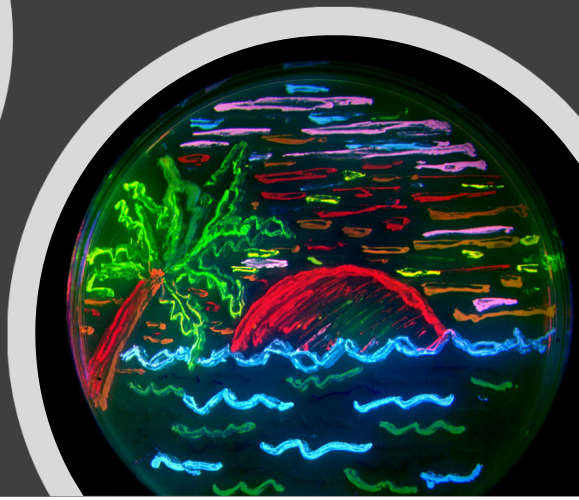
Biology – March 4, 2019

Agenda

- Independent Experiment Discussion
- Interpretation of Bacterial Results

- Responsible Action
  - Class Contribution
    Student Created Resources
  - Engagement During Class
    Comment after class on the assignment in Canvas



Basic Experiment Steps

1. Come up with idea, do some background research
2. Identify independent and dependent variables
3. Create draft version of procedure and materials
4. Refine procedure
5. Collect Data
6. Analyze Data
7. Write Analysis and Conclusion and compile parts into a lab write up
8. Communicate results (Video or Live presentation)

Introduction written with references
Accepted value identified and justified (if needed)

Is the relationship between Independent and Dependent Variable clear?
Are there references?
Is an accepted value identified?
Does the explanation for the accepted value make sense?
Is there a clear hypothesis?

I.Introduction – written in paragraph form
•Your research question written as a statement of purpose
•A brief background on what you are studying such as the organisms involved with their common and scientific names, or your existing knowledge about the subjects of the experiment. A little research or use of lecture notes may be needed.
•An explanation of WHY this is significant. Who does this topic affect and how?
•Hypothesis written in a, "If… (independent variable) then… (dependent variable) because… (explanation of the connection)" format. (If we do __, then we expected to see ___ because ___.)

Procedure finalized

Is the procedure complete?
Could you follow the procedure without assistance?
Are there any places in the procedure that seem ambiguous?

Data table built to analyze accuracy and precision

Is all the data there?
Is it clear and understandable?
Are there some calculations for averages and other relevant results?
Is there a calculation of Accuracy (percent error) and Precision (Standard Deviation)?

2.Data Table in Excel

Excel file must be saved on this page and must do the following.

Contain all raw data

Calculate your accuracy and precision using formulas

Calculate any other averages or values you think will be helpful

Lab Notebook – with observations and raw data

Lab Data - documentation of a minimum of 4-45 minutes periods of procedure improvement/data collection

Does Every entry include Dates and times for all work?
Are there clear drawings or pictures of set up?
Does the entry include observations and questions that occurred during the lab time?
Are there Ideas for improvements and/or other extension experiments?

Outline Due Next Monday

- Lab Report Scientific Reports Writing Guidelines (Web view)
- Topic Proposal EPS Biology Spring Topic Proposal and Rubric (Web view)

Outline Due Next Monday

- Lab Report Scientific Reports Writing Guidelines (Web view)
- **Introduction -** copied and pasted from Data Assignment
- **Methods -** copied and pasted from Data Assignment
- **Results** – copied and pasted from Data Assignment
- **Discussion** – bullet points addressing each of the following
- Use research and class materials to inform interpretations and conclusions about your data and the data of others doing the same experiment. Be sure to relate your interpretations back to your hypothesis. Remember, it is not important that your hypothesis was "correct."
- In what ways did and/or did not the experiment meet your stated purpose?
- Any unexpected data or observation that you found interesting or curious.
- What problems affected validity or reliability? (Were there adequate controls? Sufficient number of trials?) Avoid the term "human error," please be specific about the error involved.
- What new questions arose and how might you test them?
- What would you do next? What would be a good follow-up experiment? (Follow-up experiments should be related.)
- If you need to revise your original hypothesis, explain how so. If not, don't mention it.

- Topic Proposal EPS Biology Spring Topic Proposal and Rubric (Web view)
  - Introduction – should be a draft version, written in complete sentences
  - Evidence – bullet of evidence followed by analysis
    - Evidence needs a source/citation
  - Analysis – should follow each piece of evidence explaining it's significance
  - Organization – Illustrated by Evidence and Analysis pattern
  - Conclusion – should be a draft version written in complete sentences
  - Citations – Include a Works Cited page with all your sources. Title, author and link is fine

FYI – I'm testing some of the features in Dyknow as a classroom engagement tool

Other things to do:

- Eterna
- Pigeonetics
- Additional Current Events
- Classroom Contribution project

Lab Guidelines

-Record EVERYTHING you do in your lab notebook with date and time

-You must have a minimum of 4 45 minutes sessions of **lab work**

Label Everything that is not cleaned up at the end of class

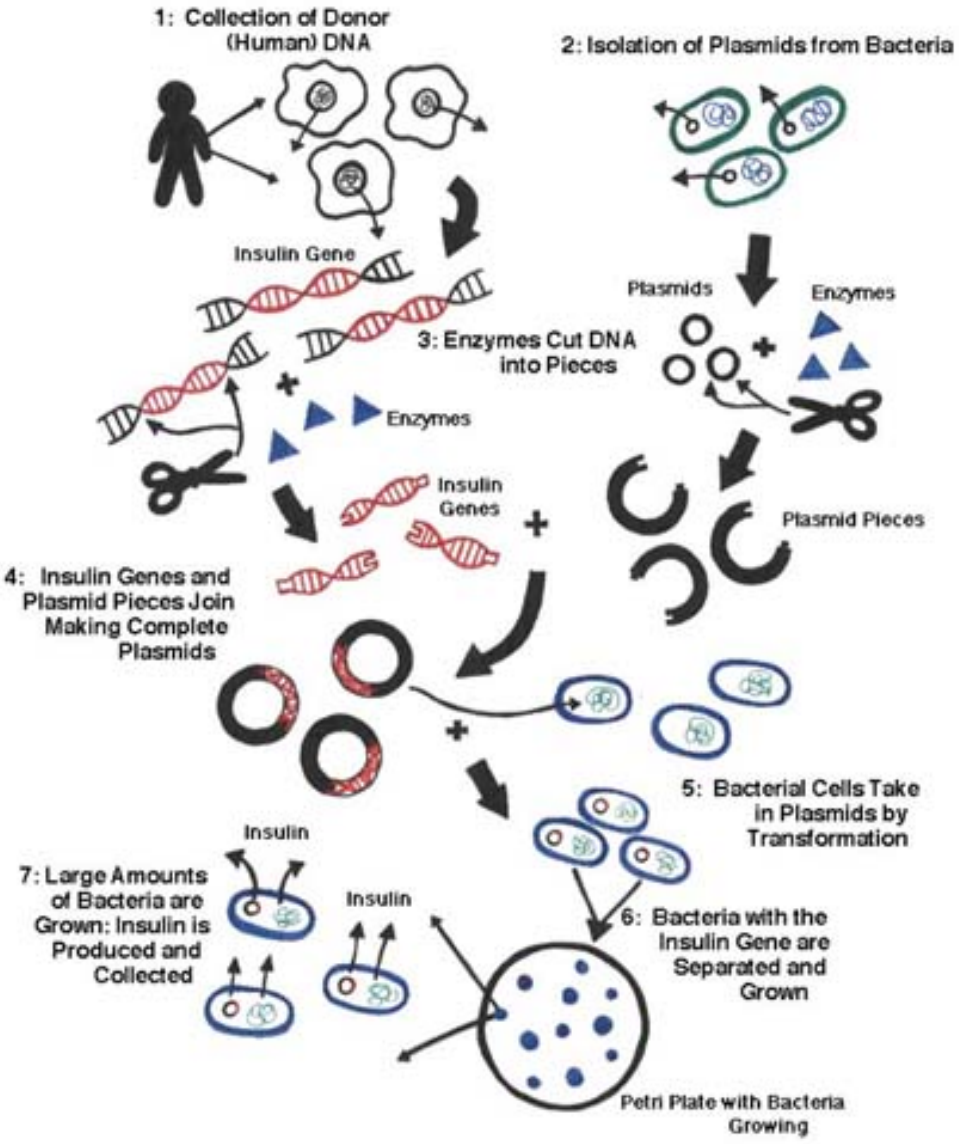
If you don't need it leave it with me. (labeled so I know what it is)

If you will need it later, ask me where to store it

(Labeled with name, date and contents)

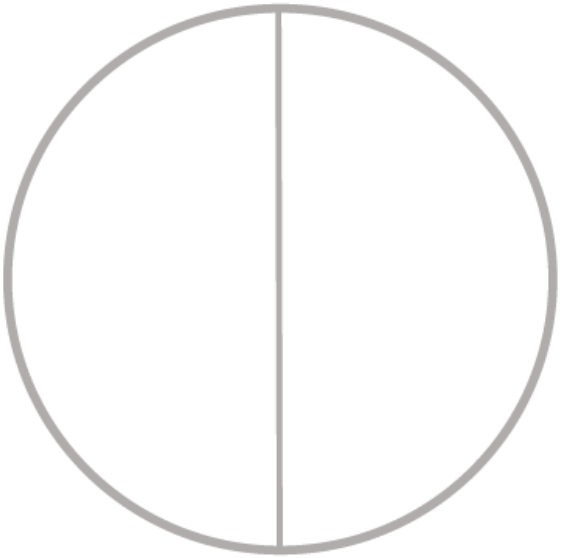
Genetic Engineering

1. Isolate DNA
2. Isolate Plasmid
3. Cut Plasmids and DNA using restriction enzymes
4. Use DNA ligase to join the ends
5. Insert plasmids via bacterial transformation
6. Isolate and grow transformed bacteria
7. Culture large quantities of bacteria and harvest the product



Label each plate with a “C” for control and “pFLO” for the experimental treatment. Make predictions about what your plates will look like.

TABLE 1: PREDICTIONS

LB 	**LB/amp** 
Justify your predictions:	Justify your predictions:

Each group needs 2 LB Plates, 2 Amp Plates and 1 X-gal Plate

	Volume Distilled Water	Mass of Agar Powder	Ampicillin	X-gal	Label
LB Plates	100ml	2.3g	NA		LB / Class Period / Group Code
Ampicillin Plates	100ml	2.3g	0.1 ml (100 um)		LB / Amp / Class Period / Group Code
LB/Amp/X-gal	100ml	2.3g	0.1 ml (100 um)	0.08 ml (80 um)	LB / Amp / X-gal /Class Period / Group Code

Do not add Ampicillin or X-gal until the mixture is cool
Amp and X-gal plates are light sensitive and must be covered with foil

When Finished:

Make sure you did your predictions for the bacteria transformation lab

Use the rest of time to collect data for your lab

(Items to the right are due beginning of next week)

Hw: Data and Introduction (with research)

Introduction written with references

Accepted value identified and justified (if needed)

Data table built to analyze accuracy and precision

Procedure finalized

Step	Location	Instructions	
Part 1 - prepare tubes	at your lab station	CaCL in your DynaChill	
Part 2 - Add Bacteria to Tubes	at station by window		
Part 3 - Add Plasmid to Bacteria	at your station with tubes I provide sterilized water is in your Dyna chill labeled H20	If I trust you with the tube, be sure to RETURN THE TUBES to me right away when finished	
Wait 15 minutes – work on your lab or answer questions on Data an Analysis (found in OneNote – Assignments and Class Tasks			
Part 4 - Heatshock	floating rack is at your station. Sterile Luria Broth is in your Dyna chill (labeled LB)	Put tubes in ice bath next to the water bath after the heat shock	
Part 5 -Plating Cells	Plates and spreader can be obtained from me.	Use 1 spreader for each petri dish Spread the control first, then the transformed bacteria	Return spreader to me when finished