

# Products and Tools

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NORTH CASCADES AND OLYMPIC Science Partnership

## Matter and Energy in Life Systems

SCED 203  
WESTERN WASHINGTON UNIVERSITY  
SPRING 2007

Advancing science learning and teaching

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## Matter and Energy in Earth Systems

WESTERN WASHINGTON UNIVERSITY  
SCED 202  
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Advancing science learning and teaching for all

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## Science Notebooks in K-12 Classrooms

*Linking science, reading, writing, communication, and mathematics*

INTRODUCTION | NOTEBOOK FEATURES | STUDENT WORK | CLASSROOM TOOLS | TEACHER RESOURCES | FREQUENTLY ASKED QUESTIONS

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## Introduction

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### Supporting Student Success Guide

**I. Student Learning is the Highest Priority**

**A. Administrators take personal responsibility for student success.**

- Administrators convey through their day-to-day operations the belief that schools will change in order to ensure that every student in every classroom is succeeding.
- Administrators facilitate school-wide agreement on improvement goals and distribute responsibility for reaching them across all teachers.
- Administrators provide the resources (e.g. space, time, staff, and money) and flexibility teachers need to increase knowledge, improve instruction, and enhance student learning.

**III. Schools Make Improvements Based on Data and Community Context**

**A. Teachers and Administrators acknowledge community context in their school improvement process.**

- Time is used to create and support the shared vision of student success that acknowledges contextual factors, such as poverty, parent ambivalence, large class size, and high teacher turnover, but is not paralyzed by them.
- Resources from internal and external sources are accessed and applied to support school improvement and student success.
- Improvement is achieved through diligence, persistence, and focused hard work that

### Science Classroom Observation Guide

**I. Classroom Culture is Conducive to Learning Science**

**A. Ideas, questions, and contributions are exchanged respectfully.**

- Students interact collegially.
- Students and teachers jointly decide what science related idea will be discussed or investigated.
- Students listen actively and ask for clarification when they don't understand.

**B. Discussions are based on scientific evidence.**

- Students use supporting and refuting evidence to inform reflection and discourse.
- Students rely on their own thinking and logical arguments to evaluate ideas.
- Students include, question, and debate their own understanding.
- Students use observation and evidence to challenge ideas and inferences.
- Students differentiate between personal and scientific ways of knowing.

**C. Science content is made accessible to each student.**

- Content and instruction is adjusted based on the background knowledge and skills of each student.
- Explanations and clarifications are clear, accurate, and accessible to each student.
- Spoken and unspoken messages communicate that each student is capable of learning science.
- Each student actively participates in thinking and learning.
- Each student experiences challenges that ultimately lead to new insights.
- Each student experiences scientifically productive discussions.

**II. Science Content is Intellectually Engaging**

**A. Science content is significant, accurate, and well organized.**

- Science content is explicit and apparent to students.
- Science content is primarily focused on big ideas, support and terms.
- Science content is within the bounds of an agreed upon level of difficulty.
- Science content is developmentally appropriate and useful.
- Science is portrayed as a dynamic body of knowledge that is available evidence.

**B. Science content builds on students' prior ideas.**

- Students reveal their preconceptions about the science concepts, or the nature of science.
- Students reveal their underlying thinking and reasoning or preconceptions.
- Students recognize links between their preconceptions and the activities or experiences in the science content.

**C. Science content is intentionally connected to the experiences.**

- Student actions and interactions focus on understanding content.
- Students generate and explore questions about the science content.
- Students can articulate the intended science content of a

**III. Instruction Fosters and Monitors Student Understanding**

**A. Instruction fosters students' emerging understanding of science content.**

- Students are confronted with evidence that challenges their initial ideas as opportunities for productive dis-equilibrium.
- Questions enhance the development of students' understanding of key concepts connected to the lesson.
- Clear and accurate explanation/clarification are provided at appropriate points.
- Opportunities are provided for students to build on their present understanding as they develop new understandings.
- Student generated questions are pursued based on their relevance to the science content and their potential to deepen student understanding.

**B. Instruction monitors students' emerging understanding of science content.**

- Student ideas are recognized, even when they are vaguely articulated.
- Responses to student questions or comments address the scientific idea expressed in their thinking and relate it to the focus of the lesson.
- Learning experiences are modified or added to ensure students develop the necessary science content knowledge.

**IV. Students Organize, Relate, and Apply Their Scientific Knowledge**

**A. Students make sense of the intended scientific ideas and concepts.**

- Students work on answering scientific questions or problems and objectively communicate their findings.

### Professional Learning Community Observation Protocol

**Introduction**

This observation protocol is structured around three key elements of an effective Professional Learning Community (PLC): Shared Vision and Ways of Working, Collaboration, and Reflective Dialogue. These three elements combine to help foster open communication among group members so that they develop common norms, vision, and goals. The two main purposes of this protocol are to help groups 1) build and deepen a shared understanding of what it means to work effectively as a PLC, and 2) provide a meaningful tool for self-monitoring a PLC's development.

**I. Shared Vision and Ways of Working**

The group has a common vision and applies standards as criteria in its actions, reflections, and planning.

- The focus of the group activities is on students' understanding of science content in order to improve student learning.
- The team has standards or criteria that specify what determines proficiency in student work.
- Team members share ideas based on evidence, and discussions of the pros and cons of ideas are grounded in evidence.
- The group plans for and pursues opportunities to enhance their content knowledge when needed.
- Actions are planned and modified based on available research.

**II. Collaboration**

The group creates an environment that fosters open communication and sharing of ideas. All members have the opportunity to learn from one another and support the group's continuous improvement. The group is organized and managed to achieve its goals.

Collaboration refers to sharing expertise and perspectives on learning and learning processes, examining data about students, and developing a sense of mutual support and shared responsibility for effective instruction. Developing collaborative cultures as the work of leaders who realize that a collection of superior teachers working in isolation cannot produce the same results as interdependent colleagues who share and develop professional practices together (Garnstein & Wellman, 1995).

- Members value the contributions of other members of the group and are open to different points of view.
- Criticism is constructive and there is a collegial challenging of diverse ideas.
- Responsibilities are shared amongst all members of the group.
- The group is good at managing their time. The meeting is efficient and effective.

**III. Reflective Dialogue**

The group monitors its actions, decisions, and reflections based on its common norms and goals.

Reflective dialogue helps develop shared understandings of such things as the purpose of and processes for learning. Shared understandings build communities together and build members to shared goals and shared work. Through reflective dialogue, group members gain perspectives on who and how they are to each other and to those they serve. Reflective dialogue is the essential for reflective practice. It helps participants develop self-awareness and collective awareness of personal and shared work (Garnstein & Wellman, 1995).

- The group monitors its understanding of information that informs its activities.
- The group monitors its progress and adjusts its processes to become more effective when appropriate.
- The group monitors several ways of doing something before deciding what might work best.
- Commitments are made between past learning, current goals, and intended applications.