Interactive & Digital Student Notebooks

Kenn Heydrick, EdD
National STEM Manager

Stephanie Shield, MEd
Regional STEM Specialist

NSTA Conference - Portland
October 2021

Who is in this session?
❖ Name, grade level, home?
❖ Poll - do you use notebooks?

https://www.menti.com/14rikyqkav
Have you used notebooks with students?

<table>
<thead>
<tr>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, paper-type notebooks</td>
<td>Yes, digital-type notebooks</td>
<td>Yes, BOTH paper &amp; digital notebooks</td>
<td>No, but I’m interested in doing so</td>
</tr>
</tbody>
</table>

What are Interactive Student Notebooks?

- Convenient way for students to organize their materials.
- They are not craft projects.
- They allow students to produce evidence of learning through targeted activities.
- They are a resource for students to practice, explore, review, and revisit your students’ learning objectives all year long.
What are Interactive Student Notebooks?

- A student thinking tool.
- An organized place for writing, drawing, and thinking about hands-on learning.
- Convenieint way for students to organize their materials.
- A formative assessment tool for teachers.

Tapping into Student’s Strengths

Interactive Notebooks tap into student’s different intelligences through a variety of assignments, such as:

- Illustrations
- Graphic organizers
- Graphs
- Models
- Sequencing
- Investigations
- Songs
- Poems
- Problem solving
- Reflections
The Evolution of Interactive Student Notebooks

Have you used paper student notebooks in the past?
- Things you liked about it?
- Things you disliked about it?

Turn and Talk (or online chat)
Format Examples - Lots of Options

**Left and Right**
- Left side = Student thinking
- Right side = Teacher information

**Open Format**
- Incorporating the components of the Science Notebook without a particular format

**Scientific Method**
- Left side = Title, Hypothesis, Materials, & Procedures
- Right side = Results and Conclusion

**Combination**
- Using any of the above

---

**Layout - LEFT SIDE SECTION**

**“Loves”**

Output = Student Work

The LEFT side = student directed

Students demonstrate that they understand the provided information.

Students PROCESS the information here. Internalize. Express opinions, feelings, and interpretations.

Allows for drawing, creativity, cartoons, imagination, experiments, etc.

**Layout - RIGHT SIDE SECTION**

**“Restricted”**

Input = Teacher Work

The RIGHT side = information from class and work; is teacher directed; includes notes, handouts, labs, diagrams, study guides, vocabulary, and testable or quizzable items.
## Layout - LEFT SIDE SECTION

**“Loves”**

Output = Student Work

- Reading responses and journals
- KWL charts and diagrams
- Pictures, cartoons, songs, & poems
- Connected or related ideas
- Reflections, quotes, & perspectives
- Mnemonic devices and memory aids

## Layout - RIGHT SIDE SECTION

**“Restricted”**

Input = Teacher Work

- Record notes from class and group discussion, lecture, & activities
- Record notes from readings & labs
- Record notes from video or audio
- Vocabulary terms to know
- Assignments given

## Organization and Setup

- **Cover page** of paper or digital notebook.
- **Materials - Paper**
  - pens, pencils, scissors, glue sticks, etc.
- **Materials - Digital**
  - Google slides and access to various apps (Jamboard, Flipgrid, Desmos, Padlet, Screencastify, etc.)
- **Table of contents** with page numbers or links to sections.
Organization and Setup - Digital Version

➢ Easy method using Google slides (landscape or portrait).
➢ For each lesson section, students include:
  ○ Notes, activities, images, videos, vocabulary, references, etc.
  ○ Links to files are usually used.
➢ Multimedia rich.

Electronic Portfolio of Learning

❑ Highlights 21st century skills.
❑ Makes learning visible.
❑ Empowers students. Allows creativity.
❑ Resource packet for studying, keeps parents informed.
Various Digital Tools to Enhance Notebooks

- **Flipgrid** - video recordings
- **Desmos** - graphing data
- **Padlet** - board for sharing/responding/uploading

Don’t Write it, Say it

- Students can enhance their notebooks by using audio or video.
- Students record their answer or do an activity on video instead of writing it.
- Use **Screencastify** - a Chrome browser extension.
- Free unlimited recordings up to 5 minutes each.
Slow Motion Animation

- Google slides - repeated to show movement.
- Students create product to show processes.

Play
Slow Motion Animation

★ Examples in science? Let’s brainstorm.

Another YouTube example - https://youtu.be/l2Ll_466oU8

Scientific Project or Science Fair

★ Students work through steps of the scientific method.
  Each section has set of slides.
★ Teacher can create a slide template. Students log their ideas and findings.
Example

**science fair project**

"Which Fabric burns the fastest?"

By Isabella B.

**purpose**

My purpose was to find which type of fabric burns the slowest.

**the fabrics**

Polyester Cotton Acrylic Nylon

**hypothesis**

Out of the four different fabrics (acrylic, polyester, cotton, and nylon), I think that acrylic will burn the slowest because it is heavier and more densely woven.

**materials**

- Bic lighter
- fabric squares 5 in. by 5 in.
- Well ventilated non-flammable place to burn the fabrics
- Adult
- Fire extinguisher
- Stopwatch
- White foam board measured in 1 inch squares
- Metal clamp to hold the fabrics

**procedure**

1. First, I will get the fabric: acrylic, cotton, nylon, and polyester.
2. Then, I will cut them into 5 inch by 5 inch squares.
3. Next, I will burn the fabrics using a Bic lighter to produce a constant flame.
4. Two pieces of each fabric will be burned. The time will stop when the fabric

**results**

<table>
<thead>
<tr>
<th>FABRIC TYPE</th>
<th>AVERAGE BURN TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nylon</td>
<td>16.7 seconds</td>
</tr>
<tr>
<td>Cotton</td>
<td>22.2 seconds</td>
</tr>
<tr>
<td>Polyester</td>
<td>26.7 seconds</td>
</tr>
<tr>
<td>Acrylic</td>
<td>49.55 seconds</td>
</tr>
</tbody>
</table>

**conclusion**

Acrylic had the slowest burn time but it also had the largest and most intense flame. My research showed that fabric weave is an important variable. Another variable is the flammability of the fabric, which is not the same as its burn time. If I were to do this experiment again I would try to select fabrics with similar weave and flammability.
Engineering Design Process

★ Students solve a problem or challenge.
★ Students think through a new idea from concept to creation.
★ The steps of the Engineering Design Process (EDP) can be displayed on slides.
★ Teacher can create a template also. Multimedia rich project.
Engineering Design Process

**ASK**
- What are the problems?
- What are the constraints?

**IMAGINE**
- Brainstorm ideas
- Choose the best one

**PLAN**
- Draw a diagram
- Gather needed materials

**CREATE**
- Follow the plan
- Test it out!

**IMPROVE**
- What can work better?
- Repeat cycle to make changes

Tips for Digital Student Notebooks

- Use **color backgrounds** for different sections, units, or projects.
- Create **master slides** for students.
  - New presentation toolbar > background > layout > theme
  - Delete any layouts that students should not use (keep simple).
- Students can **embed audio or video** to provide an explanation for what they are thinking or even link an audio file describing a visual they created.
- As the teacher, **create a screencastify video** explaining an assignment or procedure.
Let’s see an example

My Science Notebook

Check out an example

My Name:

Teacher:

Period:

Add any images or info about you and this class
In this unit, I will learn:

1. Add objective 1 - provided by teacher
2. Add objective 2 - provided by teacher
3. Add objective 3 - provided by teacher

Area for Student's Input

Any project due date: _______________
Test date: _______________
Flow of Energy in Ecosystems

September 12, 2020

Activity - Energy Dominos

1. Line up the dominoes in the following order: Sun, grass, insect, frog, and bird.
2. Put the arrows between each of the dominoes.
3. Be a “sunray” and send energy from the Sun domino to the plant. Push over first domino.

What happens when you push the first domino? They all fell over.

SUN = original source of all energy in a food chain
TRANSFER of ENERGY = represented by arrows

Flow of Energy in Ecosystems

Worksheet - teacher gave us to fill out as we go through unit

Link to chart - _______________

Homework - find short video on energy

Homework - video on energy
Flow of Energy in Ecosystems

We got a baggie of cards.

Lab and Worksheet - Food Webs

How do food webs work?

Figure our roles of producers, consumers, and decomposers in food chains and webs.

We will sort cards and create a food web from them. Draw a diagram. How energy flows through food web.

Producer = _______________
Consumer = _______________
Decomposers = _______________

We got a baggie of cards.

We needed to sort and arrange the cards.

Flow of Energy in Ecosystems

Plants; get their energy from the Sun
Animals; get their energy from plants and/or other animals
Bacteria or fungi; get their energy from breaking down dead or decaying matter

Mary Moen

No, there were organisms that we did not use.

Screencastify Audio
Flow of Energy in Ecosystems

My completed journal entry is found below.

What is the energy source?

Lorem Ipsum is simply dummy text of the printing and typesetting industry. It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged.

Where do decomposers to their work?

Lorem Ipsum is simply dummy text of the printing and typesetting industry.
Challenges? - Interactive Student Notebooks

- Address pitfalls/challenges teachers might encounter with their students? (Misuse/Misconduct)
- John Dewey quote, “If we teach today’s students as we taught yesterday’s, we rob them of tomorrow.” These words still ring true, especially in the implementation of technology in the classroom. (Edutopia)

Summary - Interactive Student Notebooks

- Portfolio of student learning.
- Makes learning visible.
- Empowers students’ creativity and ownership.
- Digital infuses multimedia and technology tools.
- Versatile and flexible for all STEM programs/materials.
Let's Start Your Own Google Page

https://docs.google.com/presentation/d/1SmtPdTaNe8KLETmpGNelgQ44yYneZVzn2-kGTewyiNA/edit?usp=sharing

Kenn Heydrick, EdD
National STEM Manager
kheydrick@acceleratelearning.com
stemscopes.com

Stephanie Shield
Regional STEM Specialist
sshield@acceleratelearning.com
stemscopes.com

Interactive & Digital Student Notebooks
NSTA Conference - Portland
October 2021