

A 3D scientific illustration featuring several DNA double helices in shades of blue and orange, intertwined with complex, textured protein structures. The background is a soft, light purple gradient.

Module 2: Manipulating Metabolism

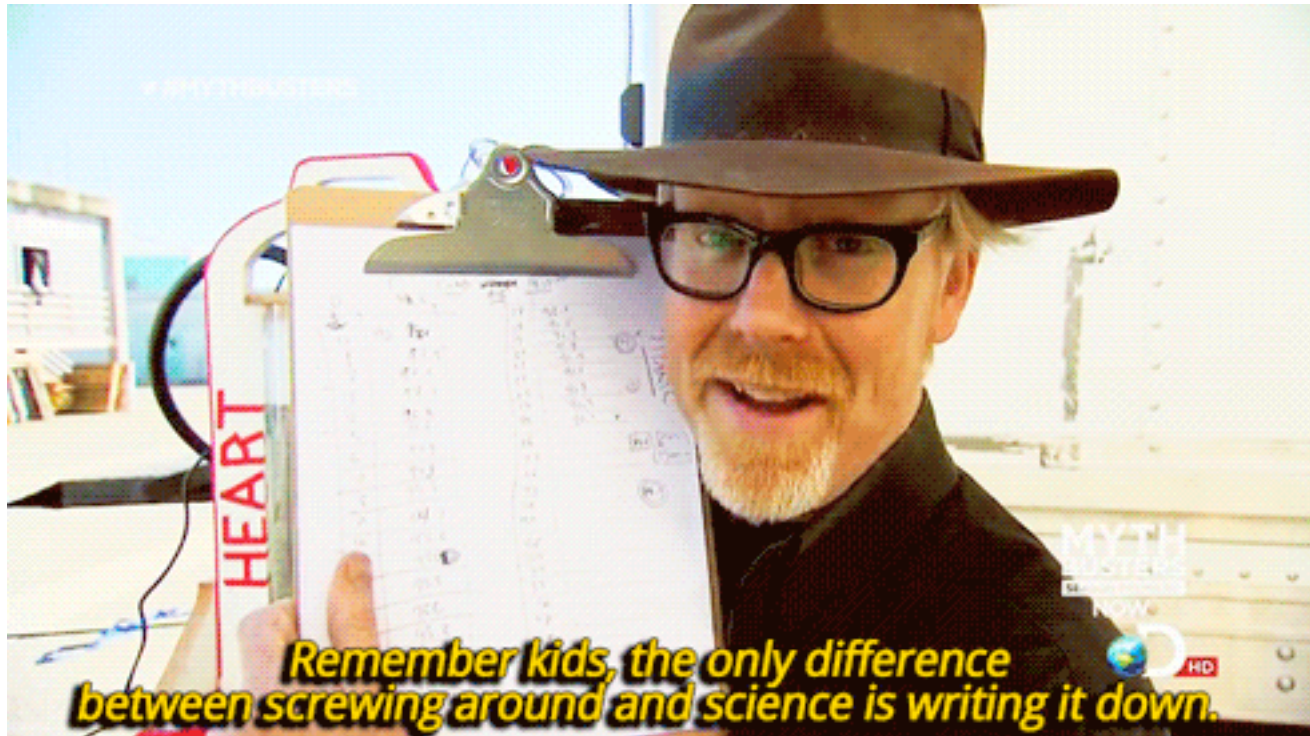
Communicating your science

10/27/15

Fa16 20.109 progress report



Module	Assignment	% of final grade	Links to description and/or evaluation
1	Data summary	15	Assignment description
	Mini-presentation	10	Assignment description and evaluation rubric
2	Journal club presentation	10	Assignment description and article sign-up Evaluation rubric (PDF download)
	Research article	20	Assignment description
3	Research proposal presentation	20	Assignment description Evaluation rubric (PDF download)
	Mini-report	5	Assignment description and evaluation rubric



Manipulating metabolism research article

- Submission due: **Saturday, Nov 19th by 5pm**
- Completed individually
- Only one draft
- Formatting guidelines:
 - Prepare using WORD
 - Text and figures may be separate documents

How will we communicate our science?

- Research article structure more formal
 - Title and Abstract
 - Introduction
 - Methods
 - Results
 - Discussion
- Complete sentences and paragraphs
- References

How will you organize your methods?

Let's first review the methods lessons we learned from Mod 1...

1. Sub-sections
2. Level of detail
3. Language choices

Methods: sub-sections

- Use sub-sections to group procedures
 - Include descriptive titles
 - Use logical, rather than chronological order
- Separate sub-sections with titles
 - Brief, but specific
- Include an introductory sentence
 - State the purpose or goal of particular method / group of procedures

Methods: level of detail



Methods: language choices

- the insert vs. gRNA sequence
 - Give your products names
- combined or mixed vs. digested
 - Be precise about the procedure used
- cleaned vs. purified or isolated
 - Use the more scientific terminology
- avoid jargon and define all abbreviations

Consider sentence structure

“pdCas9 was digested in a reaction containing ...
and resulting fragments were separated using
gel electrophoresis (130 V for 45 min) then
visualized with a”

1. PUT THE SUBJECT OF THE SENTENCE FIRST
2. BE SURE THE SUBJECT AND THE VERB MATCH

Consider combining information

- Draft as few sentences as possible to describe the following details:
 - Oligos used for sgRNA insertion into pgRNA
 - Preparation and concentrations
 - SDM (insertion / amplification) procedure
 - Cycling conditions
 - KLD procedure
 - Transformation procedure
 - Media and antibiotics

Remember the steps you didn't do

- For time reasons, the teaching faculty completed some procedures...
 - You should still include these!
 - Details are provided on the wiki

**DO NOT WRITE THAT THESE STEPS WERE
COMPLETED BY TEACHING FACULTY**

What are your data?

How will you introduce your data?

Introduction [\[edit\]](#)

As you write your introduction, recall from the [scientific writing guidelines](#) the funnel structure for the introduction. The information you use to set up the investigative question in your introduction should be supported by appropriate citations. **Any details you found in another researcher's work should be cited.**

Please pay close attention to the feedback you received from the teaching faculty on your homework assignments as you prepare your introduction (as well as the rest of the report). Also, you may find that the [BE Communications Lab](#) [↗](#) is a terrific resource for providing comments on your Introduction. If the peer tutors in the BE Communications Lab, a scientifically literate audience, understand your motivation for the study -- you are in good shape!

The introduction will account for 10% of the final grade for this assignment.

How will you report your data?

Potential figures [\[edit\]](#)

In most research endeavors, you will collect more data than you ultimately publish. In the spirit of writing a research article, in this assignment you should present only essential data that come together to tell your scientific story. The suggested list of figures below is meant to provide guidance rather than a check-list.

Schematics / Diagrams

- Depiction of your design strategy for gRNA target
- Experimental overview

Figures

- Digestion confirmation of pdCas9
- Sequencing confirmation of pgRNA_target
- Colormetric assay results for fermentation product measurements

Tables / Text

- Co-transformation efficiency
- Comparisons of gRNA_target effects on fermentation products

The results section will account for 50% of the final grade for this assignment.

How will you interpret your data?

Discussion [\[edit\]](#)

This section should incorporate all the good practices described in the Module 1 Data summary, but do so at a more advanced level. You will be expected to cite the broader scientific literature more thoroughly than before to inform your analysis in the discussion. You should also propose specific future experiments and otherwise show that you deeply understand the meaning and significance of your results; for example, if you have a hypothesis about why a gRNA target had the effect that it did, consider what follow-up experiments you might try. You may also want to consider how the experiments can be improved; for example, what additional controls might be useful to include. In addition to drawing conclusions from your own data, you are expected to spend some time considering your classmates' data. (Include the targets most relevant to your own results rather than every construct tested by the class.)

The discussion will account for 10% of the final grade for this assignment.

Reporting and interpreting your data

RESULTS

1. What was the overall goal of these data?
 - State concisely as an introductory sentence.
2. If applicable, what was the result of your control?
 - Was it expected?
3. What was your result?
 - Was it expected?
4. What does this motivate you to do next?
 - Specifically, what experiment follows?

DISCUSSION

1. What evidence do you have that your result is correct or incorrect?
 - How do your controls support your data?
2. In sum, what do your data suggest or indicate?
 - Do your data support your hypothesis? Why?
3. What does this motivate you to do next?
 - Specifically, what is the next research question?

In the laboratory...

- Mini-prep pgRNA_target clones
- Transform CRISPRi system into competent MG1655
 - pdCas9
 - pgRNA_target
- Send pgRNA_target clones for sequencing

