

HYDROVILLE JOURNAL

Description

This activity has students create their Hydroville Journal which will be used throughout the Water Quality problem and will form the student's portfolio.

Student Outcomes

Students will:

- Organize a notebook to record information and save completed worksheets.
- Use the information in their journals to analyze and synthesize data, construct hypotheses, and organize materials for the presentation of their team's solution.

Student Products

- Hydroville Journal

Prerequisites

None



Activity Timing

| Time Estimate | One 50-minute Class Period |
|---------------|---|
| 30-90 min | Prep Time: (if you plan to provide completed class notebooks) |
| 30 min | Activity Time: (if students will organize notebooks in class) |



Materials

- Three-ring binder
- Notebook paper
- Colored paper or cardstock (for dividers)

Teacher Information

Gathering and accurately noting information is an essential prerequisite for managing it. Scientists, engineers, and other experts in technological fields must analyze and synthesize data, grasp and apply new concepts, and communicate effectively. A journal helps them gather and manage the raw material for these activities.

The Hydroville Journal is central to the Hydroville Curriculum Project. As team members and experts-in-training, students will use the Hydroville Journal to keep track of their discoveries as they encounter new skills, new terms, and new challenges.

This journal gives students a place to record responses to journal prompts and questions, define new terms, make notes on teamwork skills, and store readings and completed worksheet pages. The journal provides a place for students to apply, reflect, analyze, and evaluate information, test their understanding, and question and challenge their own assumptions. The journal becomes the raw material of their thinking: their record of data, events, information, and reflection.

Benjamin Bloom, an educational psychologist, introduced a generally accepted model for the thinking process, tracing it from the least to the most complex level shown in Table 1.

Table 1. Model for the Thinking Process

| | |
|--------------------------------------|--|
| Lowest ↓ Highest | Knowledge: Learning specific facts, theorems, theories; having information |
| | Comprehension: Showing understanding of basic knowledge |
| | Application: Using previously gained information in a new situation |
| | Analysis: Classifying or breaking materials into components and recognizing the principle that organizes the system |
| | Synthesis: Putting something together from disparate pieces |
| | Evaluation: Creating standards of judgments and examining issues, problems, etc. |

Bloom, B.S. (Ed.) (1956) *Taxonomy of Educational Objectives: The Classification of Educational Goals: Handbook I, Cognitive Domain*. New York; Toronto: Longmans, Green.

The Hydroville Journal makes possible the close integration of skill-building, reading, recording, writing, and thinking, and thus students will become more aware of their own writing and thinking processes (see Table 2). This journal promotes critical thinking skills, preparing students for their roles as experts and decision-makers.

Table 2. Teaching, Learning, and Writing Objectives

| Cognitive Area | Intellectual Activity | Sample Writing Task |
|----------------------|---|---|
| Knowledge | Having information, remembering | List, define, and tell: who, what, where |
| Comprehension | Translating, demonstrating what something means | Put this in your own words |
| Application | Using previously learned information in a new situation | Use this rule to solve this problem |
| Analysis | Breaking down problem into components | Describe the parts Explain what you find |
| Synthesis | Putting something together from disparate pieces | Explain how these components fit together Account for unexpected results |
| Evaluation | Judging, weighing, evaluating | Argue which method is better Assess x in terms of y |

Bloom, B.S. (Ed.) (1956) *Taxonomy of Educational Objectives: The Classification of Educational Goals: Handbook I, Cognitive Domain*. New York; Toronto: Longmans, Green.

This activity is designed to accompany Background Activity 1: *Welcome to Hydroville*. As a teacher, feel free to structure the Hydroville Journal assignments to the academic needs and styles of your students. The more regularly students write in their journals, the more effective the process will be. Student writing should strive to model scientific journaling, with students keeping a daily record of observations, measurements, hypotheses, and conclusions.

Teachers may use the students' journal writing as a basis to pre-assess their knowledge of a particular subject or concept. Giving students a journal writing prompt at the beginning of the class period is a particularly useful time to pre-assess students. Likewise, concluding class with a prompt allows students to reflect upon what they have learned, what they are still unclear about, and to generate questions for further inquiry.



Suggested Lesson Plan

Getting Started

Option 1: Teacher-Prepared Journals

1. Collect enough three-ring binders for each class. Number journals and put class period and number on the spine. (Journals can be reused from year to year.) Designate a box or shelf in your room for the Hydroville Journals for each class.
2. Print out *Student Journal Divider Pages* from the Hydroville Water Quality CD.
3. Photocopy them on colored paper or cardstock and place them in the binders.
4. Print all pages from the *Student Journal Pages* file on the Hydroville CD.

5. Place the *Student Binder – Table of Contents* in front of the divider pages and activity pages behind the appropriate divider page.
6. Add notebook paper to *Journal Prompt* and *Glossary* sections.
7. Assign each student a binder number.

Option 2: Student-Prepared Journals

1. Students bring a three-ring binder to class and prepare their Hydroville Journals.
2. Print out *Student Journal Divider Pages* file on the Hydroville CD.
3. Photocopy them on colored paper or cardstock and have students place them in the binders.
4. Have students place the *Student Binder – Table of Contents* in front of the divider pages.
5. Add notebook paper to *Journal Prompt* and *Glossary* sections.
6. Print out all pages from the *Student Journal Pages* file on the CD. Place pages in file folders labeled for each activity.
7. Hand out photocopied activity pages to students as you begin each background activity.



Tips from Teachers:

- Teachers using the Hydroville Curriculum often begin each day by assigning the Journal Prompt, using the time to take care of roll and other classroom business.

Doing the Activity

1. For the first day of *Welcome to Hydroville*, students should be assigned a binder or directed to create their Hydroville Journal.
2. On subsequent days, class can begin by students picking up their journals and writing their answers to daily journal prompts as the teacher takes care of roll and other duties.

Wrap-up

At the conclusion of this curriculum unit, the Hydroville Journal will represent the student's experience, observations, information, and perspectives. It functions as a resource for numerous social studies and language arts assignments. It stands as the student's portfolio for the project: a record of the event and a site for further inquiry and assessment.

Assessment

The primary means of assessment for the Hydroville Journal should be formative, which involves assessing students informally as part of the instructional process. In a formative assessment, students are not given a final grade; therefore, the students' writing in the journal should not be thought of as a final measure of what was learned. An efficient and meaningful assessment method is the check/check-plus/check-minus system (see Table 3). An example of a journal prompt assessment is shown in Table 4.

Students may use the *Student Binder – Table of Contents* to help them organize their journals, and teachers may use it for grading of the journal when it is submitted by a student for a portfolio.

Table 3. Suggested Assessment Rubric

| Grade/Mark | Level of Thinking |
|----------------------|---|
| ✓ — (check-minus) | <ul style="list-style-type: none"> • Consistently inadequate responses to writing prompts • Thinking does not reflect attempts to draw connections |
| ✓ (check) | <ul style="list-style-type: none"> • Consistently adequate responses to writing prompts • Thinking is oftentimes more than superficial and reflects genuine attempt to write coherently about the subject at hand |
| ✓ + (check-plus) | <ul style="list-style-type: none"> • Writing quality and quantity is above average • Thinking continually. Attempts to draw connections and extend and apply written thoughts to more than just the topic at hand |

Table 4. Sample Journal Prompt Assessment

| Grade/Mark | Student Answer |
|----------------------|---|
| ✓ — (check-minus) | The health of the environment is important for understanding diseases. |
| ✓ (check) | Environmental health science is the study of how the environment affects our health and it is important to study it to understand how air, water, and food can cause diseases. |
| ✓ + (check-plus) | Environmental health science is the study of how the environment affects human health. It is important to study this topic to understand how the food, water, and air around us can cause disease. Lawmakers need to understand environmental health science to set appropriate limits on what is in our water, air and food. |



Resources

See the Hydroville Water Quality Curriculum Web Resources webpage for current links:
http://www.hydroville.org/links/wq_resources.aspx



PAGES TO PHOTOCOPY

Note: For ease of photocopying, Transparency Masters appear first in the student pages.

Handouts and Transparency Masters

| Day | What is Needed | Type* |
|-----|---|-------|
| 1 | Hydroville Journal divider pages (printed from the Hydroville CD) | |
| | Hydroville Journal student pages (printed from the Hydroville CD) Note: Student pages are for Background Activities only. | |

* Type = Transparency Master (TM), Background Reading (BR), Worksheet (WS), Map (M)

HYDROVILLE JOURNAL – TABLE OF CONTENTS

| Activity | Document Name | Grade |
|---|---|-------|
| Divider 1 - Journal Prompts | | |
| BA 1 | Journal Prompt-1 <i>Teamwork</i> | |
| | Journal Prompt-2 <i>Environmental health</i> | |
| BA 2 | Journal Prompt-3 <i>Topographic map</i> | |
| BA 3 | Journal Prompt-4 <i>Water treatment</i> | |
| BA 4 | Journal Prompt-5 <i>Contaminants in drinking water</i> | |
| BA 5 | Journal Prompt-6 <i>Drinking water reports</i> | |
| BA 6 | Journal Prompt-7 <i>Solution concentration</i> | |
| BA 7 | Journal Prompt-8 <i>Sampling</i> | |
| BA 8 | Journal Prompt-9 <i>Groundwater model part 1</i> | |
| | Journal Prompt-10 <i>Groundwater model part 2</i> | |
| BA 9 | Journal Prompt-11 <i>Hydrogeology</i> | |
| BA 10 | Journal Prompt-12 <i>Home water treatment</i> | |
| BA 11 | Journal Prompt-13 <i>Remediation</i> | |
| Presentation | Journal Prompt-14 <i>Environmental health review</i> | |
| Divider 2 – Teamwork Skills | | |
| BA 1 | <i>Teamwork Skills Analysis T-chart</i> | |
| | <i>Teamwork Skills Practice Guide</i> | |
| | | |
| | | |
| | | |
| Divider 3 – Background Readings and Worksheets | | |
| BA 1 | Background Reading: <i>Where Does Drinking Water Come From?</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>Water Quality Video Notes and Hydroville Stakeholders</i> | |
| | <i>Water Quality Concept Map</i> | |
| | <i>Water Quality Video Notes (optional)</i> | |
| | <i>Career Information Form</i> | |
| BA 2 | Background Reading: <i>Topographic Maps</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>3-D Models of Hydroville’s Watershed</i> | |
| | Worksheet 3: <i>Conclusion Questions</i> | |

| Activity | Document Name | Grade |
|---|---|-------|
| Divider 3 – Background Readings and Worksheets (continued) | | |
| BA 3 | Background Reading: <i>Making Water Safe to Drink</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>Source to Sink Poster</i> | |
| BA 4 | Background Reading: <i>Is Your Drinking Water Safe?</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>What’s in Your Drinking Water?</i> | |
| | Worksheet 3: <i>The Drinking Water Game</i> | |
| BA 5 | Worksheet 1: <i>Water Quality Report Scavenger Hunt</i> | |
| BA 6 | Background Reading: <i>Solutions and Concentrations</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>Making Serial Dilutions</i> | |
| | Worksheet 3: <i>Representing the MCL of a Water Contaminant</i> | |
| BA 7 | Background Reading: <i>Water Sampling and Monitoring</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>Sampling and Sampling Size</i> | |
| BA 8 | Background Reading: <i>Groundwater Basics</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>Groundwater Vocabulary Quiz</i> | |
| | Worksheet 3: <i>Groundwater Model Demonstration</i> | |
| BA 9 | Background Reading: <i>Understanding Groundwater Movement</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>Smithville Activity</i> | |
| BA 10 | Background Reading: <i>Water Treatment Solutions for Homes</i> | |
| | Worksheet 1: <i>Reading for Understanding Questions</i> | |
| | Worksheet 2: <i>Water Treatment Lab – Day 1</i> | |
| | Worksheet 3: <i>Water Treatment Lab – Day 2</i> | |
| | Worksheet 4: <i>Water Treatment Lab Report</i> | |
| BA 11 | <i>Remediation Technology Fact Sheet</i> | |
| | Worksheet 1: <i>Remediation Technology Posters</i> | |
| | Worksheet 2: <i>Remediation Technology Poster Scoring Guide</i> | |
| | Worksheet 3: <i>Terminology Crossword Puzzle (optional)</i> | |
| | Worksheet 4: <i>Comparing Remediation Technologies</i> | |
| Divider 4 – Glossary | | |
| | Definitions of Assigned Terminology | |