



ASYNCH Lesson
Tuesday, Jan 21

TDA PREP: GERMINATION

PREPARATION FOR : WHAT'S SPROUTING LAB – ANALYSIS

DAY ONE OF A FOUR DAY LESSON



ASYNCH Lesson
PTO Day

TDA PREP: GERMINATION

PREPARATION FOR : WHAT'S SPROUTING LAB – ANALYSIS

DAY ONE OF A FOUR DAY LESSON

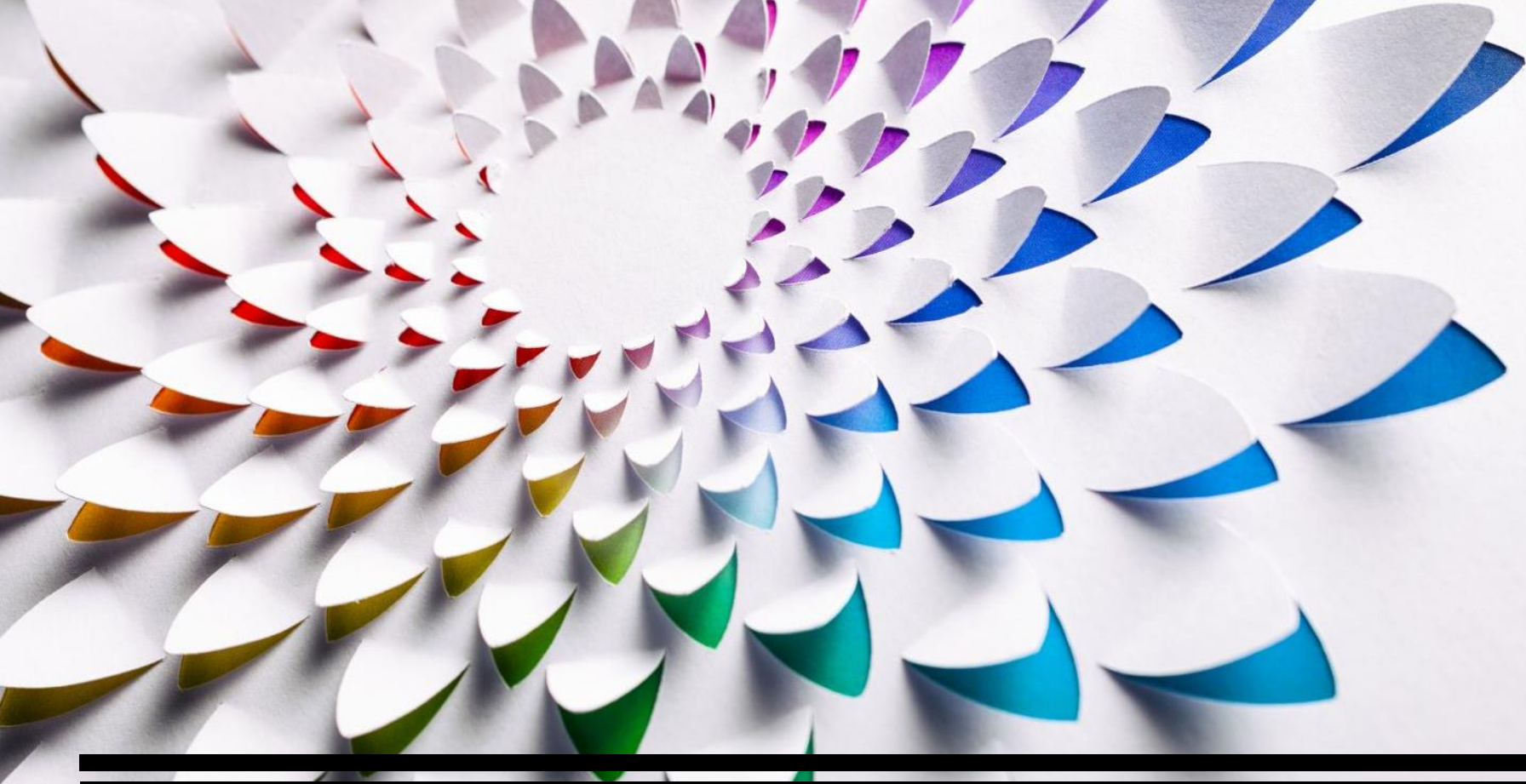


ASYNCH Lesson PTO Day

Germination of Seeds

OBJECTIVES

- Student Reading of “7 Factors that Affect Seed Germination”
- Reading Comprehension Google Form
 - To collect PRE – TDA process data on student understanding of content.



I completed my
ASYNCH
Lesson
yesterday!

TDA PREP: GERMINATION

PREPARATION FOR : WHAT'S SPROUTING LAB – ANALYSIS

DAY TWO OF A FOUR DAY LESSON



OBJECTIVES

- Close Reading of “7 Factors that Affect Seed Germination”
 - **You need your PDF of the article open!**

Germination of Seeds

CLOSE READING – I OF X

7 FACTORS THAT AFFECT SEED GERMINATION

Why Germination Conditions Matter

- Basically, **seeds are dormant** when you purchase (or collect) them and they need certain environmental conditions to break that dormancy. Germinating most common varieties of vegetable seeds is fairly straight forward. However, many herb, flower, and woody species are more difficult to germinate.



CLOSE READING – 2 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

Why Start Plants from Seed?

- ... Knowing what factors could be an issue is the first step to troubleshooting difficult to germinate species.

1) WATER

- This one seems obvious but there is more to it than you might think. Seedlings generally need to be kept moist but not wet. This water should also (ideally) be chlorine-free. Urban water supplies are heavily chlorinated, so I let my water stand on the counter for at least 24 hours before I use it to water my seedlings. Also, if seeds are allowed to dry out after they have initially been wet some species will enter a second dormancy that is much harder to break!



CLOSE READING – 3 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

2) OXYGEN

- This often-neglected factor is actually very important! Most seeds will not germinate in saturated (waterlogged) soil. Seeds and the seedlings they produce need to breathe just like we do, so drainage in seed trays is very important!

CLOSE READING – 4 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

3) SUBSTRATE

- You might have expected me to say “soil” here, but seedlings actually don’t need soil per-se. Soil*, by definition of the National Resources Conservation Service, is “The unconsolidated mineral or organic material on the immediate surface of the Earth that serves as a natural medium for the growth of land plants.” Soil is a limited resource, and it is not the only option.
- Seedlings need a substrate to germinate in but that substrate can be partially-decomposed plant matter (such as peat moss or compost), minerals (such as vermiculite or perlite), a combination of these (found in many soilless growing mixes), or just about anything that gives seedlings the structure they need. Generally, things to consider when choosing a germination substrate are:



CLOSE READING – 5 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

3) SUBSTRATE (part 2 of 3)

- **pH:** Without going into too much chemistry, pH is a measure of the acidity or alkalinity of a substance. Soil is acidic at pH levels under 7 and alkaline at pH levels greater than 7. Soil pH also affects the availability of nutrients and minerals needed for plant growth. Most seedlings will grow in slightly acidic soil (pH around 6), but some species (blueberries, parsley, potatoes) prefer much more acidic conditions. A few species (asparagus, leeks, marjoram) prefer alkaline soils.
- **Texture:** The size of the substrate particles affects how uniformly moist the seeds are kept. Finer particle sizes will keep seeds evenly moist. A coarse substrate will not retain moisture well enough to be a good germination substrate for most seeds.

CLOSE READING – 6 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

3) SUBSTRATE (part 3 of 3)

- **Compaction:** Substrates that are more compact will generally keep seeds more evenly moist. Soils that are overly compacted (such as soils that are frequently driven over by a tractor) will be too compact. Some pore space in the substrate is necessary to make sure the seeds do not become waterlogged and to make sure seedling roots can penetrate the substrate. However, too much pore space means that the substrate will dry out too quickly.

TODAY'S WRAP UP...

HOMEWORK

- **END of Semester I:**
Friday, January 24 at 11:30 pm!
- **Unit 5 Common Assessment**
ENDS Friday, January 24 at 11:30 pm

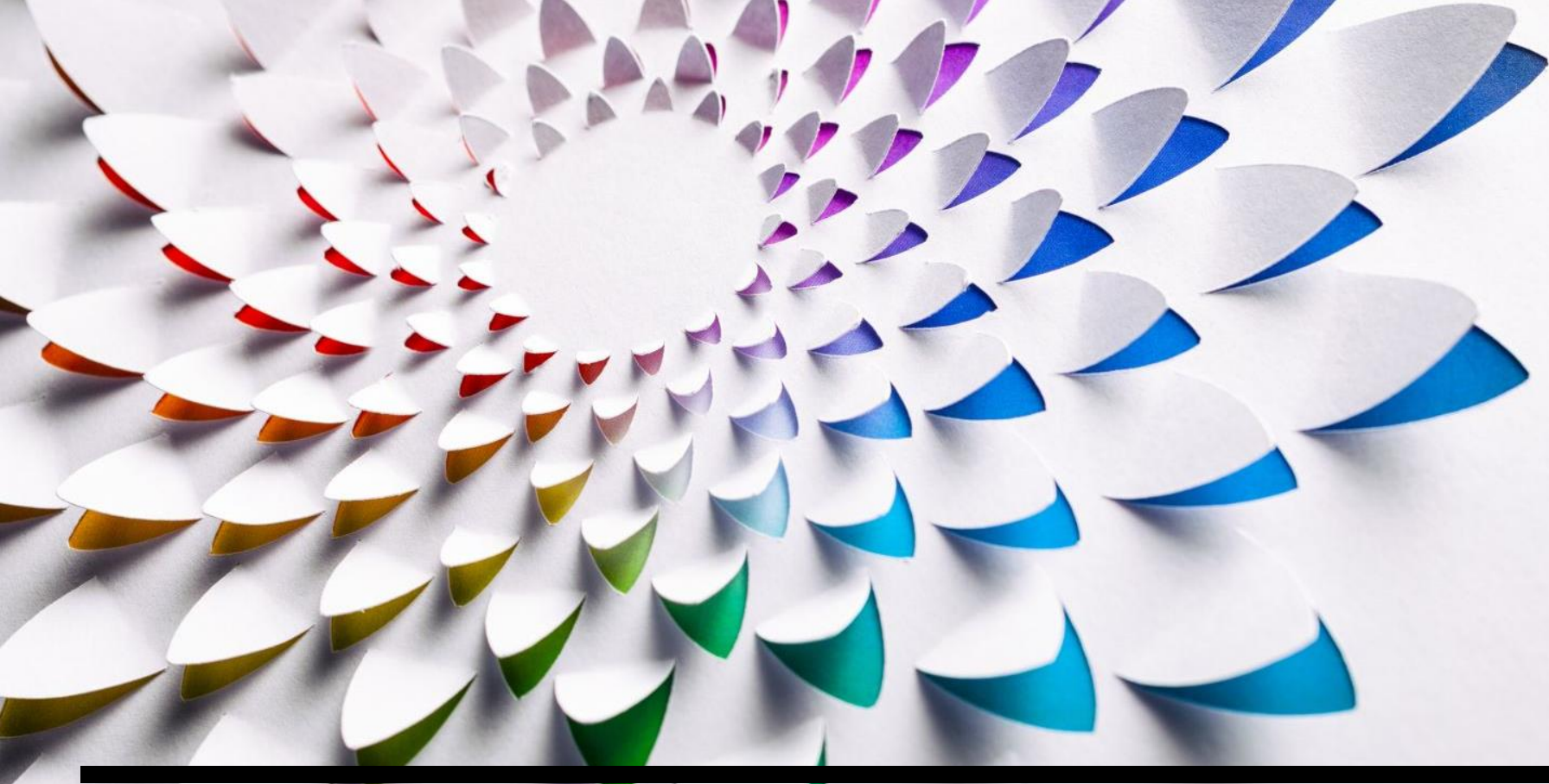
SEMESTER B Life Science course

- **What's Sprouting Lab** document
DUE Monday, January 27th at 9 am

EXIT TICKET

- **REQUIRED:**





**Have you
continued to
collect your data
for the What's
Sprouting Lab?**

TDA PREP: GERMINATION

PREPARATION FOR : WHAT'S SPROUTING LAB – ANALYSIS

DAY THREE OF A FOUR DAY LESSON



OBJECTIVES

- Close Reading of “7 Factors that Affect Seed Germination”
 - **You need your PDF of the article open!**
- What’s Sprouting Lab Graph

Germination of Seeds

CLOSE READING – 7 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

4) LIGHT

- Some seeds germinate just fine in the dark while other seeds need light to break dormancy. I put all of my seeds under lights just in case. Even though some species don't require light to germinate, all young seedlings do need light so light can't hurt in either case! A sunny windowsill is good enough for some seedlings, but if you don't have enough light coming in your windows then fluorescent lights can be a good supplement/substitute. Some seeds respond to the length of the day to germinate, so adding lights can be a good way to force germination of species that typically wouldn't germinate early in the year when the days are still short.



CLOSE READING – 8 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

5) TEMPERATURE

- Some seeds require heat for germination, others simply benefit from it. There is also the occasional species that germinates best on cool soil. In my experience, most vegetable seeds benefit from added heat (with a few exceptions – spinach and parsnips have their optimum germination at room temperature). However, some herbs and ornamental species germinate best at cooler temperatures. There are also species that need alternating warm and cool periods for germination. For some species, day-night warm-cool cycles are needed.



CLOSE READING – 9 OF X

7 FACTORS THAT AFFECT SEED GERMINATION

6) OTHER DORMANCY-BREAKING FACTORS

- Some seeds need additional help in breaking dormancy. Abrasion of the seed coat can help in some cases. This can be accomplished by rubbing the surface of the seeds with sandpaper or other abrasive surface. This is not necessary with most common vegetable varieties, but is fairly common for tree and shrub seeds. For other seeds, an extended period of cold – known as a stratification period – is needed to break the seed's dormancy. Additionally, the seeds of some species will benefit from soaking prior to germination. ...

CLOSE READING – 10 OF 10

7 FACTORS THAT AFFECT SEED GERMINATION

7) NUTRIENTS and MINERALS

- Seeds contain stored nutrients, so generally seeds don't technically need additional nutrients to germinate, however young seedlings do. Most substrate mixes are formulated to contain the necessary nutrients, so this isn't something that is much of an issue unless you are formulating your own custom mix.
- SOURCE: <https://livingonagreenthumb.wordpress.com/2015/03/16/7-factors-that-affect-seed-germination/>
- *Soil definition: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054280



REVIEW

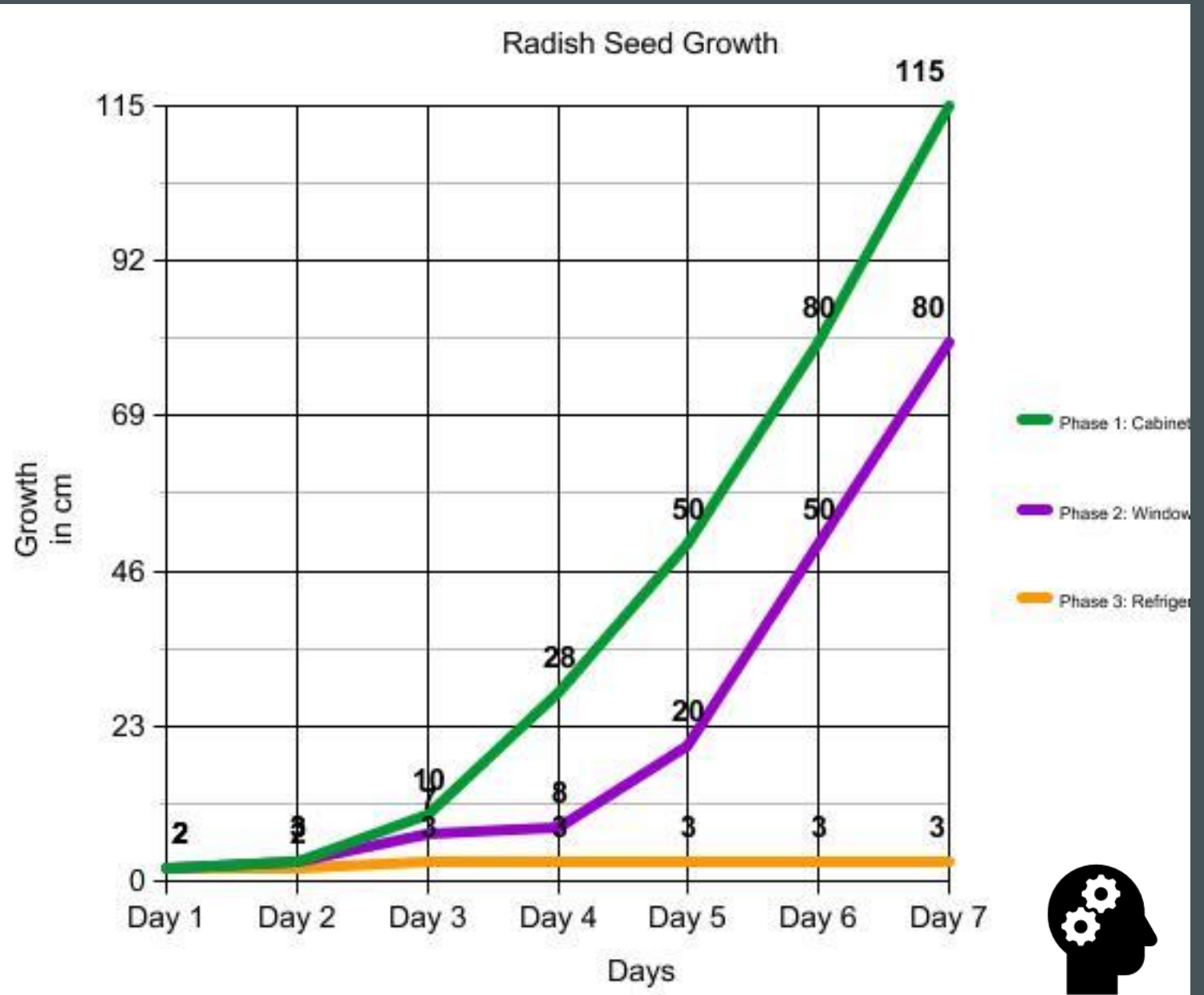
WHICH factors from this article had the greatest impact on the What's Sprouting Lab?

- TEMPERATURE
- LIGHT
- *water*

I understand my TDA answer should include these factors.

WHAT'S SPROUTING LAB GRAPH - INTERPRETATION

You are required to
create your OWN
graph and insert
into the Lab
document



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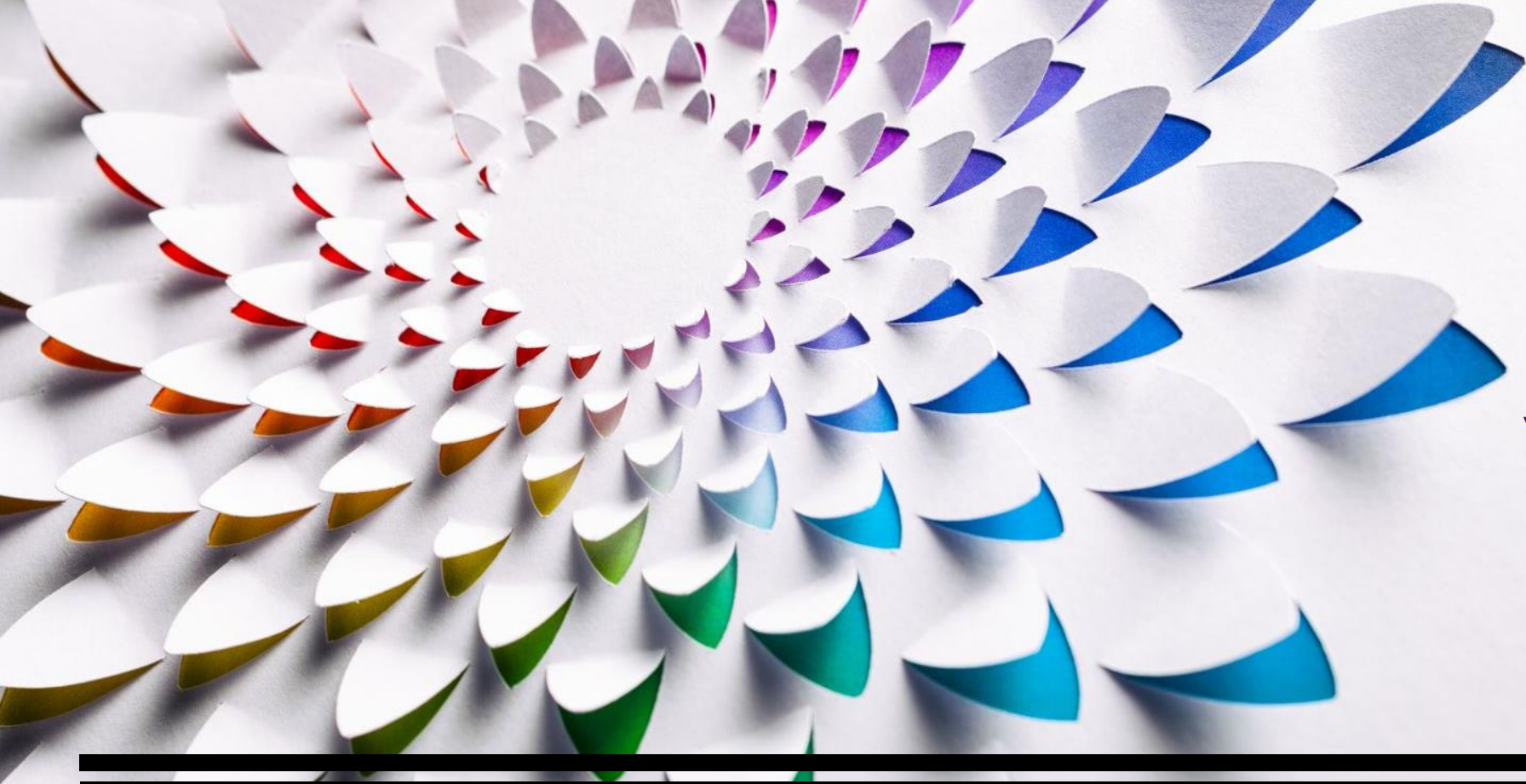
SEMESTER B Life Science course

- **What's Sprouting Lab** document
DUE Monday, January 27th at 9 am

EXIT TICKET

- **REQUIRED:**





Have you
FINALIZED the
What's Sprouting Lab,
yet?
(completed Scientific Method
Steps 6 & 7)

TDA PREP: GERMINATION

PREPARATION FOR : WHAT'S SPROUTING LAB – ANALYSIS

DAY FOUR OF A FOUR DAY LESSON



OBJECTIVES

- What's Sprouting Lab – FINALIZE the Document
- Define and explain Text Dependent Analysis (TDA) Questions.
- Use a graphic organizer to answer a TDA question about the What's Sprouting Lab

Germination of Seeds

FINALIZE the Lab Document for Submission!

FOLLOW the
Scientific Method!

#6, 7 &
8

ACTION ITEM:

Phases 1, 2 & 3 should be COMPLETE!!

ALL Data Tables should be filled in!

6. Analyze the data

- Complete Graphs of your Data
 - MAKE ONE line graph using: <https://nces.ed.gov/nceskids/createagraph/>
 - INSERT Line Graph with all Three Phases' Data ...as a JPEG
 - Examine the Graph of your Data: You are looking for the most growth.

7. Form conclusions

- Based upon the data, which environment is the best for radish seed development?
(write in complete sentences)

8. Write and present your research.

- Make sure all sections (above) are completed and saved.
- And, **SUBMIT** your saved lab document through the Assignments module.
 - Your PRINTED lab should have your drawings on it!

**This MUST be complete so you can UPLOAD your saved
What's Sprouting Lab document on MONDAY, January 27th!**

TEXT DEPENDENT ANALYSIS (TDA) QUESTIONS

Basically, these questions ask you to think like a scientist! You need to figure out the answer to the question and **SHOW** the evidence you used to get that answer.

Text Dependent Analysis!

This is when you are given a question/writing prompt that requires you to find textual evidence within a specific reading passage. You also need to explain and interpret the meaning behind the textual evidence.





TDA QUESTIONS

TDA Questions have 3 sentences.

1. Describes the text.
2. Describes the task/question.
3. Reminds you to explain with evidence.



In the What's Sprouting Lab, you read an article titled, "7 Factors that Affect Seed Germination" and created a graph of your data. Write an essay explaining which factors impacted radish seed germination in this lab. Use evidence from the article and graph to support your analysis.

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TDA QUESTIONS

TDA Questions have 3 sentences.

1. Describes the text.
2. Describes the task/question.
3. Reminds you to explain with evidence.

Who can underline the task you will need to complete to answer this question?

<p>RA - <u>Restate</u> the question (the 2nd sentence in the TDA question) and <u>answer</u> it.</p>	<p>The Task/Question: Restate the Question: Which factors impacted the seed germination in this lab?</p> <p>Your answer (this will be your introductory sentence):</p>
<p>C - Cite an example from the text to support your answer. Use a direct quote.</p> <p>To complete YOUR sentence ADD one to/before the quote: The text says... or <u>The</u> author says...</p>	<p>E - Explain why the quote you used is evidence to support your answer.</p> <p>To complete YOUR sentence ADD one: This shows... or This is because... or This means... or This proves...</p>
<p>FOR EXAMPLE: (not no use) "Seedlings generally need to be kept moist but not wet."</p>	<p>FOR EXAMPLE: (do not use) In all three Phases of the lab, the paper towel was wet.</p>
<p>REMEMBER: <i>E is Explain ... How does the article quote support the three Phases of the Lab?</i></p>	
<p>1. From the Article - <i>This will be a supporting sentence.</i> "</p>	<p>1. About the quote from the Article - <i>This will be a supporting sentence.</i></p>
<p>2. From the Article - <i>This will be a supporting sentence.</i> "</p>	<p>2. About the quote from the Article - <i>This will be a supporting sentence.</i></p>
<p>3. From the What's Sprouting Lab Data Graph – (what does the graph show) <i>This will be a supporting sentence.</i> "</p>	<p>3. From the What's Sprouting Lab Data Graph – (explain what you see in each line of the graph) <i>This will be a supporting sentence.</i></p>
<p>S - Sum it all up. <u>Restate</u> the question or prompt as a conclusion.</p>	<p>Your concluding sentence:</p>

TDA GUIDED NOTES

- The TDA Guided Notes **MUST** be **COMPLETED** by Monday, January 27th.
- You will be submitting your **What's Sprouting Lab TDA Assignment** as part of your **ASYNCH Lesson** on Monday, January 27th
- **What's Sprouting Lab** Assignment (document) **DUE Monday, January 27th!**

OPEN THE FOLLOWING:

1. What's Sprouting Lab TDA Guided Notes (the RACES Graphic Organizer)
2. "7 Factors that Affect Seed Germination" (PDF)
3. What's Sprouting Lab (document with your data)

NOW, is the time to:
complete the TDA Guided Notes
for the What's Sprouting Lab TDA
Assignment!



TDA GUIDED NOTES WORK ROOM

YOU should have OPEN:

1. What's Sprouting Lab TDA Guided Notes (the RACES Graphic Organizer)
2. "7 Factors that Affect Seed Germination" (PDF)
3. What's Sprouting Lab (document with your data)

You **MUST** complete/**SAVE** the TDA Guided Notes for **USE** on **Monday** to the **What's Sprouting Lab TDA!**

■ IF YOU NEED HELP:

1. Raise your hand!
 - Help will be given based upon your raised hand number.
2. You **MUST** appshare your desktop!



TODAY'S WRAP UP...

HOMEWORK

- **Unit 5 Common Assessment**
ENDS TODAY January 24 at 11:30 pm

SEMESTER B Life Science course

- **What's Sprouting Lab Assignment**
(document)
DUE Monday, January 27th at 9 am
ENDS Sunday, February 2 at 11:30 pm
- **MONDAY, Jan 27 ASYNCH Lesson:**
What's Sprouting Lab TDA Assignment

EXIT TICKET

- **REQUIRED:**

*Today
is the
Day*



<p>RA - <u>Restate</u> the question (the 2nd sentence in the TDA question) and <u>answer</u> it.</p>	<p>The Task/Question: Restate the Question: Which factors impacted the seed germination in this lab?</p> <p>Your answer (this will be your introductory sentence):</p>
<p>C - Cite an example from the text to support your answer. Use a direct quote.</p> <p>To complete YOUR sentence ADD one to/before the quote: The text says... or <u>The</u> author says...</p>	<p>E - Explain why the quote you used is evidence to support your answer.</p> <p>To complete YOUR sentence ADD one: This shows... or This is because... or This means... or This proves...</p>
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<p>1. From the Article - <i>This will be a supporting sentence.</i> " . "</p>	<p>1. About the quote from the Article - <i>This will be a supporting sentence.</i></p>
<p>2. From the Article - <i>This will be a supporting sentence.</i> " . "</p>	<p>2. About the quote from the Article - <i>This will be a supporting sentence.</i></p>
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<p>S - Sum it all up. <u>Restate</u> the question or prompt as a conclusion.</p>	<p>Your concluding sentence:</p>



WHAT'S SPROUTING LAB

IMPORTANT INFORMATION

- What's Sprouting Lab Assignment (document)
DUE Monday, January 27th
ENDS Sunday, February 2nd
- TDA Guided Notes **COMPLETED** by Monday, January 27th.
 - SEE Class Recording: Fri, Jan 24th!**
- ASYNCH Lesson Monday, Jan 27th
What's Sprouting Lab TDA Assignment
DUE Monday, January 27th
ENDS Sunday, February 2nd