THINKING BEYOND THE LECTURE

LEARNING TO LOVE BIOLOGY THROUGH THE EYES OF A NON-MAJOR

CTL SUMMER INSTITUTE - 2023

LET'S MEET TODAY'S PRESENTERS

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HERE'S A LITTLE INSIGHT ON "OUR" COURSE

- Non-majors General Education Lecture Course
  - with "optional" complementary lab course
- 2 course sequence (Fall & Spring Semesters)
- Consists of:
  - 1st thru 5th years
  - >60+ majors
- Style:
  - Before 2019-2020 AY - Traditional Lecture
  - 2019-2020 AY to Present – Active Learning

PART ONE

TEACHING MAJORS VS NON-MAJORS

WHAT DO YOU THINK IS THE BIGGEST DIFFERENCE BETWEEN MAJORS AND NON-MAJORS?

- Working in Groups of 2-3.
- Take 5 mins. to discuss what you think is the BIGGEST difference between teaching majors and non-majors.
- Write “your” thoughts on your white boards.

WHAT DO YOU THINK IS THE BIGGEST DIFFERENCE BETWEEN MAJORS AND NON-MAJORS?

LET'S SEE WHAT YOU'VE COME UP WITH.

REFLECTION QUESTION #1

Answer on your notecard

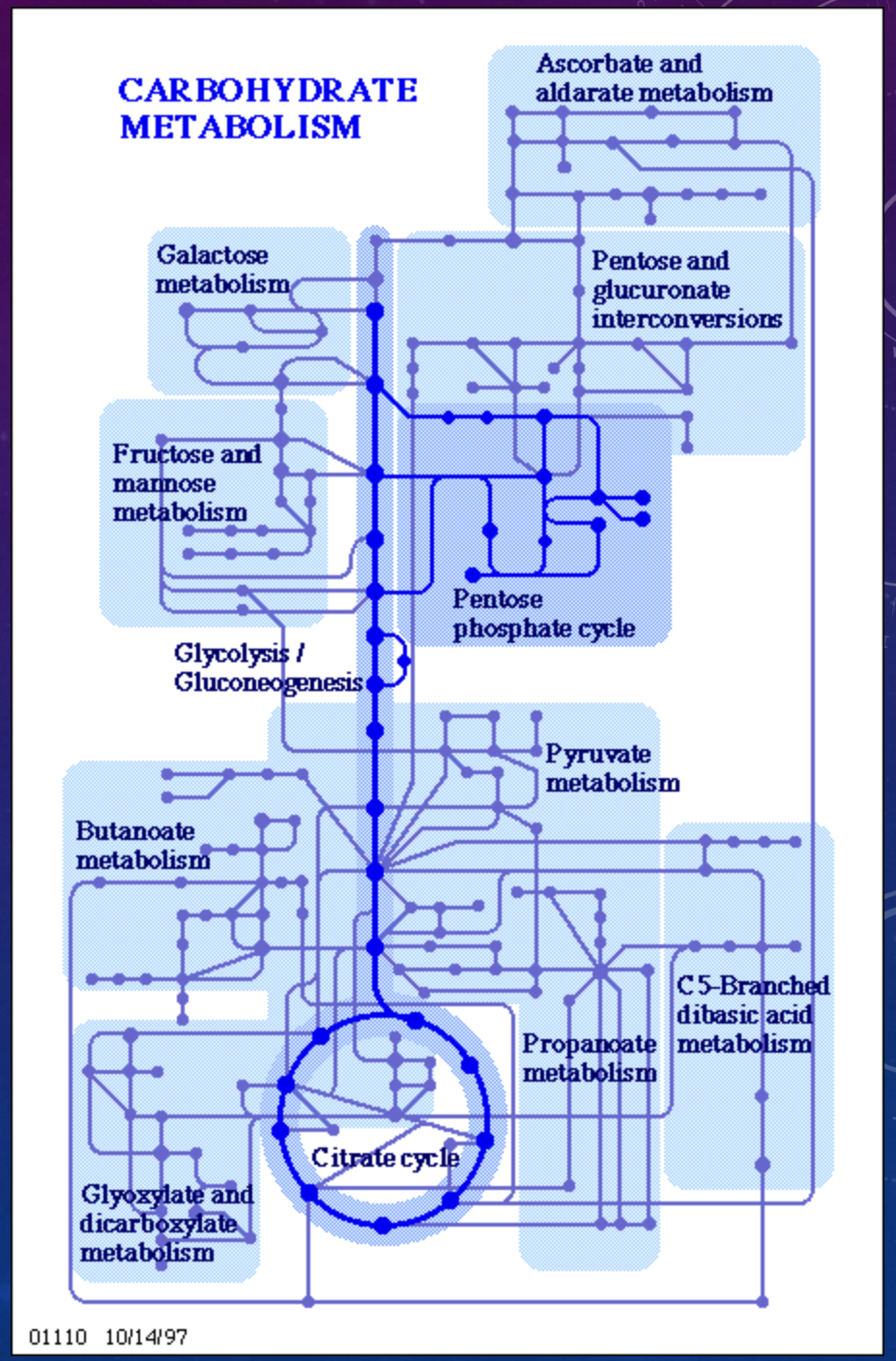
Do you believe you need to have a different classroom pedagogy when teaching majors vs. non-majors?

If so, why?

PART TWO

SHALL WE GET OUR ACTIVITY ON?!?

SCIENCE IS SCARY…RIGHT?

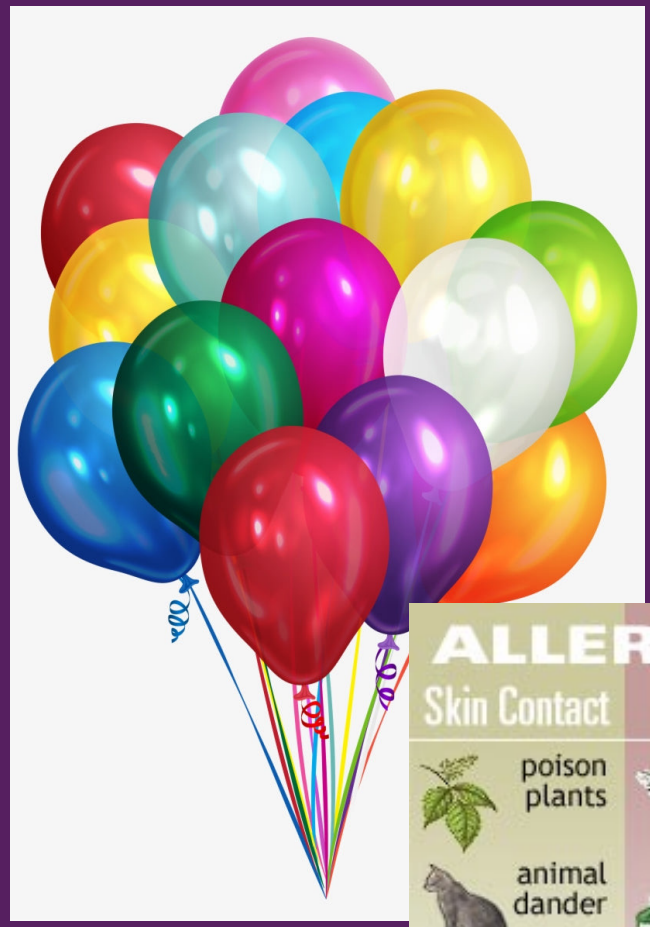


LET'S MAKE A SCARY TOPIC,
A LITTLE LESS SCARY…

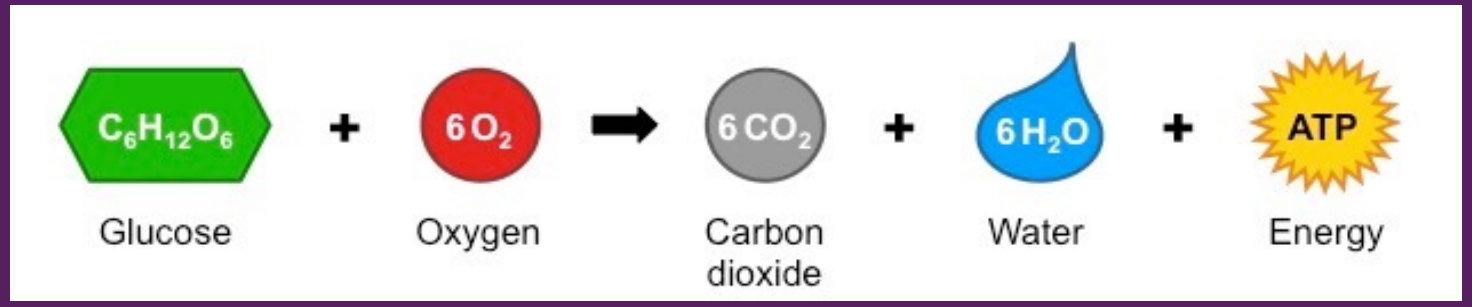
ALLERGY WARNING!!!

We will be working with Latex balloons in today!

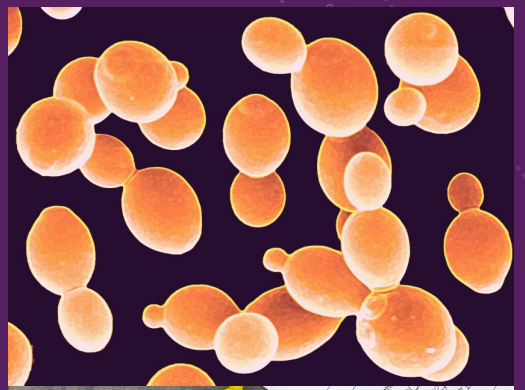
If you are allergic, you need to let your presenters know!

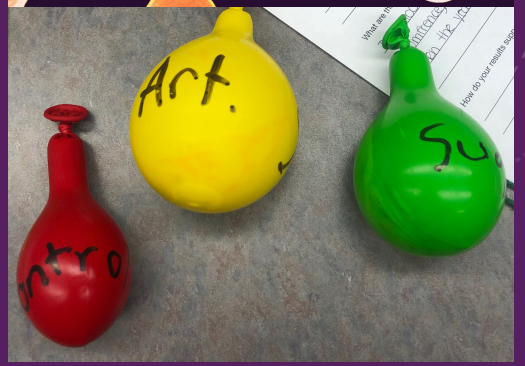


CELL RESPIRATION EXPERIMENT



- The purpose of this experiment is to understand the rate of production of CO_2 in the process of cellular respiration using yeast as the cell.
  - <u>Biologics:</u>
    - Yeast – "Rapid Rise"
      - *Saccharomyces cerevisiae*, or "sugar-eating fungus"
  - <u>Treatments:</u>
    - Table sugar (Sucrose)
    - Various types of sugar substitutes and other sugar sources

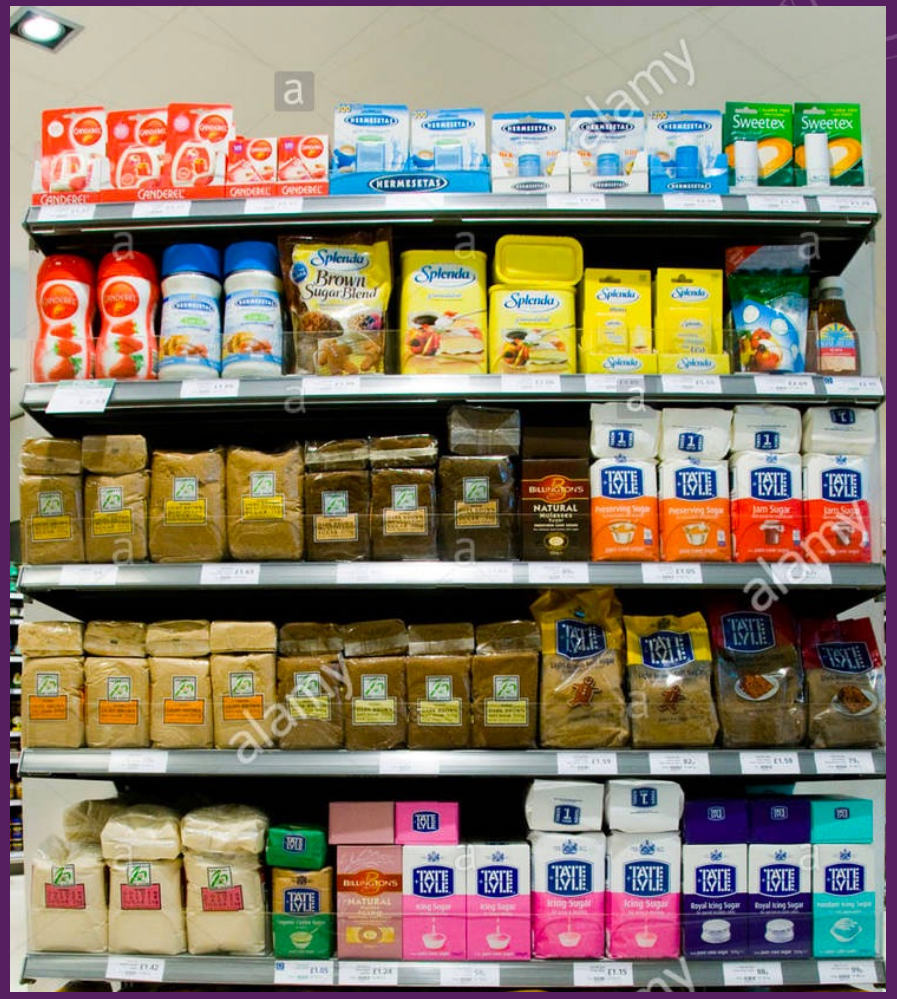




YEAST BALLOONS…GETTING STARTED

- <u>Step 1</u>: Make sure you have all of your supplies
  - 3 – Latex Balloons
  - 3 - Vials of yeast
  - 3 - Pieces of yarn
  - 1 - Vial of sucrose
  - 1 – Plastic Funnel
  - 2-3 Plastic Pipets
  - 1 – Plastic Beaker
  - 1 – Ruler
  - 3 – Black Markers
  - 40^{o}C Water

- <u>Step 2</u>: **Develop your experimental design and your hypothesis**
  - You have everything you need to set up a positive and negative control, as well as an experimental treatment. What would those look like?
    - *Hint: Every balloon should have yeast but not every balloon will have sucrose…*
  - Use the contents of your bin to determine which sugar alternative you want to use as your experimental treatment.



SUGAR VS. SUGAR SUBSTITUTES…

WILL THERE BE A DIFFERENCE?

YEAST BALLOONS…TIME TO EXPERIMENT!

- Step 3: Set up your experiment
  - ***One*** person from your group - come to the front and fill your beaker of water
    - You will need ~10.0 mL of water per balloon
  - Fill the balloons based on your experimental design in part 2
    - Hint: They should all have at least water and yeast in them.

- Step 4: Incubation
  - Let sit for the duration of this session…watch them grow!
  - Take pictures and note the time as you notice big changes

PART THREE

TEACHING A LARGE ENROLLMENT COURSE WITH ACTIVE LEARNING

WHAT ARE YOUR BIGGEST CONCERNS TEACHING A LARGE ENROLLMENT, ACTIVE LEARNING COURSE?

- Working in Groups of 2-3.
- Take 5 mins. to determine “your” biggest concerns are about teaching a large enrollment, active learning course.
- Write the groups thoughts on your white boards.

WHAT ARE YOUR BIGGEST CONCERNS TEACHING A LARGE ENROLLMENT, ACTIVE LEARNING COURSE?

LET'S SEE WHAT YOU'VE COME UP WITH.

REFLECTION QUESTION #2

Do you think you can utilize the same active learning teaching methods regardless of the class size?

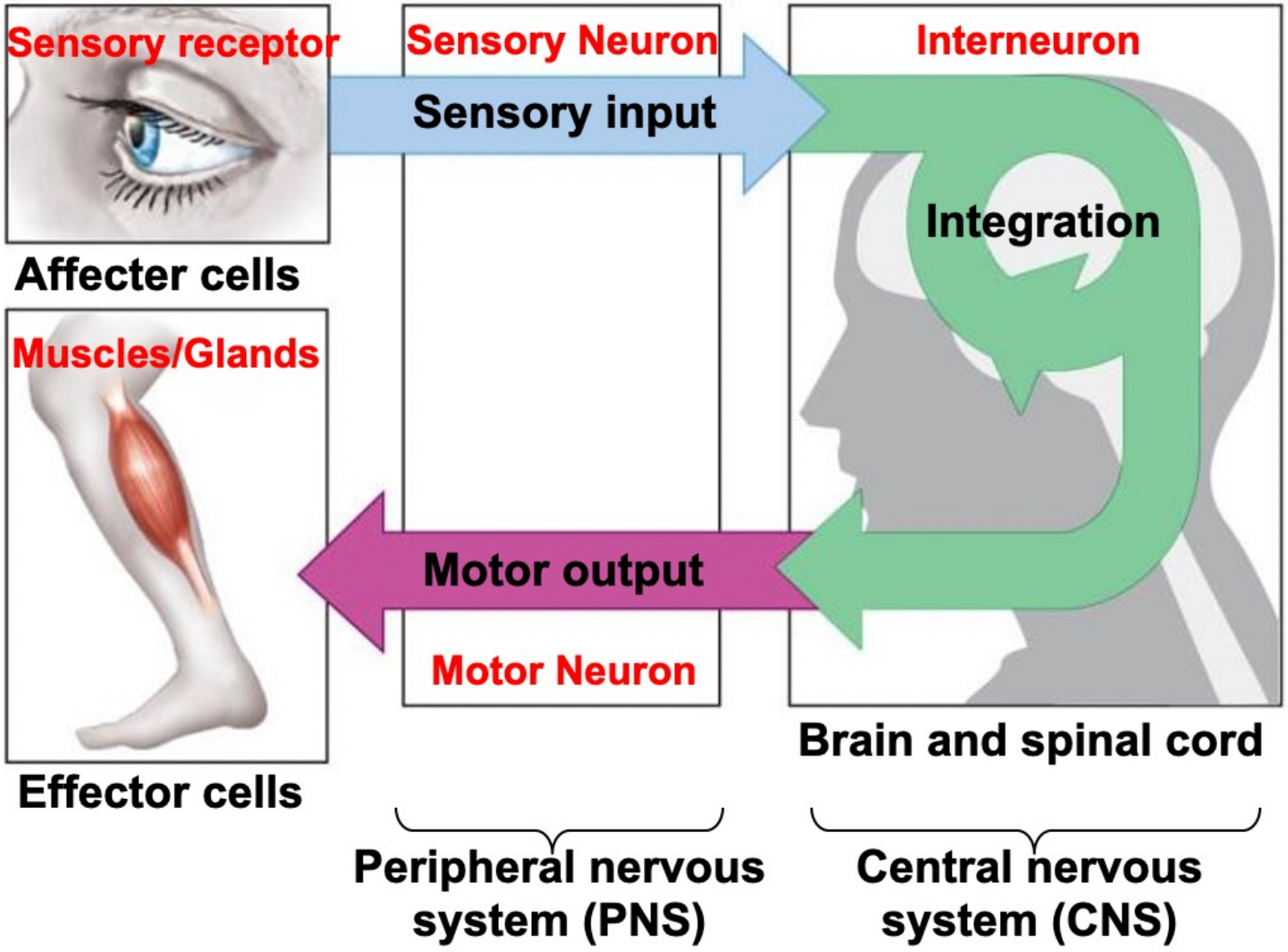
Elaborate.

PART FOUR

MAYBE THERE'S TIME FOR ANOTHER ACTIVITY…
AFTERALL, THE MORE HANDS ON THE BETTER….RIGHT?

SENSORY INTEGRATION AND PERCEPTION

- Information from both the general senses and the special senses is integrated by our brains to help us make sense of our surroundings.
- We are usually unaware of how multiple senses are employed in this integration.
- This simple demonstration will allow you to see how taste, smell, and vision are integrated when we determine flavor.


Sensory receptor
Sensory Neuron
Interneuron
Sensory input
Integration
Affecter cells
Muscles/Glands
Motor output
Motor Neuron
Brain and spinal cord
Effector cells
Peripheral nervous system (PNS)
Central nervous system (CNS)

NOW, IT'S TIME FOR A SNACK

- Obtain one package of Gummy Bears per person.
- Divide into pairs.
  - Each pair will consist of a "taster" and a "recorder."
- To start, have the taster:
  - Close their eyes and plug their nose
  - Consume "1" Gummy Bear from their package
- Once, swallowed (keeping eyes closed & nose plugged, have them Identify the flavor (to the best of their ability)
  - Record their confidence level on a scale of 1-5
    - 5 = highest confidence; 1 = lowest confidence
- Repeat protocol with two more gummy bears with eyes closed and nose plugged.

LET'S CONTINUE OUR TASTE TEST

- For the next round:
  - the taster should have open eyes but keep their nose plugged.
    - Repeat for 3 bears with nose plugged.
- Final Round:
  - Eat the gummy bears with no inhibition of the sense.
    - Repeat with 3 bears.
- Switch taster and recorder and have the other group member in the pair go through the same protocol.
- Compare your confidence level with your peers and answer the questions on the worksheet

WAS THERE A DIFFERENCE IN YOUR ABILITY TO PRECIEVE “FLAVOR” THROUGHOUT YOUR TRIALS?

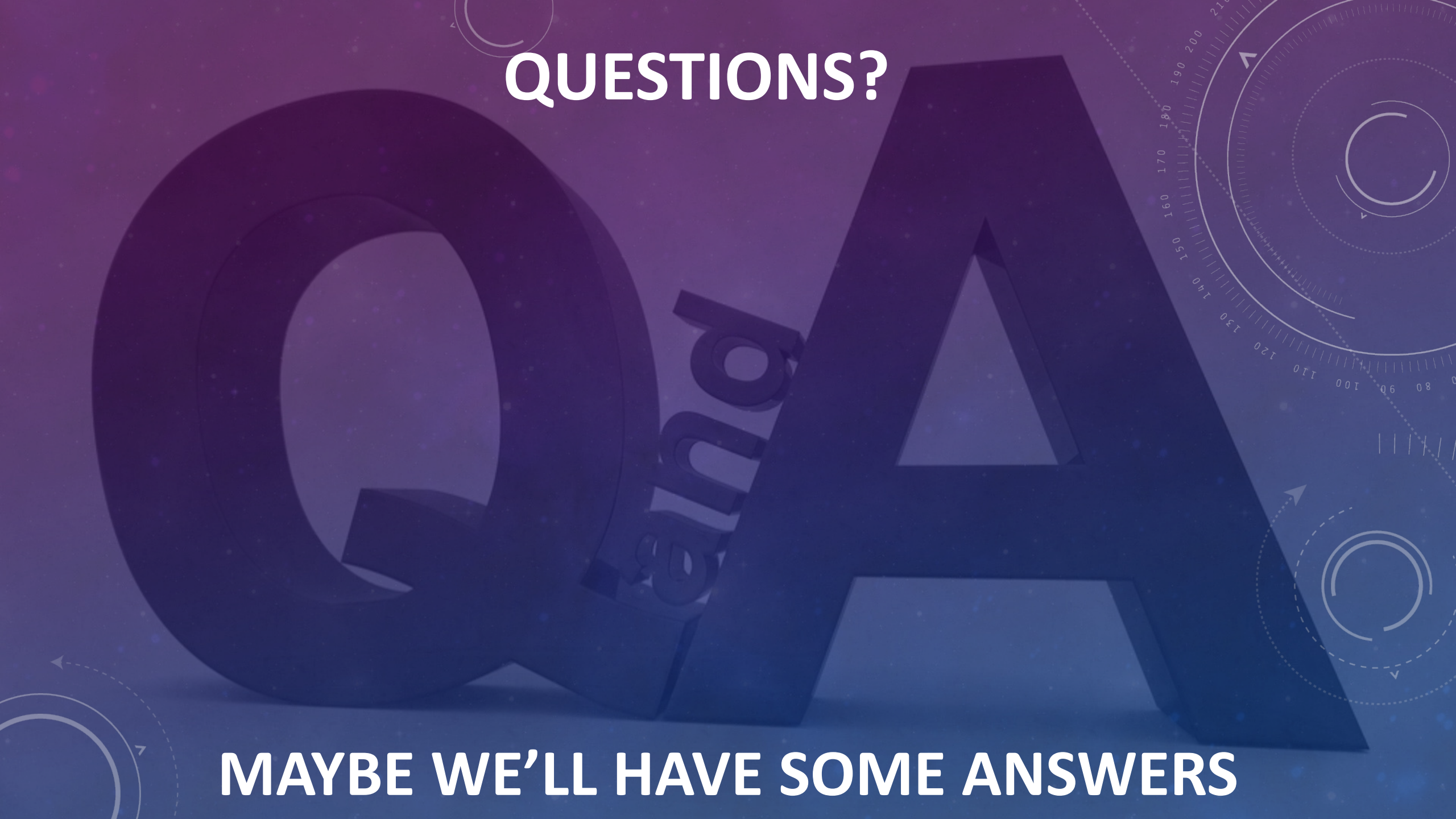
WAIT….WHAT ABOUT THE YEAST?

BEFORE WE WRAP THINGS UP… HOW ARE YOUR BALLOONS DOING?

- Step 5: Results and Analysis
  - Read and record the results on your data table in your worksheet
    - Rulers are in your bins ☺
- Let's take a moment to discuss your results among the groups
  - What kind of trends did you see in your balloons?

FINAL THOUGHTS

QUESTIONS?



MAYBE WE'LL HAVE SOME ANSWERS

REFLECTION QUESTION #3

Please share your thoughts on this workshop

Favorite part? Least favorite?


Thank You
Asante
Merci
Arigato
Obrigado
Spasibo
Juspaxar
Kiitos
Grazie
Matondo
Maake
Dankon
Multumesc
Chokrane
Matur Nuwun
Mochchakkeram
Nirringrazzjak
Raibh Maith Agat
Ua Tsaug Rau Koj
Terma Kasih
Dank Je
Salamat
Welalin
Kia Ora
Cam on ban