What are Interactive Science Notebooks?

- A student thinking tool
- A way to access and process the learning utilizing various modalities (writing, drawing, and discussion)
- A place for writing rough drafts based on hands-on learning
- A formative assessment tool for teachers
Why are we using Interactive Science Notebooks?

- Record data
- Study for tests
- Record progress
- Communication
Science Notebook Supplies

Composition Notebook

Glue

pens & pencils

scissors

colored pencils

NO MARKERS!
LET’S GET STARTED…

Cover or Title Page
Give your science notebook a title.

This should give the reader an idea of what this notebook will be about.
SCIENCE NOTEBOOK EXPECTATIONS AND RUBRIC

Your Science Notebook is evidence of your hard work and learning, so treat it with utmost care. You are expected to have it with you at all times. Use the posted example of the notebook as a guide for the correct format.

1. Begin each new lesson by adding the title to the top of your next blank page and recording the date in the upper right corner. Your title can be at the top of either page. Page numbers are always located in the bottom right corner.

2. If time allows you may add the lesson title and page number to your table of contents, otherwise, you’ll need to complete that at the end of the lesson.

3. Each page must have the title, date, and page number. Lessons must be in order and listed in the appropriate table of contents, based on the current six-week period.

4. All papers associated with each lesson must be taped or glued neatly on the page of the activity. No papers should be loose or sticking out from the notebook.

5. Everything you’re asked to write in the course of a lesson should be written in your notebook neatly.

6. Skip lines between the IN activity and the OUT activity.

7. The notebook should be relatively clear of doodling. Use the white space instead for illustrations related to and explaining the science information.

8. The IN Activities must be answered in such a way that you know what the question was asking. For example:
   a. IN Activity: “Which of the following items are examples of physical characteristics?”
   b. Appropriate answer: “Color, size, and shape are examples of physical characteristics.” This answer will allow you to study from it and understand the content of the lesson later.
   c. Not an appropriate answer: “Color, size, and shape.” When you read this later, you won’t have any idea what the lesson was about.

9. Table of Contents needs to be updated regularly with date, lesson title, and page #.

10. AFTER EACH ACTIVITY you should go through your science notebook to:
   - Add color to any diagrams and/or illustrations from the lesson.
   - Ensure that your OUT activity is fully complete and reflective of your learning.

Student Name
Ms. Wolfe
2015-2016
Graphic Organizers

• There are twelve graphic organizers that are acceptable to use in this classroom.

• I may ask you to use a specific GO, or sometimes you will be able to choose one.
<table>
<thead>
<tr>
<th>Student Side</th>
<th>Teacher Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) <strong>IN activity</strong></td>
<td>(2) <strong>THROUGH activity</strong></td>
</tr>
<tr>
<td>Essential Question</td>
<td>Lesson Notes</td>
</tr>
<tr>
<td>Bell Ringer</td>
<td>Diagrams/Illustrations</td>
</tr>
<tr>
<td>Quick-Write</td>
<td>Lab Sheets</td>
</tr>
<tr>
<td></td>
<td>Data and Graphs</td>
</tr>
<tr>
<td>(3) <strong>OUT activity</strong></td>
<td></td>
</tr>
<tr>
<td>Exit Ticket</td>
<td></td>
</tr>
<tr>
<td>Quick-Write</td>
<td></td>
</tr>
<tr>
<td>Graphic Organizer</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Title</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You will need 6 TOC Pages
You will trim 4 ST Pages
Starting behind the TOC, number all of the right-hand pages.

STOP when you reach the Scientific Toolbox.
Moon Phases (Cycles)

I know the moon looks different, but I don't know why or when it changes. I learned about the words: full moon (all the moon shows), half moon (only half shows) and a crescent moon (only a little shows).

Moon Notes
- The moon rotates around the earth.
- One side of the moon always faces the sun.
- We see different "moons" because our position around the sun changes, which changes the light of the moon as the sun hits it.
- The moon does not make (produce) its own light.
- The phases or positions of the moon we see depend on where the moon, sun, and earth are.
- There is a new moon (can't see it), first quarter, full moon, and third quarter (half moon).

Facts of a gas:
- The particles move fast and away from each other.
- The temperature
- Facts of a liquid:
- The particles of a substance are farther apart and slide by each other. (It can change)
- The molecules move faster.
- The temperature increases.
- Molecules take the shape of their container.
- Liquids are denser than a gas.

Facts of solids:
- Particles are close together.
- Molecules move slowly.
- The temperature of the substance decreases.
- The substance contracts.
- A solid keeps its shape + volume.
- The particles are locked together.
Graphic Organizer

Renewable Resources

- Plants
- Animals
- Water
- Oxygen
- Soil

Nonrenewable Resources

- Cannot be replaced quickly, needs years and years to replace

- Fossil fuels
- Natural gas
- Coal
- Minerals

People use them as sources of energy

- Sun
- Ocean water
- Wind

Inexhaustible Resources

This type of energy, people cannot use up
Mistakes should be struck out with one line!

The **larva** larvae wriggled atop the grain.

Information should be clear and understandable by any reader.
Observations & Sketches
8/25/15
IN Activity

1. How do scientists use ISNs? (Interactive Science Notebooks)

Team chat and write down your answer
The following slides show real notebooks from scientists who work at Battelle – Pacific Northwest National Laboratory in Richland, Washington.

Watch carefully as important parts to a scientist’s notebook are shared.
Computational Chemist

“Something wrong with this”

<table>
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<th>BLYP</th>
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<td>UHF unable to reach instability - claim 2</td>
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</tr>
<tr>
<td></td>
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<td>-149.893600068</td>
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1. Obviously an odd surface. Going to try E.S.C. BLYP. Will have all of them check for instability and optimize.

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<tr>
<td>1.14</td>
<td>-149.893600068</td>
<td>-149.893600068</td>
</tr>
</tbody>
</table>

2. Found second instability unable to resolve it.

3. I think there's only 1 instability, but it has trouble getting there. Note identical energies for multiple instabilities.

4. |

5. |

Battelle

...Putting Technology To Work
Computational Chemist

“will have all of these checked for instability and optimize”

<table>
<thead>
<tr>
<th>Date</th>
<th>Method</th>
<th>E (kJ/mol)</th>
<th>Change (kJ/mol)</th>
<th>Note</th>
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<td>UHF unable to resolve instability - Claim 2</td>
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<td>-149.893611856</td>
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<td></td>
<td>1.15</td>
<td>-149.893260068</td>
<td></td>
</tr>
</tbody>
</table>

4 June 94

1. Obviously an odd surface. Going to look at DFT BLYP.

2. Will have all of these checked for instability and optimize.

3. | R (Å) | BLYP 1 | BLYP 2 | Change (kJ/mol) |
<table>
<thead>
<tr>
<th></th>
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<td>okay</td>
</tr>
</tbody>
</table>

4. Found second instability unable to resolve it.

5. I think there's only 1 instability, but it has trouble getting there. Note identical energy for multiple instabilities.

6. 1.18 -149.89071, 1.689 -149.89071831
Materials Scientist

Reference graphs and tables pasted into notebook.
Materials Scientist

Sample sketch
Materials Scientist

Results (crossed out)
July 1997.  
Due to growing elk populations on ALE, the need to assess their impact on vegetation became apparent.  Kent Johnson (WA) and Jim Marc (AUX/SERS) want to ALE to look for potential stronger Elk Exclusions.  Also they located some plots left from prior studies on the Reserve.  Criteria for sites included accessibility, forest type, presence of elk excreta, vegetation types, and elk tracks or continued elk presence.  
Four sites were chosen: near Rattlesnake Spring, near the power lines, at gate 1/20, at Upper Sprucey Canyon, and the last plot Rattlesnake Spring off a road just a few miles from the main road of State 118. (Sorry that I don’t have the names of the plots.)

August 1997.  
Larry Cullowe, Bob Raitz, Kent Johnson, WA Dept of Fish & Wildlife and J. Jones (USFWS) built the fence enclosure.  

I want to each elk enclosure and set up 3 10x10m plots within the enclosure and two sets of 3 (0x10m plots outside the enclosure).  These control plots are in place so that vegetation inside and outside can be sampled and compared, thus evaluating the impact elk are having on ALE.  The control plots were marked with attention to elk trails (tried to include part of at least one on a control plot) maintaining similar vegetation type, distribution, similar topography, and slope.  Also the control plots were located at about 15-25m from the structures.

Describing the problem – the purpose of the study
ECOLOGIST

Identifying the site including selection criteria
ECOLOGIST

Specifications regarding the Elk Enclosures

July 1997:
Due to growing elk populations on ALE, the need to assess their impact on vegetation became apparent. Kent Johnson (WDFW) and Jan Marie (AWRI/ERS) went to ALE to look for potential sites for Elk enclosures. Also they located three new enclosures, left from past decades on the Reserve. Criteria for sites included accessibility, vantage points, evidence of elk presence (including trails), different vegetation types, and likelihood of continued elk presence.

Forest sites were chosen near Rattlesnake Springs, near the power lines and at the site of the road which is a straight line from the main road of State 118. (Sorry that I don’t know the Road name.

August 1997:
Larry Odell, Bob R. F. Johnson, Kent Johnson, WA Dept of Fish Wildlife, and Jamie (Shearing) built the fence enclosure.

- A raised tier, about 3.5 ft in ground
- 45 m
- 15 m
- 15 m

Metal fence posts were placed along the perimeter of the structure and driven into the ground.
About 4.5 rows of barbed wire were strung around the perimeter as well. The structure seen very sturdy and durable.

October 1997:
I went to each elk enclosure and set up 3 10x10 m plots within the enclosure and two sets of 3 10x10 plots outside the enclosure. These control plots are in place so that vegetation inside and outside can be sampled and compared, thus evaluating the impact elk are having on ALE. The control plots were treated with attention to elk trails (tried to include part of at least one in a control plot), maintaining similar vegetation types, distribution, similar topography, and slope.

Also, the control plots were located at about 15-25 m from the structures.

The vegetation in the control plots has not been sampled yet.
THINKING ABOUT YOUR SCIENCE NOTEBOOK…

• What are some of the things you saw happening in the scientists’ notebooks?

OUT Activity
List 6 things that you observed from the scientists ISNs
THINKING ABOUT NOTEBOOKS...

Share out with your table group...
REFLECT...

Which of those things do you think you could incorporate in YOUR notebook?
Model first – describing what you are doing…

Outside shape

Split object into parts
Move from Sketch to Scientific Illustration

- Label the parts
- Add color and dimension
- Drawing now is detailed, accurate, and labeled
This organizer or writing frame is one part of a comprehensive, research-based approach to teaching students how to think, talk and write like scientists. (See Writing in Science by Betsy Rupp Fulwiler, © 2007, Portsmouth, NH: Heinemann.)
Now add a new object...
THE BOX & T-CHART

Similarities

Object #1

Object #2

Differences

This organizer or writing frame is one part of a comprehensive, research-based approach to teaching students how to think, talk and write like scientists. (See Writing in Science by Betsy Rupp Fulwiler, © 2007, Portsmouth, NH: Heinemann.)
## COMPARE AND CONTRAST

**Writing Frame**

| Start with how things are the same or similar. | The _____ and the _____ are the same because they both __________. |
| Add more details as needed. | In addition, they both ______________. |
| Explain how they are different. You can compare the same property or characteristic in the same sentence. Use “and”, “but”, or “whereas” to set up the contrast. | They are different because the _____, but the _____ does not. |
| Add more detail as needed. | Also, the __________, whereas the ______________ does not. |

This organizer or writing frame is one part of a comprehensive, research-based approach to teaching students how to think, talk and write like scientists. (See Writing in Science by Betsy Rupp Fulwiler, © 2007, Portsmouth, NH: Heinemann.)
Update Your Table of Contents

• Turn back to your Table of Contents.
• Add “Observations and Sketches” with the corresponding date and page numbers.
• Now that you have had a basic experience in using your science notebook you are ready to record your experiences while at work in your science class!
THEN…

Don’t forget to let your notebook reflect your…

ARTISTIC PERSONALITY