

Lessons from Dyslexia

Strategies for teaching compromised students

Why this talk?

I currently teach at a school that focuses on the teaching of students with dyslexia and related language-based learning differences.

Our students are quite compromised in issues related to reading, calculation, writing, memory, anxiety, attention, and more. Many are doubly or triply exceptional, meaning that they have multiple issues to deal with.

We focus on strategies for helping them succeed in and beyond school - college (for the majority of our students who attend), trade school, or work.

Why this talk?

Our School Philosophy:

Jemicy School educates talented and bright students with dyslexia or other related language-based learning differences by addressing both their intellectual strengths and their learning needs. The school utilizes creative, multisensory, and research-based programs and techniques to develop reading, writing, spelling, math, and organization skills; promote a love of learning; and prepare students for the intellectual and social challenges of college and life.

We often reference this Aldous Huxley quote:

“It is no good knowing about the taste of strawberries out of a book.”

Translation: education should be experiential.

Remember also this George Evans quote:

“Every student can learn, just not on the same day, or the same way.”

What we see - and what many of you will also see

- Dyslexia
- Dysgraphia
- Dyscalculia
- ADD
- Executive function issues
- Anxiety
- Extreme math phobia

Day to day issues

- Lab errors you never imagined possible
- No number sense - for example, calculating how much it costs in gas to drive to Ocean City and arriving at an answer in thousands of dollars (or pennies), and having no sense that it is ridiculous
- Repeated units in data tables when units are at the top
- Scientific notation baffling students
- Difficulty with measurement and units
- Difficulty understanding fractions, time (3 minutes and 30 seconds written as 3.30)

Day to day issues

- Taking notes by copying and pasting yours
- Taking huge amounts of time between experiment trials
- Not remembering what 'c' or 'g' means no matter how many times you say it
- Hearing "I'm so confused" over and over again
- Huge variety of processing speeds - some kids in their own time zone
- ADD x 3 kids = ADD¹⁰
- Trouble getting started with labs

Day to day issues

- Getting a 1 sentence answer when you ask for a paragraph; or simply seeing “IDK”
- Taking half of the data (only diameter and not circumference, for example)
- Difficulty understanding graphs, circuit diagrams, etc.
- Occasional speech issues - students with impediments, mumbling, etc.
- Not knowing words you think they should know: “What is a lens?”

Day to day issues

- Refusal to read directions - or inability to read and process them
- Short-term memory issues - even on tests, quizzes. Not making connections between problems
- Missing key descriptive words in sentence - “currently,” “greatest”.
- Impulsive answering on multiple-choice questions
- Big confusion with base-12 and base-60 systems: 5' 2" is NOT 5.2'. 3.45 hours is NOT 3 hours 45 minutes

Day to day issues

- Minimal attention to detail and writing; putting words down that seem like gibberish to you, but they mean something in the kid's head
- No matter how many times you will demonstrate the right way to take data (and what to write down), students will make mistakes and write down things that make no sense. You will often not be able to deconstruct where they went wrong.

What I see every day.

- You will be shocked at how many times you repeat yourself.
- You will hear a lot of student “helplessness.” For example, “What does $2f$ mean?”
- Students often want you to grade their work/lab AS they do it - asking you to help them with and/or grade every question on a lab as they answer it
- Students not knowing how or what to study

What I see every day.

- Listening to music while they work/study
- Students who do not use study hall time
- Students often have trouble with trying to do “obvious” calculations: subtracting 2 location distances to get the net distance between 2 things (think lens lab)
- Inability to get started - wasting of entire period, taking no data (getting distracted or never starting)

What I see every day.

- Students forgetting how to do a lab in the middle of a lab.
- Students not know how to take notes - very common

And much, much more...

It sounds bleak. What can you do?

There is not one approach that will work for all students.

Patience is essential. I seem to lose my temper once every few months. It happens.

You are first teaching children, not physics - the material is obvious to you because you learned it several times and have already done the problems and derivations. The steps in the derivation, and indeed, the rationale for doing a derivation in the first place is obvious to you. Actually, physics itself is way more important to you than to them.

Avoid sarcasm - many kids don't get it, and you just seem like a jerk

Beginning of year teachables

My first unit covers basic executive function skills, then a variety of other things students should (in my view) know early in the course;

1. Note-taking
2. Detecting BS (memes vs. truth, etc.) and how to test claims; see Sagan's "Tools for Skeptical Thinking," etc.
3. Why we study physics (or any science, for that matter)

Beginning of year teachables

My second unit covers some important quantitative skills:

1. Graph interpretation - I show a variety of graphs that are misleading and discuss why it is so
2. How to graph - Google sheets is nice and free, but not as intuitive as Graphical Analysis (Logger Pro).
3. Units - why and how we use them
4. Equations - what are they, why we care, how to use them, triangle forms of equations
5. Unit conversions (for my accelerated classes)

Note-taking strategies for digital note-takers

Marrying typed notes with written equations:

- Use the “insert drawing” tool in Google Docs to add equations to typed notes
- Have students take pictures of their written-out equations or mathematical notes; add to typed notes

You must demonstrate (and help with) note-taking

Provide digital templates

Use my suggested rules (see end notes)

Measurement

Metric vs. English. Use metric. If you have meter tapes or meter sticks, cross out the non-metric side. Very clearly cross it out, as students will still try to use imperial units when you put a very bold line through the entire side of the tape. Yes, that was a lesson learned. Students will also mix units, if there are different units on each side tape - make it clear which side is to be used. It is NOT obvious to students.

Quick suggestions

- Place equations in boxes in your notes and on the board.
- Have highlighters handy.
- Use variables that make sense, wherever possible: d for distance/displacement.
- Formal labs - use checklists with boxes to check
- In your notes, boldface things that should be written down.
- Discourage the use of phones as calculators - they cannot see their mistakes.
- Attach a metric height scale on your wall.
- Use Screenpal (formerly Screencast-o-matic) or some other tool to prepare videos that walk students through labs, calculations, derivations, etc.

Quick suggestions

- Check student notes once per quarter and make helpful comments on them.
- Start your labs early in the year by giving data tables (with legend and units listed). Students will soon learn to create their own tables and graphs.
- Use triangle/circle equations when possible, though they are not intuitive to all students.
- Students will frequently have technology issues. If possible, keep chargers handy.
- Avoid sarcasm.
- Have scale models in your room: Earth and Moon, for example

Quick suggestions

- Expect to help some students get started on a lab. You may have assigned it to read, but that does not mean that they actually read or understood it.
- Create a class YouTube page and/or post explanation videos for complex labs and tricky problems to solve.
- Be patient. Sometimes you are preparing the next generation of scientists. More often than that, you are helping students understand some science for their own personal enrichment. Always, you are trying to be a kind role model for children who are struggling with learning way more than you ever did.

Notes on note-taking

Notes on note-taking

1. Use a bound notebook, ideally with quad-paper (or whatever works for you - I prefer totally blank pages). Spiral-bound notebooks fall apart. Bound notebooks keep you "honest."
2. Use a new page for each new class and/or topic.
3. Write on only one side of the page - it makes it easier to read, particularly if you use pen (which can bleed through to the other side).
4. Give each new page a heading and date.
5. Use color to highlight central concepts and/or put boxes around important ideas or equations. Highlighters can be your friend!

Notes on note-taking

6. Draw pictures that represent the problem - label relevant things in the diagram.
7. Unless truly necessary for your learning, do not use a laptop to take notes. You spend too much time getting down trivial details and will inevitably miss something critical. It is also way too tedious to include equations, pictures, graphs, calculations and anything that really demands visual representation.
8. Keep a running page of the important equations or ideas - maybe on the inside cover of the notebook.
9. Label formulas with what each variable represents, as well as the units.

Notes on note-taking

10. If things are moving too quickly for you, leave space for omitted notes – with a heading of what that topic is. And then touch base with me or a classmate to fill in the gaps.
11. Leave space in your notes – don't cram them all together. Again, writing on one side of the page is helpful.
12. If you have questions, but don't want to ask them in class (or see that we have moved beyond that topic already and you don't want to revisit it at the moment) – write down the questions in the margin of your notes, and circle it. And then seek out the answer after class, or by email. But get your question answered!

Notes on note-taking

13. If taking notes on a laptop is really important for your learning, use the Google drawing tool (best with a touchscreen) and take images of the board and incorporate them into your notes. You can even add pictures in real-time. More about this later.
14. By and large, if it is on the board it should probably be written down. For me personally - if I think it is important for the students, I will write it on the board.
15. Never be shy about asking for extra help – even to have me look at your notes. Sometimes I can tell where you went wrong in your thinking by seeing errors in your notes.
16. I AM ON YOUR SIDE.

Notes on note-taking - another take on it

From one physics student who prefers to use binders:

Be consistent across your classes. Use a different binder for each subject.

- Section 1: Homework. Your version, then the solutions (if available).
- Section 2: Teacher's Notes, if given out, split into appropriate content sections. Your version of the notes (re-written?) after the teacher's notes.
- Section 3: Laboratory experiments
- Use engineering paper for technical classes. Write on only one side of each page, date and title each page.
- Rewrite notes to help ideas make more sense. The notes are for you, so you should understand them.

Helping your students with executive function

Digital Organization - in your Google Drive

Folders for each class

Sub-folders in each class folder, as needed:

- Homework
- Notes
- Labs
- Quizzes and tests
- Review

Digital Organization - for those who type notes

Choose a notebook style - see samples in class

Do you want it to be google doc style or slides style? See the templates and pages available.

Digital Organization - so many options and ideas...

<https://www.onlineschoolscenter.com/notetaking-techniques-tips/>

https://success.oregonstate.edu/sites/success.oregonstate.edu/files/note_taking_-_7_kinds_20.pdf

<https://sciencenotes.org/how-to-take-science-notes/>

<https://collegeinfo geek.com/how-to-take-notes-in-college/>

<https://www.cc-seas.columbia.edu/node/31875>

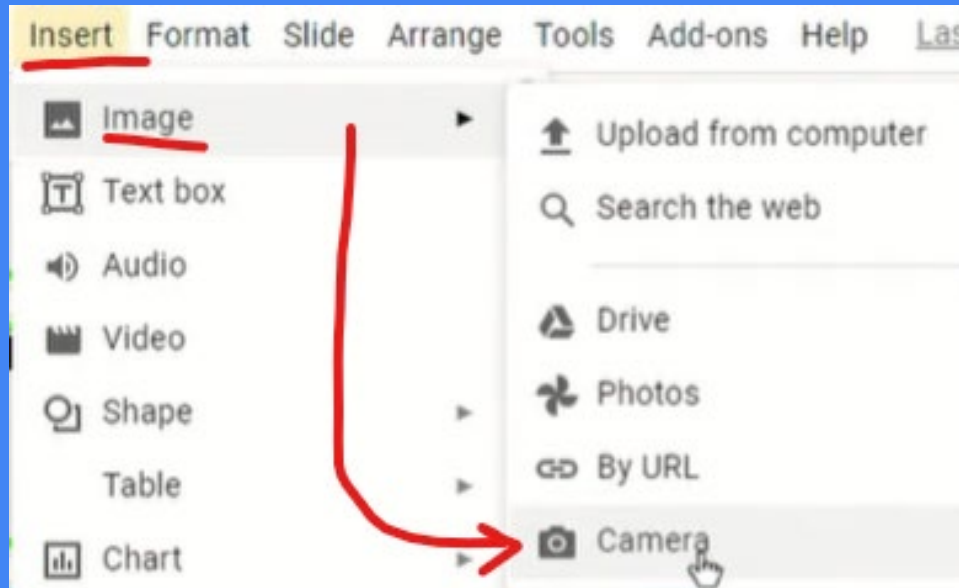
If you use Google Docs

Here are some ideas found online. The complete notebook examples are shared with you.

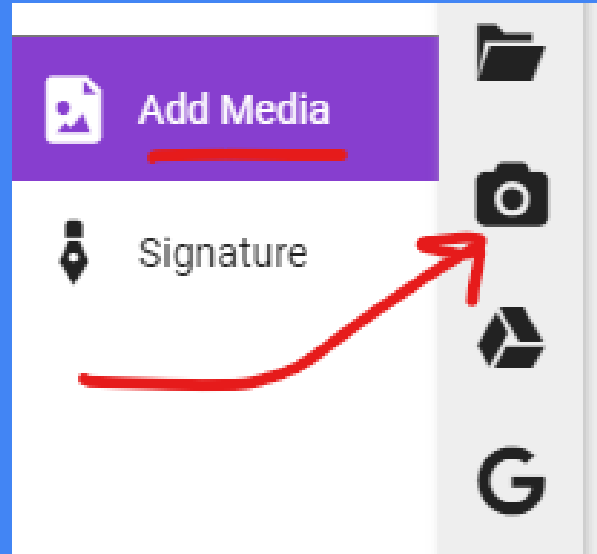
You can use some of the templates shared, or you can create your own. You can also easily adapt some of the strategies you may already know - concept maps, Cornell notes, Kami, OneNote, Apple Notes, etc. - to Physics class.


If you use Google Docs

For you Google Docs 'n Slides folks, please know that you can insert images in real time (if your device has a camera). This could be a huge time saver. Chromebooks can do this.



Or in Kami:



Physics	Student Name
Chapter/Handout/Lab	Class/Period
Key Words, Vocab, Questions	Notes
	<p>1. Record: While reading use the <u>notetaking</u> column to record the supporting facts, ideas, dates, etc using telegraphic sentences.</p> <p>3. Reads: Cover the notetaking column with a sheet of paper. Then, looking at the questions or cue words in the question and cue column only, say aloud, in your own words, the answers to the questions, facts, or ideas indicated by the cue words.</p> <p>4. Reflect: Reflect on the material by asking yourself questions, for example: "What's the significance of these facts? What principle are they based on? How can I apply them? How do they fit in with what I already know? What's beyond them?"</p> <p>5. Review: Spend at least ten minutes every week reviewing all your previous notes. If you do, you'll retain a great deal for current use, as well as, for the exam.</p>  <p>→ Title</p> <p>→ By author</p> <p>→ Location</p> <p>→ Big Take</p> <p>→ Read like a book</p> <p>→ Read like a book</p> <p>→ Read like a book</p> <p>→ Read like a book</p> <p>→ Summary</p>
Summary	

Topic: Types of Questions

Date:

Notes: Types of Questions - Kinesthetic Activities

Summarize your Notes below:

Closed Questions:

- Definition:
- Examples:

Open Questions:

- Definition:
- Examples:

Evidence Based Argumentative Questions:

****Remember these are what we are focusing on this marking period****

- Definition:
- Examples:

An Argumentative Essay is/includes:

-

Homework:

Finish summarizing your notes above. Check out the Review [here](#).

Topic: Research Questions

Date:

We will view the following video. Please take bulleted notes about the important key aspects of a research question.

Video: <https://www.youtube.com/watch?v=DW1VCYcT2ak>

Notes:

-
-
-
-
-
-
-

Homework:

Evidence Based Argumentative Questions handout -
Come up with 5 evidence based questions that we have not discussed in class!

Topic: Developing Your Evidence Based Argumentative Research Question

Date:

Review the graphic organizers around the room. Write down TEN (10) Evidence Based Argumentative Questions that you might want to answer this marking period:

Turn your outline on → Click on VIEW > SHOW DOCUMENT OUTLINE

Topic: Questions	Date: 11/6/2017
Notes:	
Homework:	Questions:
Resource Link in Classroom: https://classroom.google.com/c/NTAvcDQ1OTk3Mlpa0NxbjMzc2OTY5MFpa	

Topic:	Date:
Notes:	
Homework:	Questions:

Topic:	Date:
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Homework:	Questions:

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Homework:	Questions:

Topic:	Date:
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Turn your outline on → Click on VIEW > SHOW DOCUMENT OUTLINE

Topic: Questions	Date: 11/6/2017
Notes:	
Homework:	Questions:
Resource Link in Classroom: https://classroom.google.com/c/NTAxODQ1OTk3Mlpa/t/NzlyMzc2OTY5MFpa	

Topic:	Date:
Notes:	
Homework:	Questions:

If you use Google Slides...

Here are some ideas found online. The complete notebook examples are shared with you.

MY NOTEBOOK

Here goes your name.

Table of Contents


SECTION

CONTENTS

01	Section 01 is about this and that.
02	Section 02 is about this.
03	Section 03 is about that.
04	Section 04 is about this and that.
05	Section 05 is about this.
06	Section 06 is about this and that.
07	Section 07 is about that.
08	Section 08 is about this.
09	Section 09 is about this and that.
10	Section 10 is about that.







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presentation title

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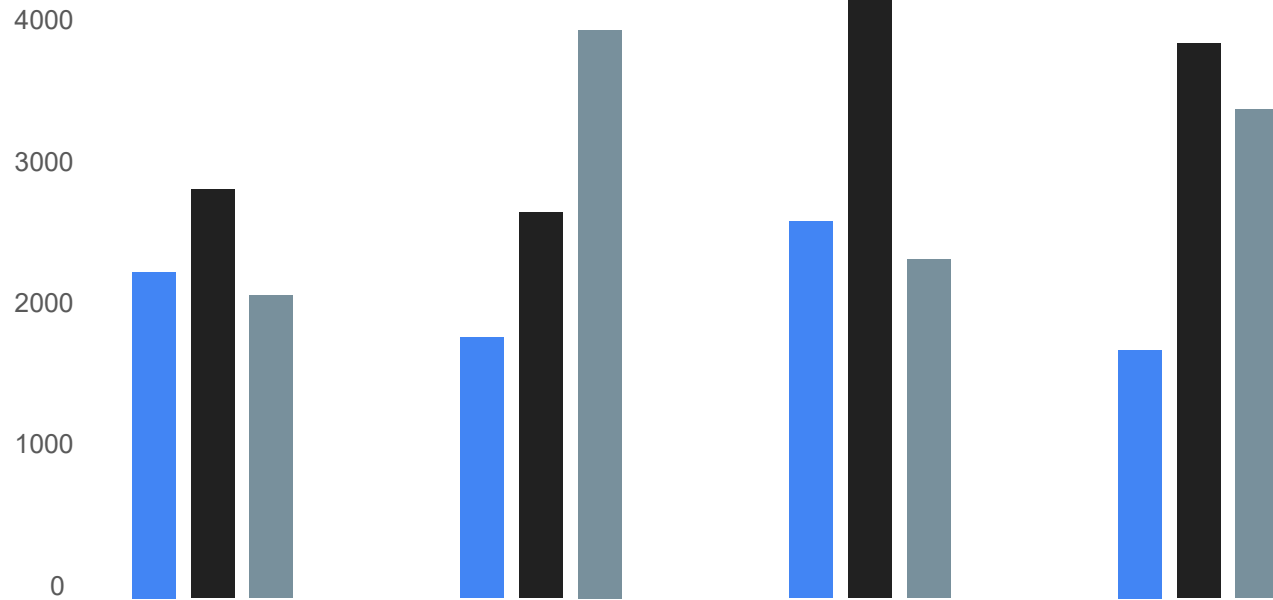
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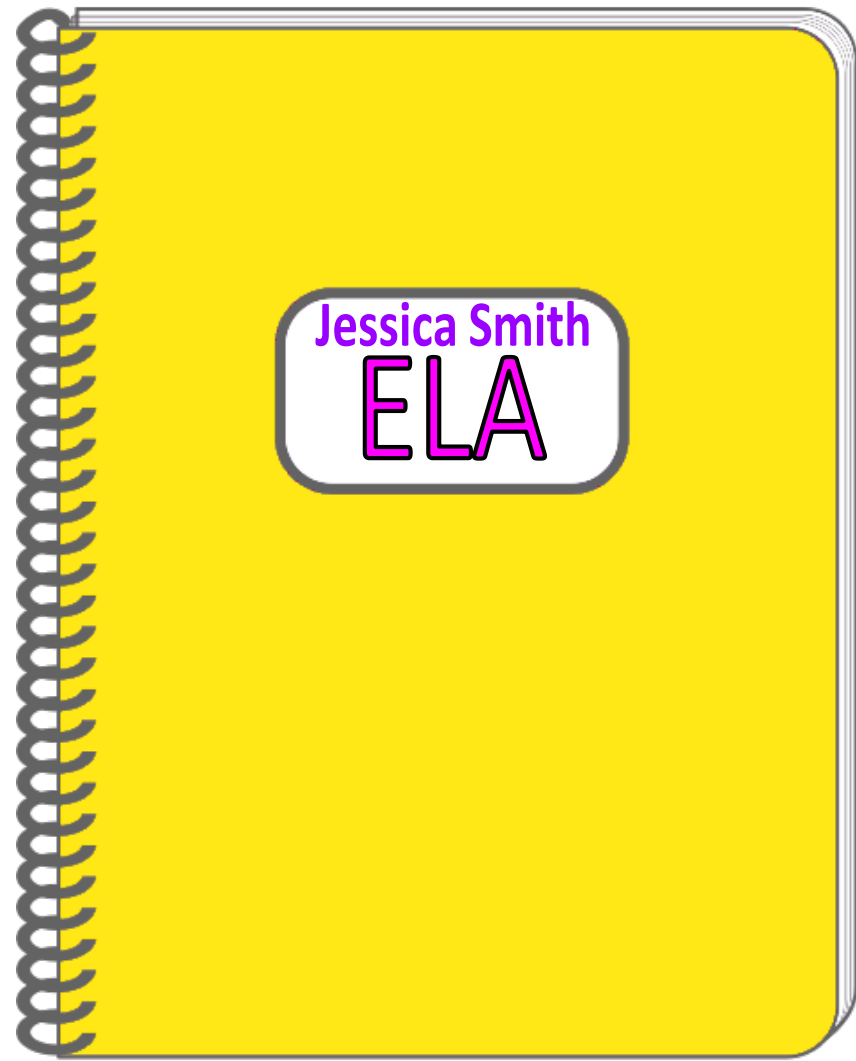


You can insert graphs from Excel or Google Sheets

Unit ___ Digital Interactive Notebook

Make your notebook your own!

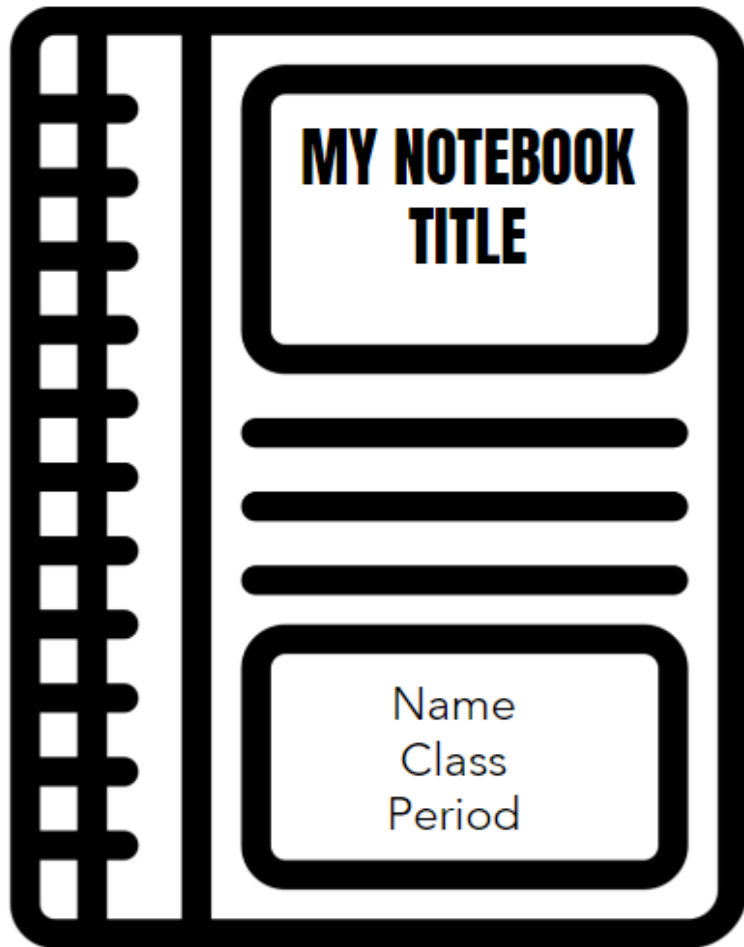
Choose from the following stickers or add some of your own. Also include your name on your notebook, make sure to change the font and color





MY NOTEBOOK TITLE

Name
Class
Period



**MY NOTEBOOK
TITLE**

Name
Class
Period

Moveable vocabulary

Category 1 for sorting

Category 2 for sorting

Category 3 for sorting

Category 4 for sorting

Other techniques for digital notetaking

- Apple notes
- Microsoft OneNote
- Evernote
- Google Keep
- Simplenote
- Kami
- Mindomo
- Canva
- Sketchnote