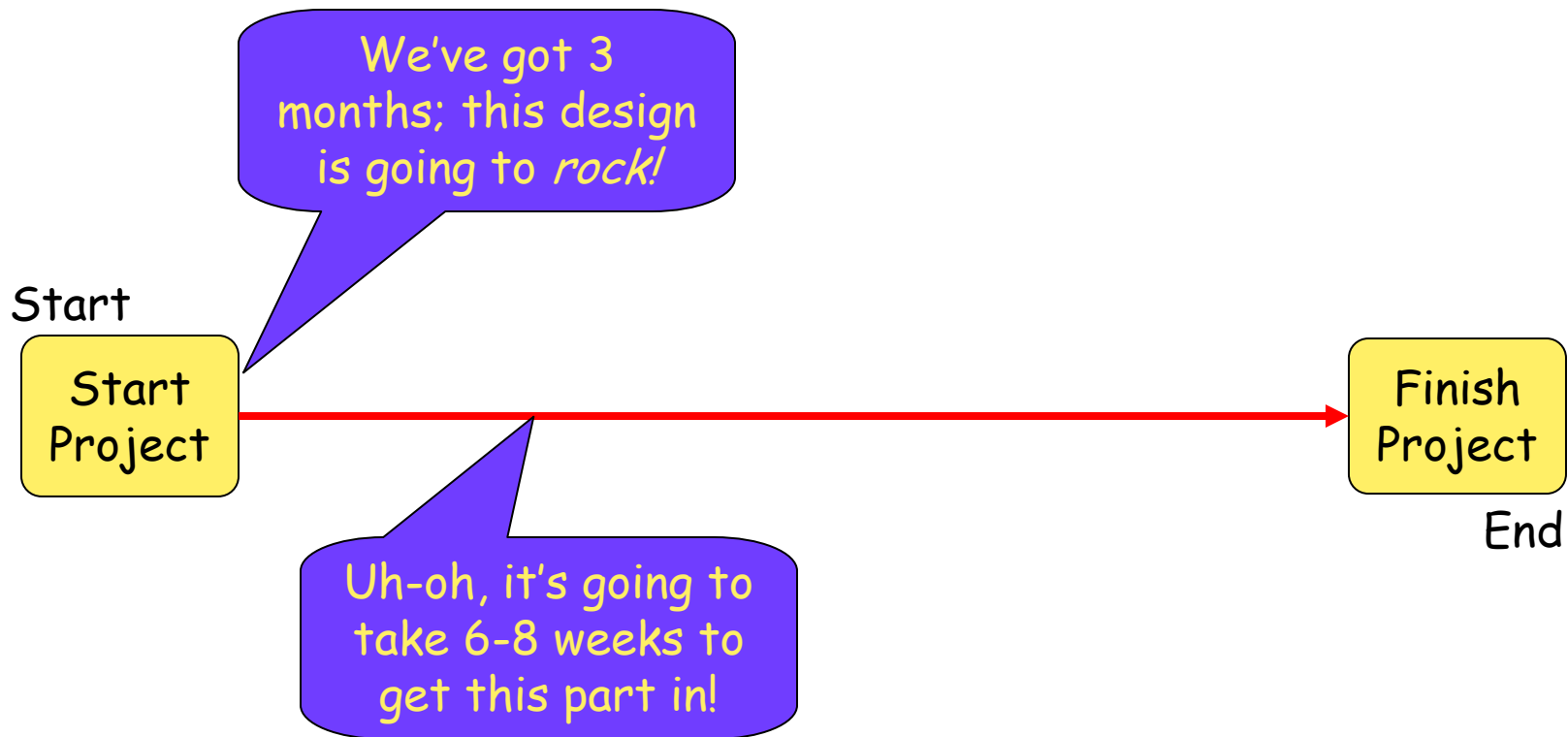
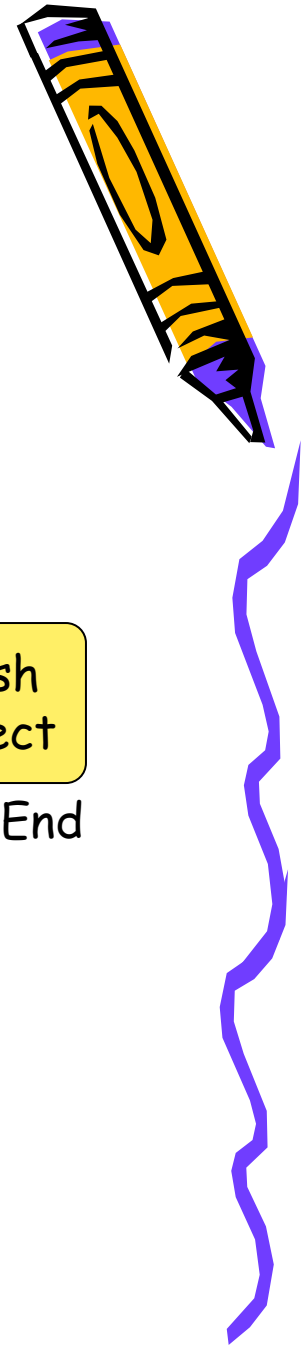
Start



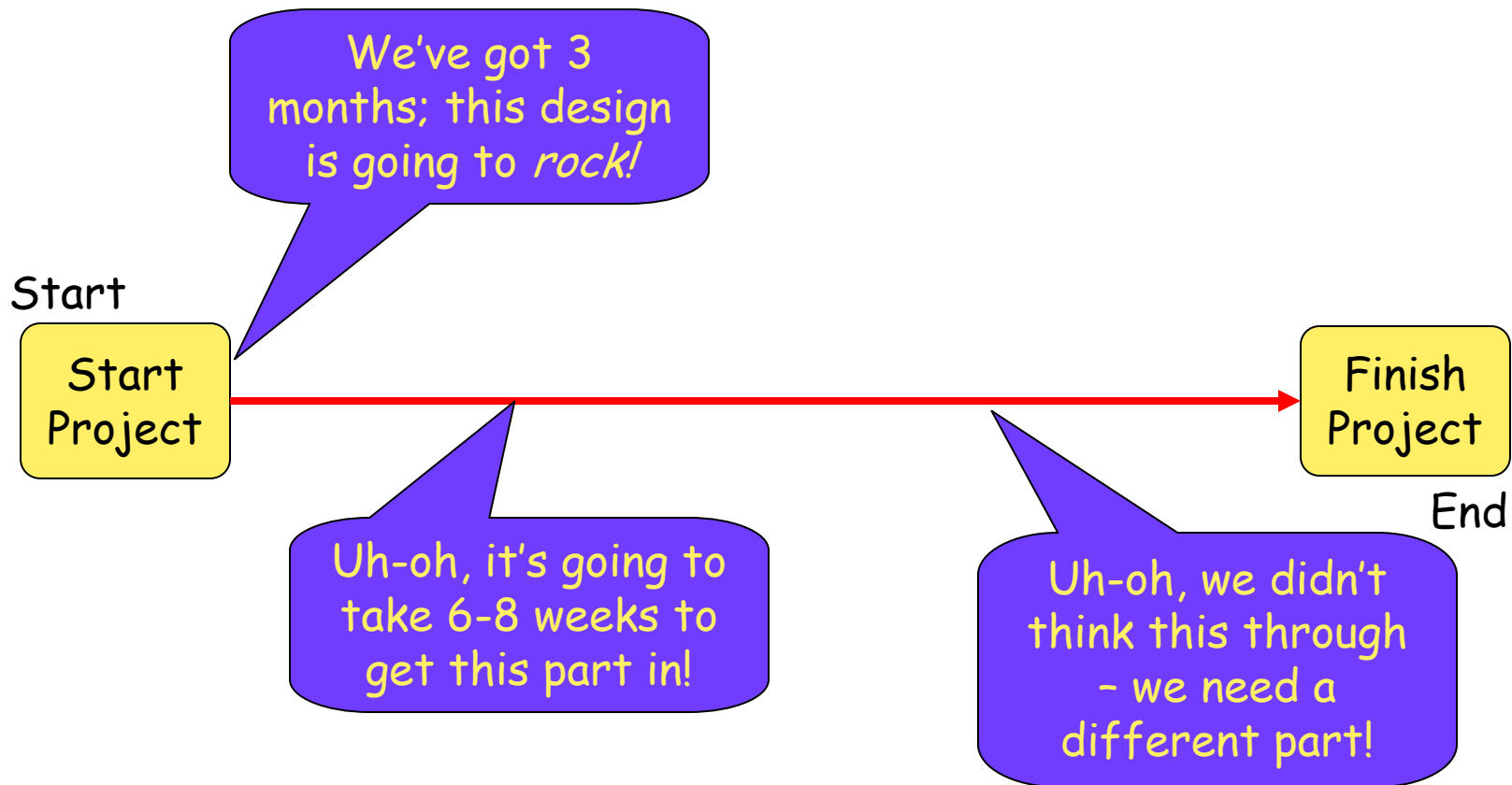
End



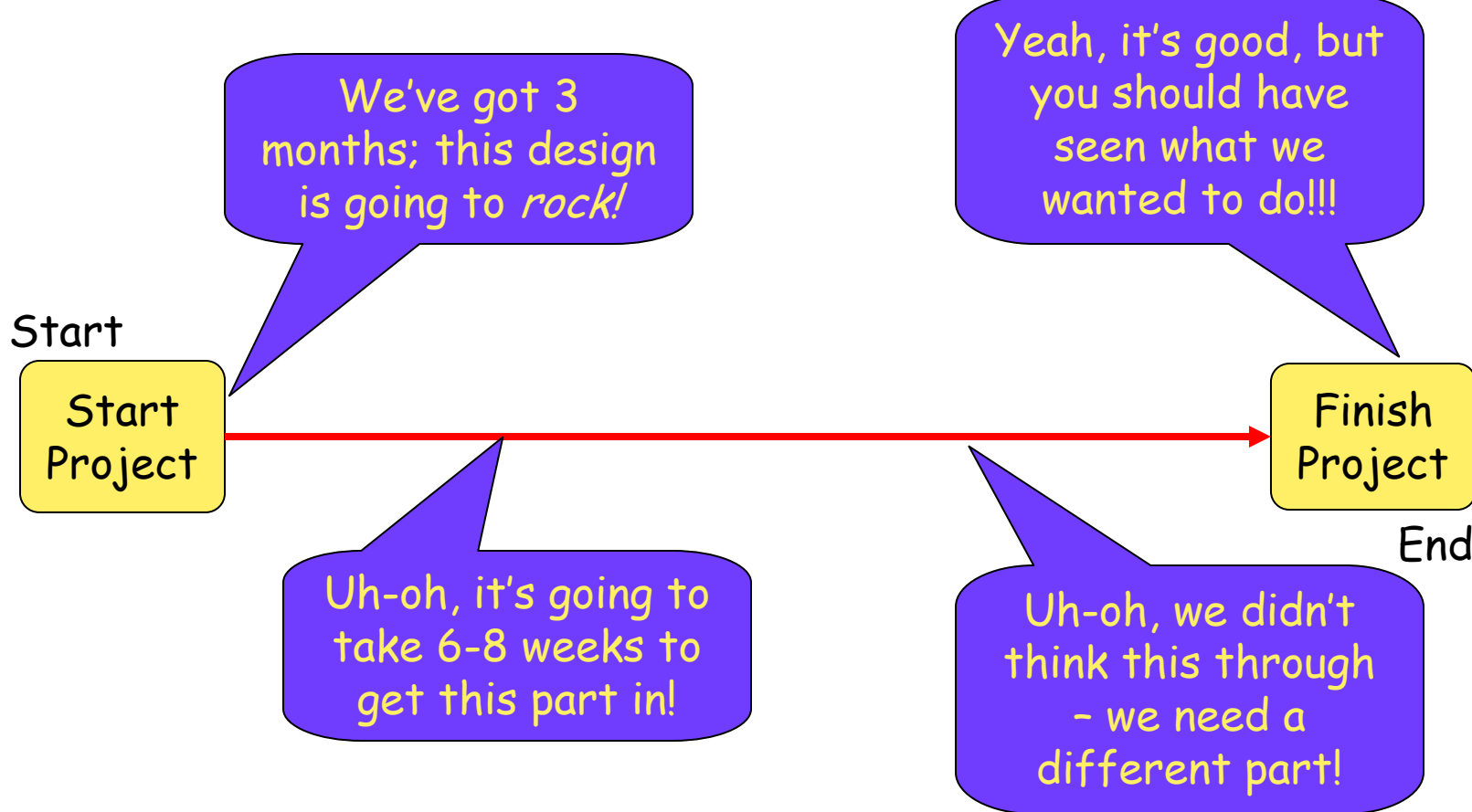
Being Prepared - Laid Back



Being Prepared - Laid Back



Being Prepared - Laid Back



Being Prepared - Planned Approach

Start

Start Project

Design Stage/Gate

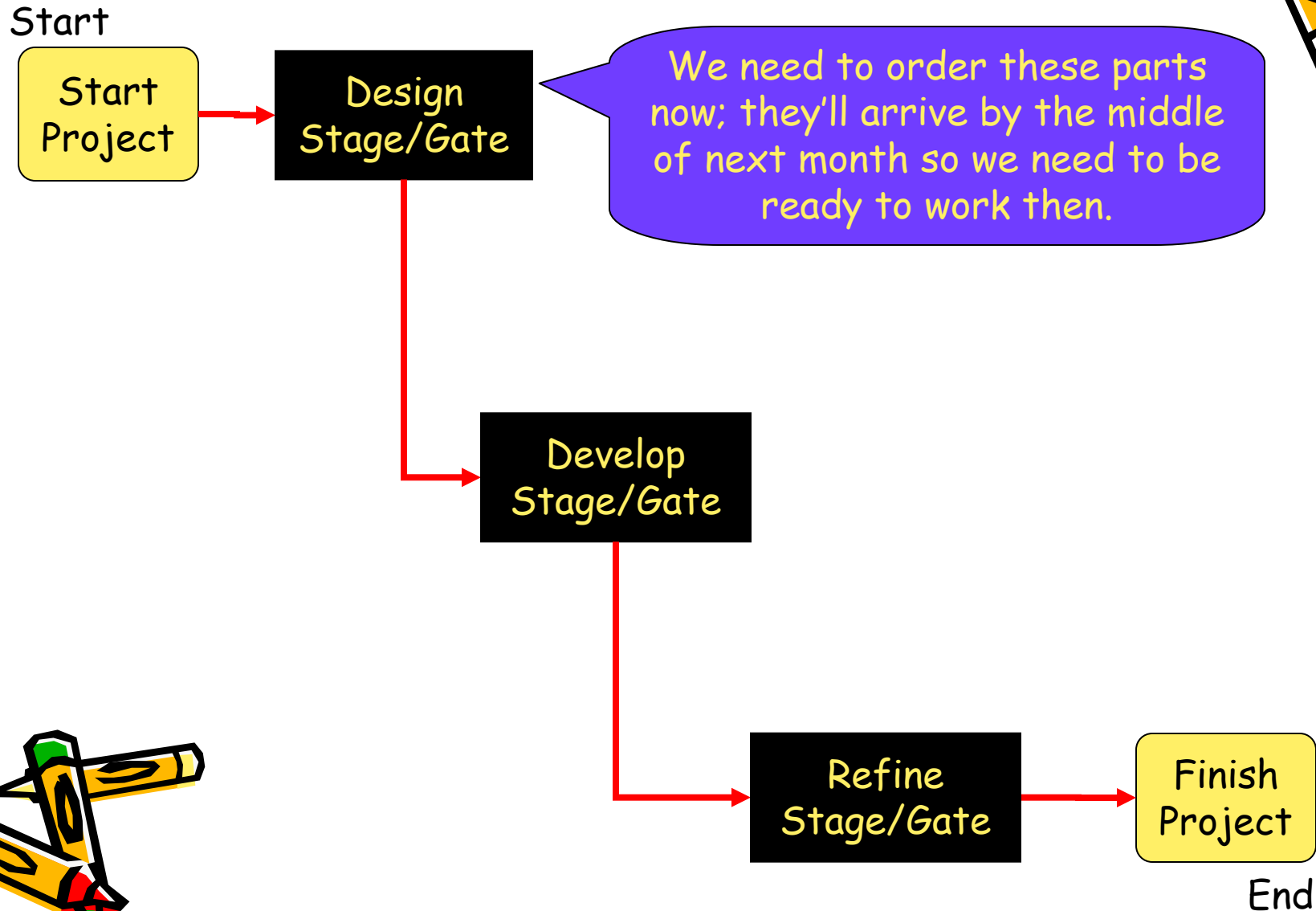
We need to order these parts now; they'll arrive by the middle of next month so we need to be ready to work then.

Develop Stage/Gate

Refine Stage/Gate

Finish Project

End



Being Prepared - Planned Approach

Start

Start Project

Design Stage/Gate

We need to order these parts now; they'll arrive by the middle of next month so we need to be ready to work then.

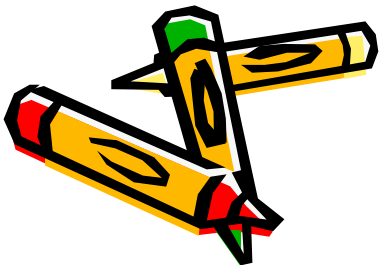
Develop Stage/Gate

Hey, this part of the design isn't doing what it's supposed to - let's get these new parts...

Refine Stage/Gate

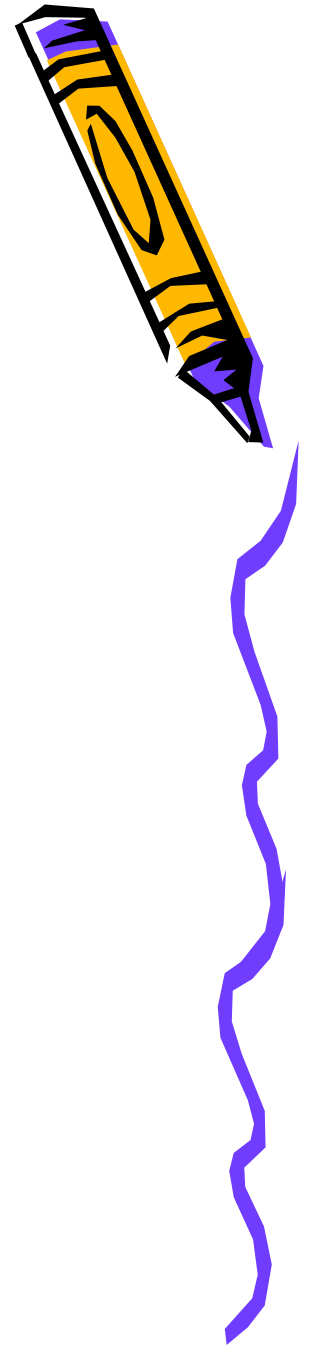
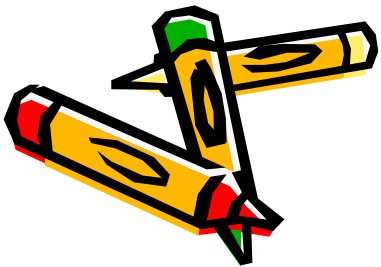
Finish Project

End

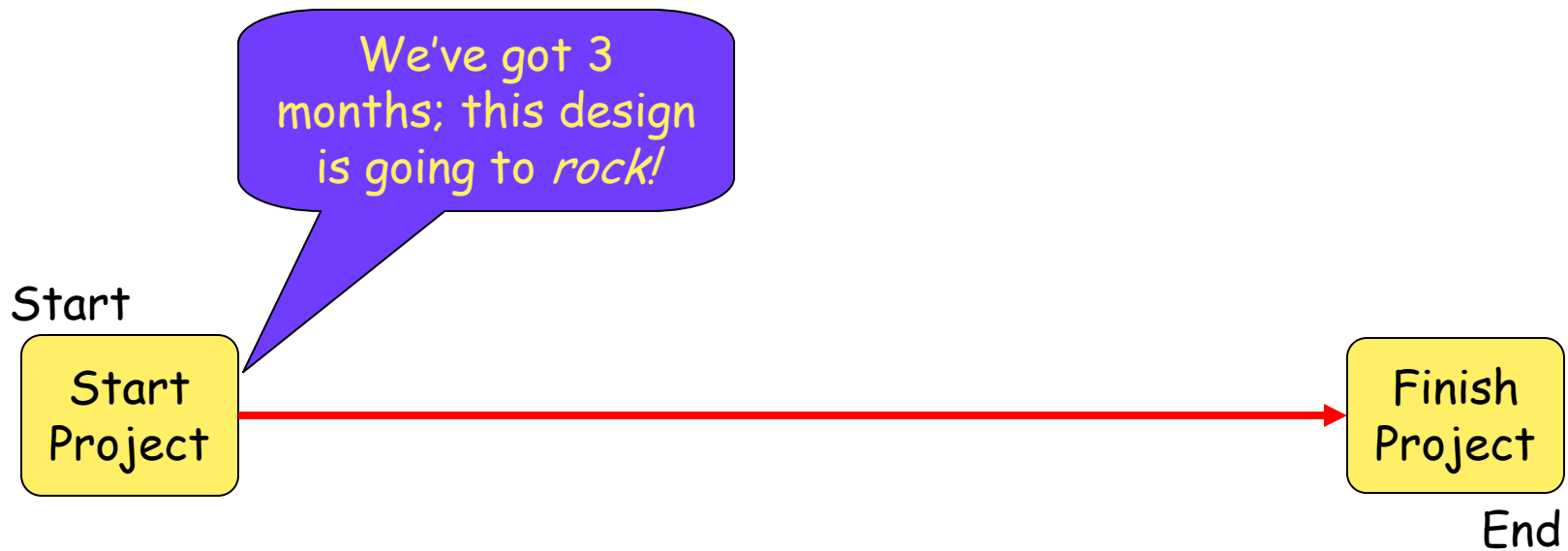
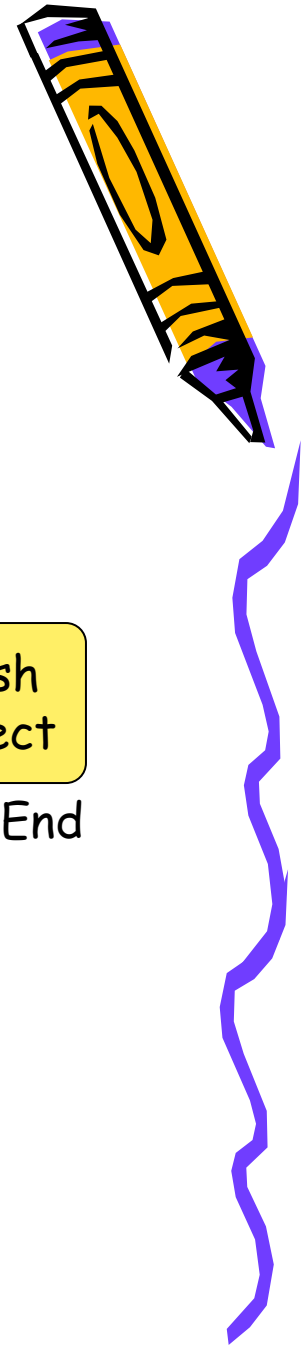


Why?

- You can be more realistic
- You can be better prepared
- Your team can coordinate their efforts better
- The result is more likely to please the customer



Communication - Laid Back



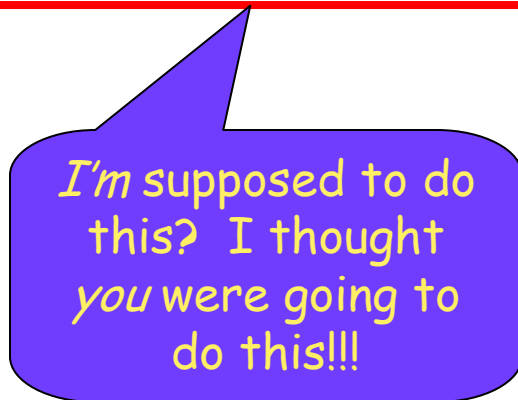
Communication - Laid Back



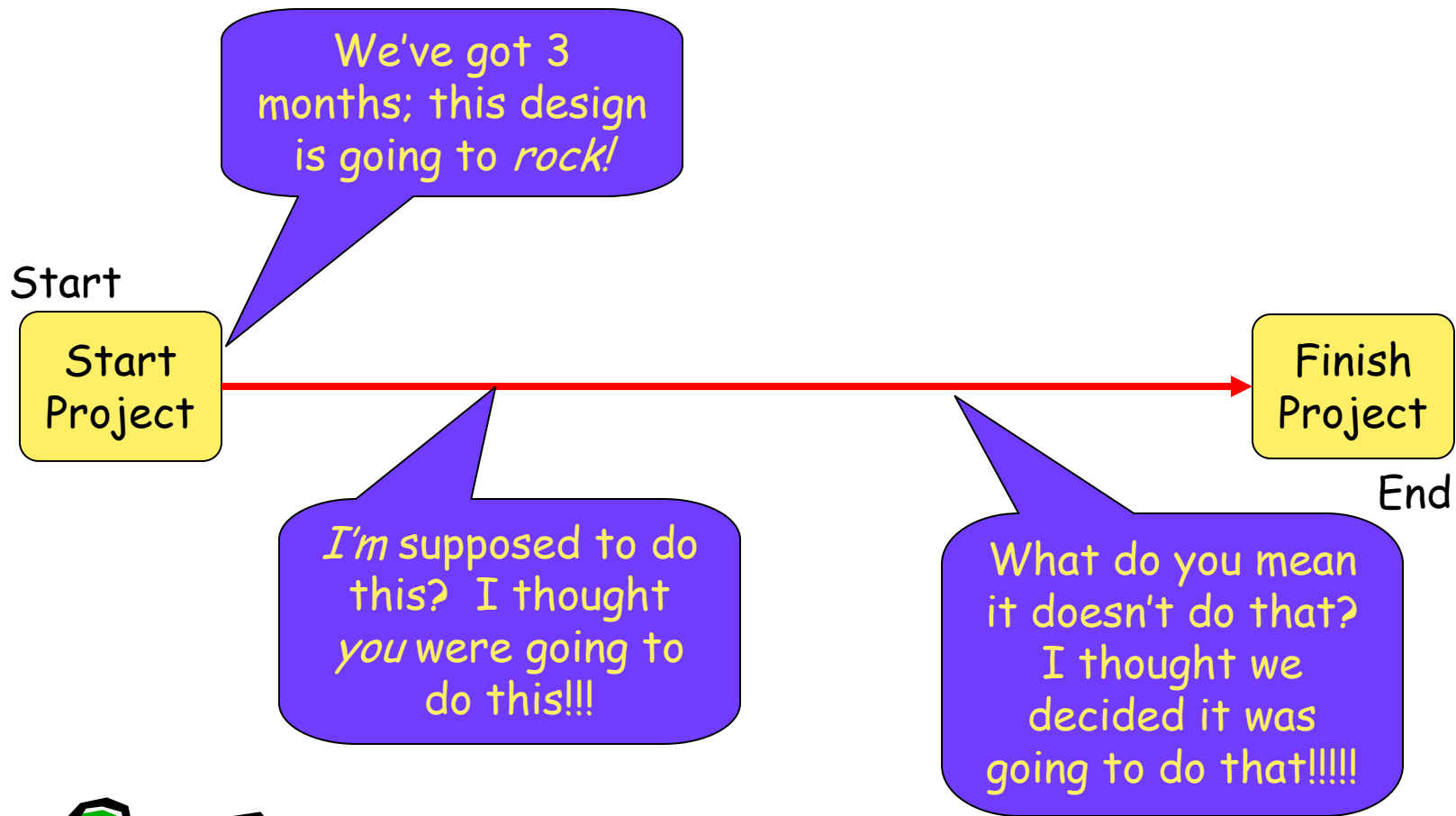
Start



End



Communication - Laid Back



Communication - Laid Back



Start

Start Project

We've got 3 months; this design is going to *rock!*

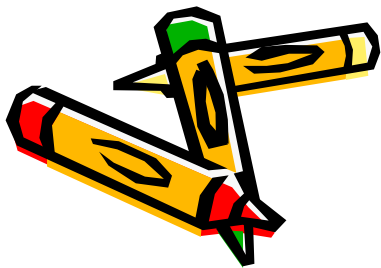
Yeah, it's good, but you should have seen what we wanted to do!!!

Finish Project

End

I'm supposed to do this? I thought you were going to do this!!!

What do you mean it doesn't do that? I thought we decided it was going to do that!!!!



Communication - Planned Approach

Start

Start Project

Stage/Gate 1

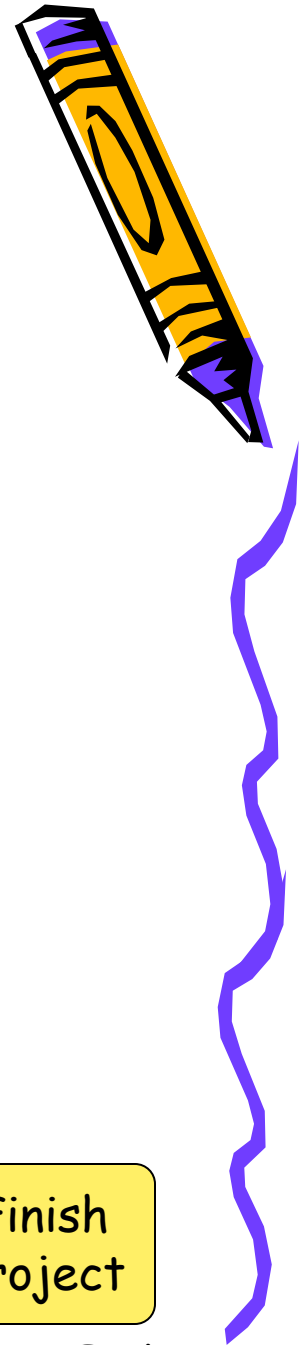
So, we're all agreed:
This is what the design is going to do;
this is who is going to do what & when

Stage/Gate 2

Stage/Gate 3

Finish Project

End



Communication - Planned Approach

Start

Start Project

Stage/Gate 1

So, we're all agreed:
This is what the design is going to do;
this is who is going to do what & when

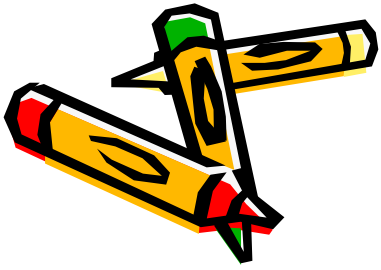
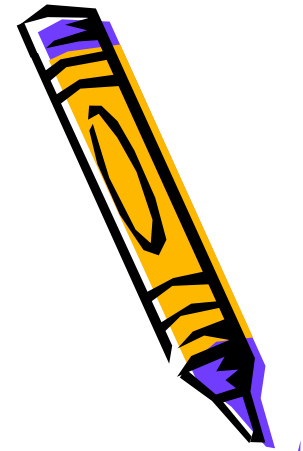
Stage/Gate 2

Here's what isn't working. What do we need to shift and how to make our goals?

Stage/Gate 3

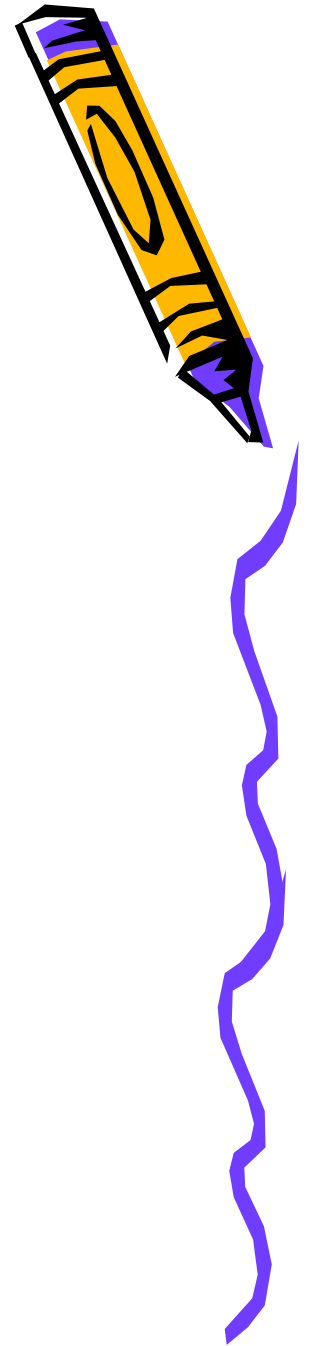
Finish Project

End



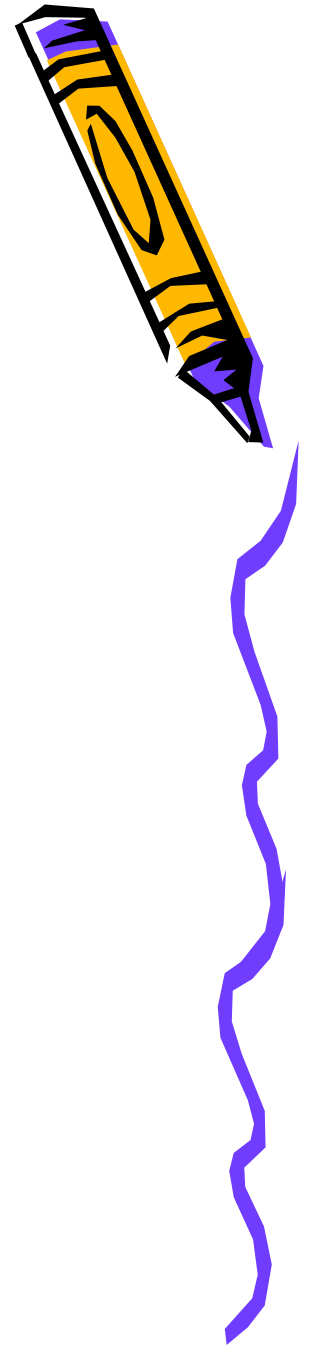
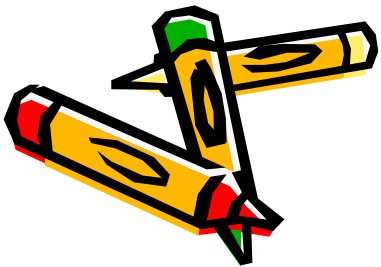
Why?

- You can be more realistic
- You can be better prepared
- Your team can coordinate their efforts better
- The result is more likely to please the customer



Who is Your Customer?

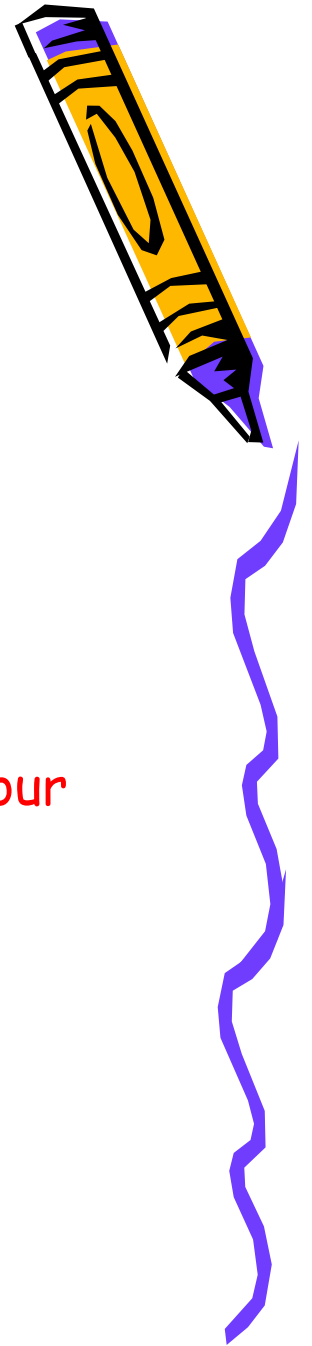
1. Community Partner?
2. Amy, Kurt and/or Will?
3. You and your teammates?
4. All of the above?



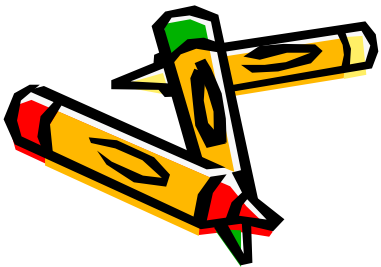
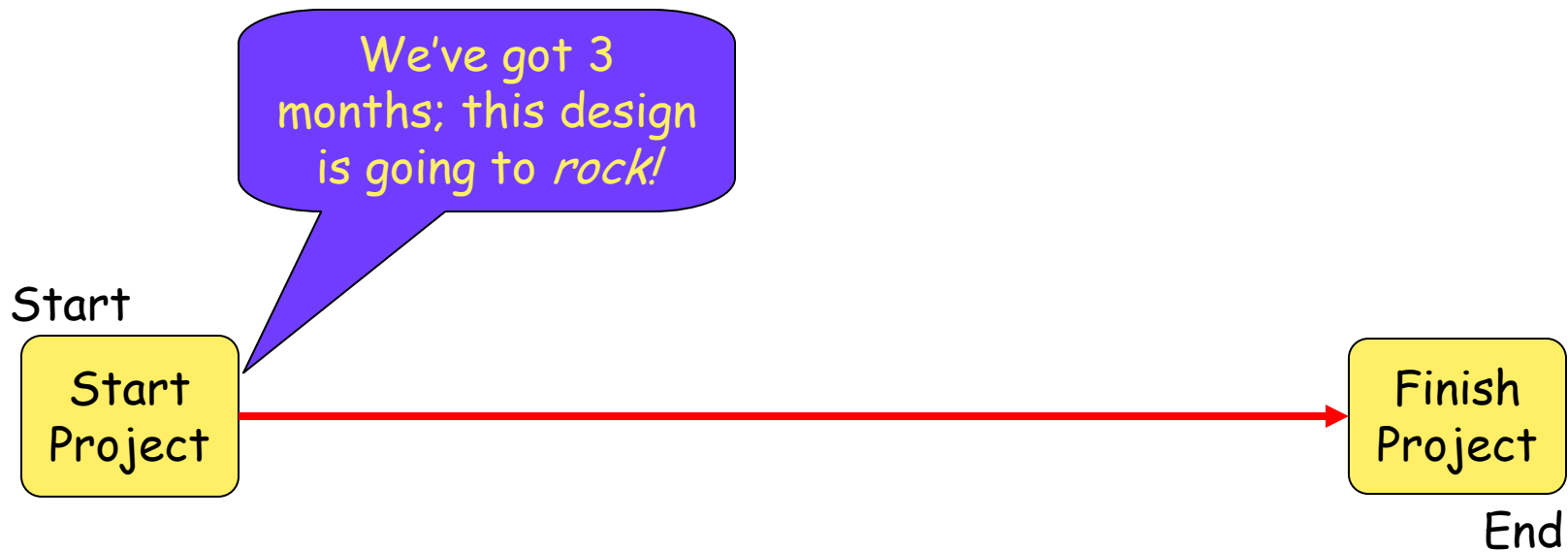
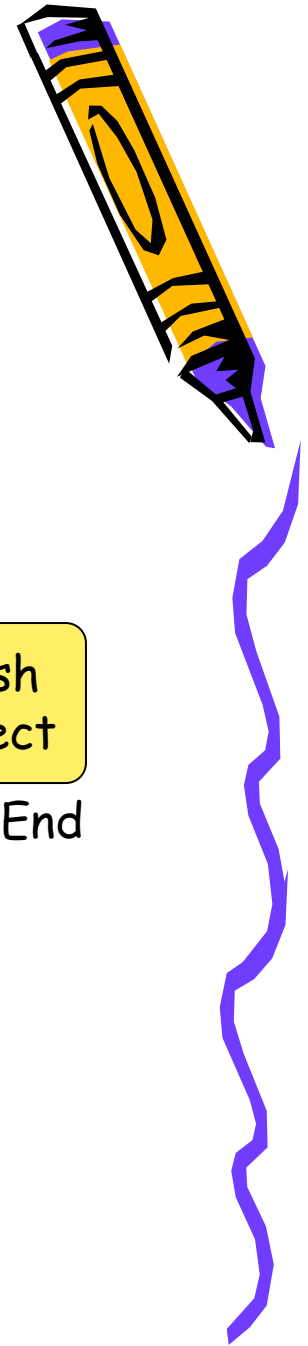
Who is Your Customer?

1. Community Partner?
2. Amy, Kurt and Will?
3. You and your teammates?
4. All of the above?

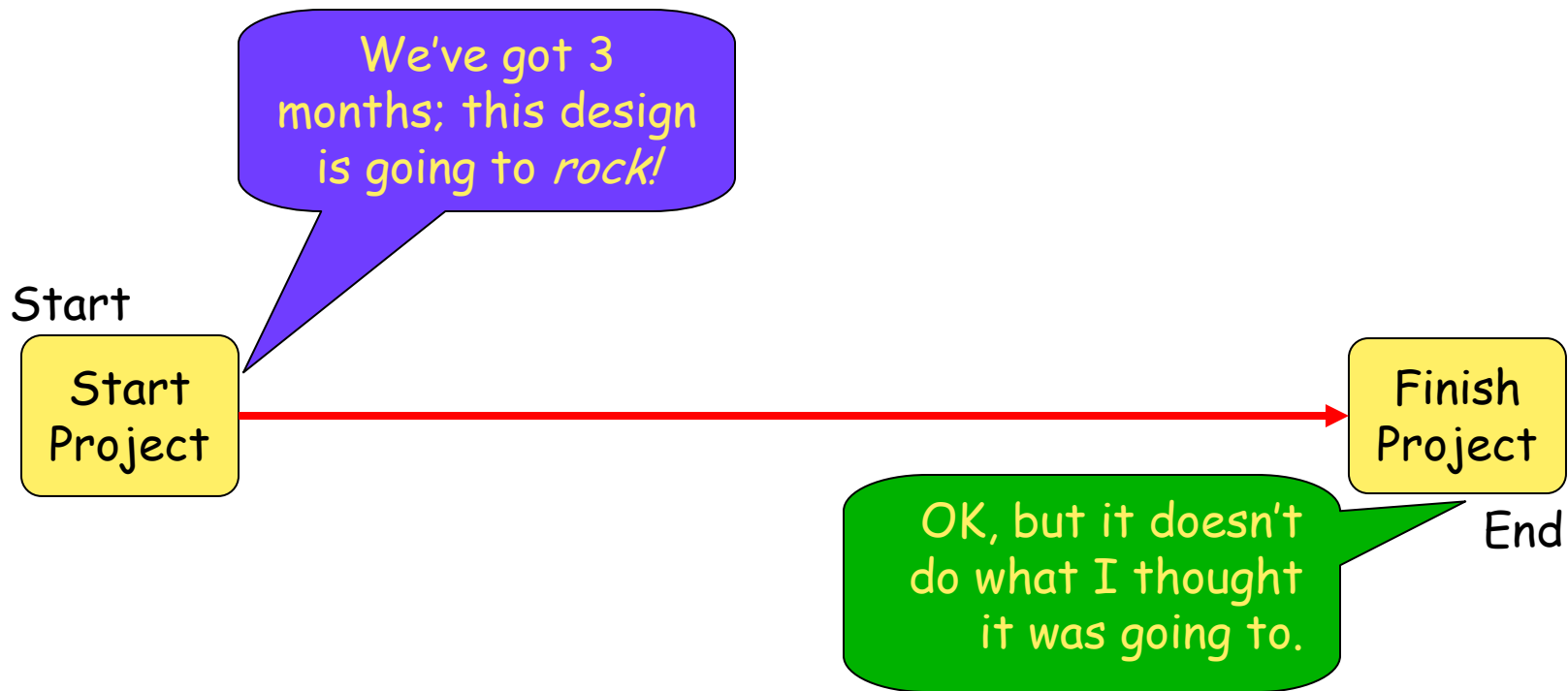
5. Someday in the future, someone who will pay you for your work so you can keep doing great designs!



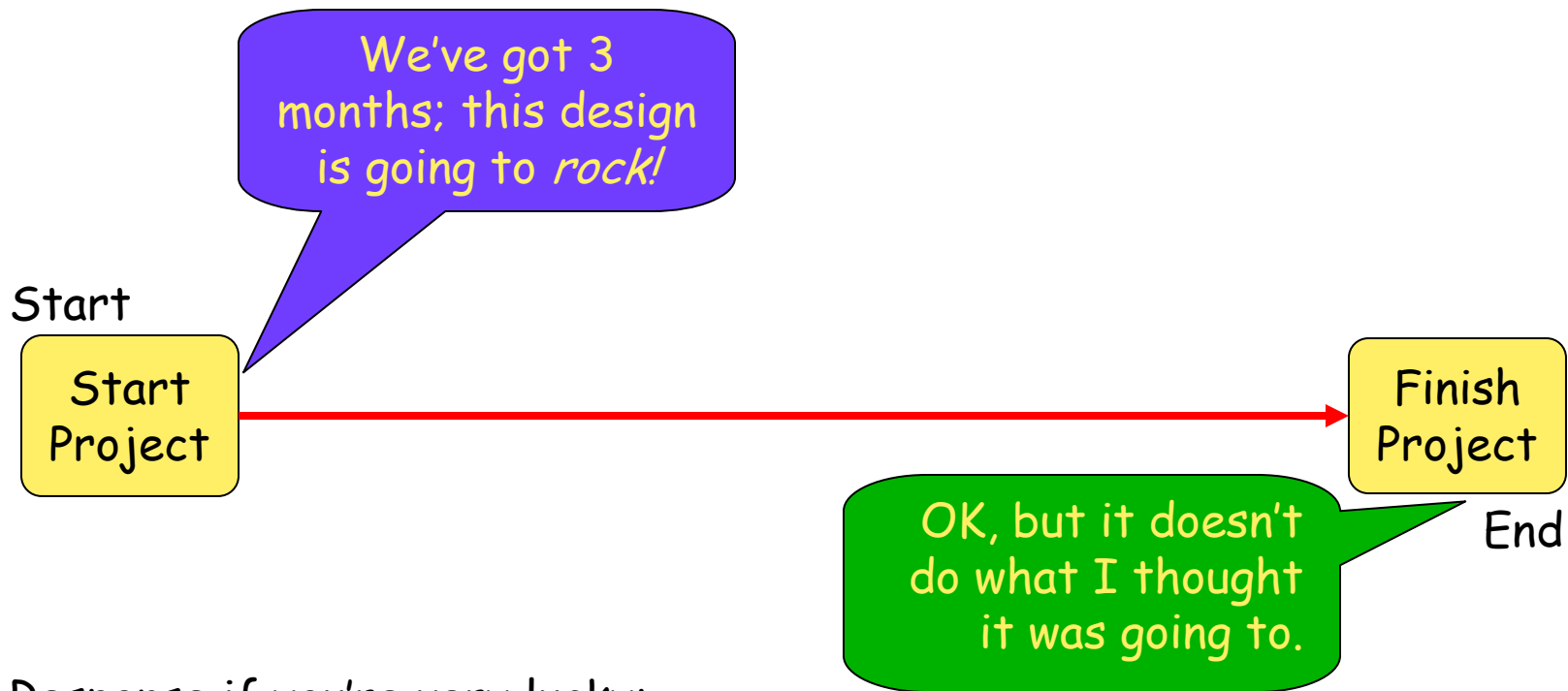
Customer Satisfaction - Laid Back



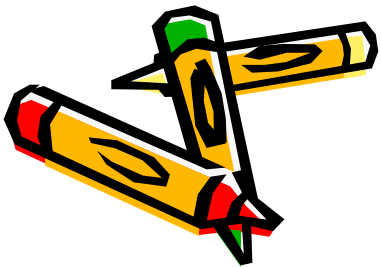
Customer Satisfaction - Laid Back



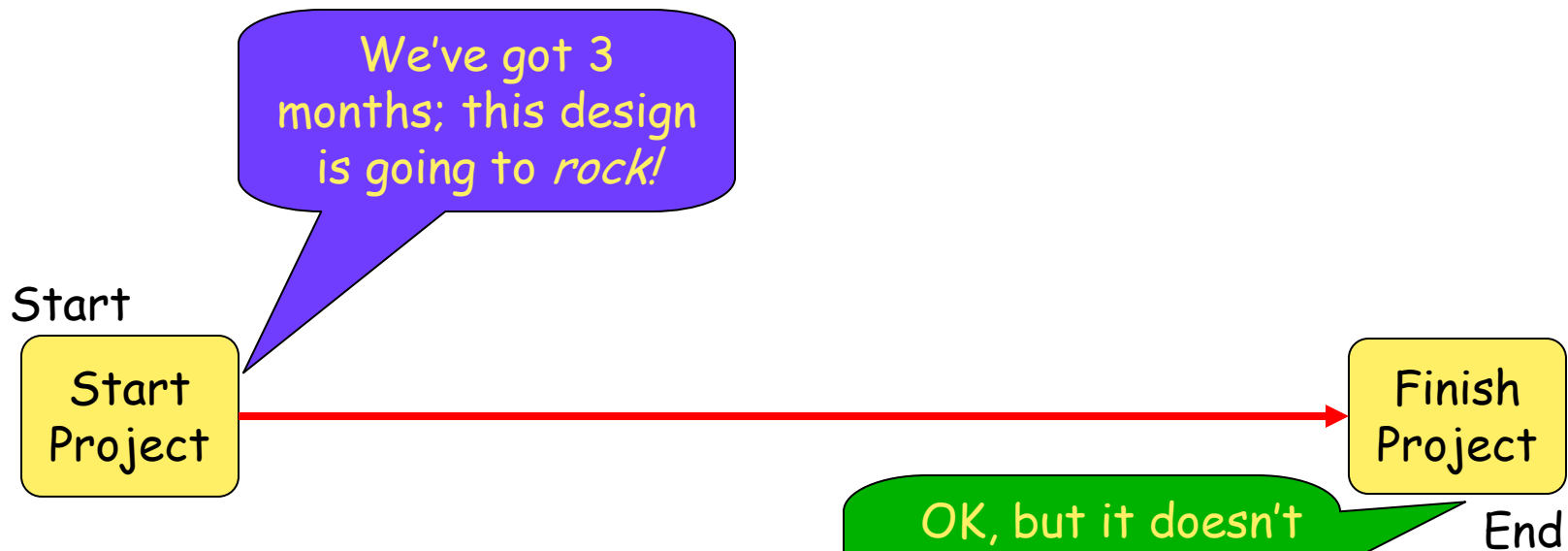
Customer Satisfaction - Laid Back



Response if you're very lucky:

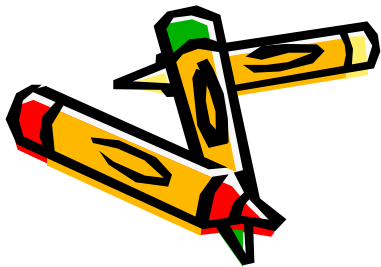


Customer Satisfaction - Laid Back

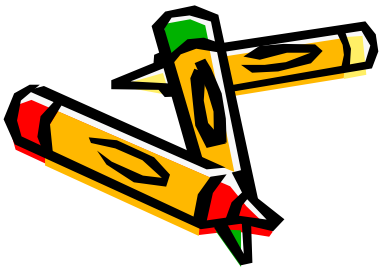
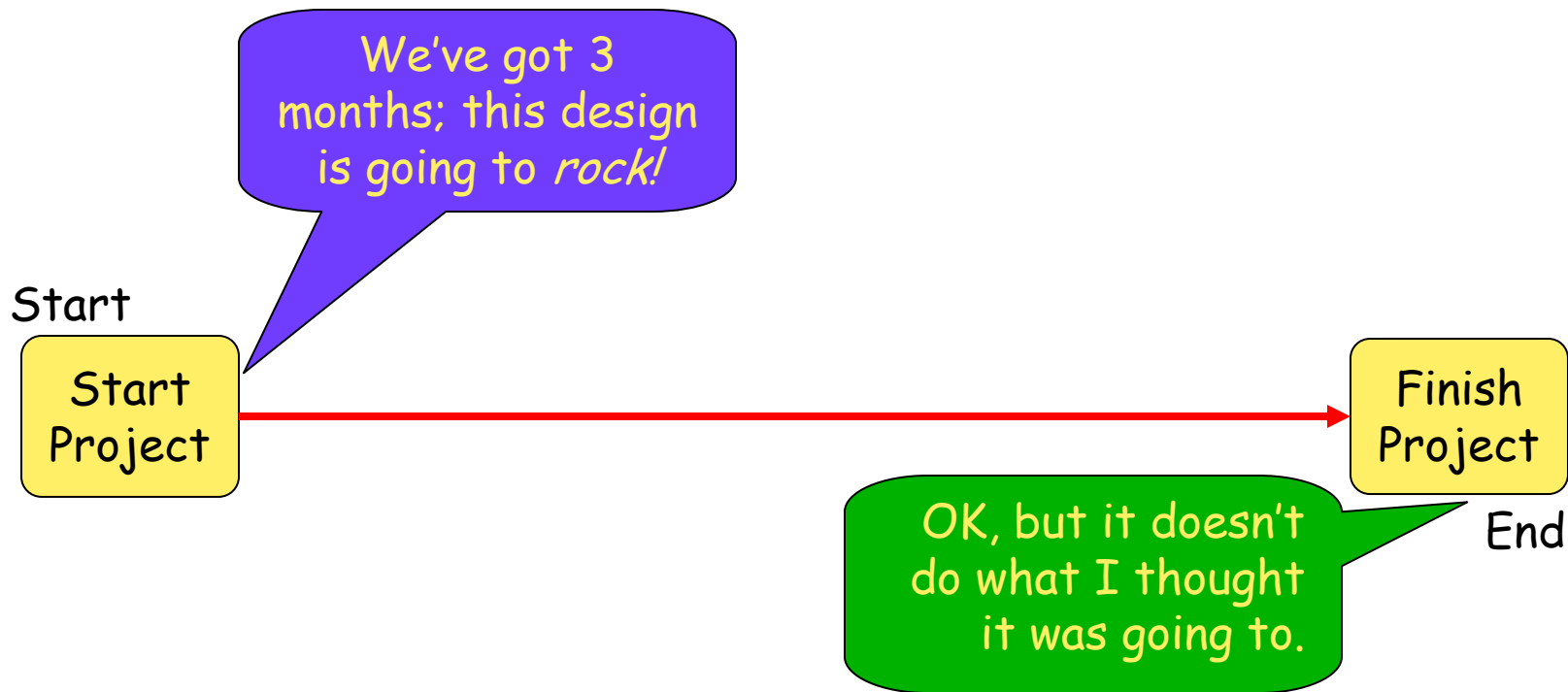


Response if you're very lucky:

We can make it work anyway...



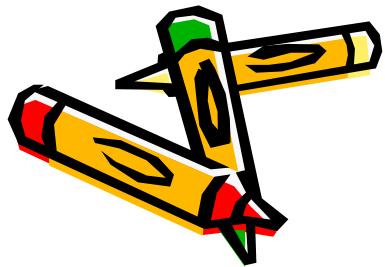
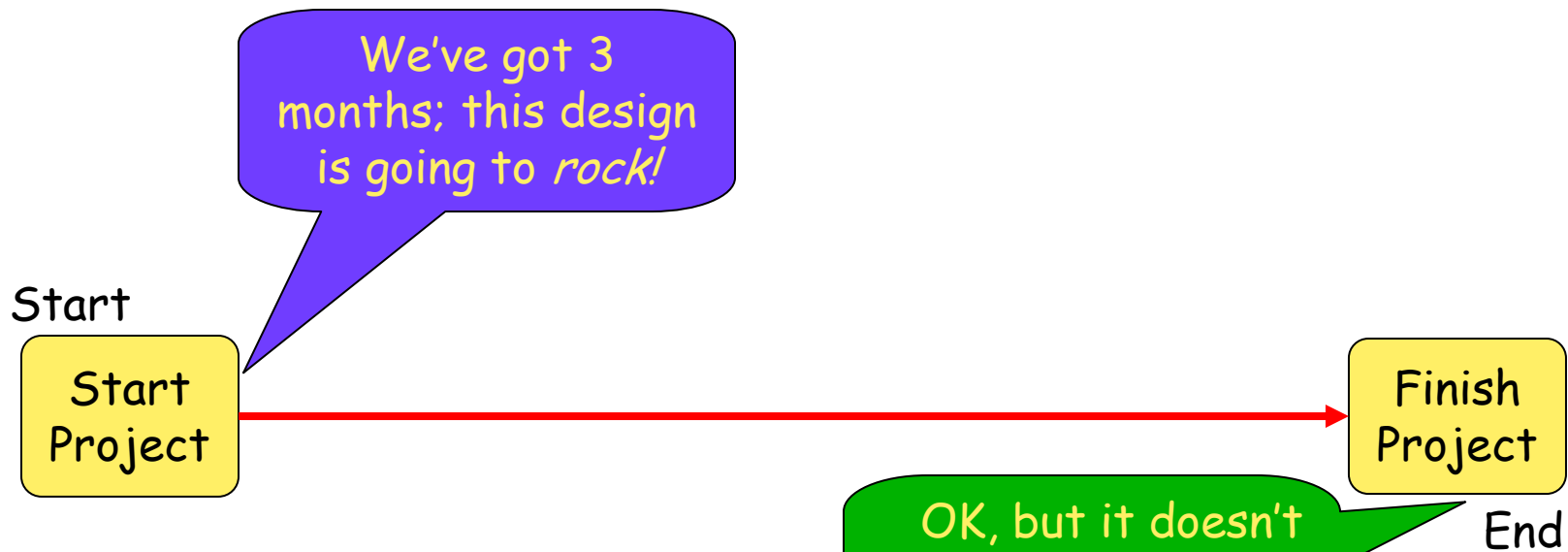
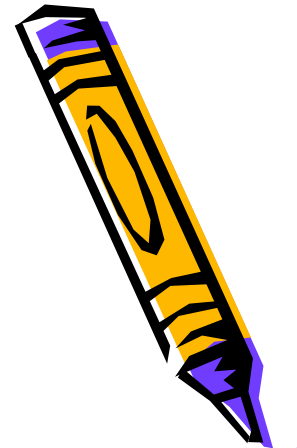
Customer Satisfaction - Laid Back



...if you're unlucky:



Customer Satisfaction - Laid Back

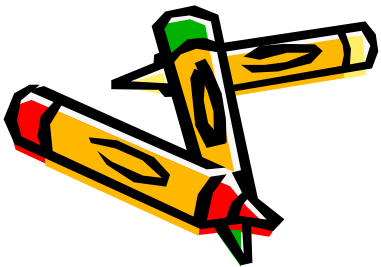
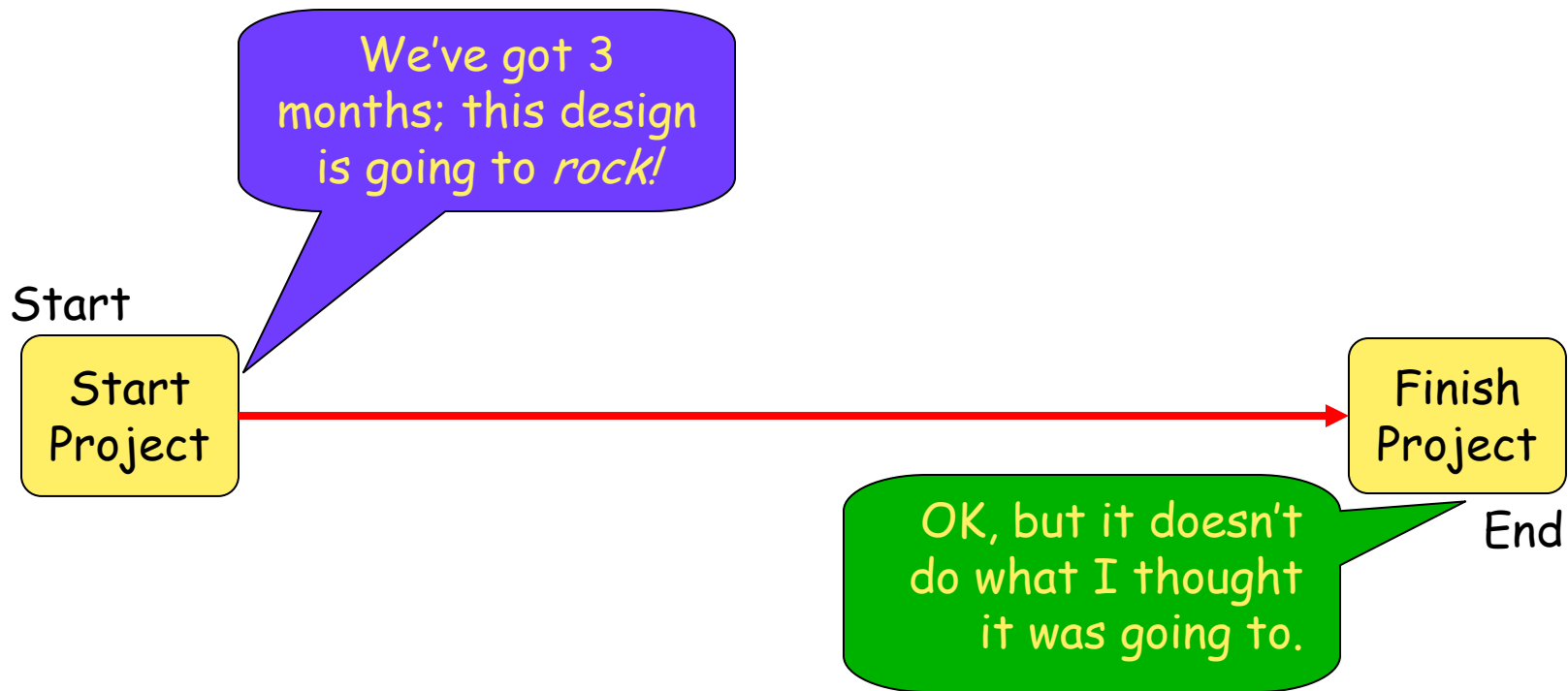


...if you're unlucky:

Don't like it but we'll work with it...

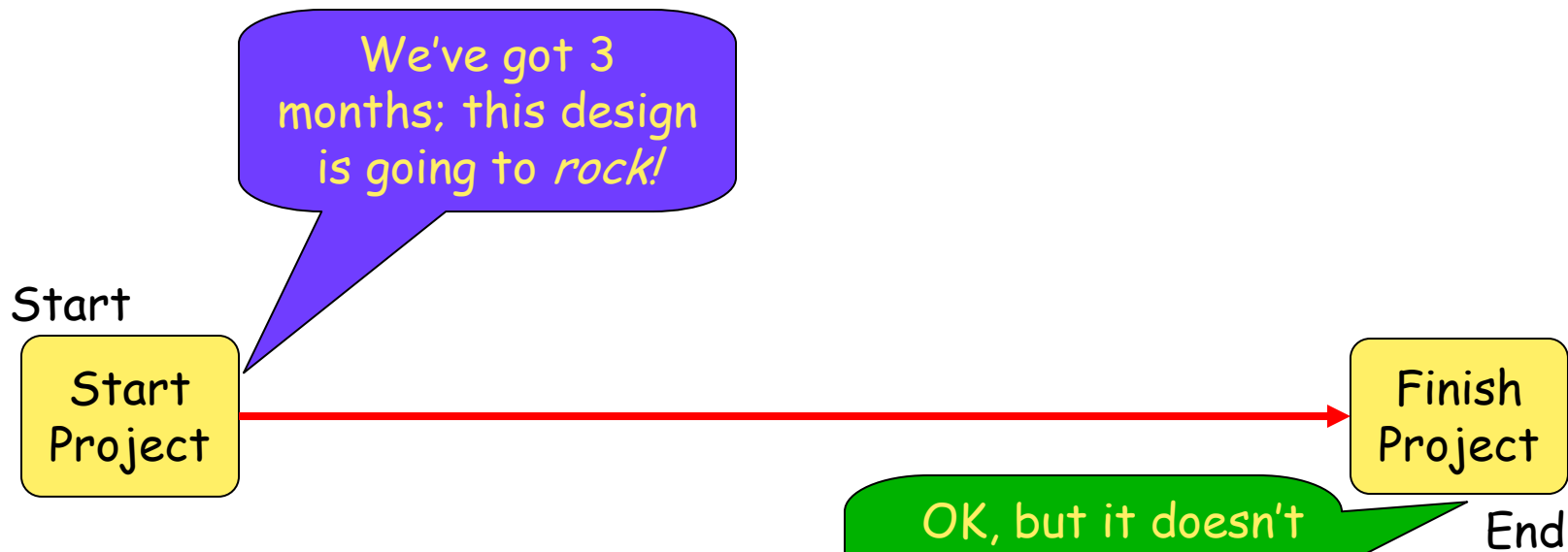


Customer Satisfaction - Laid Back



...if you're very unlucky

Customer Satisfaction - Laid Back



OK, but it doesn't do what I thought it was going to.

No thanks. We'll go with another designer...

...if you're very unlucky



Customer Satisfaction - Planned Approach

Start

Start
Project

Design
Stage/Gate

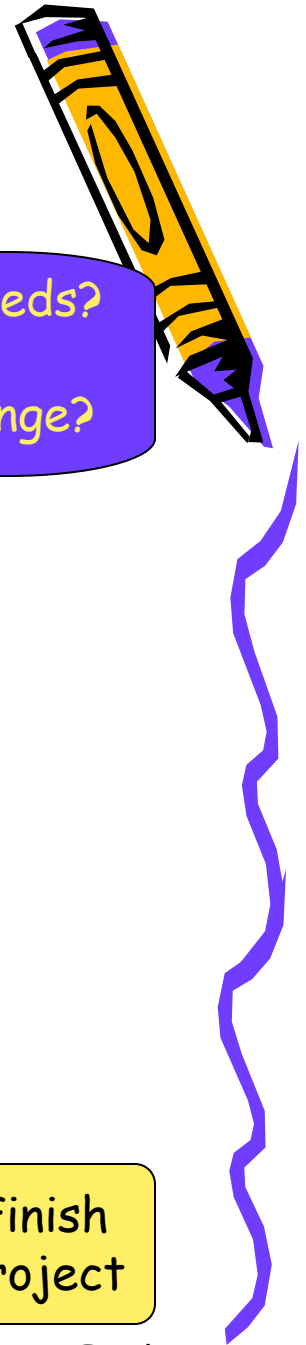
Does this design meet your needs?
Yes? Great!
No? What do we need to change?

Develop
Stage/Gate

Refine
Stage/Gate

Finish
Project

End



Customer Satisfaction - Planned Approach

Start

Start
Project

Design
Stage/Gate

Does this design meet your needs?
Yes? Great!
No? What do we need to change?

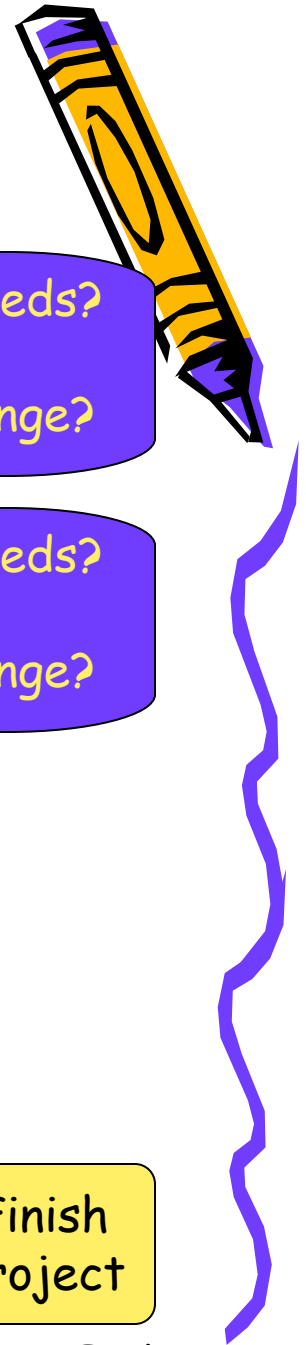
Does this design meet your needs?
Yes? Great!
No? What do we need to change?

Develop
Stage/Gate

Refine
Stage/Gate

Finish
Project

End



Customer Satisfaction - Planned Approach

Start

Start
Project

Design
Stage/Gate

Does this design meet your needs?
Yes? Great!
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Yes? Great!
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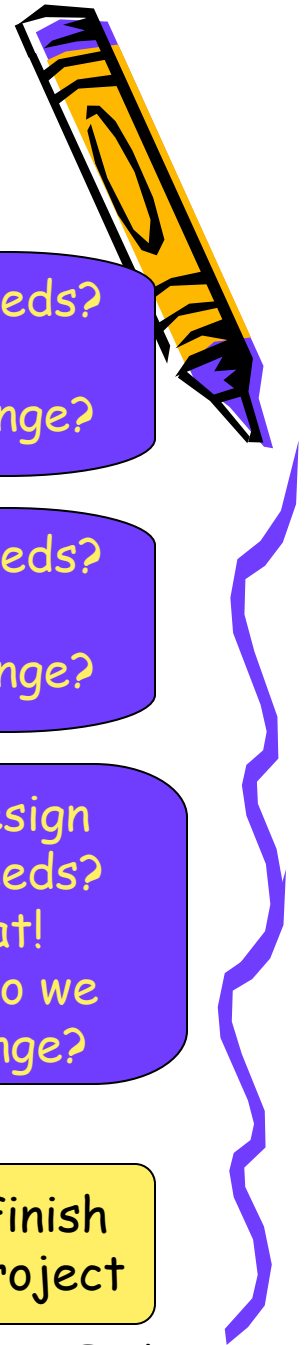
Develop
Stage/Gate

Does this design
meet your needs?
Yes? Great!
No? What do we
need to change?

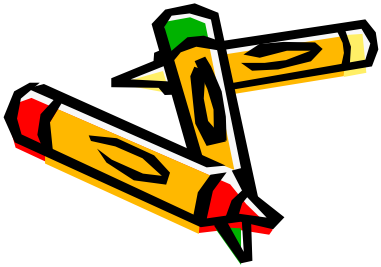
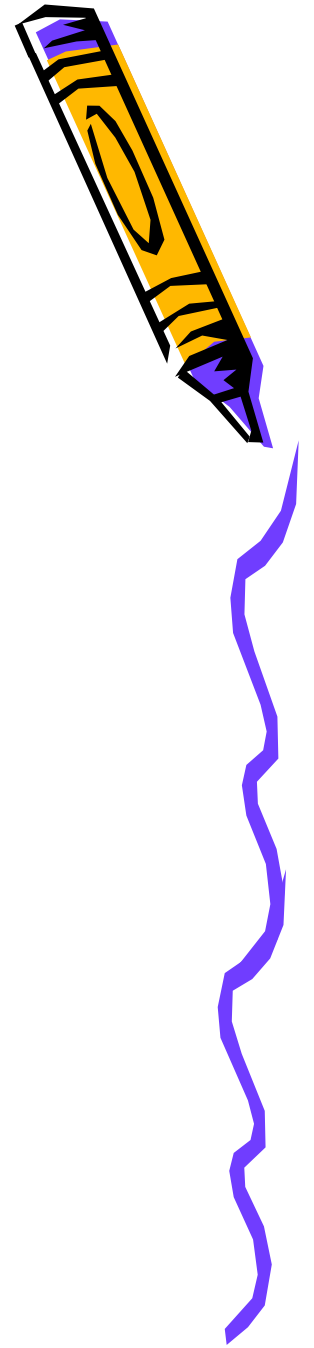
Refine
Stage/Gate

Finish
Project

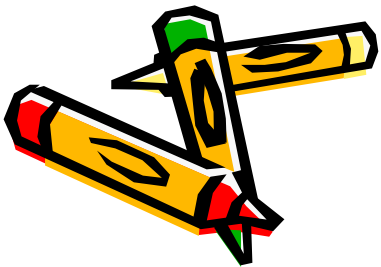
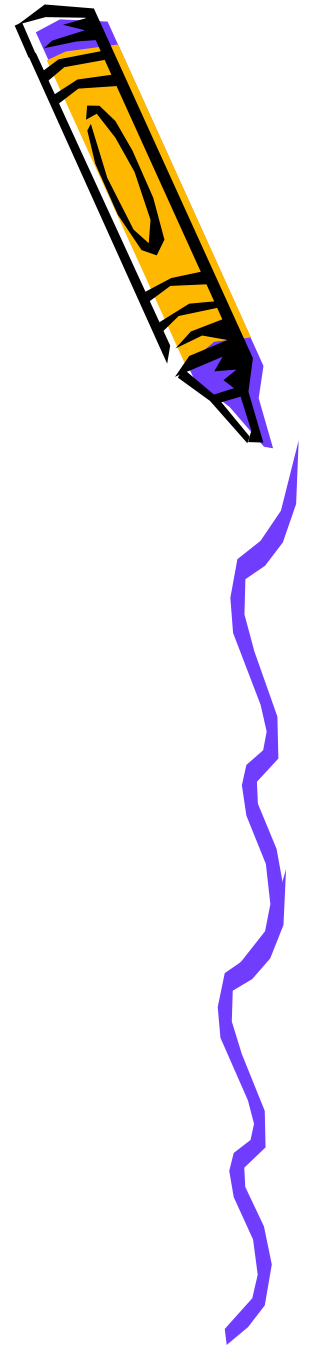
End



Are you convinced?

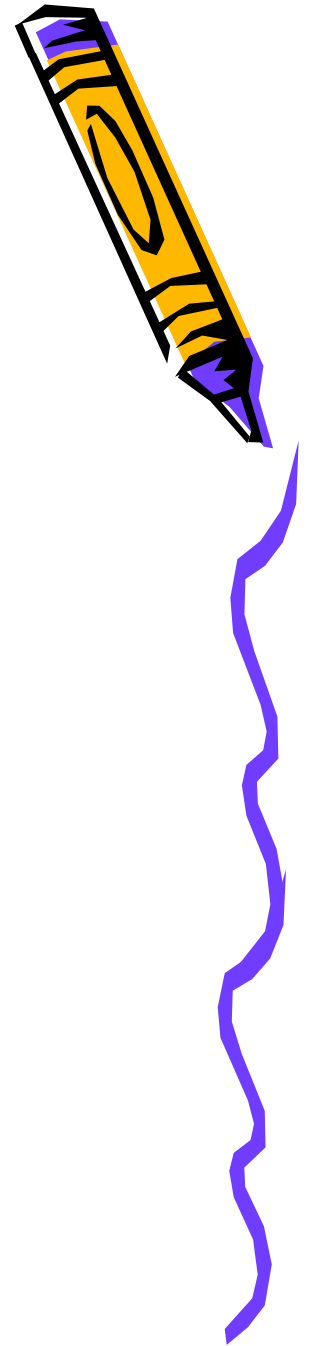


Good! Let's try it out...



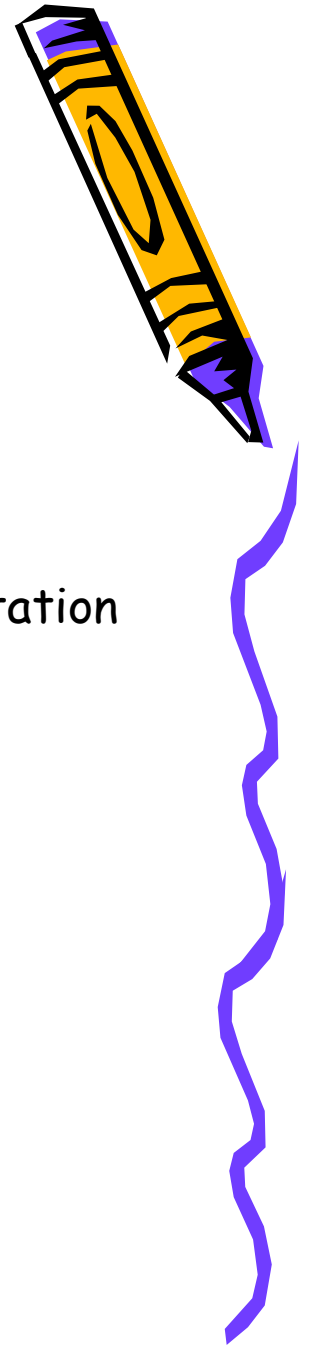
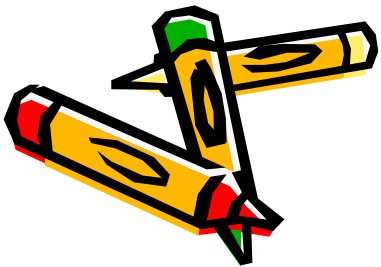
Pick a Project

- Community Partner
 - Zandir, Bragord of Lesindaiti
- Need
 - Electricity, cheap and off-grid
- Timeframe
 - 3/7/05 - 4/20/05
- Resources
 - Team
 - Machine shop
 - Limited budget
 - D-Lab teachers



What Does the Customer Want?

- Zandir
 - Low capital cost
 - Low operational cost
 - Locally manufacturable
 - Locally operational
 - Culturally acceptable
 - Training
- Amy, Kurt and Will
 - Thoughtful design
 - Good documentation
 - Clear, useful presentation
- You
 - Design experience
 - Team experience
 - Successful design
 - Functional implementation
 - ?

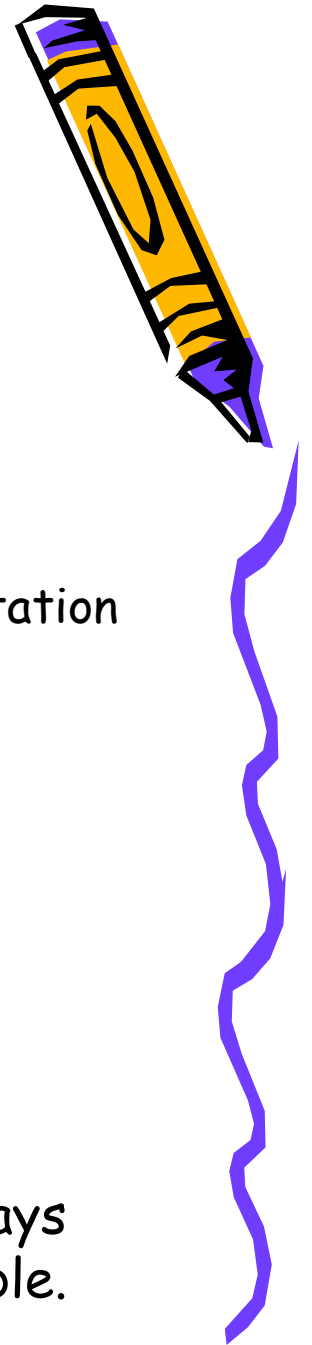


What Does the Customer Want?

- Zandir
 - Low capital cost
 - Low operational cost
 - Locally manufacturable
 - Locally managed
 - Culturally acceptable
 - Training
- Amy, Kurt and Will
 - Thoughtful design
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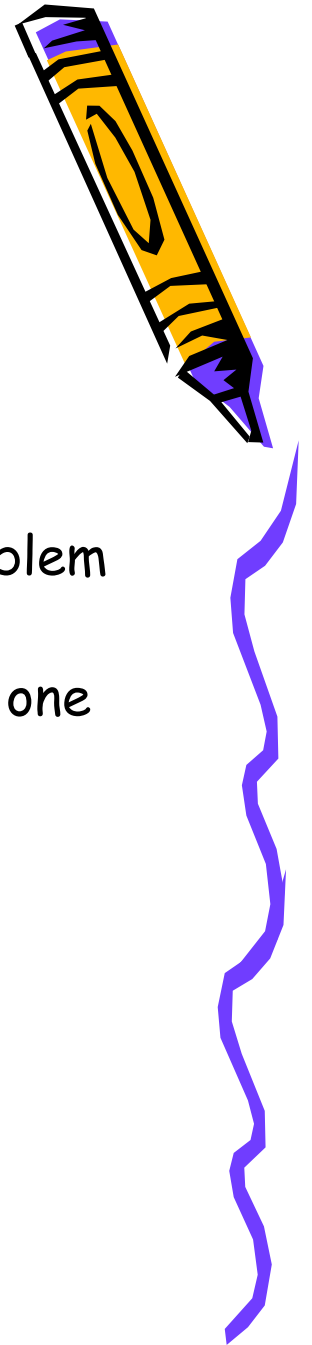
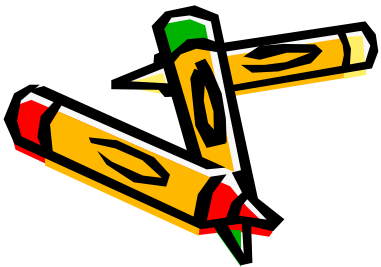
*Note: These are poor criteria! Always quantify and specify whenever possible.



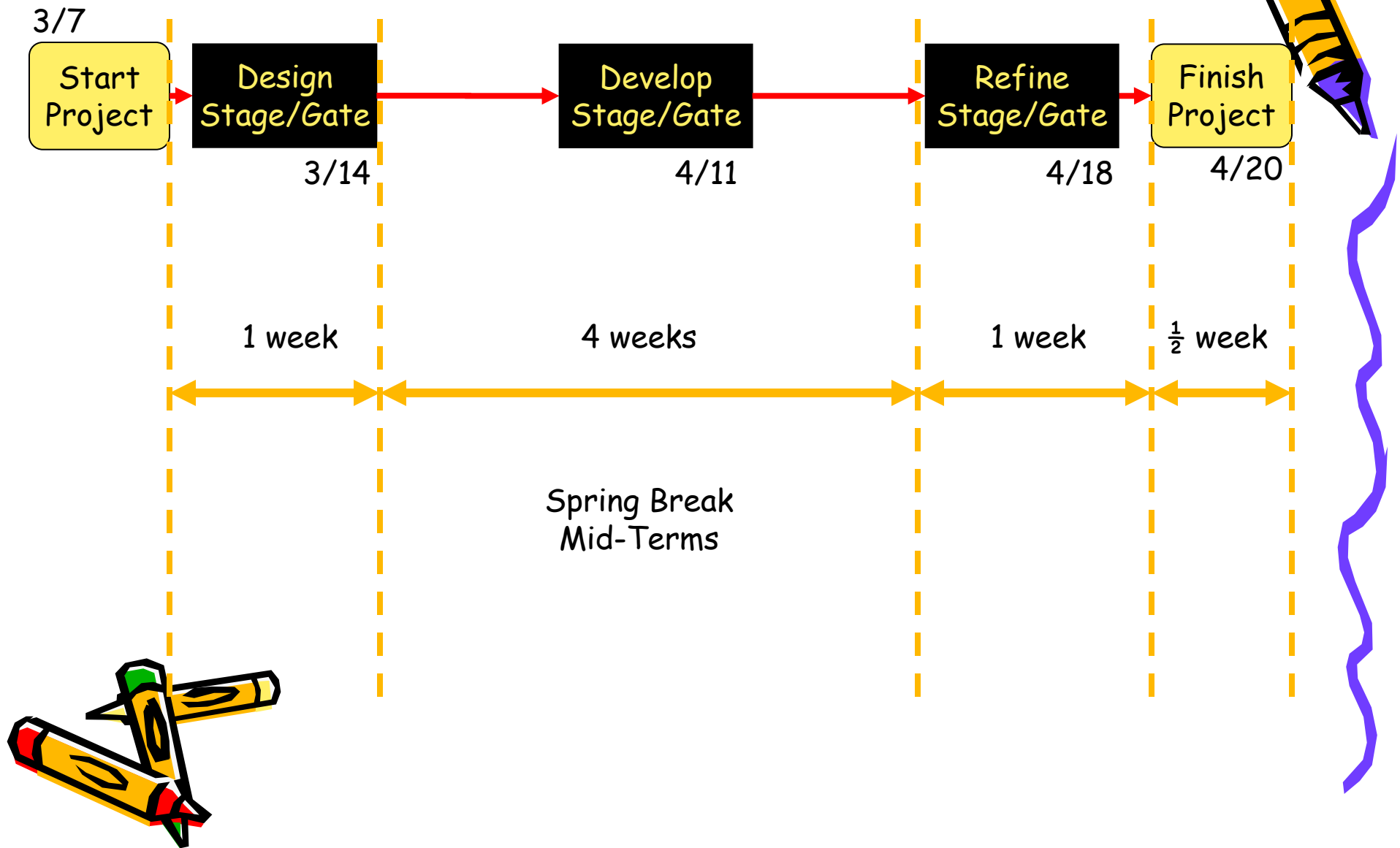
Timeframe

- $3/7 - 4/20 = 6.5$ weeks
- Subtract one week for Spring Break
- Subtract one week for studying for midterms
- Subtract half a week for attending class and doing problem sets
- Don't forget that 13 days are weekend days - subtract one week

- Three person-weeks spread over 6.5 weeks
- Three person team = 9 person-weeks over 6.5 weeks

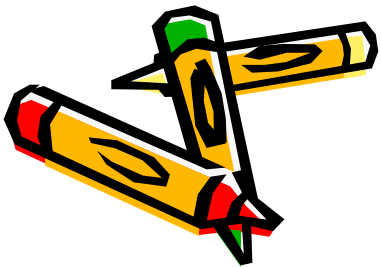
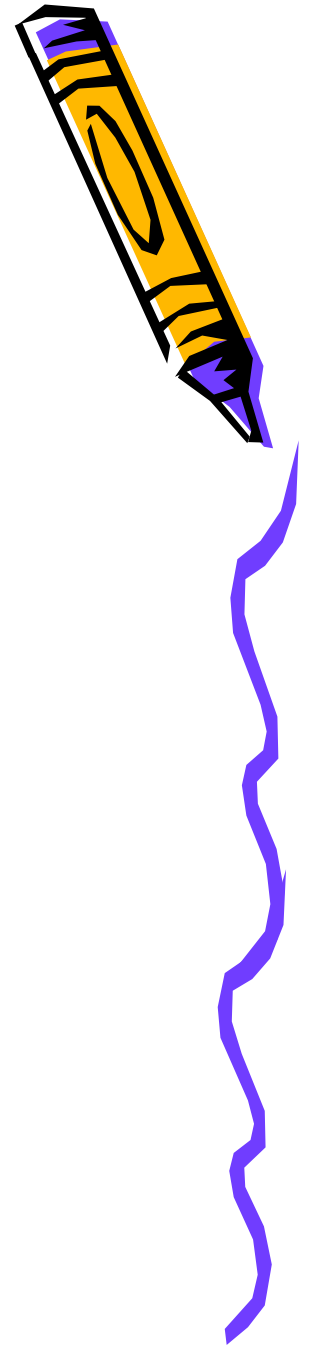


Time Frame Planning

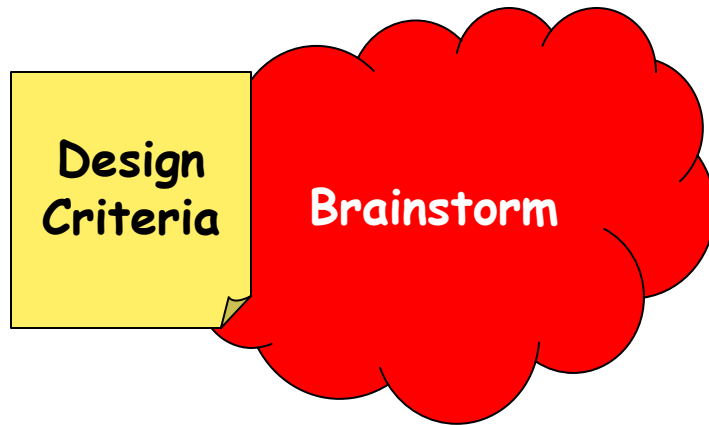
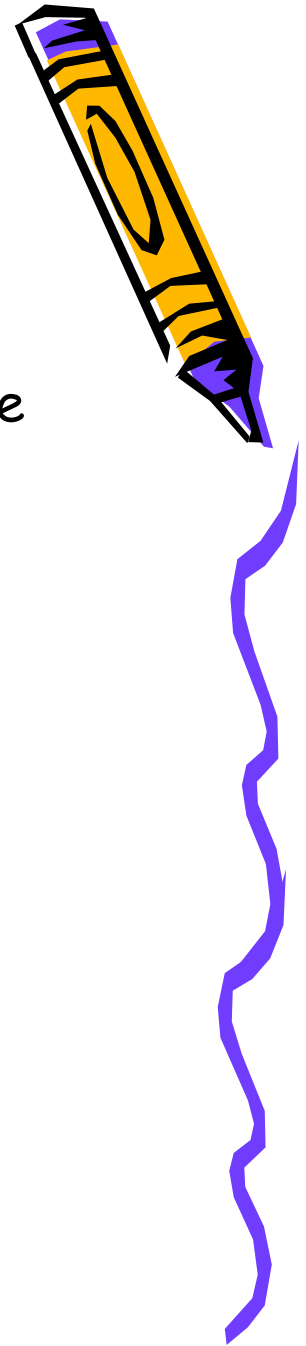


Design Stage/Gate

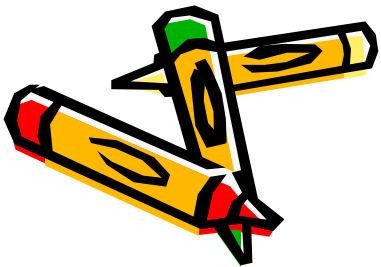
- Start with Customer Requirements
 - Zandir's
 - Teachers'
 - Yours
 - Team's
- Write them out
 - Identify clear goals
 - Address conflicts
 - Obtain team consensus



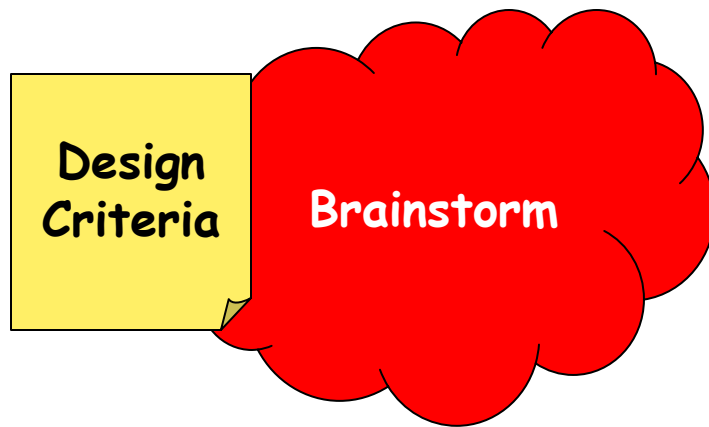
Design Stage/Gate



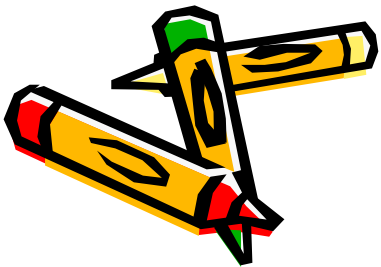
- Whole Team
- Customers, where possible
- Generate ideas
 - Good
 - Bad
 - Indifferent
 - Nuts
- No negativity!



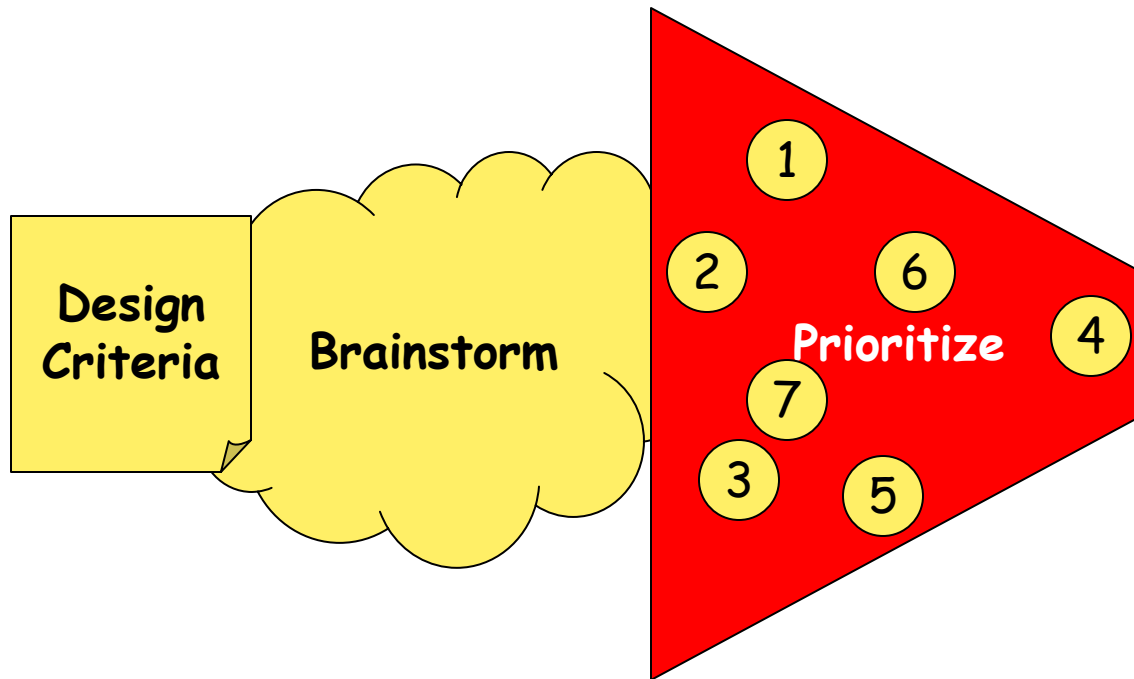
Design Stage/Gate



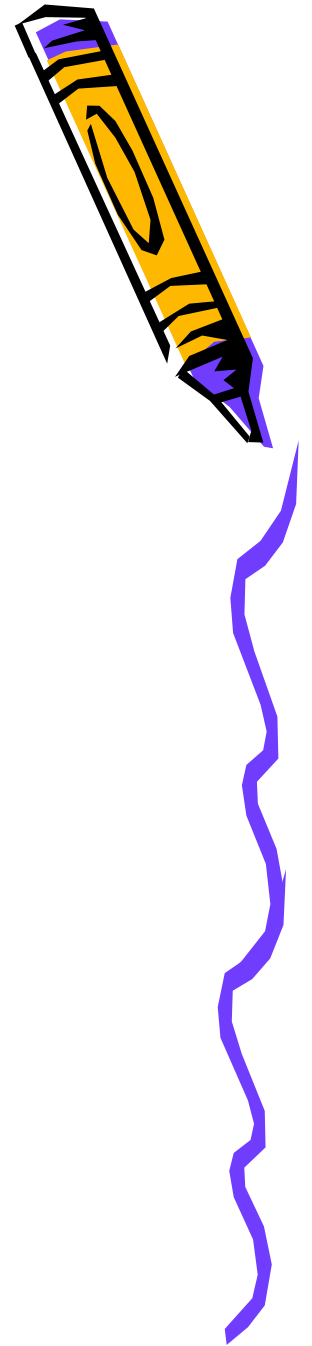
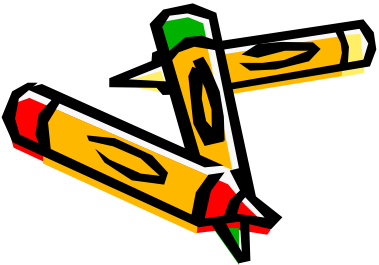
1. Perpetual motion machine of the first kind
2. Perpetual motion machine of the second kind
3. Perpetual motion machine of the third kind
4. Zero Point energy system
5. Cold Fusion
6. Hot Fusion
7. Etc.



Design Stage/Gate

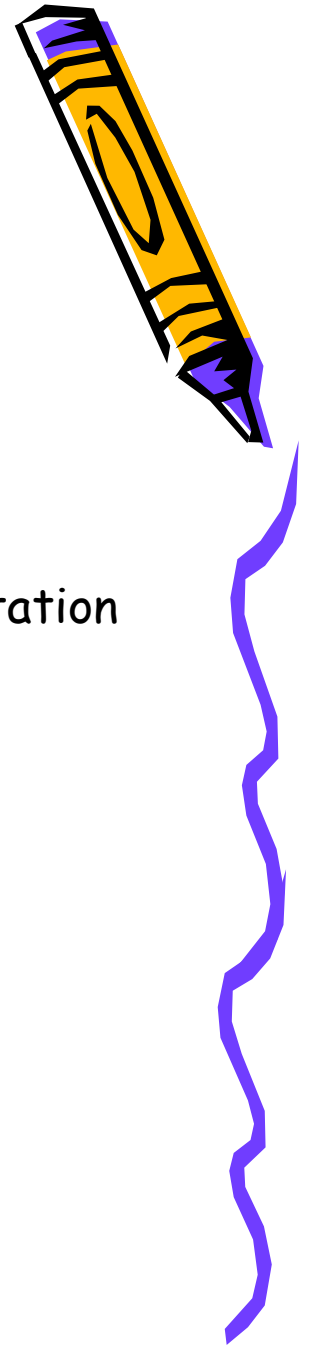
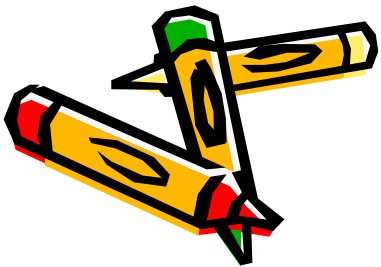


- Which idea(s) fit your criteria and resources the best?

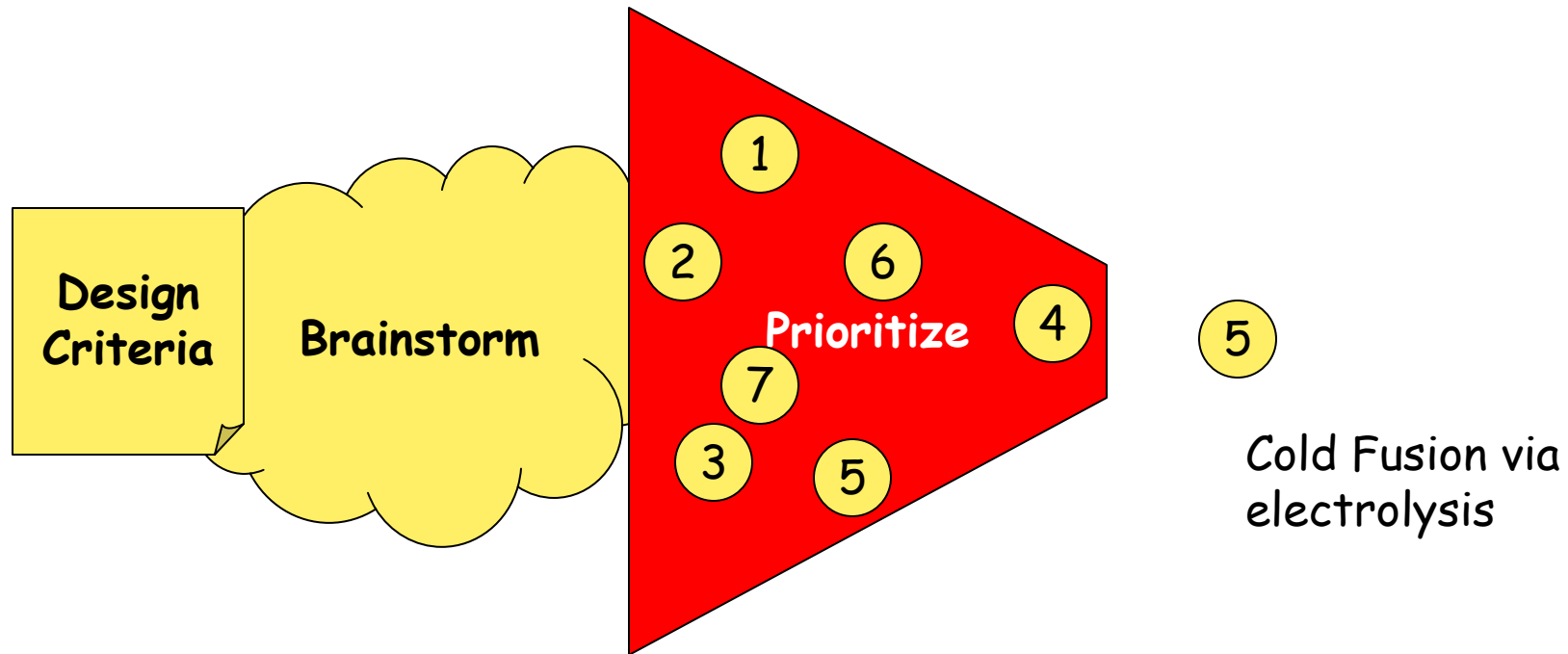


What Does the Customer Want?

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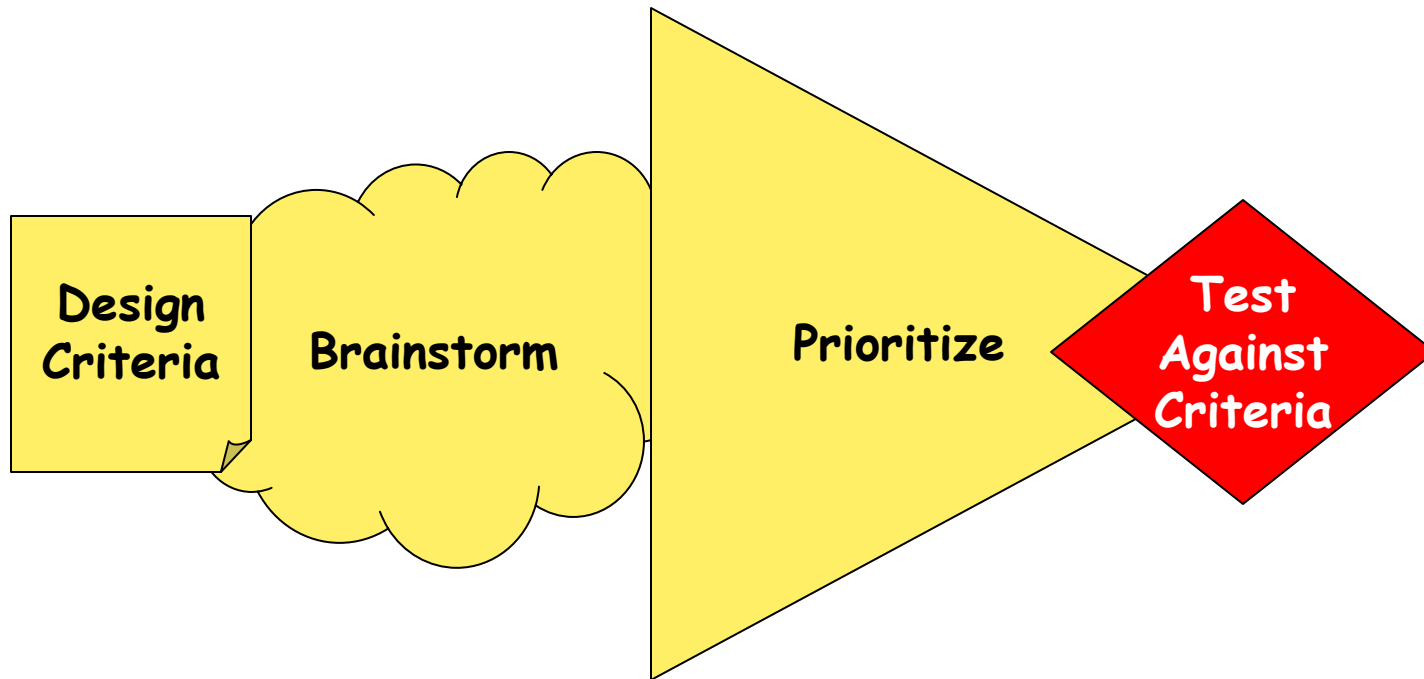
Design Stage/Gate



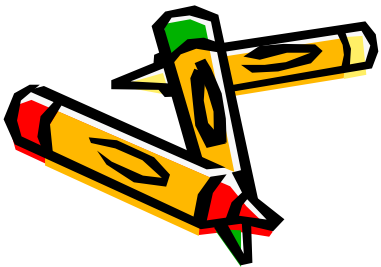
- Which idea(s) fit your criteria and resources the best?



Design Stage/Gate



- Are you sure??

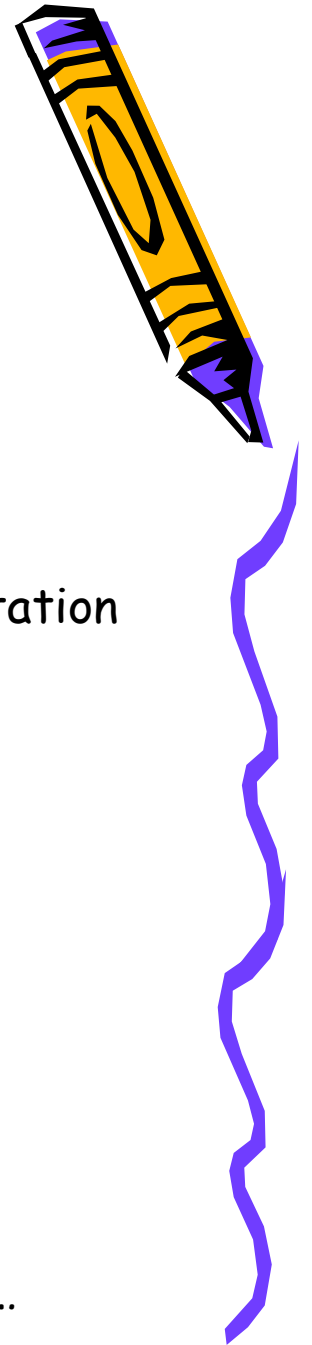


What Does the Customer Want?

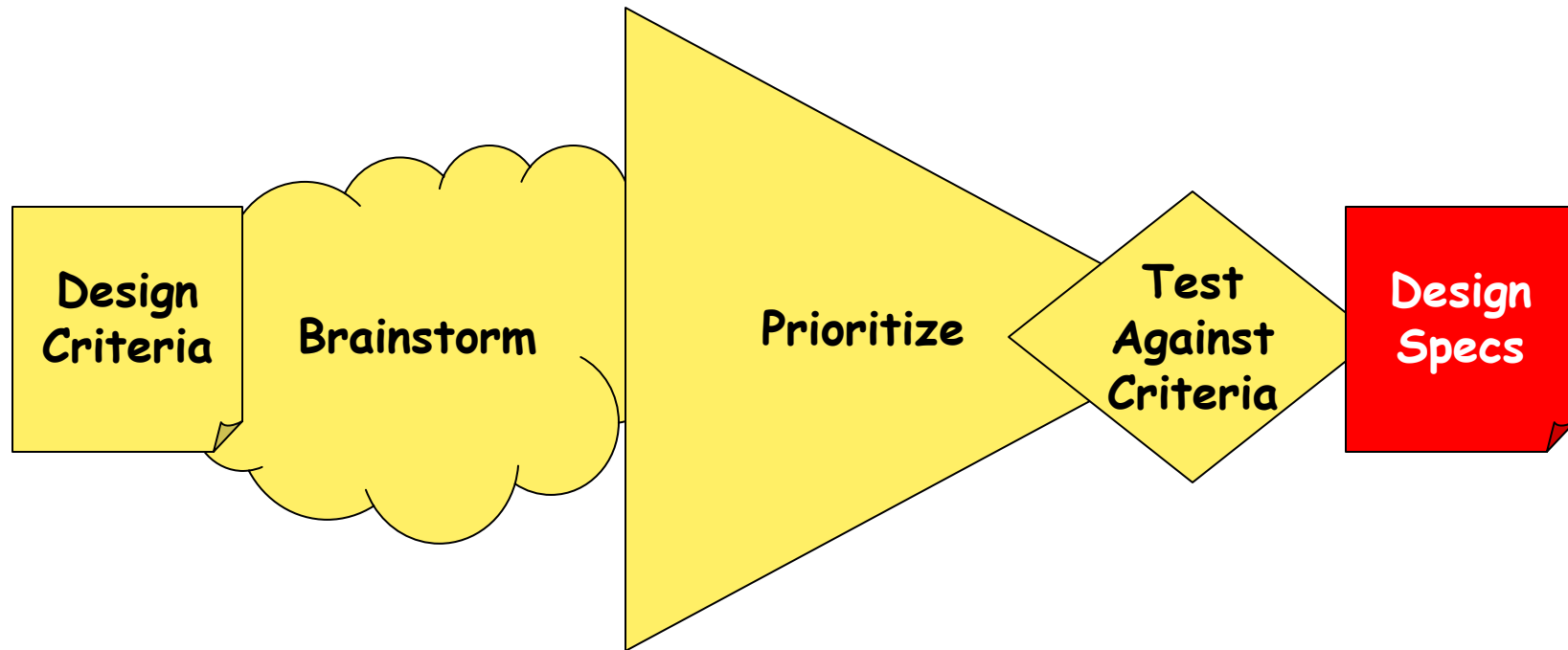
- Zandir
 - Low capital cost
 - Low operational cost
 - Locally manufacturable
 - Locally operational
 - Culturally acceptable
 - Training
- Amy, Kurt and Will
 - Thoughtful design
 - Good documentation
 - Clear, useful presentation
- You
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 - Team experience
 - Successful design
 - Functional implementation
 - ?



And maybe some laws of physics issues...



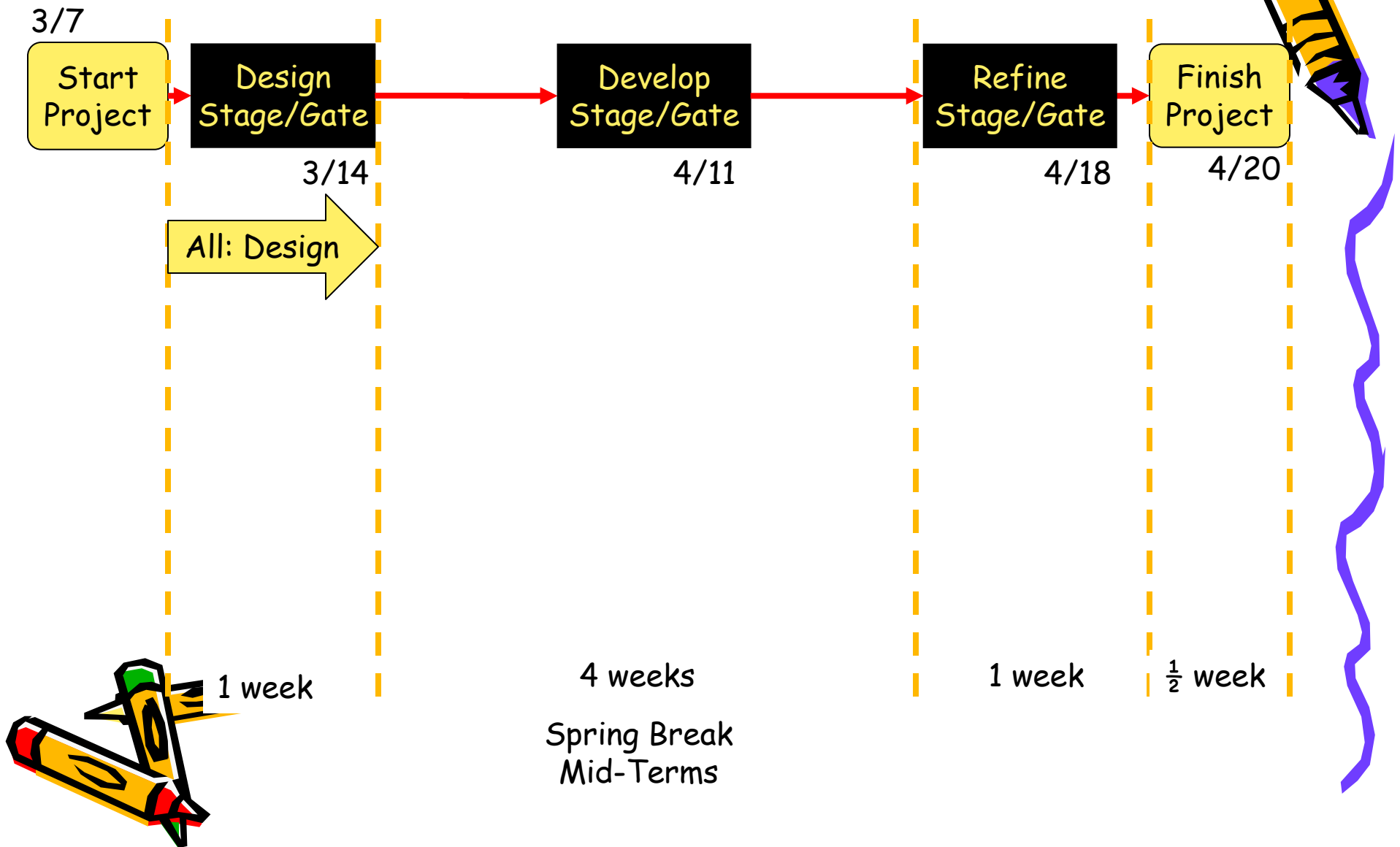
Design Stage/Gate



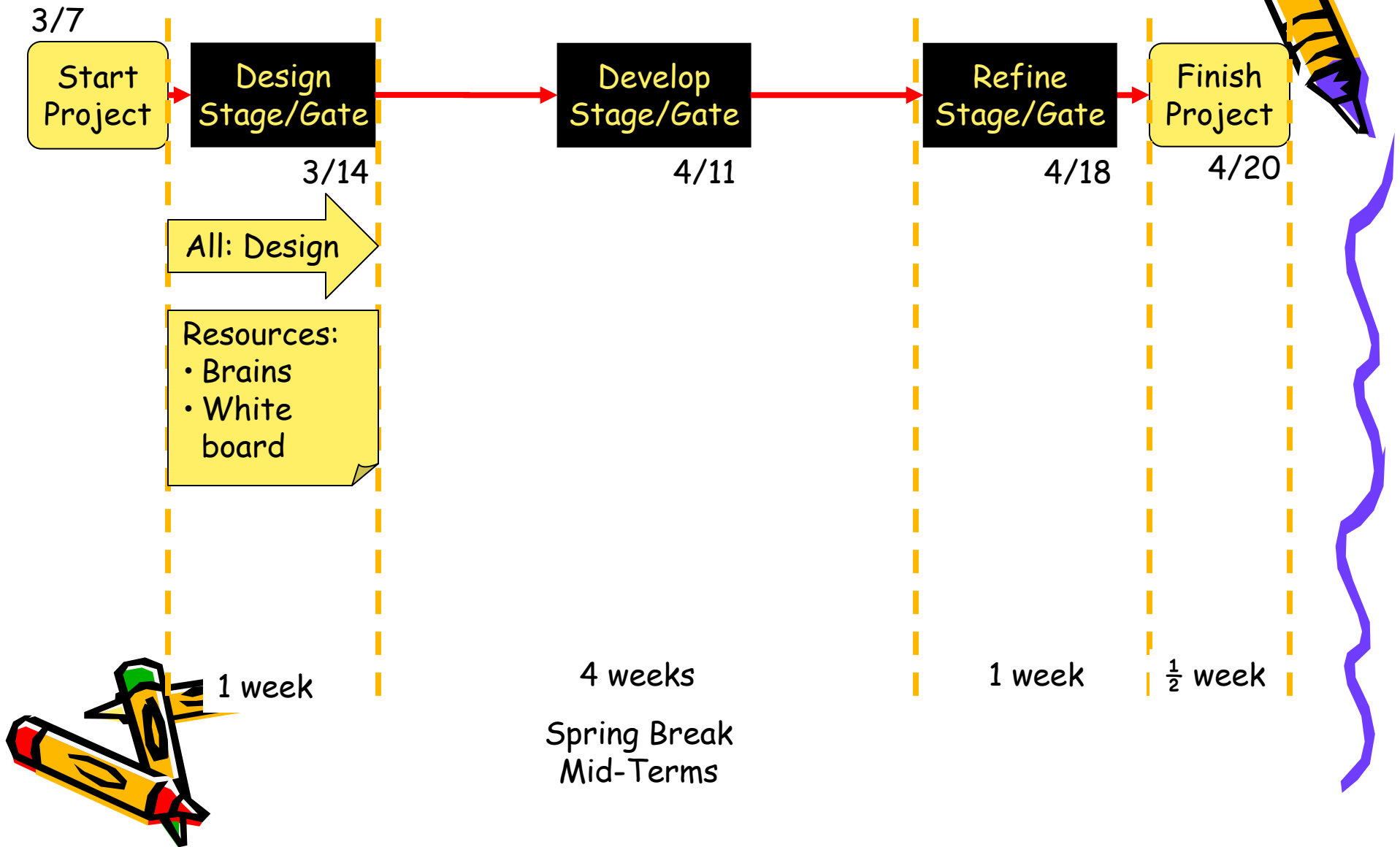
- Now have strong idea with group consensus (disagree & commit!)
- Fill out plan details



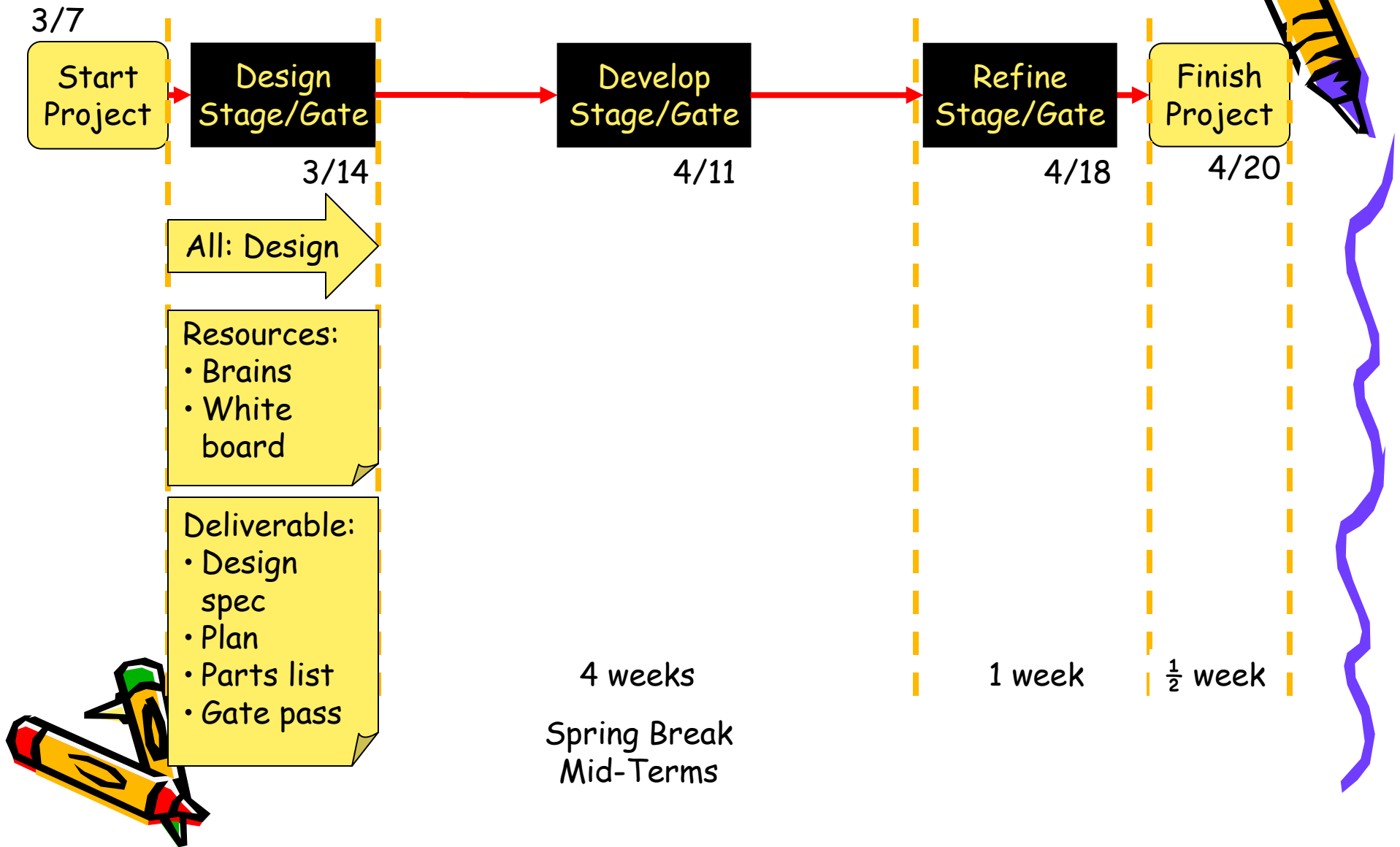
Time Frame Planning



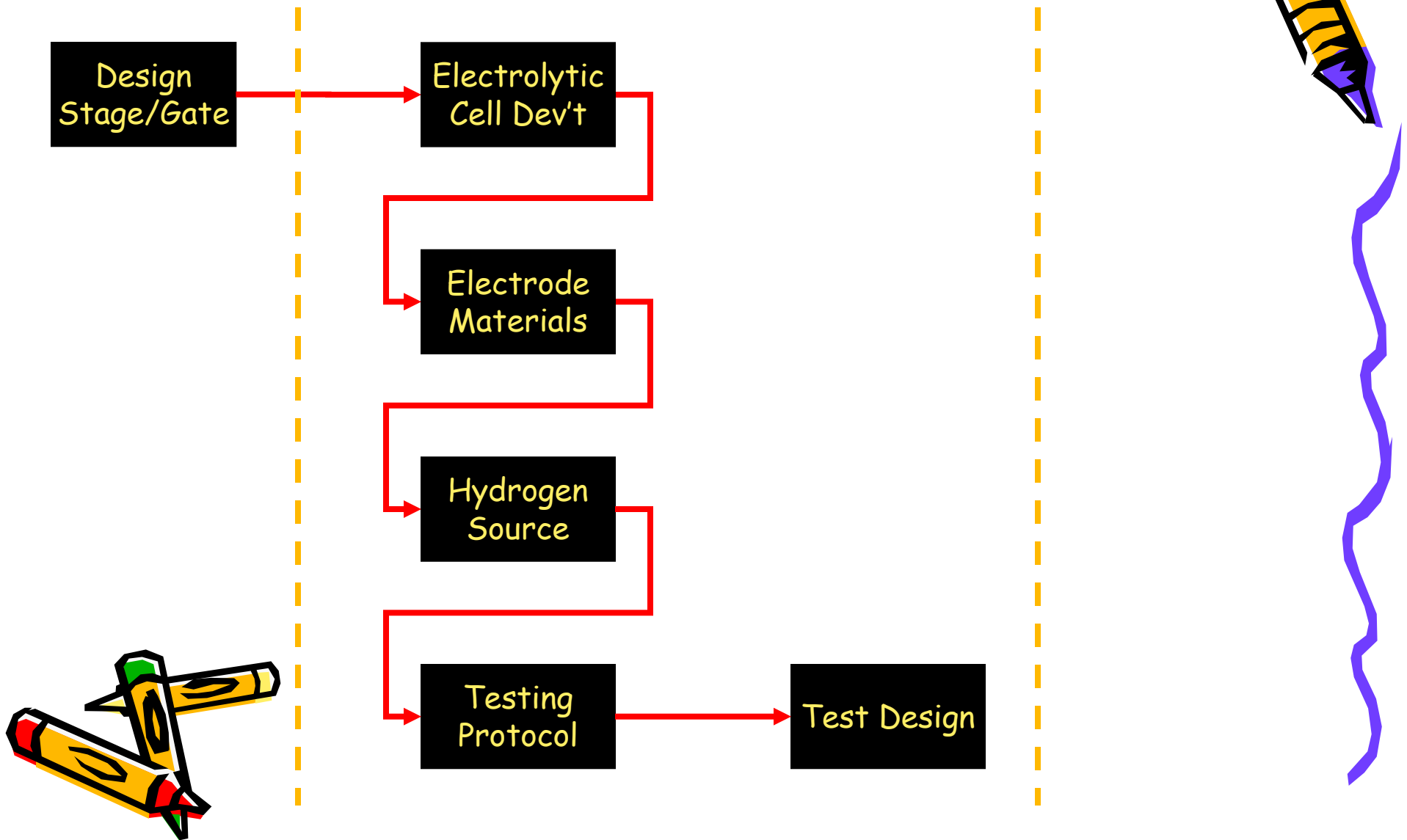
Time Frame Planning



Time Frame Planning



Develop Stage/Gate



Develop Stage/Gate

Design
Stage/Gate

Electrolytic
Cell Dev't

Electrode
Materials

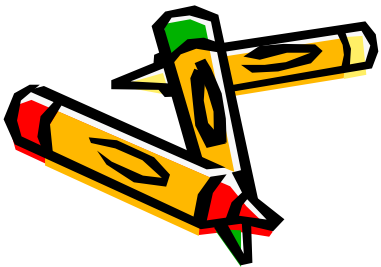
Hydrogen
Source

Testing
Protocol

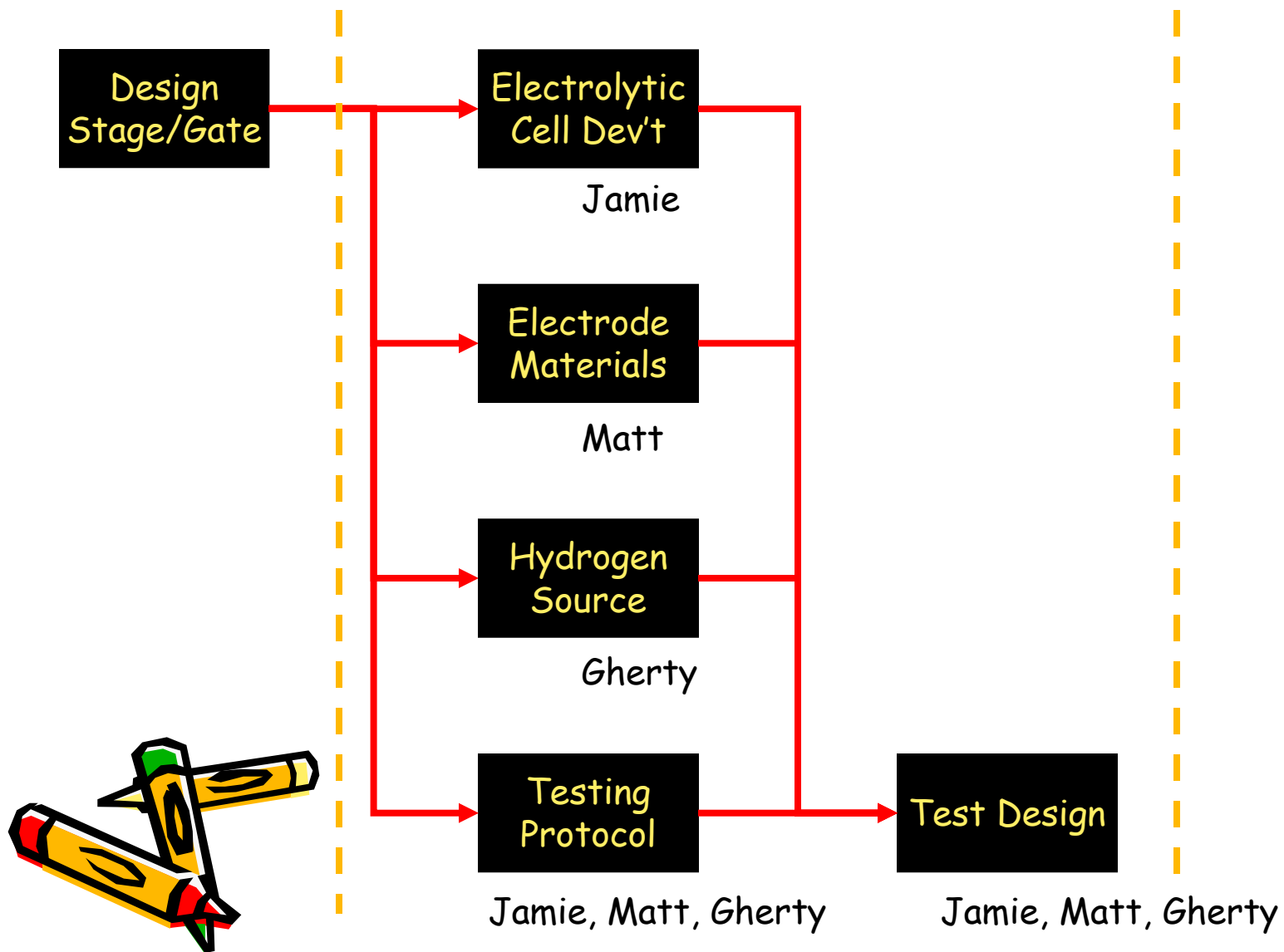
If all three of you spend one week on each task, that's 15 person-weeks over a 4-week period.

Each part gets only one week of attention or else delays the whole project.

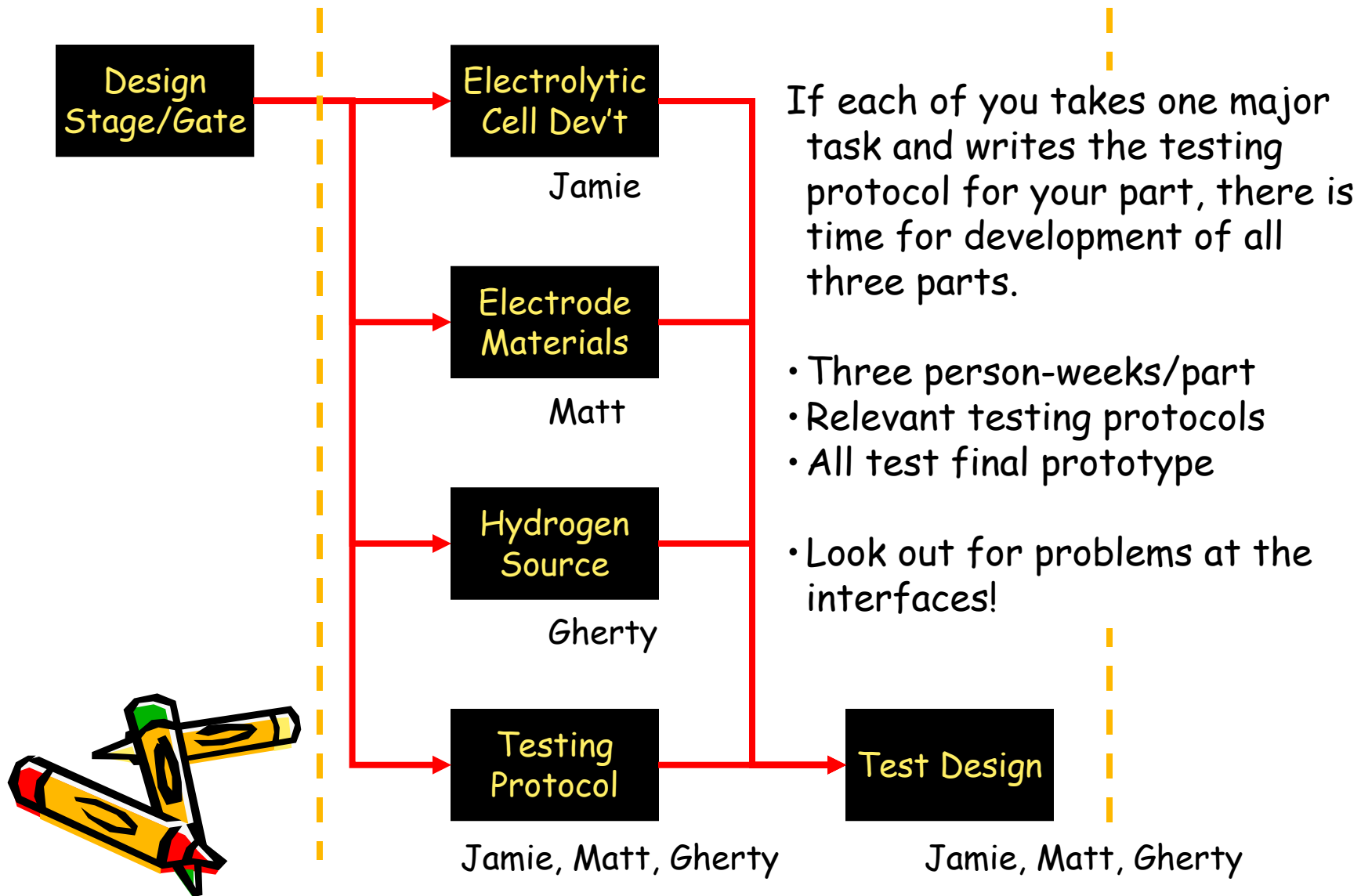
Test Design



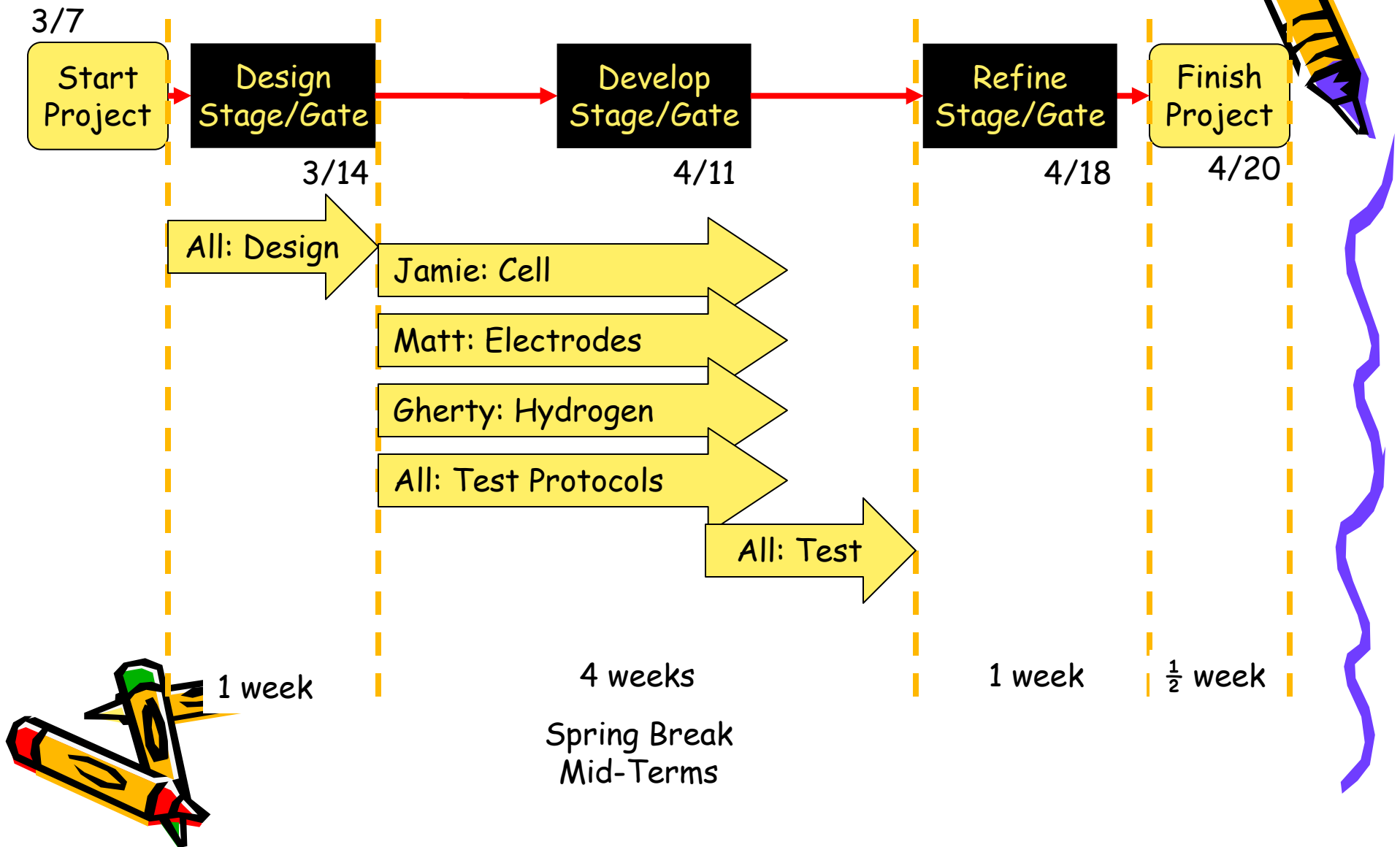
Develop Stage/Gate



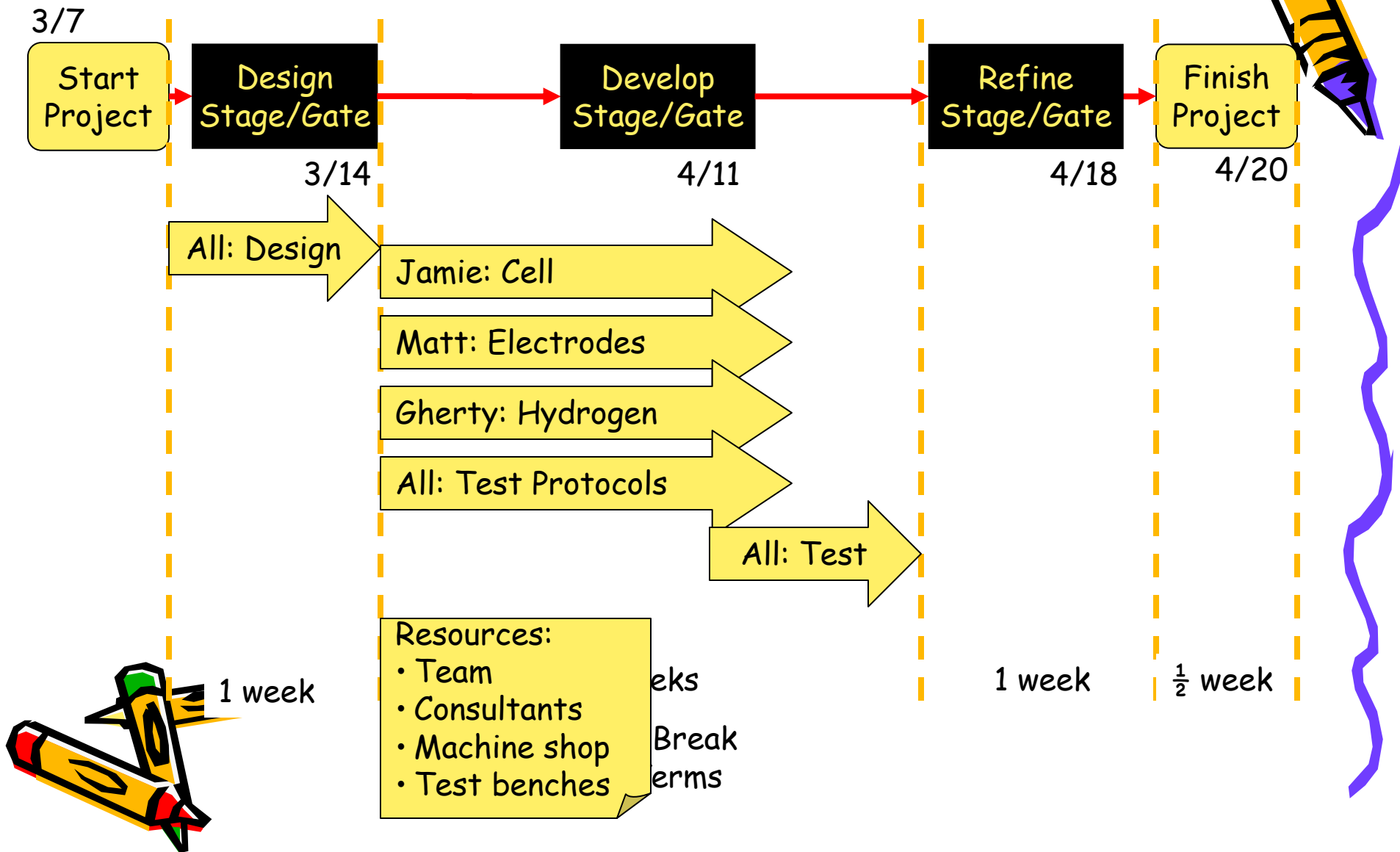
Develop Stage/Gate



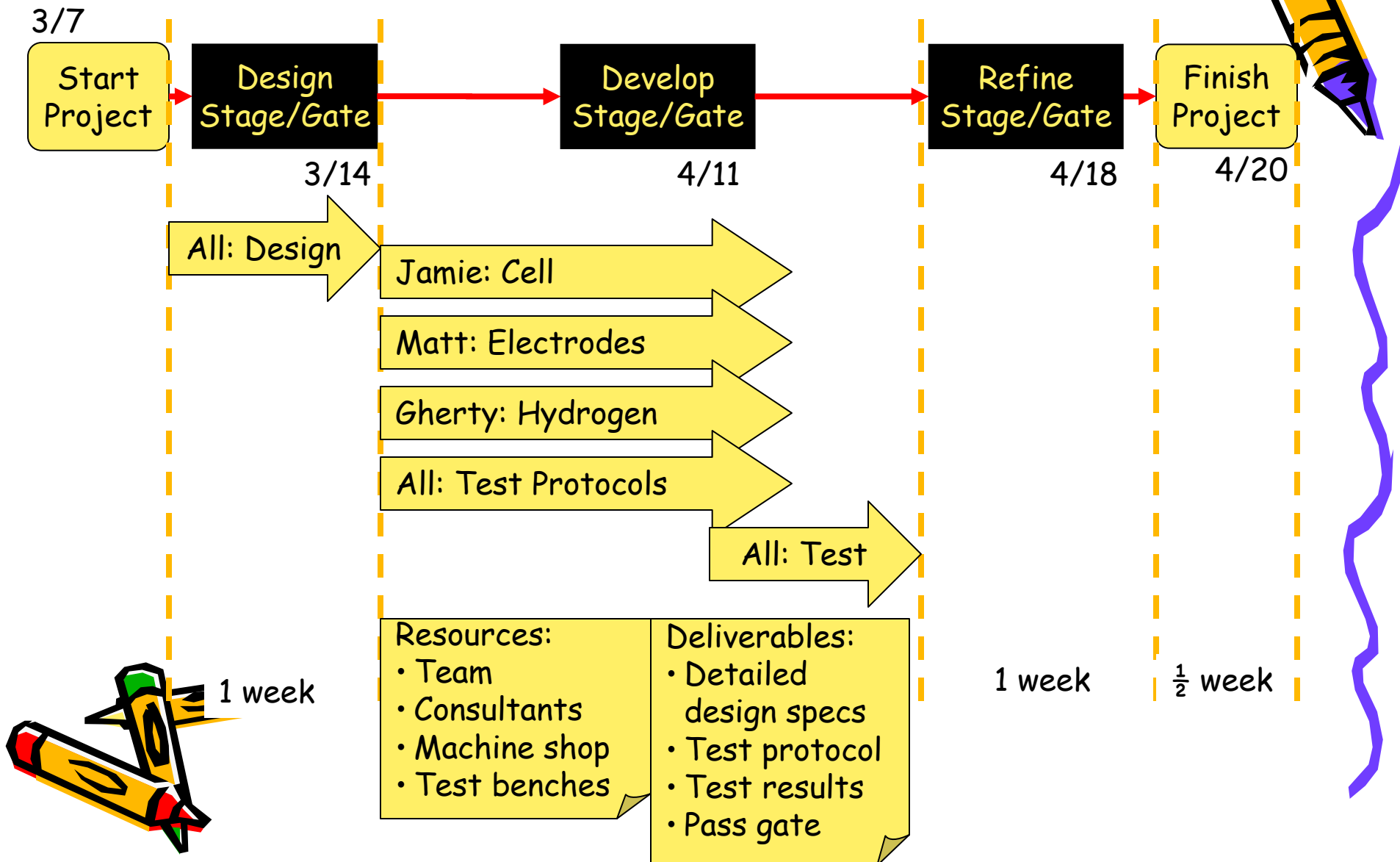
Time Frame Planning



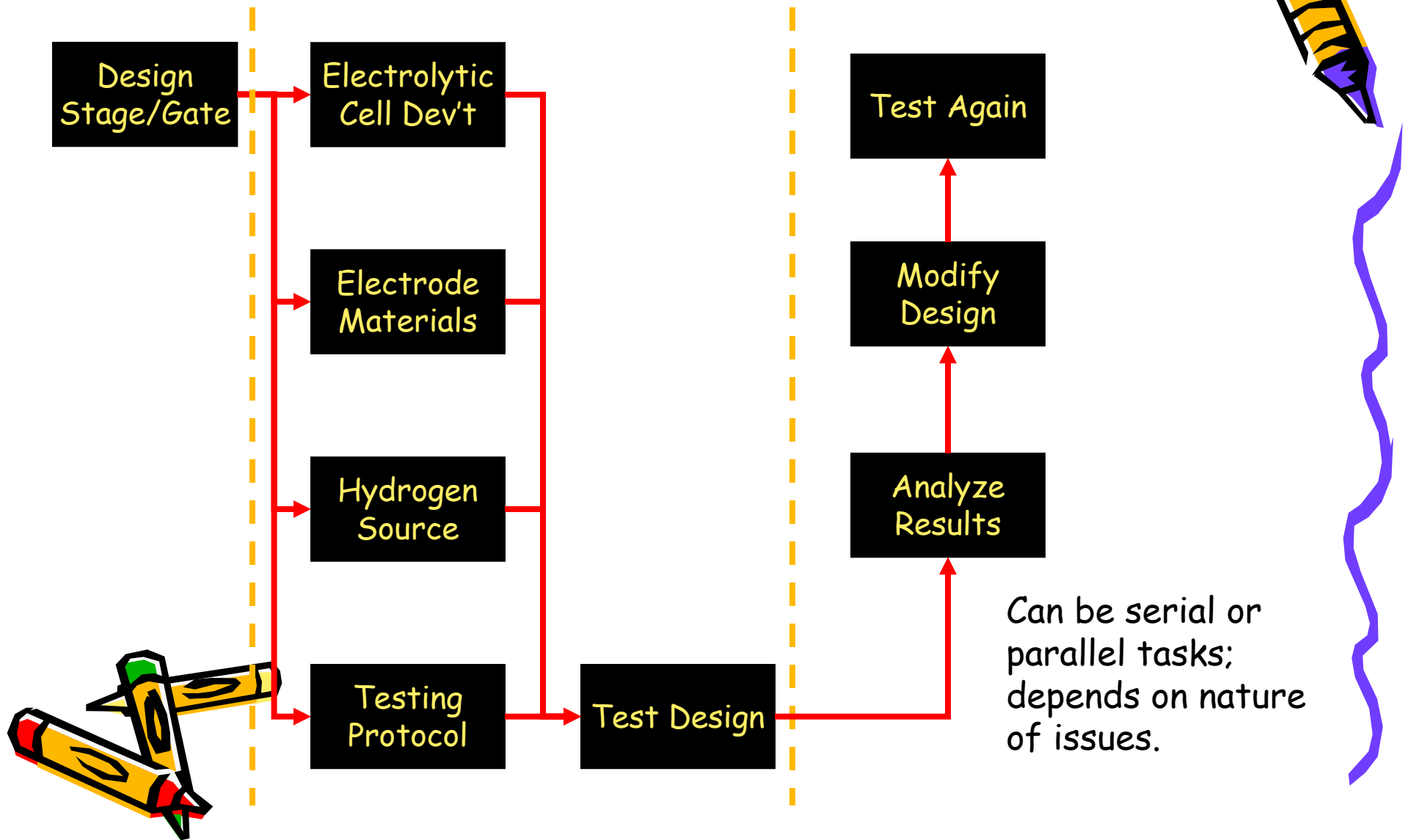
Time Frame Planning



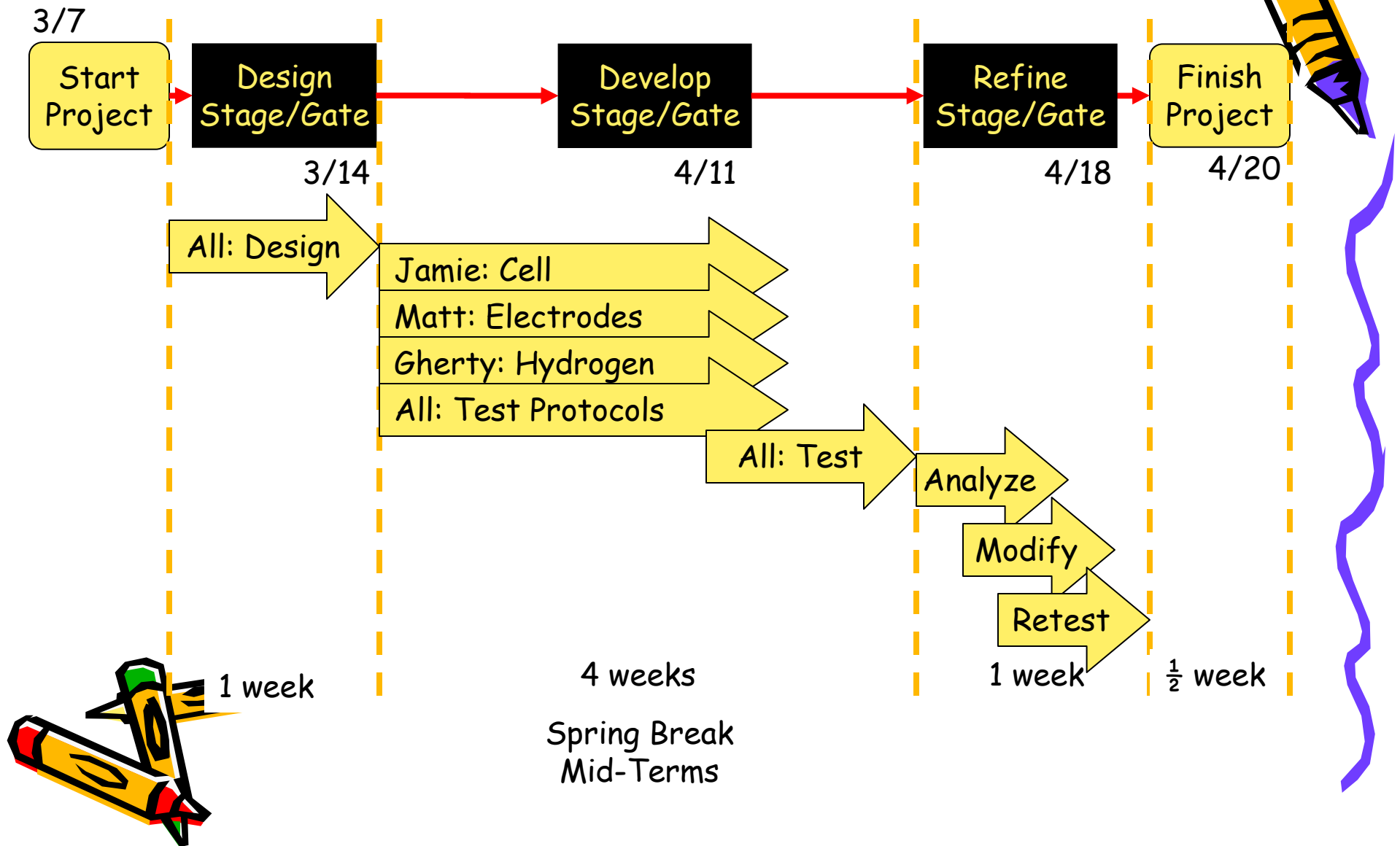
Time Frame Planning



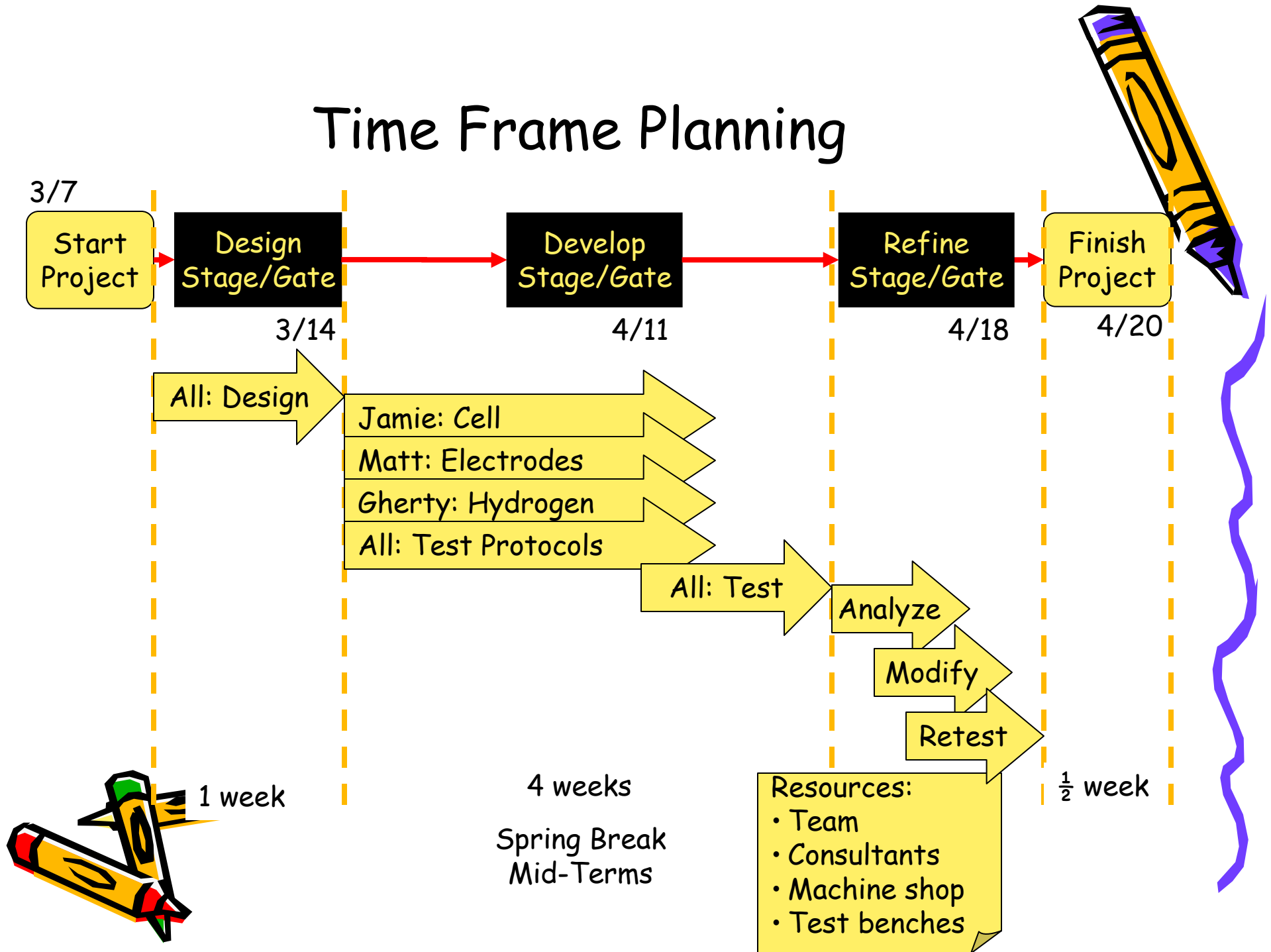
Refine Stage/Gate



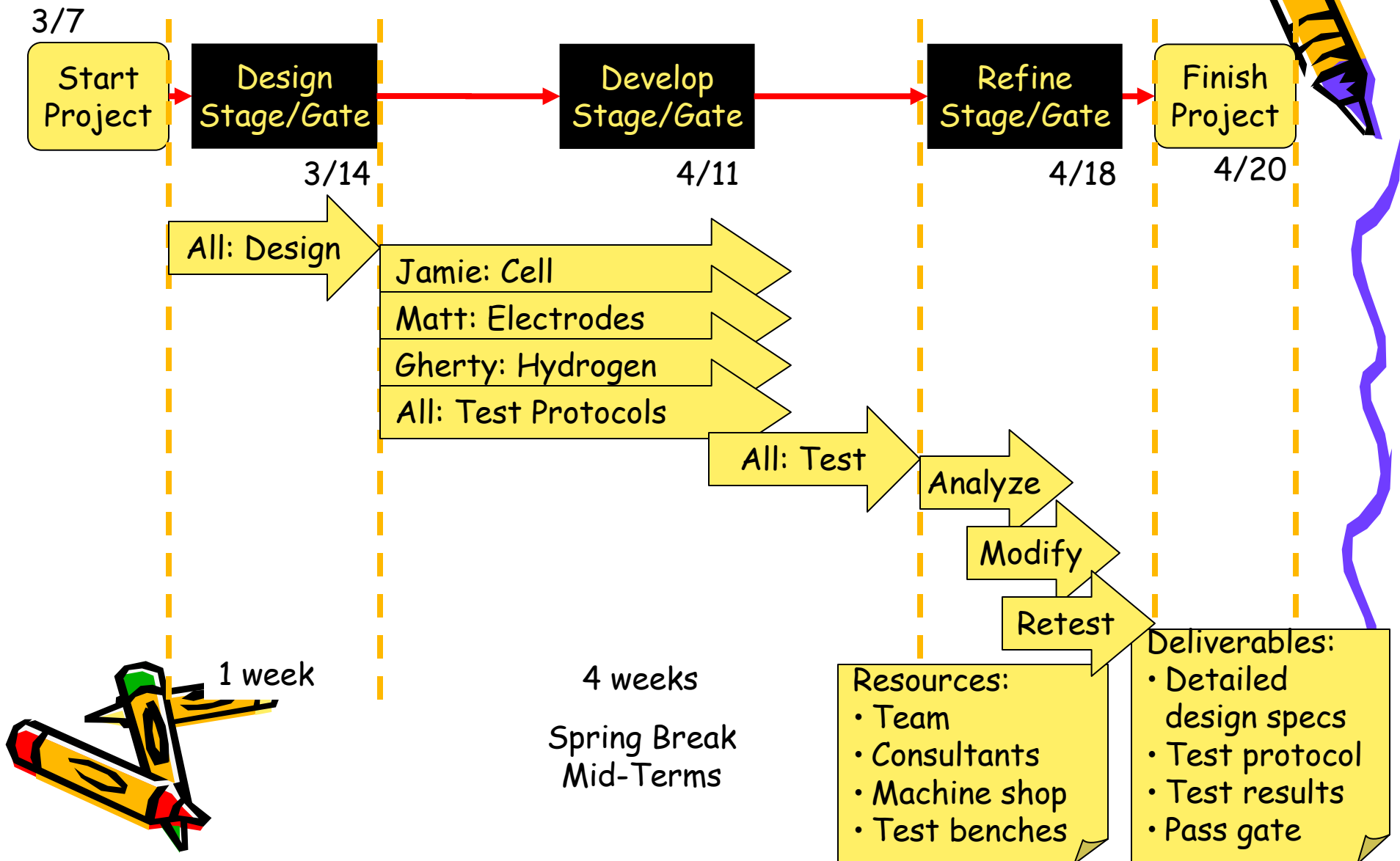
Time Frame Planning



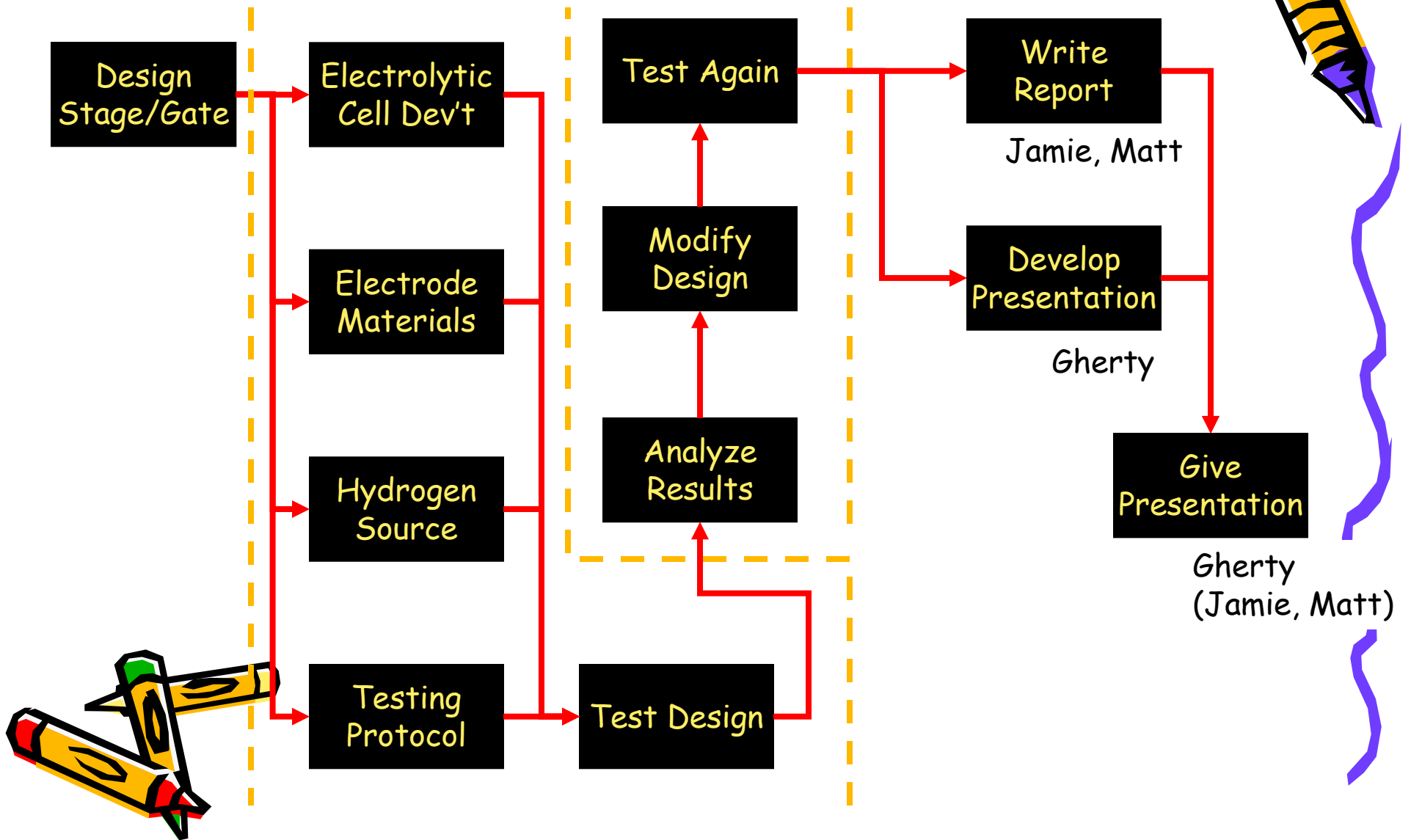
Time Frame Planning



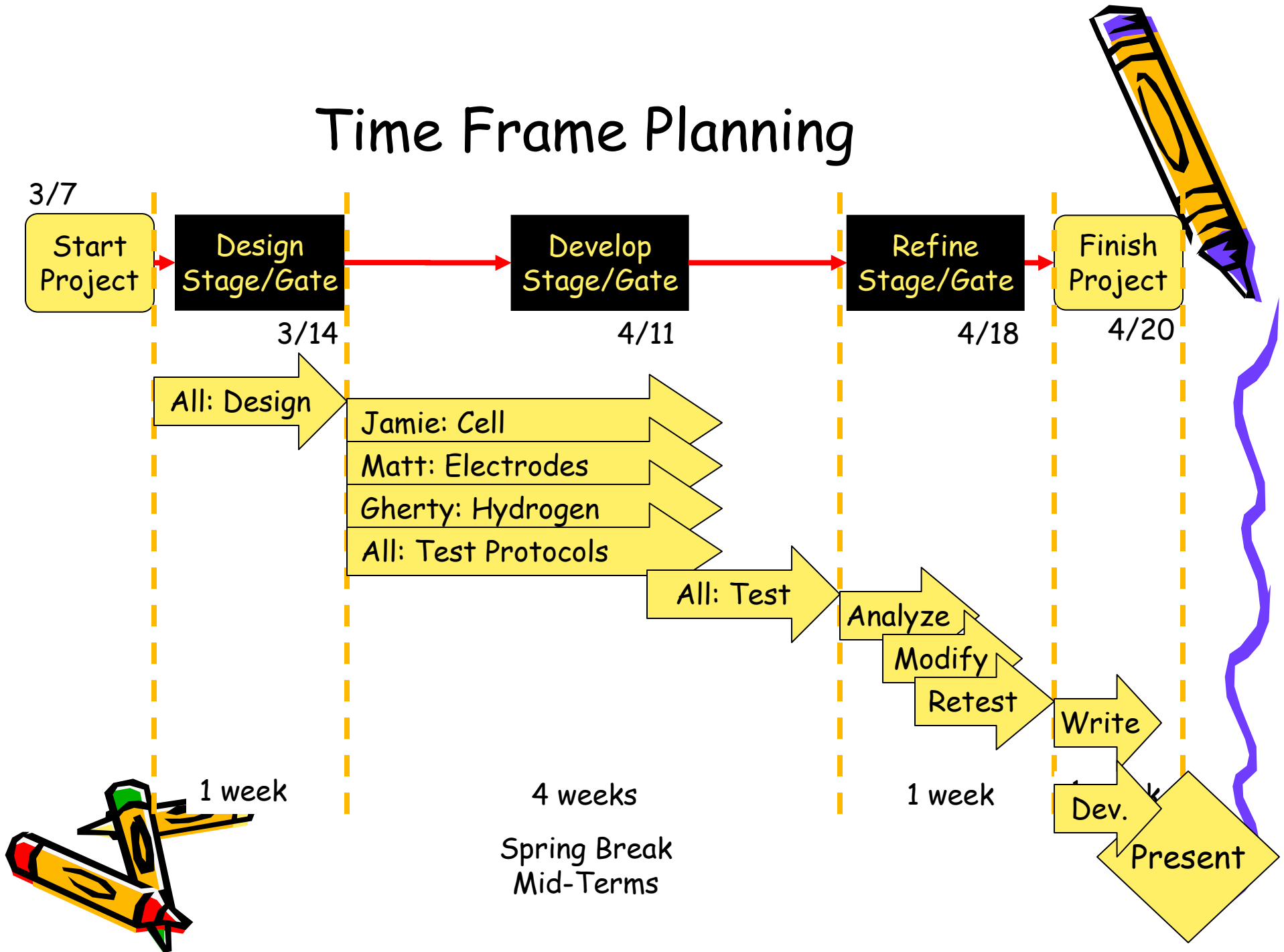
Time Frame Planning



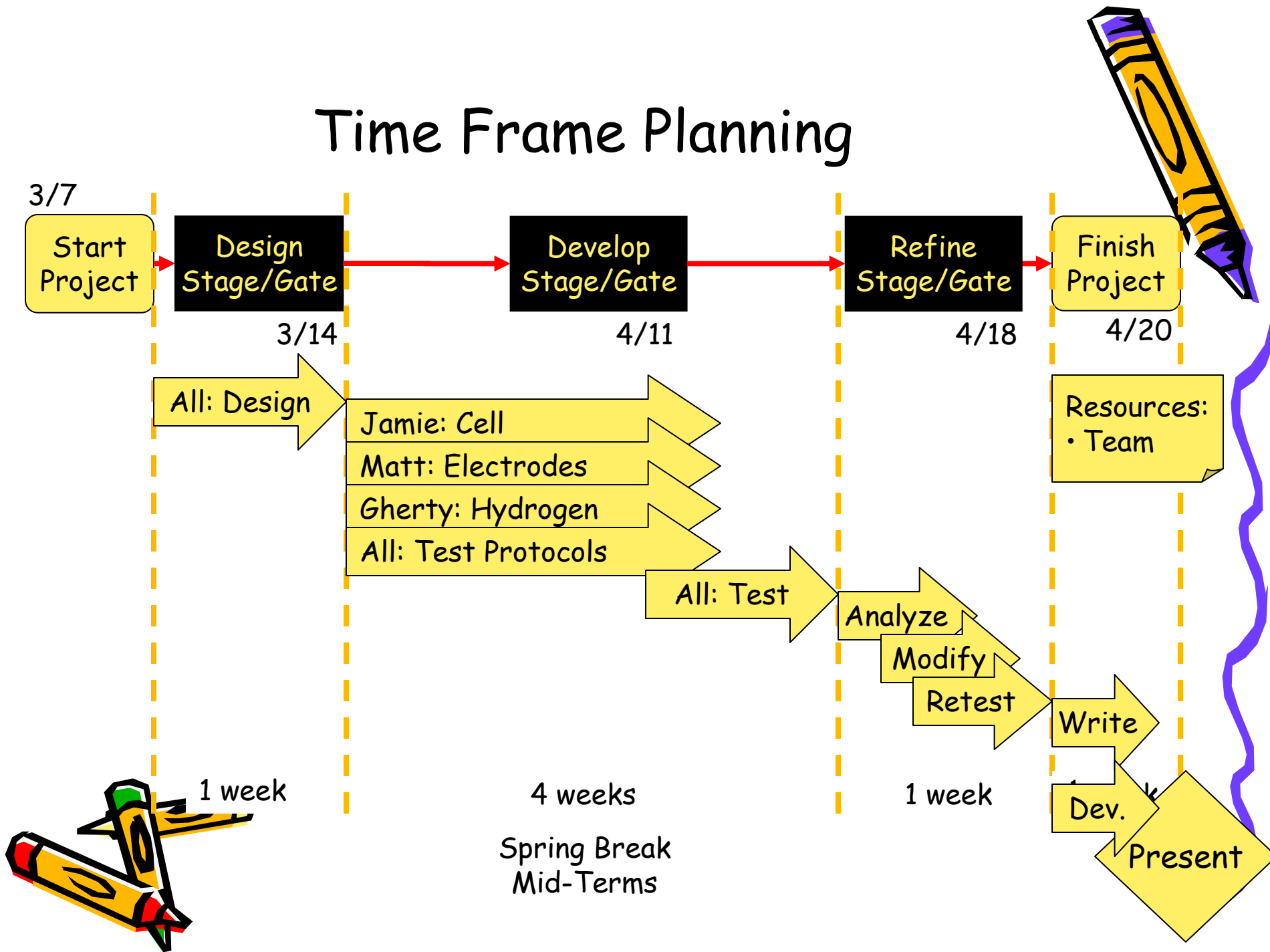
Finish Project



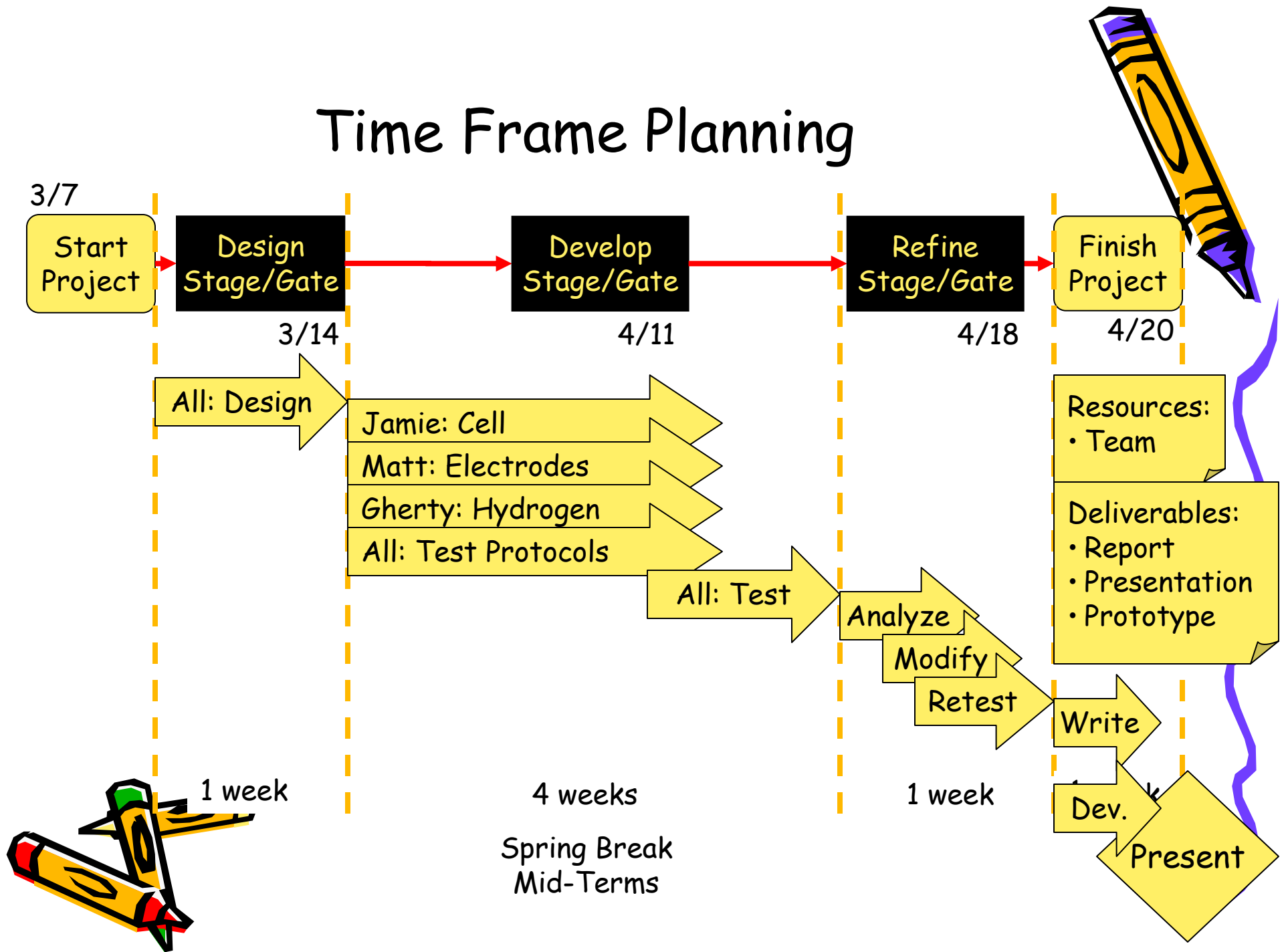
Time Frame Planning



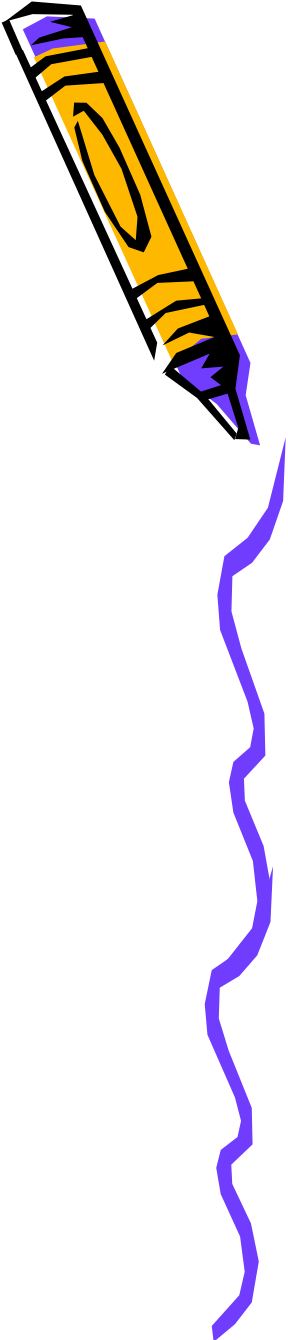
Time Frame Planning



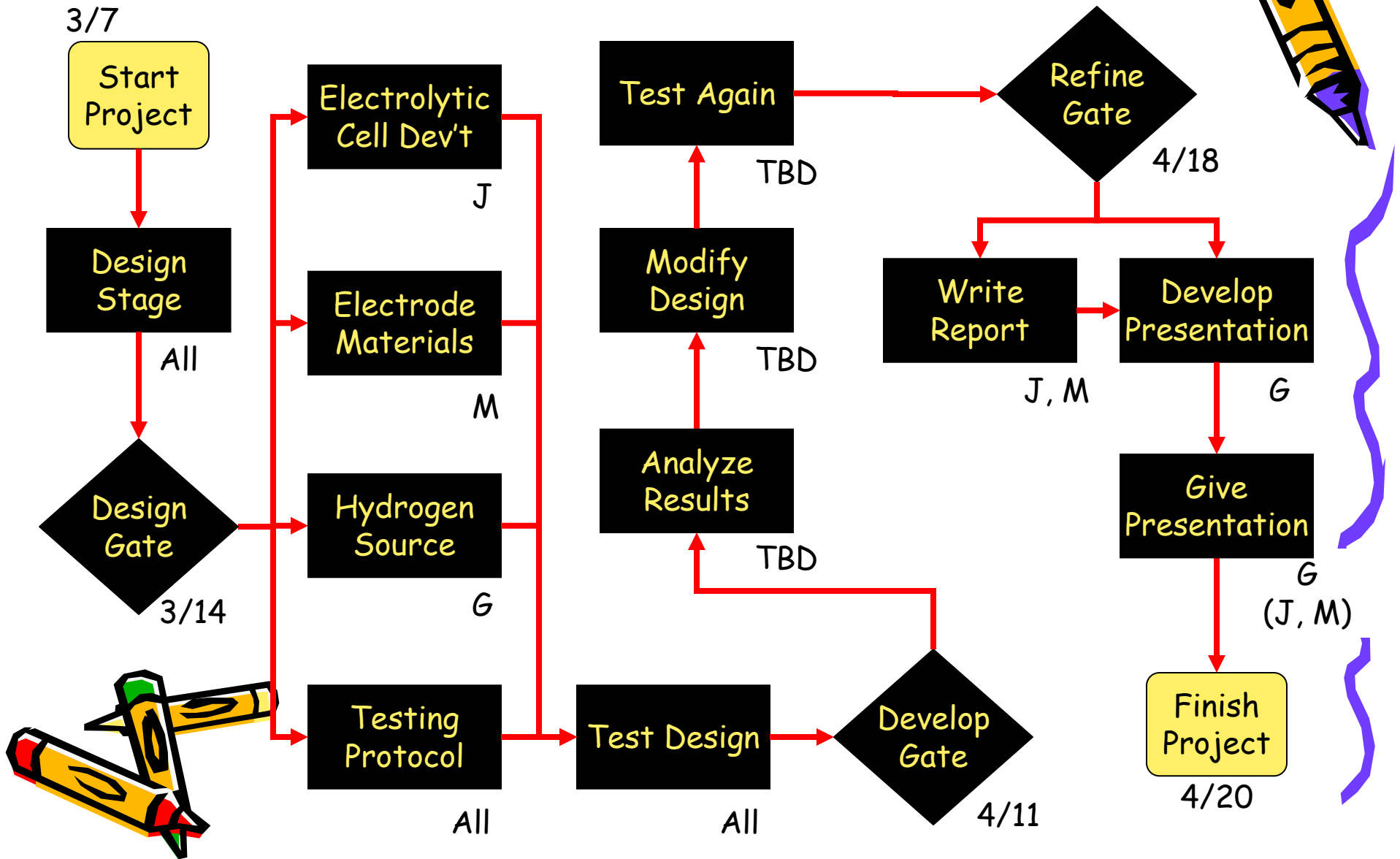
Time Frame Planning



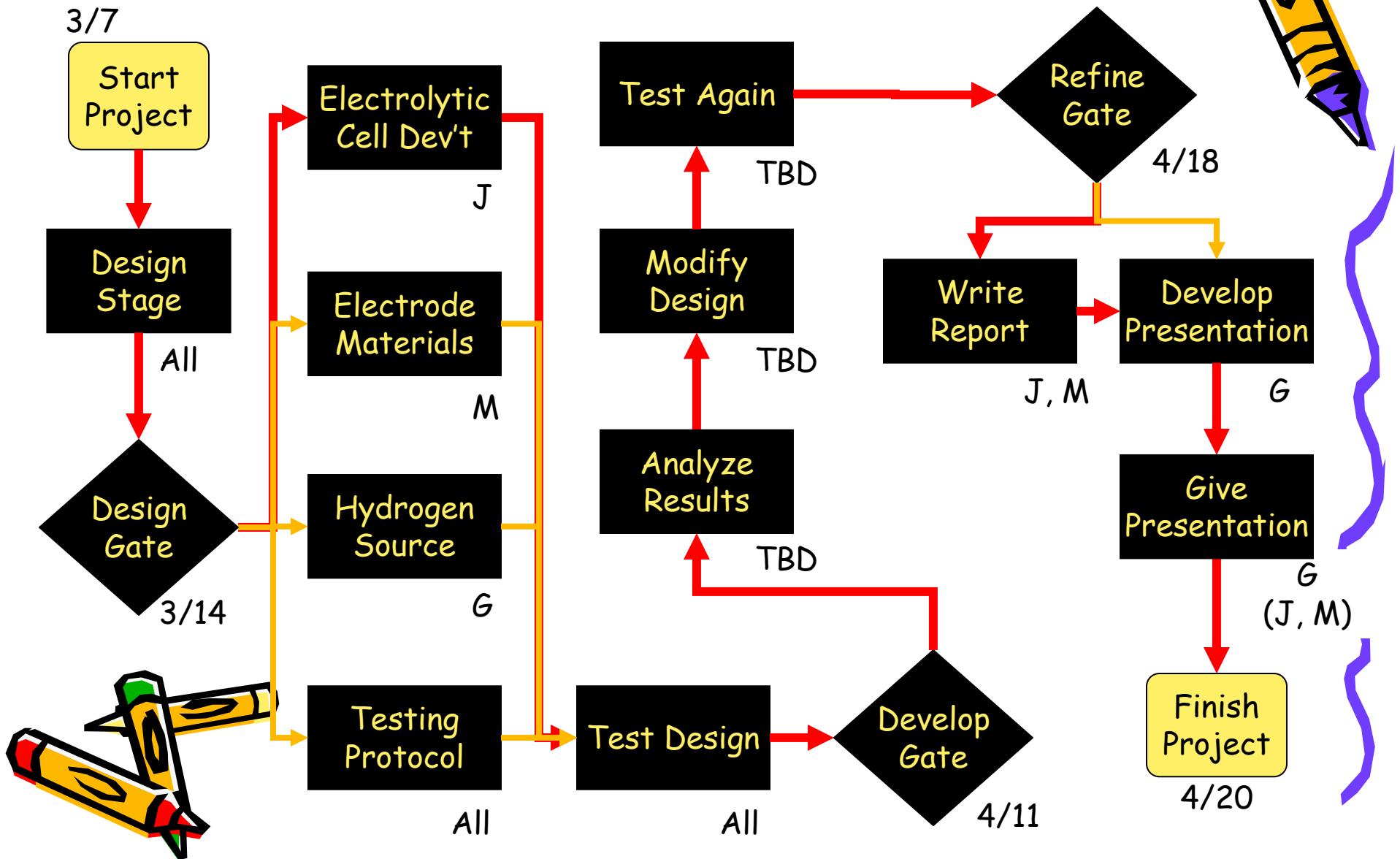
Tools



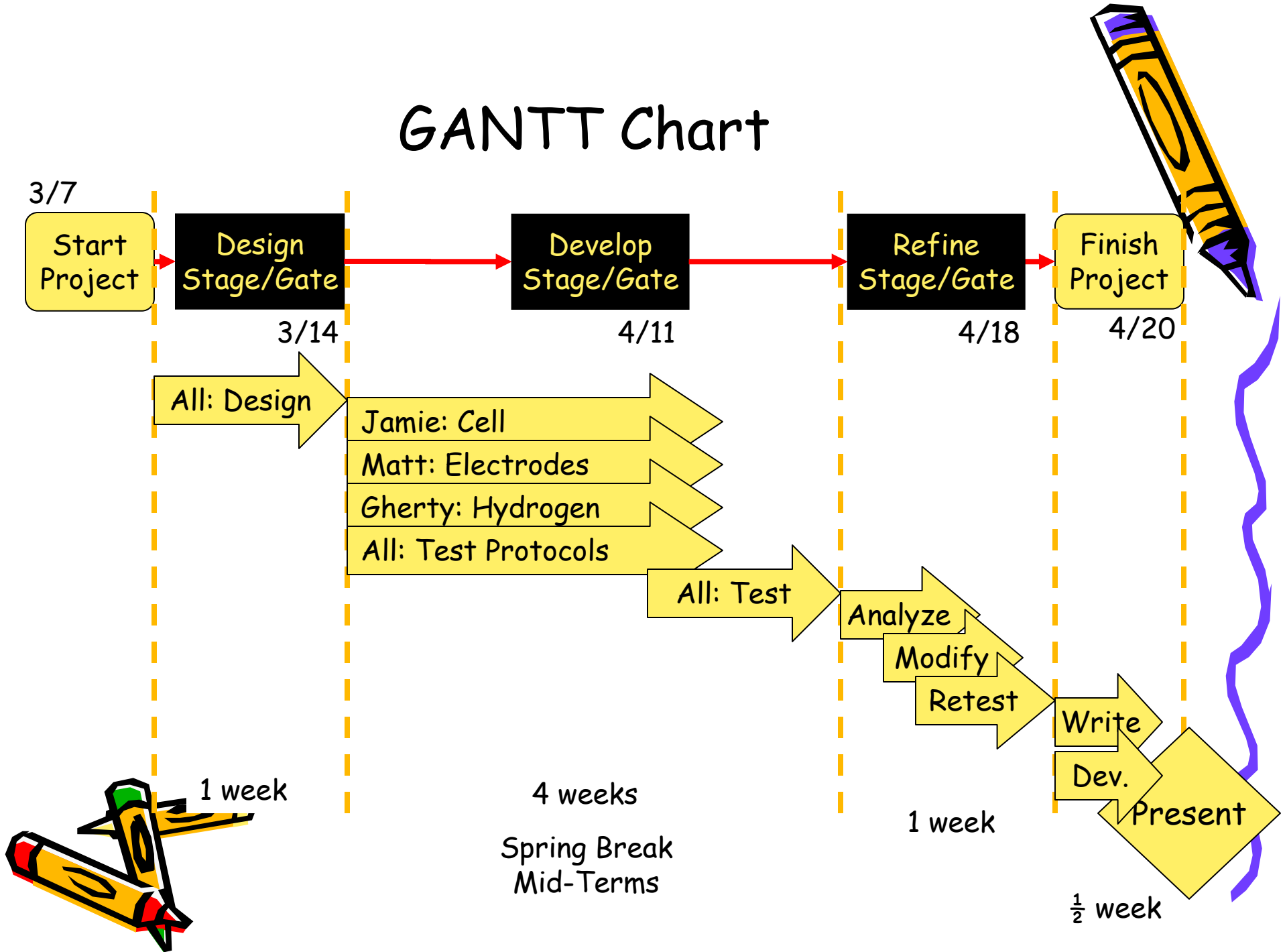
PERT Chart



Critical Path



GANTT Chart



Your Turn!

