- Create word wall as class, students add these words to word bank in their notebooks
- May include scientific terms or words that are important to know within the context of a test question or activity (e.g. compare, contrast, formation)

Science Notebook Entry Types

H3f

Science notebooks contain information about the students' classroom experiences and are used much as scientists would, before, during, and after all investigations. They are a place where students formulate and record their questions, make predictions, record data, procedures, and results, compose reflections, and communicate findings. Most importantly, notebooks provide a place for students to record new concepts they have learned.

By reviewing hundreds of actual student notebooks, a group of education leaders from Washington State explored how teachers were asking students to record their ideas in their science notebooks. Analysis of the student work revealed eight distinct strategies or "entry types," used most frequently by practicing K12 teachers. This handout describes those eight entry types and offers a rationale for why a teacher might select a given entry type. The companion website – www.sciencenotebooks.org - illustrates each entry type with multiple samples of student work stored in a searchable online database. The samples come from students of all grade levels, demographic groups, and geographic regions.

Entry Type	*Definition and Purpose*
Drawings	*Definition* Student generated drawings of materials, scientific investigation set-up, observations, or concepts. Three common types of drawings used in science notebooks include: 1. Sketches: Informal pictures of objects or concepts created with little detail. 2. Scientific Illustrations: Detailed, accurate, labeled drawings of observations or concepts. 3. Technical Drawings: A record of a product in such detail that someone could create the product from the drawings.
	Purpose Students use drawings to make their thinking and observations of concrete or abstract ideas visible. Drawings access diverse learning styles, allow entry to the writing process for special needs students and emergent writers, and assist in vocabulary development (e.g. oral explanations, group discussions, labels).
Tables, Charts, and Graphs	*Definition* Formats for recording and organizing data, results, and observations.
	Purpose Students use tables and charts to organize information in a form that is easily read and understood. Recording data in these forms facilitates record keeping. Students use graphs to compare and analyze data, display patterns and trends, and synthesize information to communicate results.
Graphic Organizers	*Definition* Tools that illustrate connections among and between ideas, objects, and information. Examples include, but are not limited to, Venn diagrams, "Box–and-T" charts, and concept maps.

	Purpose Graphic organizers help students organize ideas to recognize and to communicate connections and relationships.
Notes and Practice Problems	*Definition* H3g A record of ideas, observations, or descriptions of information from multiple sources, including but not limited to direct instruction, hands-on experiences, videos, readings, research, demonstrations, solving equations, responding to guiding questions, or developing vocabulary.
	Purpose Students use notes and practice problems to construct meaning and practice skills for current use and future reference.
Reflective and Analytical Entries	*Definition* A record of a student's *own* thoughts and ideas, including, but not limited to initial ideas, self-generated questions, reflections, data analysis, reactions, application of knowledge to new situations, and conclusions.
	Purpose Students use reflective and analytical entries to think about scientific content from their *own* perspective, make sense of data, ask questions about their ideas and learning processes, and clarify and revise their thinking.
Inserts	*Definition* Inserts are artifacts placed within a notebook, including, but not limited to photographs, materials (e.g. flower petals, crystals, chromatography results), and supplemental readings (e.g. newspaper clippings).
	Purpose Students use inserts to document and to enrich their learning.
Investigation Formats	*Definition* Scaffolds to guide students through a controlled investigation, field investigation, or design process. Examples include, but are not limited to investigation planning sheets or science writing heuristics.
	Purpose Students use investigation formats to guide their thinking and writing while they design and conduct investigations. Students also use these formats to reflect on and discuss their findings and ideas.
Writing Frames	*Definition* Writing prompts used to focus a student's thinking. Examples include, but are not limited to, "I smelled…I felt…I observed…","My results show…", "The variable I will change is…", or "I think that because…".
	Purpose Students use frames to organize their ideas, prompt their thinking, and structure their written response. Frames help students become more proficient in scientific writing and less reliant upon the prompts.

SOME Prompts and Mechanisms for Eliciting Student Thinking

Prior Knowledge

Prompts

- I think _____about ____'
- This is what I know about_____
- What is something you remember about_____
- What are some examples of _____
- This is like_____because_____
- Predict what you think will happen
- How do you think this works?

Mechanisms

- Discrepant events: what is occurring
- Visuals: what does this remind you of
- Total Physical Response to show what you know
- Write the ideas on post-its; compare with a partner
- Write ideas on whiteboards and share

Data Collection

Prompts

- Display data in two ways
- How can you measure_____?
- What do you _____(insert senses)
- What are the outliers?
- How could you organize your information so that someone else could understand what you did?
- Compare your information with _____and make adjustments

Mechanisms

- Real data (e.g. pile pennies)
- Use post its for bar graphs
- Notes on videos or reading
- Use diagrams, drawings, illustrations

Sense Making

Prompts

- Explain to your friend
- I noticed
- Compare data
- Share data with another group; look for similarities and differences
- Make an explanation (claim, evidence, reasoning)

- Refer to _____ and explain how this experience relates
- What might be the reason for outliers?
- How does what you experienced today relate to the Big Idea concept on the wall?

Mechanisms

- Use graphic organizer
- Construct and graph and summarize data
- Produce a product (e.g., brochure, letter to governor, poster)
- Create new experiment based on findings

- Use a snowball (students write what they know, toss in air; next student picks it up and adds to the first comment)

Metacognition

Prompts

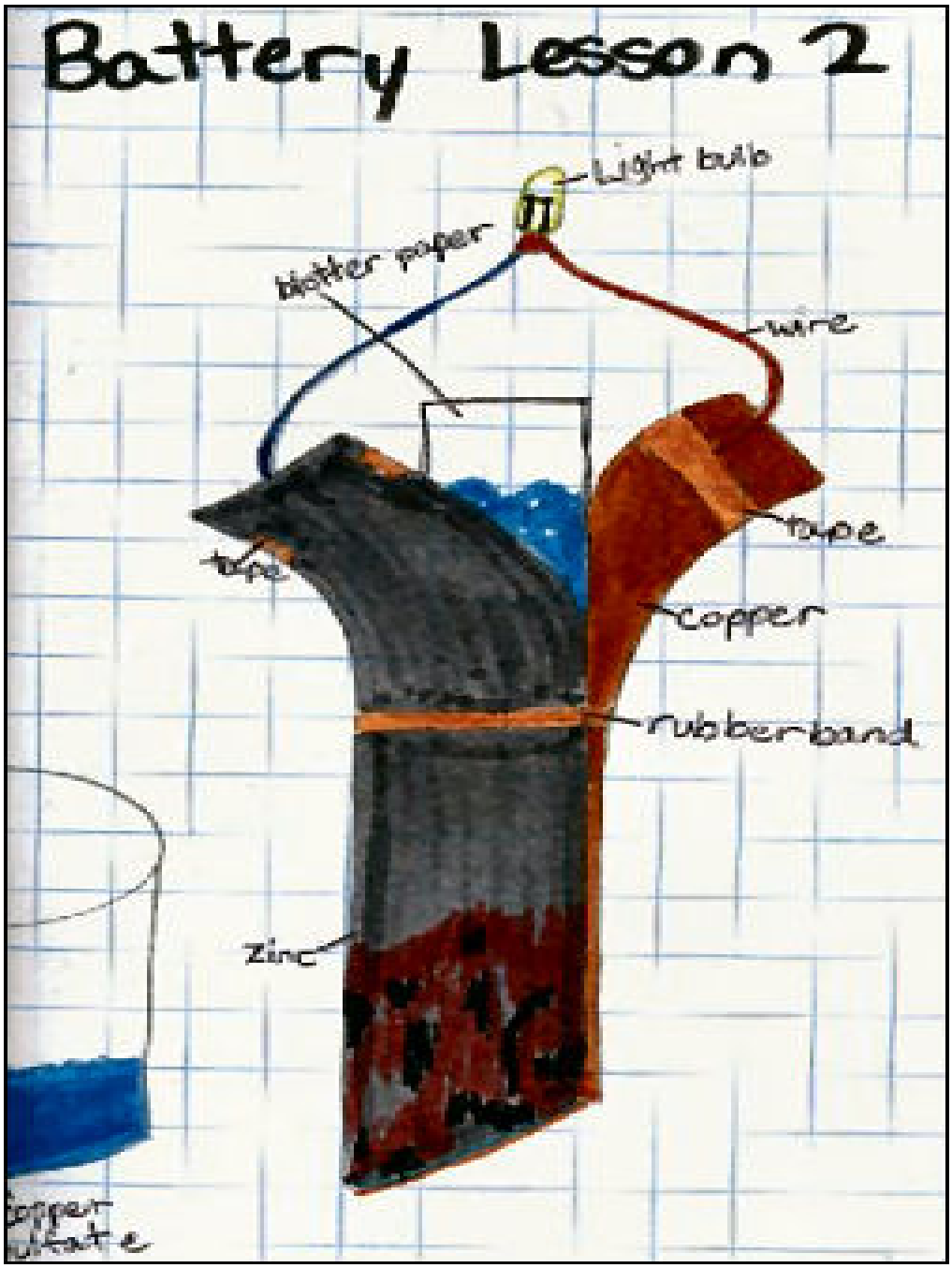
- Before I thought_____ Now I know_____
- Choose the task that is easier/more difficult for you and explain why
- I know this for sure_____ I am not sure about_____
- What would you change and why?
- Where in the process did you struggle? Why?
- What amazed you? Why
- I wonder_____
- How do I know this?
- What is one thing you still have a question about?

Mechanisms

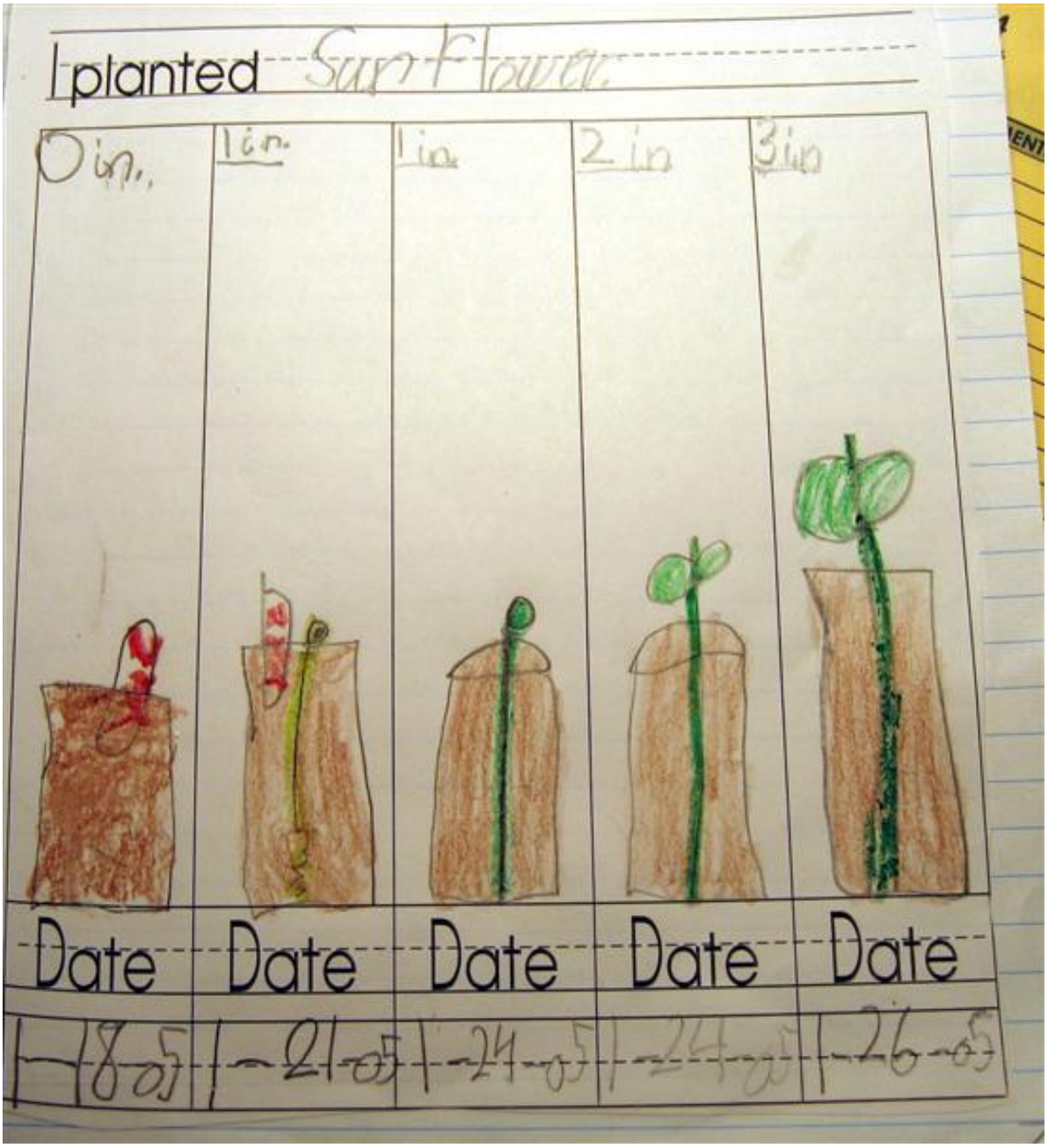
- Post Card to self with metacognitive prompts/answers
- Explain phenomenon to a younger student
- Reflection in notebook

H3h

H4a



Drawings



H4b

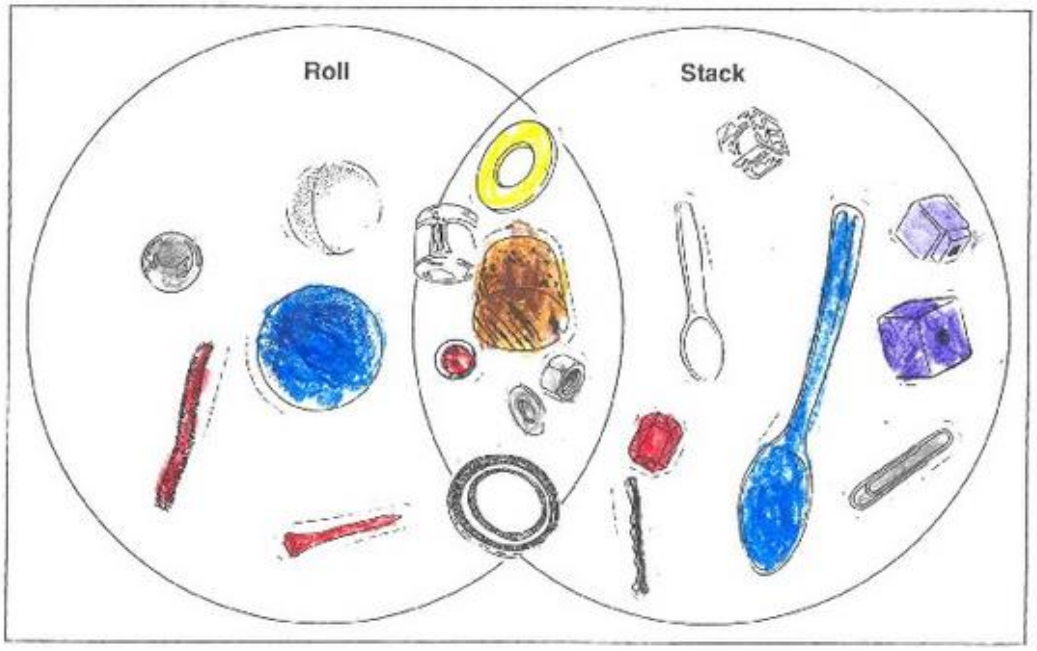
Tables, Charts, and Graphs

Record Sheet 3–A

Name: Cameron Date: 1-19-06

LESSON 5

Rolling and Stacking Solids



STC / Solids and Liquids

H4c

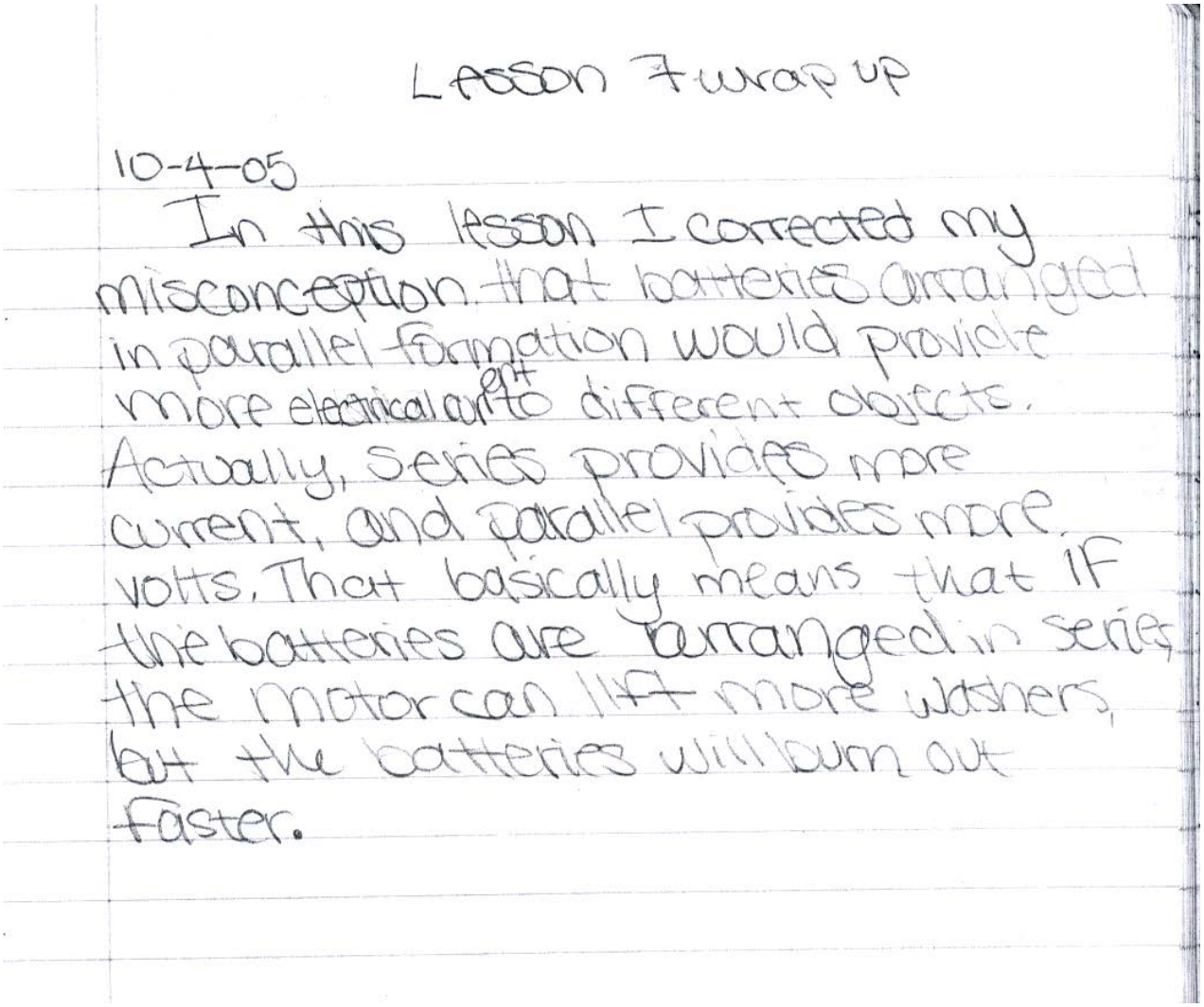
Graphic Organizers

Micro-Life Video

Objective: Gather Information About Infectious Diseases

1. The tower has 35,000 lightbulbs.
2. President Mckinley gets shot by an assassin.
3. The presidents operation started at 5:29.
4. The president died 8 days later because of an infection in his wound.
5. In 1900, the era of scientific medicine was only beginning.
6. Germs cause disease.
7. Scientists don't know how to destroy germs.
8. All immagrants must be inspected for illness before they enter the U.S.
9. Even after 500 years, there is still no cure for The Plague.
10. The plague is thought to be spread by dirt.
11. March 6, 1900 was the Chinese year of the Rat
12. No one knows how many plague victims there really are.
13. In 1906 a devastating earthquake shakes San Francisco.
14. Rats transmitt the Plague.
15. Fleas carried the Plague.

Notes and Practice Problems



H4e

Reflective and Analytical Entries

EXPERIMENTAL DESIGN PLANNING SHEET

The **question** we are investigating is:

how does the sun's shadow change every half hour?

Our **prediction** is:

The shadow will move East to west as time passes.

The **materials** we will use are (include measuring tool):

gnoman
Paper
pencil
compass

The **changed variable** is: (manipulated variable):

every 1/2 hour

The **measured variable** is: (what we are measuring):

where
The shadow is

These are the **controlled variables:** (things kept the same):

faced paper north
the
gnoman on the
x

The step-by-step **procedure** is:

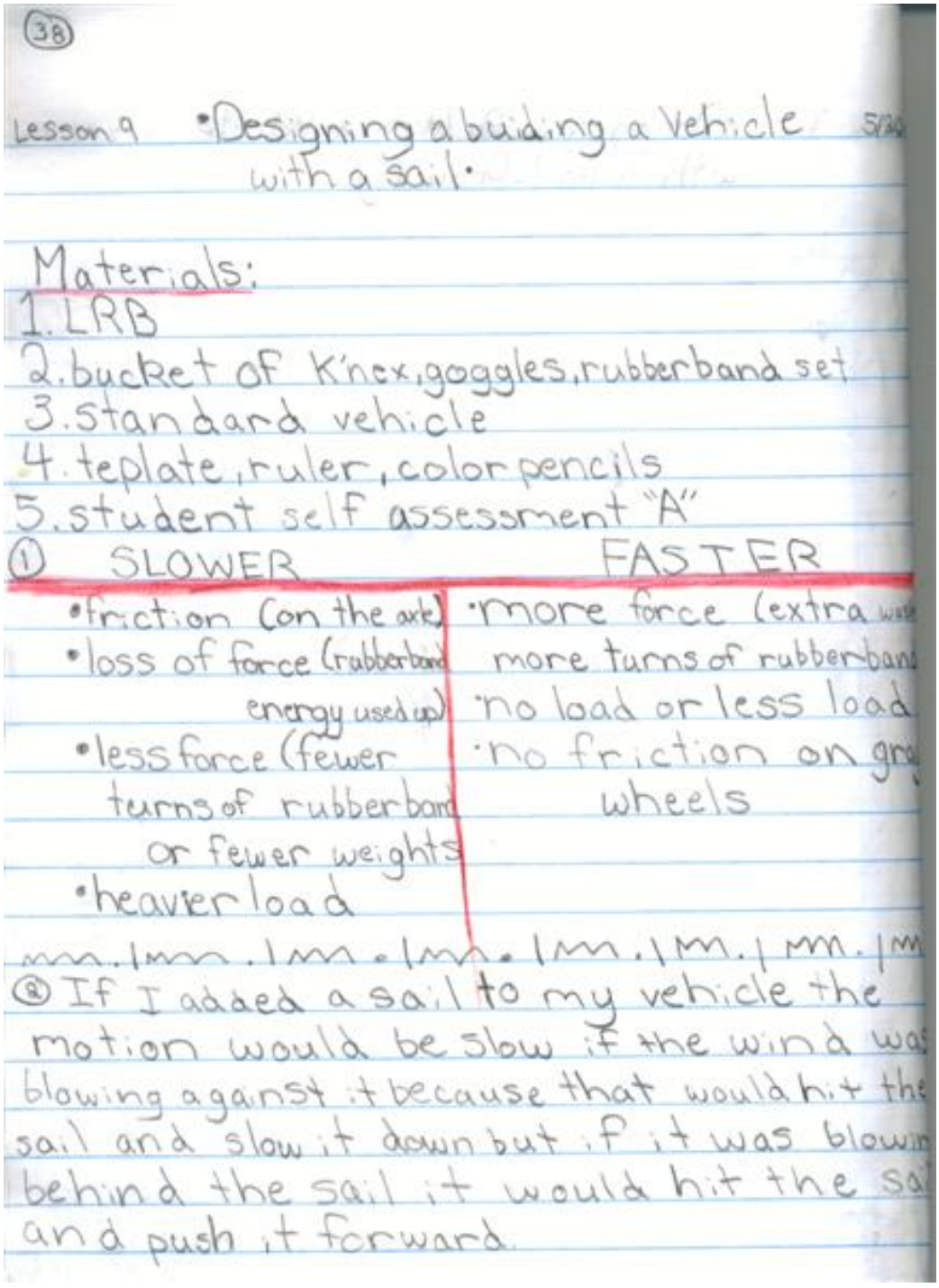
1. Put a crayon in to a lump of clay.
2. Gather materails.
3. Draw X in center bottom. of papper.
4. Go outside on a sunny morning.
5. pat paper on flat. Surface. facing
6. use paper to postion paper facing north.
7. Postion gnoman on x.
8. trace the gnomans shadow and lable with time.

SE WA LASER Alliance

WASL-Based Experimental Design Planning Sheet for Elementary Students

H4f

Inserts



38

Lesson 9 •Designing a buiding a Vehicle with a sail•

Materials:
1. LRB
2. bucket of K'nex, goggles, rubberband set
3. standard vehicle
4. teplate, ruler, color pencils
5. student self assessment "A"

① SLOWER | FASTER

- friction (on the axle)
- loss of force (rubberband energy used up)
- less force (fewer turns of rubberband or fewer weights
- heavier load

- more force (extra more turns of rubberban
- no load or less load
- no friction on gr wheels

② If I added a sail to my vehicle the motion would be slow if the wind was blowing against it because that would hit the sail and slow it down but if it was blowin behind the sail it would hit the sa and push it forward.

H4g

Investigation Formats

H4h

Writing Frames

The Oak and the Cactus

The oak and the cactus are the same because they both are homes to animals.

In addition they both grow from a seed.

They are different because the oak has a acorn as a seed and the cactus has black seeds.

Also the oak has leaves but the cactus does not. Whereas they both have protection.

H4h