



INSTRUCTIONAL DIFFERENTIATION FOR STUDENT INDEPENDENCE

An instructional model for sustained differentiation using the Maine Learning Results

SOUTHERN MAINE PARTNERSHIP



UNIVERSITY OF
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INTRODUCTION

Differentiation is the practice of varying teaching and learning strategies so that all students can reach high standards of achievement and become independent learners. As such, differentiation has long been a goal of educators. In the context of Maine classrooms with the Maine Learning Results (MLR), we have seen a rising tension between differentiating instruction to best meet individual learning needs of students and the press to “cover” the allotted MLR Performance Indicators. Teachers are readily acknowledging the need to bring these seemingly opposite needs together, realizing that they have to dig deep into their practice to find strategies that will lead to success for all students.

In order to understand differentiation more fully, we visited Maine classrooms to observe educators who consistently have success in reaching a wide variety of learners. The ten teachers included in this study have experienced that kind of success; they come from elementary, middle and high schools that vary in size, location and populations. While they may differ in how they structure their classes and how they relate to their students, these teachers share foundational beliefs and goals that shape and sustain differentiation as an effective teaching approach. They avoid seeing differentiation as an occasional, effective tool, they practice differentiation as a philosophy, a way of approaching the craft of teaching and learning on a daily basis. They combine the just-in-time use of a variety of traditional tools with a long view of their vision and goals. They use the Maine Learning Results as a way to further clarify their practice, to narrow and define what is necessary for all students, and to expand avenues for student choice and self-expression.



“The model we developed as a result of our observations is truly ‘homegrown.’”



The model we developed as a result of our observations is truly “homegrown,” grounded in the real life practices of teachers and bolstered by an extensive review of the literature on differentiation and how students learn. Building on effective current practices and structures, our model adds cohesion, focus, and practicality to discussions about differentiation. Our observations taught us that skilled teachers differentiate with a specific goal in mind -- to develop in their students the abilities and habits of mind to become independent learners. By placing independence in learning at the center of differentiated instruction, our ten teachers re-framed the very notion of differentiation and made it more powerful and compelling as a strategy for student success.

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Note: Readers may want to investigate the Southern Maine Partnership (SMP) Content Area Frameworks to view “vital concepts” for students to know in the areas of English Language Arts, science, social studies, math, health/physical education, and visual and performing arts. (www.usm.maine.edu/smp)



I. THE THREE LEVELS OF DIFFERENTIATION

Central to our model of differentiation is a movement through three levels. Teachers move through the levels depending on how long they have known their students, what they are teaching and how familiar the students are with the necessary content, skills and learning strategies. The key to being able to move successfully from one stage to the next, is to make students aware of why they are learning what they are learning and what the next stage will be. Below is a representation of the three levels, followed by a description of each. Embedded in each description are the elements of essential content, essential skills and differentiated learning strategies. (See Appendix A for templates for the elements).

Though inherent in using the terms “Levels” is a sense of progression, one level is not necessarily ‘better’ than the next; the learning goals of the teacher and/or the students should define which level is the most suitable. However, if the long-term goal is for students to feel more empowered and in control of their own learning, then there should be a shared vision of working toward Level 3 even if students don’t remain at that level.

The following explanations contain an overview of each level, followed by teacher and student considerations in the areas of content, skills and learning strategies. These three areas are described both in terms of required course outcomes and possible outcomes that can deepen independent learning. Following each area is a series of questions to consider when designing classes as a prompt to expand differentiation while meeting standards. In the appendix, we have included Maine classroom examples to illustrate each level. Each example describes actual classroom practice, includes a listing of which Maine Learning Results are addressed, and details what essential content and skills are embedded in those Maine Learning Results (these are derived from SMP Content Area Frameworks). The differences among the Levels are sometimes subtle, sometimes dramatic as students take on more responsibility and teachers shift away from the center of control to supportive coach.



Level 3: Students Design Inquiry and Implement Strategies for Solutions

- Students design questions and problems
- Students select processes and resources to address questions and problems
- Students develop responses/solutions to questions and problems
- Students reflect upon entire process from design to solution
- Teachers work with as coaches to support students' continual growth as independent learners

Level 2: Students Choose from Options Teachers Have Designed

- Students select from various problems or help construct problems with teachers
- With guidance from teachers, students select processes, resources and/or solutions to problems
- Teachers help students reflect upon how to design problems as well as the processes and resources used to solve those problems
- Teachers and students discuss and negotiate roles in learning to move students closer to being independent learners

Level 1: Teachers Design Options and Coordinate Implementation

- Teachers design and present problems
- Teachers offer a variety of processes and/or resources to solve problems, requiring students to experience all of them
- Teachers help students reflect on how problems were developed, which processes and resources may be the best selection, given the problems and the individual students
- Teachers help students understand how they will use the various processes and resources in an increasingly independent manner



LEVEL 1: TEACHERS DESIGN INQUIRY

At Level 1, the teacher introduces students to the different ways they can access content and skills and lays the groundwork for independent learning. By offering a variety of approaches and materials and requiring that everyone experiences all the options, the teacher leads students to an understanding of the choices that will be available in the future. In addition, Level 1 enables teachers and students to gather information about how they learn best. Later, when students learn more independently, they will be able to draw on the strategies and materials they have experienced at Level 1 and make informed choices about how they can best learn new content and skills.

CONTENT

During this phase, the teacher selects what is vital to study. It is essential that goals are clearly stated and that they make sense to the students. They should have immediate and clear application in the class, but should also be transferable to situations beyond the classroom and the school. The more focused and specific the goals, the more room there will be for differentiation. Teachers should be particularly careful and selective about what they designate as essential content.

Questions for the teacher to consider to define essential content at this level include:

- What content is essential for students to master?
- Could I create a concept-based learning goal to allow more flexibility in specific content?
- What content do students need to function independently in the future both in this class and beyond?

SKILLS

Writing, speaking, and computing are just a few of the necessary skills for students. Leadership skills, cooperation techniques and analysis are also important ingredients for student success. In Level 1, students take turns experiencing each skill, refining it and offering constructive criticism to one-another to aid in skill development. The teacher's job is to address the skill directly and break it into manageable bits; this enables students to understand how to improve their skills.

“Teaching students learning strategies is an essential component to helping all students reach the Learning Results.”



Questions for the teacher to consider at Level 1 to define essential skills include:

- What skills are essential for students to master?
- What skills do students need to function independently in the future in this class?

LEARNING STRATEGIES

Teaching students learning strategies is an essential component to helping all students reach the Maine Learning Results. Learning strategies are the connectors, the means through which teachers and students differentiate common content and processes. Learning strategies can be developed around student interest or different intelligences. Teachers might present a variety of graphic organizers to help things get started or might temporarily group students for optimum learning. It is important that the students thoroughly understand and can articulate the strategies they use in order to transfer them to new situations.

Questions for the teacher to consider about learning strategies at this level include:

- How can I gather information about my students' learning and interests and continue to apply this information to new situations throughout the year?
- Are there existing systems of learning strategies or materials that would readily apply to my content and skills while helping a variety of learners?
- Could I differentiate skills to help students master content?
- Could I differentiate content to help students master the skills?
- How can I build reflection into my design?
- How am I moving my students toward greater independence?



LEVEL 2: STUDENTS MAKE CHOICES

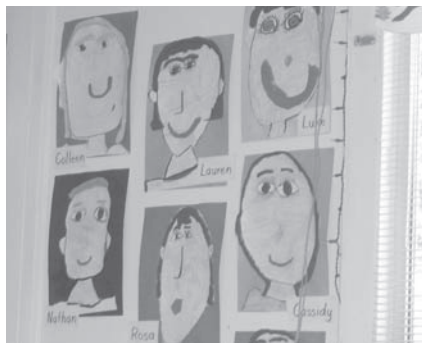
Level 2 is a stage that affords students greater choice. Although the teacher remains largely in control of designing the learning strategies, content and processes, students are now allowed and encouraged to make choices among various options. They must apply prior learning to select the most appropriate content, skills and strategies. Because there is choice involved and because students do not enter this level with the same experiences, it is essential that the teacher establish requirements around content and skills. Failure to do this could potentially result in a student not learning expected content or skills. The teacher also has to remind students of the experiences they had at Level 1 and make transparent to students the connections between the two levels.

Students in Level 2 become reflective about the choices they are making; they learn to make decisions that promote their own learning. This reflection on the process of selection (before, during and/or after) is pivotal for further growth in independence for students. Though selection is generally centered around learning strategies, choice may appear in the design questions or avenue of study. While the teacher designs a variety of essential questions, students may be able to select the one that most engages them. Essentially, Level 1 requires students to participate in all options; Level 2 supports them in choosing an option best suited for themselves as learners.

CONTENT

When moving a class into Level 2, the teacher must select very limited content. It is not feasible to cover a great deal of common content and expect all students to understand and use that knowledge in any meaningful way. Required content should enable and encourage students to feel empowered and to expand their voice. The knowledge selected should, of course, be valuable to the students. At this level, deciding with students what content is required helps to model the decision making process that is at the center of Level 2.

“Students in Level 2 become reflective about the choices they are making; they learn to make decisions that promote their own learning.”



Questions for the teacher to consider about content at this level include:

- What content is essential for students to master?
- Could I create a concept-based learning goal to allow more flexibility in specific content?
- What content do students need to function independently in the future both in this class and beyond?

SKILLS

As in Level 1, the goal of differentiating instruction is to ensure that all students learn a particular skill. It is the teacher’s responsibility to identify the most essential skills and to delineate the underlying processes involved in that skill to the whole class. It is often helpful to students if the teacher de-couples goals at this level. For example, if an instructor wants to assess students’ understanding of the Civil War, it may make sense to allow for demonstration of content knowledge in many forms and not just limit it to writing. Although combining a writing assignment with a content target may seem efficient, it may only prove confusing to the student if content knowledge is the target. Conversely, if the teacher wants to assess writing per se, it may make sense to de-couple that from the demonstration of content knowledge.

Questions for the teacher to consider about skills at this level include:

- What skills are essential for students to master?
- What skills do students need to function independently in the future both in this class and beyond?





LEARNING STRATEGIES

Students need to learn about their own learning so they can begin to make informed choices. This may be as simple as selecting the most appropriate level of reading or as complex as selecting the most helpful “intelligence” through which to filter information. The teacher can plan the choices around what students have already learned in Level 1 or they can rely on student-driven motivation, interest and ability. The most pressing concern at this level is to make sure that students understand exactly what the choices are and the implications behind the choices. We have found that using grade incentives to encourage students often has the opposite effect and discourages them from opting for an appropriate pace or learning strategy.

Questions for the teacher to consider about learning strategies at this level include:

- What are different strategies that could apply to the learning goals?
- Based on prior assignments or inventories, where will students struggle the most with this assignment and how many different approaches could I offer to help them?
- How can I support students to be thoughtful about their choice of learning strategy?
- Do students understand their choices?
- What is the greatest variety of skills I could offer?
- What is the greatest variety of content I could offer?
- How can I ensure that students connect their choices to prior shared differentiation experiences?
- Do the choices all prepare students to become more independent in the future?





LEVEL 3: STUDENTS DESIGN INQUIRY

Level 3 is about student ownership. At this stage, students demonstrate an understanding of themselves as learners in all three realms: content, skills and learning strategies. The teacher acts as a coach for the students as they design problems and construct solutions founded on self-knowledge. Student and teacher become engaged in an authentic dialogue about teaching and learning. While the work still encompasses required goals, the students assume much more responsibility for designing ways to meet those goals and for demonstrating and recording how they have been met.

Students who initiate their exploration of learning strategies, content and skills infuse their work with enthusiasm and find it intrinsically valuable. At Level 3 the teacher makes a major shift from the holder of knowledge to a supportive coach and becomes a helpful resource for students. In order to address a specific student-identified need, the teacher may temporarily take a very directive approach, similar to that seen in Levels 1 or 2, but only briefly. Level 3 requires extremely clear behavioral and academic expectations from the teacher to allow for greater flexibility and creativity while still incorporating rigor. Students need to be aware that this freedom to design comes with heightened responsibility and that they will be held accountable for their efforts.

CONTENT AND SKILLS

Students at Level 3 have a much greater voice in deciding learning goals around content and skills. While completely opening up this kind of learning to students may be difficult, it can certainly be done with some boundaries and by asking students how they could meet certain requirements. If the conversation about what is important contains real decision-making and design by students, the problems will be much more pertinent and alive for them.

Questions for students to consider about content at this level include:

- Is there essential content I need to consider when I design my problem?
- What is most important to me now that I could incorporate in my design?
- How could I connect past content to my current design?
- How can I access the content I need to pursue solving my problem?



Questions for students to consider about skills at this level include:

- Are there essential skills I need to incorporate in my problem?
- What skills will I need to use to solve the problem I am designing?
- Are there particular steps or strategies I should consider when I am using these skills?
- How can I best express what I have learned?

LEARNING STRATEGIES

Even at this stage, teachers may still need to prompt students about possible methods to achieve their goals. Asking the right questions may be what it takes to have students transfer strategies they absorbed in different levels and stages of development to their current situation. Alternatively, teachers may need to have students learn new strategies to match new designs. It is possible, for example, for students to be designing their own learning and need the teacher to pause and provide a Level 1 introduction to learning strategies. Ideally at this level, the students should be the ones to request assistance, though, noting a lack of perception by students, the teacher may need to gather students together and re-group, prompting new approaches to learning strategies. Even so, the project should remain in the hands of the students. It is important that students, at this level, develop a sense of goal-setting, both daily and long-term. Pairing effective learning strategies with clearly defined goals is an invaluable skill for students to develop.

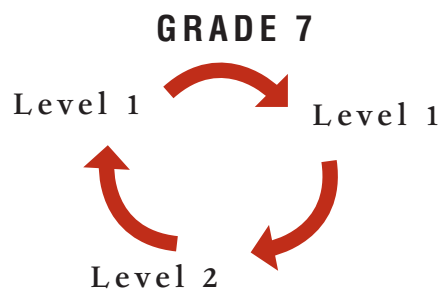
Questions for students to consider about learning strategies at this level include:

- What are some learning strategies we have used in past classroom projects that I could apply to my project design?
- How can I build reflection about learning strategies into my project design?
- What learning strategies would enhance my learning around this project?



II. CYCLES OF DIFFERENTIATION AND HOW THEY WORK

There is no “correct” place to begin using this approach to instructional differentiation. Depending on teachers, students, conditions in the school and other factors, teachers will begin and end at a variety of differentiation levels. We do, however, encourage teachers and students to work towards increasing levels of student independence. Below are examples of some of the cycles we have observed.

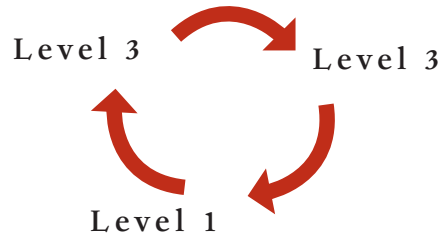


“I don’t leave Level 2,” Jeanne (a classroom teacher) says with certainty. “During Level 1, I make it perfectly clear to students how they will use this understanding or skill more independently later. If you don’t make this transfer completely transparent, they simply won’t apply it later.” For example, all Jeanne’s students perform a steel wool experiment. The students learn the characteristics of physical and chemical reactions, the procedures for experimentation, and how to report their findings. Once this content and process information is mastered (Jeanne offers differentiated experiences along the way to ensure mastery), she has students choose a steel based material, design their own procedures and develop their own means to report out the results.

“If you don’t make this transfer completely transparent, they simply won’t apply it later.”

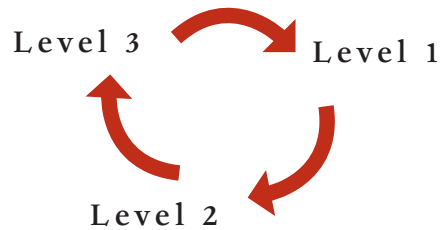


GRADES 10, 11, 12



At The New School, students begin at Level 3 with a communal understanding of what interests them. “How did we get here?” is the essential question they decide upon. The word “here” needs defining and through a series of discussions, the students identify four areas they need to know more about before they pursue more independent inquiry. Moving to Level 1, the teachers either provide a mini-unit on one of these topics, or find a member of the community to come in to teach the students. During these classes, they move through varying levels of differentiation, but there is always a choice offered at some point during the class. The units are taught explicitly for the purpose of getting the students closer to their ultimate goal: learning independently about something for which they feel passionately. After all the students have developed a core understanding of the four areas of study, they select an area to pursue. The group then designs a more specific essential question and an agreed-upon final product. They function for the remaining two months of the year at a Level 3 for this project.

GRADE 8



Sara’s classroom is just beginning their learning around acceleration. Students are trying to grasp the concept through reading, discussion and a small experiment Sara has designed. During the experiment, students have some choice about who they work with, what roles they will play (e.g., observer, note-taker, person who carries the jar around the room), so the differentiation bumps into a Level 2. Finally, Sara lets students choose from two vital concepts and then design their own experiments and questions. While there are certainly boundaries around concepts, students clearly have control over the design and implementation of the inquiry.





III. CORE BELIEFS AND TEACHING STRATEGIES

The ten teachers involved in this study teach different age groups, different populations of students, and different subject matter. Their classroom management and activities also vary tremendously. However, they share foundational beliefs and teaching strategies. All the teachers make knowing each individual student a top priority and all use this knowledge as a backbone for learning. Based on this knowledge, they develop lessons and units to meet student needs and interests. The teachers make decisions to involve students in their own learning in order to enable students to gain further knowledge about themselves as well as the content matter. At the heart of their practice are *seven* core beliefs.

CORE BELIEFS

1. All students can learn.

Teachers cannot assume students enter their classrooms with the same interests, abilities or educational background. Respecting learners means believing they can all learn but not that they all learn in the same way.

2. Teaching must be responsive to the differences and similarities among learners.

Teachers who differentiate accept the responsibility of knowing students well enough to offer choice and variety when it helps them achieve the learning goals. Ultimately, however, it is the teacher's role to help students see their own learning differences and similarities and support them in designing their own learning experiences.

3. The use of a variety of processes and resources simultaneously or over time allows for greater success in reaching all learners.

There are a number of different models to allow for differentiation. Deciding on the learning goals first helps to define what choices would be appropriate for students and at what level of differentiation they should be offered. Students cannot be empowered to make good decisions if they don't understand the possible choices, nor, on the other hand, can they be expected to care deeply about their own learning if the teachers never allow them a voice in creating their own learning options.



- 4. It is more important that students know things in depth than it is to cover many things superficially.**

Teachers must continually ask themselves if they are addressing what is truly vital for each child to learn. Only by narrowing the focus of required learning, can choice be added to instruction.

- 5. The more students understand about their own learning, the more successful they will be.**

Teacher control of differentiation may be effective in the short-term. In the long term, however, students need to understand how they can differentiate without teacher assistance. It is often the decisions students make outside of the classroom that are the most critical to their future. Students who possess self-knowledge make wiser decisions within and beyond the classroom.

- 6. Students who are able to choose and design their own paths of academic exploration are more engaged and successful.**

Choice isn't simply about what the teacher can generate. Real choice prepares students for their future by being authentic and open-ended. This transfer of power does not relinquish teacher requirements and expectations. Rather it enables the teacher to engage in conversation with the students about how to prioritize their own learning and possible ways to meet those learning goals.

- 7. The goal of differentiation is that students become independent learners and choose appropriate strategies to achieve that end.**

Both the teacher and students need to readjust their relationship and expectations. The students need to initiate more while the teacher needs to allow students to make decisions and occasionally mistakes that lead to greater learning. The teacher needs to be seen less as a font of knowledge and more as a supportive coach. This shift does not decrease the importance of the teacher, but rather changes how the vital guidance of the teacher influences the learning experience.



“The students need to initiate more while the teacher needs to allow students to make decisions and occasionally mistakes that lead to greater learning. The teacher needs to be seen less as a font of knowledge and more as a supportive coach.”

TEACHING STRATEGIES

Complementing the core beliefs, classroom observations uncovered seven teaching strategies that promote and sustain differentiation and independent learning.

1. Take Risks.

- Seek new ideas through workshops, presenting and sharing your work, allowing others to observe your classroom.
- As the students become more independent in their learning, allow them greater freedom of choice and initiation.
- Seek out innovations in school structures that might enhance opportunities for differentiation (e.g., team teaching, looping, multi-age).
- Create a classroom structure based on democratic decision-making.
- Encourage students to take positive risks themselves by establishing a non-threatening environment.

2. Get to know your students.

- Take advantage of school structures that offer ways to know students over several years (e.g., looping, multi-age, advising).
- Use a variety of data to create both short-term and long-term personal learning plans.
- Take on more than one role in the school in order to interact with students in a variety of ways (e.g., advisor, teacher of multiple subject areas, sports coach).
- Have students take personal inventories that address learning styles, or multiple intelligences, then incorporate that self-knowledge in differentiation.

3. Be clear about behavioral and academic expectations.

- Goal setting should be clear with both short term and long term expectations that are frequently revisited.
- Expectations should be attainable but challenging for all students.
- The benefits for meeting expectations should be clear, as should the consequences for not meeting those expectations.



4. Integrate reflection into curriculum design.

- Design a variety of ways to reflect on learning including quick classroom check-in, formal written analyses of work, peer reviews.
- Include in reflections ways that students could improve with an eye toward increased independence.
- Use reflection before beginning a project to improve decision-making and design choices.

5. Use questions to promote student thinking.

- Shift from providing answers to modeling good questioning.
- Provide processes for creating questions.
- Provide processes for seeking answers to question.

6. Create a variety of audiences for student work.

- Use small groups for students to experiment and take risks with work.
- Use audiences outside of the classroom to lend import to student work.
- Find authentic audiences who need to have solutions to problems presented.

7. Promote change in school structures to support differentiation.

- Incorporate as many of the following structures as possible to sustain differentiation in your school: common planning time, looping, multi-age grouping of students, teaming, small class sizes, learning communities, flexible use of time determined by learning needs, and longer class periods.



IV. CONCLUSION

During an era when so much is made of data and numbers, the idea that children are individuals seems almost radical. The irony is, of course, that in order to create learning worth our children's time, we need to revert to that very American idea that each person is valuable, worthy and special. As educators, we need to help students understand just how they are special and capitalize on their strengths while shoring up their weaknesses. Ultimately, the greatest gift we can give our students is not an isolated, interesting day designed by teachers, but a deep understanding of how they learn. If students walk out of a classroom more empowered to understand the world around them, make healthy decisions, participate in our democracy, then we have succeeded as educators.

Though many of us have created classes that would fall within the definitions of Levels 1 or 2, few of us have been bold enough to seize a philosophy that makes transparent the belief that all students can move from Level 1 to Level 2 and, ultimately, Level 3. There is a fear that accompanies the risk of allowing students greater power and independence. We fear they will make the wrong decisions, that they will fail, and it will appear that we have failed. In reality, our students make decisions all the time without consulting their teachers. They make decisions that have life-long implications. We cannot argue this fact. Instead of trying to diminish their decision-making, we as educators could support students in making valuable, important and safe decisions within and outside classroom walls. Only if we empower our students, can we expect them to become productive, happy and healthy citizens.

“In order to create learning worth our children's time, we need to revert to that very American idea that each person is valuable, worthy and special.”





Appendix A: Examples of Level One Differentiation

GRADE 3 ENGLISH LANGUAGE ARTS

Maine Learning Results Goals:

- A. Process of Reading (1)
- B. Literature and Culture (2, 3, 4, 5, 6, 7, 9, 10, 12)
- E. Processes of Writing and Speaking (4)
- G. Stylistic and Rhetorical Aspects of Writing and Speaking (1)
- H. Research-Related Writing and Speaking (1)

Essential Content:

- Using a shared novel, explore some aspect of life in the United States during the Westward Expansion.

Essential Skills:

- Actively engage with text (SMP Frameworks, p.7).
- Use specific strategies (SMP Frameworks, p.7).
- Recognize basic elements of plot and recount events, ideas and important details (SMP Frameworks, p. 7).
- Identify important characters in works containing several characters (SMP Frameworks, p.7).
- Reflect on growth as readers (SMP Frameworks, p.7).
- Recognize the story has a structure intentionally created by the author (SMP Frameworks, p.9).
- See patterns within texts to draw conclusions and make predictions (SMP Frameworks, p.9).
- See connections between themselves and texts (SMP Frameworks, p.9).
- Make connections between texts and the world (SMP Frameworks, p.9).

Differentiated Learning Strategies:

- Multiple Intelligences
- Variety of reading strategies
- Flexible grouping
- Reflection



“What role are you taking today?” I ask a boy who is gathering his materials together. He stops for a moment. He and his peers are focused and very serious about their work, despite the fact that it’s pajama day at the school and they all look at least comfortable if not a little silly.

“I’m literary luminary,” he tells me. The words get garbled in his mouth, and I wonder if he knows what that means.

“I pick two important paragraphs in the story, read them, and explain why I think they are important.” He defines his role clearly and succinctly. The students set off to five different spaces in the room to run their literary groups. There are six different roles: discussion director, summarizer, artful artist, connector, vocabulary enricher and literary luminary. Students rotate weekly through the roles getting tips from last week’s participant along with a notebook defining that particular part and examples from past efforts. Equally well defined are behaviors and attitudes for working in groups. Students practice their parts with classroom volunteers before the groups meet formally. They are expected to have written work completed and be prepared to listen and respond to their peers with attentive attitudes. This is my second visit to the classroom. My first, in the fall, impressed me and I’m wondering how the groups will differ now in May. I move through the groups watching them present their parts.

“What role do you enjoy the most?” I ask one group. Their hands shoot up and I work my way around the table. Most of them like the artful artist but a surprising number enjoy being discussion director. They like having some control of the group and, on meeting day, they have quite a bit of control. If there are any adults in the circle, they are only allowed to be silent observers. On the day I am there, Deb makes no comments to her students; she simply wanders through the room watching her students in action.

As the groups draw to a close, they begin their reflection process. Students must start with positive observations about how their group performed. It’s clear, in this group I’m with, that students want to criticize one boy who got a little silly, but the discussion director steps in.

“No, we must begin with things we did well. Does anyone have something good to share?” she prompts her partners. All the hands go up and she picks a girl with bangs that graze her eyes and pigtails that brush the shoulders of her pajamas.

“I think we did a good job.” She pauses. “We didn’t fidget with stuff and we mostly listened to each other and looked at the person speaking. I think having visitors,” she glances shyly my way, “is helpful. We were very serious. Maybe she should come back every day.”

Deb comes over to where I’m sitting and whispers, “You’ve got one more group to visit and not much time. They would really like you to observe them.” I move over to the last group. Deb tells me later that they were so excited to have me come in and see how much they had improved



that she didn't want to disappoint any one group. After my observation, I take a few students aside to ask questions about the class. The literary groups are now well-oiled machines. Even if students are not equally comfortable in all roles, they have all learned to function extremely well, no matter what the task. And as groups, the students are generally supportive, very serious in their performances and proud of their achievements. I'm wondering how this all applies to other activities. I ask a boy with plaid pajamas and curly blond hair.

"Well, we're making a town now," he tells me. I ask him what he means. "We get to take different parts, be different people in the town. I'm the recreation director. We make decisions and vote on things." I'm fascinated and later follow-up with Deb.

"Oh, yes," she says. "Students choose a role that exists in our town. Then they come up with a problem the town is actually facing and try to solve it."

"Have they decided on a dilemma yet?"

"Yes. They feel the town (York) is too crowded with cars in the summer. They're coming up with solutions."

I smile, thinking of the possibilities for eight and nine year old minds. "I bet helicopters got a big vote."

"Initially," Deb says seriously. "But they priced them out and realized they weren't feasible. I let them come up with any solution and don't pass judgment. They then have to decide which one or ones are most suitable and reasonable. Then they will present their ideas to the city council." Deb has a lot of fun with her students. They laugh often and she obviously takes great joy in them. However, when it comes to problem solving, she takes them very seriously. And they, in turn, take themselves very seriously. The application of the skills from the literary circles is evident. They are highly aware of functional group processes; they understand the role of leadership; and they respect everyone's ability to lend something important to the process. It was this second visit to Deb's classroom that made me so keenly aware of levels of differentiation and the way one level leads to the next.



In this example, Deb uses the following differentiated learning strategies:

- 1. The students use multiple intelligences to convey understanding of the text: drawing, writing, speaking.*
- 2. Each week, the students develop a new strategy for extracting meaning from a text.*
- 3. Over time students develop an array of skills for group process and speaking; the requirements for the discussion director are very different from those of artful artist. Yet each lends value to the students' understanding of the text.*
- 4. Though the groups are held to the same number, over time, Deb groups students in a variety of ways. Sometimes Deb offers a variety of books based solely on interest. Students make their selections based on what looks interesting to them. (Deb guarantees they will either get their first or second choice.) Other times, Deb will vary the level of sophistication and length, encouraging students to seek a book they can read and understand comfortably. If students choose books that challenge them, she offers them extra support and allows them to take the book home (something other students aren't doing) to give them extended reading time.*

GRADE 7 SCIENCE

Maine Learning Results Goals:

- A. Classifying Life Forms (2, 3)
- C. Cells (5)
- K. Scientific Reasoning (5, 8, 9)

Essential Content:

- Understand that the human body functions as a system (SMP Frameworks, p.45).
- Names/functions of bones
- Name/functions of joints

Essential Skills:

- Develop strategies to enhance comprehension (SMP Frameworks, p.62).
- Be able to articulate using accurate scientific language how the human body functions as a system (SMP Frameworks, p.45).

Differentiated Learning Strategies:

- Multiple memorization techniques
- Multiple intelligences
- Variety of grouping approaches
- Reflection on application and efficacy of techniques

“By encouraging them to reflect, [students] become more aware and effective at applying different learning strategies and skills. Initially, Jeanne teaches them several methods and they must try them all. Later they will be able to select the one that works best for them. ”

The class chants, “Femur, snake cage. Phalanges, Sea Bass.” Though it sounds absurd as they practice, Jeanne is training them in one method of memorization: associating a word with a physical place. Later they create songs, make acrostics and word associations like “cranium, brainium”. Some of these techniques she makes totally transparent, but she also uses stories and jokes all through her teaching. She takes a moment to talk about her “double jointed” relative, and why her knees creaked so much she could never sneak up the stairs to see what her children were up to. While it’s important that they memorize the bones in order to engage in discussions about human and animal bodies, it is as important that students learn different ways to memorize. It’s clear to Jeanne that science is like learning another language and the students need ways to develop vocabulary in order to communicate. Jeanne moves into a method helpful when memorizing things in a certain order.

“When would you use this?” she asks her class. By encouraging them to reflect, they become more aware and effective at applying different learning strategies and skills. Initially, Jeanne teaches them several methods and they must try them all. Later they will be able to select the one that works best for them. Unbelievably, no student ever scores below a 97% on the first quiz when she has them try all these memorization techniques. She combines the multiple memorization techniques with foundational material she requires all students to know throughout the year, so they spend the greatest amount of time on the essential knowledge.

After students have warmed up with their vocabulary memorization, it’s on to the study of how the joints work. In the same class period, Jeanne brings out the largest skeleton I have ever seen from her back closet. Just the wonder at the sheer size of the bones overtakes initial discomfort of viewing real bones. Jeanne engages students in a conversation about how the moose’s joint is like ours.

The skeleton disappears and Jeanne calls out, “Out of your seats, I need to know the range of motion of your elbow.” The students pop up and examine their elbows as if they are newly acquired. Miraculously, no one is battered, as they raise and lower their arms. Jeanne then wheels out a life-size plastic human skeleton to demonstrate what is happening on the inside of their bodies. As Jeanne moves the connected bones of the model, the students continue, without prompting, to move their corresponding joints. Jeanne increases some students’ discomfort by setting a box of bones down on each table.



“I am not touching that,” one class member proclaims loudly. However, within minutes, every student has handled the bones and put together the various joints like puzzle pieces. Jeanne, meanwhile, wanders through the class answering the occasional questions with questions of her own: “Why do you think that? Does that joint provide a lot of movement? Why would some joints offer a lot of movement and other limited?” Finally, Jeanne pulls the class together, and, with input from the students, draws a multi-colored hinge joint on the chalkboard. Students take out their own notebooks and add new information in both written and pictorial forms.

Jeanne wants her students to understand the human body, specifically how bones function as a system and what happens when bones meet to become joints. She wants her students to begin to ask questions about why the human body is put together the way it is and become increasingly curious about how their bodies function and, by extension, how all bodies function. She is also aware that anything pertaining to the students’ own bodies will hold greater interest than more abstract learning. It is through the study of bones that she gets at systems, a requirement of the Maine Learning Results.

In this example, Jeanne uses the following differentiated learning strategies:

1. Jeanne relies on scientific research around memorization techniques such as word association to train students in the different approaches to memorization and their most effective applications.
2. Jeanne uses many “intelligences” to allow students to explore the function of joints. Students can see how they work on her life size skeleton and transfer that understanding to the moose skeleton. They touch the bones, draw and write about the bones. The students even use their own bodies to see how the bones work in action. Simultaneously, students are constantly conversing either in teacher directed whole groups or in small groups at their tables.
3. Jeanne uses differing skill bases to help students process knowledge. Some write well, some draw well but all the students have an opportunity to process using the skill that suits them best.
4. The grouping fluctuates based on what approach she is focusing on. The moose discussion, for example, is whole class, while the box of bones activity is done at tables of 5 or so. The key to keeping the students’ attention is that Jeanne alternates among whole class, individual and small group within one 75 minute period.
5. Though Jeanne is the leader for the vocabulary development, she becomes almost invisible during their group work with the boxes of bones. By shifting her role during Level 1 activities, she prepares students to become more independent. She refrains from directly answering questions, but offers another question to prompt students. Again, she becomes less the font of knowledge, and more a coach to help students develop the process of inquiry.



GRADE 10 HUMANITIES

Maine Learning Results Goals:

- A. Process of Reading (1, 5, 6)
- B. Literature and Culture (5, 10, 11)

Essential Skills:

- Readers see connections between themselves and texts (SMP Frameworks, p.9).
- Differentiated Learning Strategie and: Multiple Intelligences
- Flexible grouping
- Multiple Texts

Mike and Ellen have taught as a team for three years. The students who enter their humanities classroom have had them for two years. There is an easy rapport, made even more comfortable because many of the students are in Mike and Ellen's advisory groups, aiding in their understanding of how their students learn. "Are we finishing poetry groups?" one student asks. After Ellen says yes, the students begin to rearrange the classroom.

Their students in the past have scored poorly on poetry sections of exams, but rather than offer traditional curriculum, they believe they will make greater gains by engaging students. Mike and Ellen know their students have had negative reactions to poetry in the past and are familiar with the previous curriculum that was offered. Rather than attempt to skill and drill or begin with one specific approach or author, they have offered as many interesting and varied approaches to poetry as possible. Their hypothesis is that if they can find a poetic approach that interests the students and that will connect them personally to poetry, they will be more open to more difficult poetry over time.

Because the teachers as well as the students move around the school, the students have to help reconfigure the class. Once the tables and chairs are in groups of four, Ellen and Mike put out a variety of poetry-related materials. The content varies dramatically offering students a great selection, but the groups must rotate through the materials and experience them all. I start with the group reading concrete poetry. A couple of students are confused, so Ellen comes over and finds a few samples that seem to shed light for the students. Ellen leaves, allowing the students to thumb through texts, offer opinions and jot in their poetry journals. Next, I visit the limerick station. The four boys are engaged in writing a limerick that, surprisingly, doesn't shock me, and



they seem to be enjoying themselves. Other stations include Shel Silverstein collections, magnetic poetry pieces the groups have to use cooperatively to create a poem, poetry magazines from high schools around Maine, a photo/poetry book Ellen's father helped to create, color-based poems, poem puzzles and Haikus. While not every student enjoys every station, by the end of this Level 1 activity, students are much more relaxed about poetry and willing to begin more challenging explorations into both poetry analysis and their own writing of poetry.

In this example, Mike and Ellen use the following learning strategies:

1. Mike and Ellen offer a variety of skills to allow students to reach their conceptual goal. Students may write or read poetry, even put pieces of poems back together by analyzing what should go in what order. The magnetic poetry pieces serve as an alternative to writing, while still allowing students to create poems.
2. Another strategy they employ is the variety of content and materials based on student interest. The books and magazines they have selected are appealing to the eye, or very accessible in other ways. Because these students have worked together over time, they often help cull through poems and offer ones to each other.
3. Students are in self-selected groups of four. Because this activity is about enjoying poetry, it's important that they feel comfortable with their group members.



Appendix B: Examples of Level Two Differentiation

GRADE 8 LITERACY

Maine Learning Results Goals:

- A. Process of Reading (1-8)
- B. Literature and Culture (2, 7, 8, 10, 13)
- F. Standard English Conventions (1)
- G. Stylistic and Rhetorical Aspects of Writing and Speaking (3, 4, 8, 9)

Essential Content:

- An understanding of basic events in the Holocaust
- Shared reading of Night by Elie Wiesel

Essential Skills:

- Readers will construct meaning through using a variety of comprehension strategies (SMP Frameworks, p.7).
- Readers see patterns within texts to draw conclusions and make predictions (SMP Frameworks p.9).
- Readers see connections between themselves and text (SMP Frameworks p.9).
- Readers make connections between texts and the world (SMP Frameworks p.9).
- Construct an effective piece of writing by using support and evidence (SMP Frameworks p.13).
- Goal-setting.
- Reflection.

Looking around at the three reading groups in Sara's classroom, I wonder how they were originally separated. One group is about to head off with the ed. tech. to listen to Night, the assigned reading. Another group is meeting with Sara to discuss how to develop themes for the essay they are going to write based on the book. The last group is gathering quotations from the book to apply to their essays. As they extract these quotations, they place the page numbers next to shared themes that have been developed by the students and posted at the front of the class. The students who will be starting the essay a little later will be able to go directly to those pages rather than search through the entire book. Some of these students work alone, some in pairs.

Later, Sara says, "I didn't plan on breaking this assignment into groups, but I was really struggling. This class has such a variety of reading levels in it that I just couldn't continue on the



way I usually do.” All of the groups have the same end point; they will complete a five-paragraph essay about Night. However, they will go at their own pace, with varying levels of support. If someone launches ahead on some aspect of the reading or writing, they move themselves into another group. The most significant aspect of this grouping is that it is based on student choice. Students avoid the trap of getting labeled and feel empowered to decide how much they can take on. The groups are fluid for this assignment and will disband for the next. Also, by keeping the content and assignment generally the same, no students get the message that they are destined for a lesser future than any other student. Their means to complete the assignments may vary, but the students are equally worthy of completing the assignments.

In this example, Sarah uses the following learning strategies:

1. *Though Sara requires that all students share the same book, she allows them to work at varying paces and, in some cases with a combination of reading and listening to the novel.*
2. *Students self-select their groups and the groups are extremely flexible.*
3. *The skill focus is on the five- paragraph essay. Again, students are able to move at their own pace with varying degrees of support and depth of analysis of the novel.*
4. *Through the use of smaller groups, students may work with the ed. tech., occasionally with Sara or use each other for consultation.*
5. *Sara uses both formal and informal reflection to make sure she knows how each student is doing and the students themselves are aware of their progress.*

GRADE 8 SCIENCE

Maine Learning Results Goals:

- I. Motion (1, 2, 3)
- J. Inquiry and Problem Solving (1, 2, 3)
- L. Communication (2, 3, 6)

Essential Content:

- Understand that the motion of an object depends on the forces acting on it and a reference point (SMP Frameworks, p.60).

Differentiated Learning Strategies:

- Multiple Intelligences
- Flexible Grouping
- Choice of rolls within groups



Although Sara has shared a definition of acceleration and had students share their own definitions of acceleration, it's clear not many students are grasping what affects acceleration. Sara has selected an experiment and set up the room ahead of time so students may learn through action and observation. Though the content and general process are required, she leaves the students to select their jobs in their small groups.

As the students cart the jars full of water over to their tables, they begin to sort out their roles. They understand that, as a group of four, they must perform the experiment, observe, take notes, draw conclusions and share the results. The students have chosen their seat mates, contingent upon approval from Sara, and change seats often to shake up the dynamic. During this experiment, one student in each group volunteers to walk with the container to see what happens as they accelerate. The rest of the group comment as they observe, and one takes notes. As they choose their roles, sometimes they shift. "No, I don't think you were walking fast enough," says one student who was originally the recorder. She passes off her notebook and takes the jar from the original walker. The students unconsciously alter roles as they see fit; the one common ingredient is that they are all engaged.

In this example, Sara uses the following learning strategies:

1. Sara offers written information, draws from prior knowledge, has students get up and perform an experiment and then has them write about it. They use many intelligences in order to understand the concept of acceleration.
2. Because this is only the first day of their discussion of acceleration, the choices are relatively limited. However, students do quickly assign themselves roles and offer feedback about how each is doing.
3. Sara has already prepared students that this Level 2 assignment is a precursor to their self-designed experiment. Though they need to know much more about the basic content pertaining to motion, the students are aware of how important this knowledge will be as they move toward greater independence.

"They understand that, as a group of four, they must perform the experiment, observe, take notes, draw conclusions and share the results. The students unconsciously alter roles as they see fit; the one common ingredient is that they are all engaged."



GRADE 2 LITERACY

Maine Learning Results:

- A. Process of Reading (1, 5, 6)
- B. Literature and Culture (1)

Essential Skill:

- Readers, through the habit of reading, will develop fluency (SMP Frameworks, p.5).
- Readers will use multiple strategies when they encounter unfamiliar words (SMP Frameworks, p.5).

“I am an excellent reader,” Bob, a very focused student takes time to say. “I can choose any book from the silver container or, if I want a break, from the green or blue.” There are many color-coded bins filled with a variety of books, placed side-by-side for the students to select from. Later, Terry reports that Bob is around the middle of the class in terms of reading ability. His confidence comes, she says, from the sense of improvement. The increments of difficulty between books are small, allowing students to shift from one container to the next very rapidly. I ask her about self-esteem when you differentiate that way.

“The kids understand their strengths and weaknesses,” Terry replies. “They like feeling successful. This way, they can choose what they enjoy at a level they can comprehend, and work on the skills they need to improve.”

In this example, Terry uses the following learning strategies:

1. *Terry narrows her focus to reading fluency here (she focuses on analysis and other critical thinking skills in her literacy circles). Terry offers a variety of content to appeal to the individual interests of her students. She has an understanding of what they like and can tailor the selection to their interests and she also has a wide variety so students can expand their interests.*
2. *Terry also varies the difficulty in small increments so students can move up quickly and see their improvement.*



Appendix C: Examples of Level Three Differentiation

GRADES 9-12 SOCIAL STUDIES

Maine Learning Results Goals:

- Civics and Government: (A. 1,2,3, B. 2, 5, C. 4, 6, 7)
- History: (A. 1, B., 4, 5, 6, C. 2, 4)

Essential Content:

- Personal participation can have a powerful effect on communities and government (SMP Frameworks, p.70).
- Embedded in any public policy are enduring philosophical issues (SMP Frameworks, p.70).
- Themes and patterns recur throughout history (SMP Frameworks, p.72).

Essential Skills:

- Analyzing Errors
- Analyzing Perspectives
- Comparing
- Constructing Support
- Investigation
- Systems Analysis (SMP Frameworks, p. 70)

Differentiated Learning Strategies:

- Students design inquiry
- Materials, strategies and processes are tailored to the individual needs of the students
- Flexible grouping



Uncharacteristically, Marylyn is standing at the front of the class facilitating the decision-making. It is the first day of a refined line of inquiry. The students have written four essential questions based on their previous studies (see *Cycles*, p. 15); they each selected the one that held the most interest for them and are designing their final inquiry project. The group I am sitting with is exploring the following question: “How are our civil liberties affected by increases in social tension?” The walls are covered with paper to record each of the eight students’ paths of inquiry, their individual projects, the communal project and the tasks leading to that project. It’s a messy process of decision-making, but the students become aware of how each one will delve into individualized research and how they can finally come together.

The students have already narrowed their own inquiry. One student is looking at what government does in times of crisis with regard to laws made to restrict certain groups of people. Specifically, he wants to know if the laws that made Japanese internment camps possible and the House Un-American Activities Committee possible have any resemblance to the Patriot Act. Another student, Andrea, is going to do an internship with the ACLU. The group members have decided on their individual project goals and agreed upon a community presentation as their combined product. They will present their projects then run facilitated discussions around their topics. The next step is to design a schedule and make sure each of the more immediate tasks has a lead student to be held responsible and make sure Marylyn knows exactly what has and has not been happening. As they sort out the tasks, Andrea’s hand goes up for every one. “Oh,” she says to me, “I just want to do it all. I love this stuff!!”

“Is anyone going to the city council meeting in Portland tonight?” Marylyn asks. Three hands go up. The ACLU is holding a rally to bring awareness to the implications of the Patriot Act. Andrea again volunteers to drive students up. Later, I ask Andrea what school she attended before she entered the New School.

“You must have been a remarkable student there,” I comment.

“Actually, I was in a lot of trouble. I don’t know...it just felt like no one cared what I was interested in. I tried to talk to the teachers, especially in history (I love history), but they just didn’t think anything I had to say was important. Here, everything I think about is important. I can’t wait to start this project!”



GRADES 2 ENGLISH LANGUAGE ARTS/SOCIAL STUDIES

Learning Strategies that Marylyn uses include:

1. The students design the inquiry from day one on.
2. The teacher acts as facilitator initially, and continues to help students with next steps, keeps motivation up if needed and guides students through difficulties.
3. Should students need to develop a more basic foundation, teachers construct courses using Levels 1 and 2 differentiation to establish knowledge and skills. Students didn't begin this independent project until they had learned essentials around civil liberties, The Patriot Act, and the war in Iraq.
4. The materials students use include computers, books, magazines, but also televised news, history shows, etc. However, Marylyn is very clear that understanding civil liberties today means going out and exploring current events as they are happening. She takes time to find insured drivers to get the students out of the building and into the communities as much as possible. Students are expected to be on the cutting edge of events to anticipate needs to support their projects.
5. Students work independently or with others depending on the over-lap of their projects.

Grade 2 Language Arts Maine Learning Results Goals:

B. Literature and Culture (3)

G. Stylistic and Rhetorical Aspects of Writing and Speaking (1, Grades 3-4: 1, 2, 3, 4, 5)

Essential content:

- Written language can enhance or diminish access to power. (SMP Frameworks, p. 11)

Essential Skills:

- Writers need to match form with purpose (SMP Frameworks, p.11).



“I know! We could have the narrator tell the kids what they’ll be doing next,” Jimmy says, barely able to stay seated he is so excited. This is the first day of a challenge based on Project Imagination, a gifted and talented program. This problem, however, is for all the students in Terry’s second grade. Including everyone is one of the requirements the students have to incorporate. Terry uses the challenge as a culmination of their African studies as well as their two years they have spent together. She expects her students to apply the strategies they have learned over the two years to this situation, but as a coach she can only facilitate discussion and remind students of the requirements of the project.

“What level voice would you need for this play?” Terry asks her 23 students.

“Level 2,” Fred, a boy with fiery red hair answers with great seriousness.

“Oh, at least,” Terry agrees and the students nod.

Although the project requires humor, the students all take the challenge with resolve and gravity. While students, strictly speaking, are not creating their own problem, the solution comes completely out of their imaginations. They must, according to the rules, write an eight minute play that involves traveling to two different locations, invoking traditions that the students would encounter in those places. They also must use scenery and humor to enliven their presentation. (Terry adds the requirement that students use Africa because a student’s grandparents had traveled to Africa for a safari and returned with all kinds of information and resources. Terry seized the opportunity to create a unit around African culture and tradition and has added artifacts that the students may use as props.) Terry reminds students of the play they performed last year. “Now, you have all kinds of information in your schema to write and perform this play. Remember last year? What play did we perform?” At least half the students raise their hands and begin to share what they performed and what lessons they gleaned from their performance. Last year, however, they did not write their own play. Students realize the elevation in difficulty. Terry invites me back in two weeks to view the dress rehearsal.

When the observer arrives, the students are excited because I’ve brought a video camera. The students, Terry explains, have had field trip after field trip and are behind in their rehearsals. Terry has taught the students a trick she uses on many occasion: seizing opportunity. The students ask me to play back the video of their two groups,



“Terry explains the challenge given them and points to a couple of very ingenious design components, then the students are on their own. Flexible thinking and individual problem solving are daily activities prioritized no matter what the subject.”



two groups and as the one group performs, the second is to comment. The group acting as an audience peers over my shoulder. “I can’t hear you at all on this tape,” a student with endless braids says to her classmates. Terry stops rehearsal.

“Okay, let’s listen to the tape and learn from it.” Just like Terry, the students take what could have been an interruption and turn it into part of their learning experience. While the academic expectations are clearly elevated with the performance only two days away, the behavioral ones are just as high. Students urge on their classmates and remind them of what they should be doing. When a student in charge of props begins to fool around, it is one of the students who reminds him how little time they have before the next performance. The students seem to have fun as things fall into place. A giant cardboard box serves as a green bus on one side, but later, is turned around and becomes a plane. They complete the transformation by slotting a long narrow box through a hole to serve as the wings. Later, Terry talks about that clever scenery design. The kids had to design all of it and they only had one box, so they solved the problem. Flexible thinking and individual problem solving are daily activities prioritized no matter what the subject.

On the evening of the performance, parents with video cameras and children file in and beam with pride. Terry explains the challenge given them and points to a couple of very ingenious design components, then the students are on their own. The performances vary with some students reveling in their parts, using no scripts and using expressive body language. Some students keep their scripts while still others are scenery technicians. The students have all contributed and participated, but they have differentiated what and how they perform. At one point, someone accidentally steps on the African cloth at the market place. The props fall down and the three closest students fix the scenery. However, the student playing the lion is so distracted she cannot refocus and simply doesn’t notice it’s her turn to say her line. A student close by leans down as if to fix the fabric once more



and prompts her with such subtlety that though it brings her back to the play, no one even notices. It is a moment when students could have been impatient and insistent the way they can be when they feel someone is not acting up to par, but no one does chastise the errant actor. The play goes on without a hitch and another lesson in how to treat one another is added to the intentionally designed ones.

In this example, Terry used the following learning strategies:

1. Like many of these projects, this play begins with giant white pieces of paper around the room. The brainstorming stage is essential for setting the tone that all students are welcome to participate.
2. At this age, students are given more boundaries and a short time frame to make the Level 3 manageable for them.
3. Students, now used to transferring knowledge and skills, incorporate three books into their play as well as set design and acting skills they have learned in the past. Terry may prompt them by asking them what they know about Africa, but they make the connections between prior knowledge and this project.
4. Students themselves differentiate based on ability. Because risk-taking is encouraged, students participate and stretch themselves. They also know their parents are coming in to celebrate with them, so they want to reveal their best work. Students had to participate in both the creation and performance, but they did so very differently. Some were more active in the idea portion, some in the writing, some in the set design. Similarly, they chose the parts they wanted to play and got either their first or second choices. There were parts that required some real acting and there were narrative parts that could simply be read. Some students worked mostly with the changes in the set. The key to success was working together and supporting one another.

GRADE 8 SCIENCE

Maine Learning Results Goals:

- I. Motion (1-3)
- J. Inquiry and Problem Solving (1-6)
- L. Communication (3, 6)

Essential Content:

- Students demonstrate that motion can be described mathematically (SMP Frameworks, p.60).



“Sara’s role has dramatically changed in the classroom. She is no longer the focal point of learning. Instead, she is much more of a coach, pulling the team together to re-group.”



Essential Skills:

- Questioning and problem solving
- Formulating and justifying ideas
- Communicating effectively (SMP Frameworks, p.60)

Differentiated Learning Strategies:

- Choice of topic within a certain range
- Flexible groups
- Choice of materials
- Choice of roles within the groups

“This is our third experiment,” says a student who has consistently done very well in Sara’s class.

“You mean your third attempt at this experiment?” I ask.

“No, we’ve done three totally different experiments,” she responds. She and her partner are clearly frustrated with their failure so far. When pressed, she explains she would rather design her own experiment than perform an experiment already developed.

Sara’s students have worked their way through Levels 1 and 2 learning about acceleration and motion. Now, Sara is asking them to design their own experiments. Their first step is to define their inquiry. Next, they have to design an experiment to support their inquiry. During the first observation, Sara was just introducing the concept of acceleration.



Students were struggling and understanding concepts at varying levels. Three weeks later, all the students are engrossed in their projects and are amazingly conversant about both acceleration and momentum. The focus of this observation is the potato gun group. The students in the group all march outside to observe their experiment on the effects of mass on momentum.

The potato gun experiment is both a success and a failure. Four boys crowd around the PVC pipe and try to fit the potato into the opening. The potato clearly is too large so one student shoves it down the tube. It's not quite far enough down the tube, so another student uses a stick to force it. In the meantime, potato bits are shearing off and falling to the ground, directly affecting the mass of the potato. The students are so excited about firing of the gun, they forget about accuracy. Eventually, Sara calls all the students around her. "Let's huddle," says one student. It's an interesting turn of phrase; Sara's role has dramatically changed in the classroom. She is no longer the focal point of learning. Instead, she is much more of a coach, pulling the team together to re-group. She is clear with them that certain things need to be completely re-done in order to create a mathematically accurate experiment. Together they develop a revised game plan. Still, Sara rolls with the enthusiasm, and lets the students fire the potato gun.

Later, when questioned, a student from the group, describes very clearly what went wrong. He's very exact about the details and how the group is addressing the issues now. When I ask him what he has learned from the experiment so far, he replies thoughtfully, "Well, I learned what to do and what not to do next time. I learned a process. And I will definitely remember this project later on. "

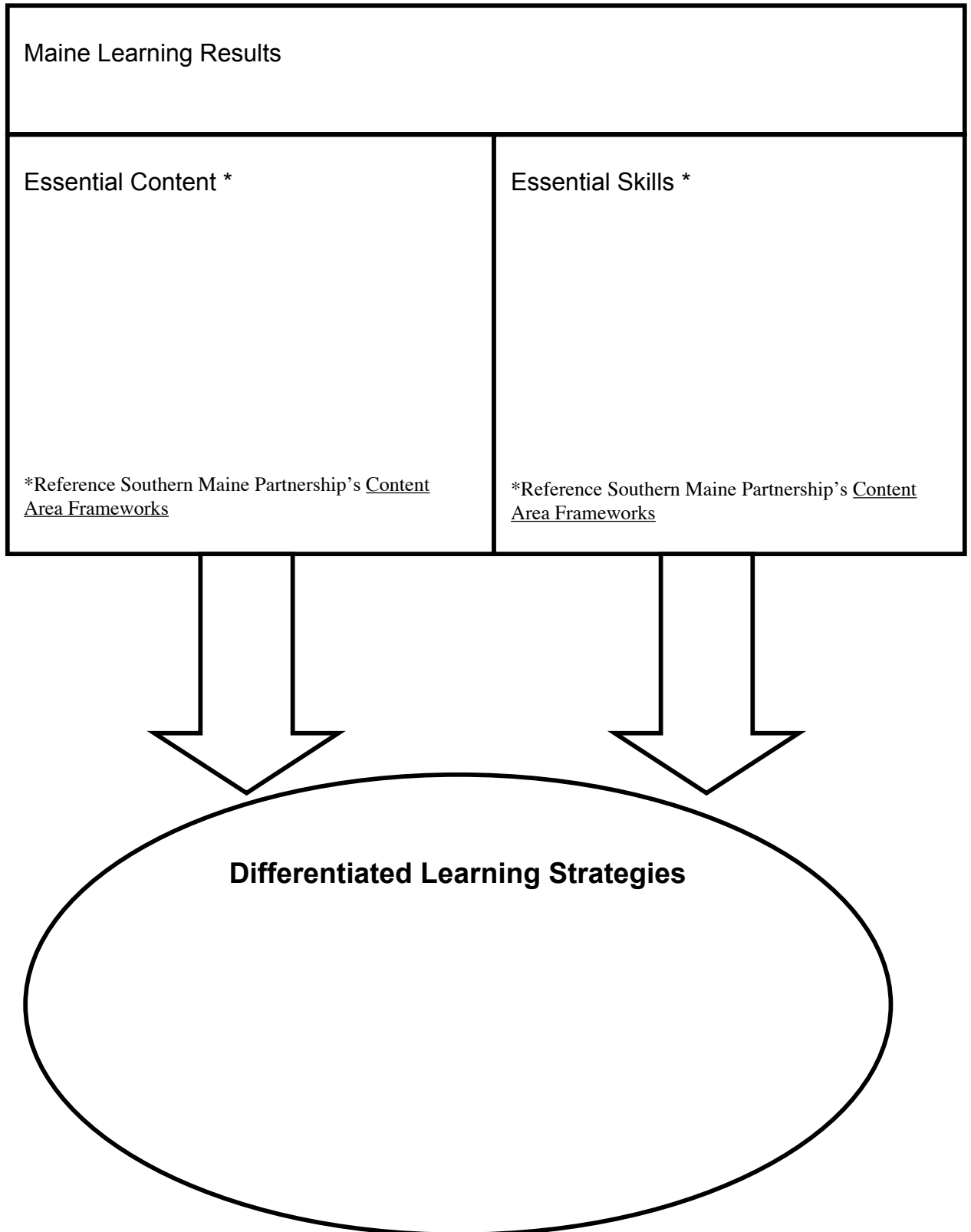
In this example, Sara uses the following learning strategies:

1. Every group has some choice about selection of vital concepts.
2. Each group chooses the materials they wanted to work with.
3. Each group designs the processes and deadlines to meet.
4. The groups are self-selected and the roles within the groups are self-appointed.





Appendix D: Design Inquiry Templates



Level 1 Teachers Design Inquiry Template

Maine Learning Results:

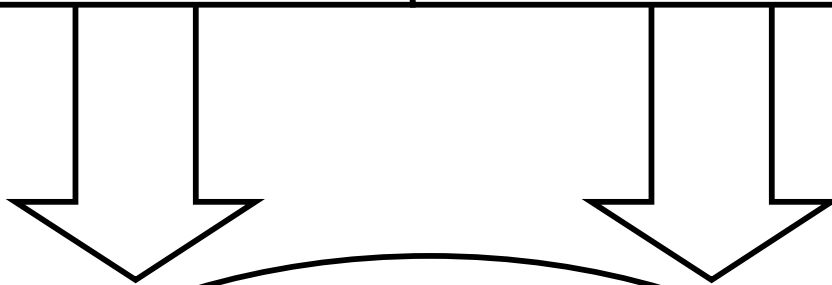
- What Content Standards and Performance Indicators am I expected to cover?

Essential Content:

- What content is essential for students to meet the Content Standard/Performance Indicator(s)?
- Could I create a concept-based learning goal to allow more flexibility in specific content?
- What content do students need to function independently in the future both in this class and beyond?

Essential Skills:

- What skills are essential for students to meet the Content Standard/Performance Indicator(s)?
- What skills do students need to function independently in the future both in this class and beyond?



Differentiated Learning Strategies:

- How can I gather information about my students' learning and interests and continue to apply this information to new situations throughout the year?
- Are there existing systems of learning strategies or materials that would readily apply to my content and skills while helping a variety of learners?
- Could I differentiate skills to help students master content?
- Could I differentiate content to help students master the skills?
- How can I build reflection into my design?
- How am I moving my students toward greater independence?





Level 2: Students Choose from Options Teachers Have Designed

Maine Learning Results:

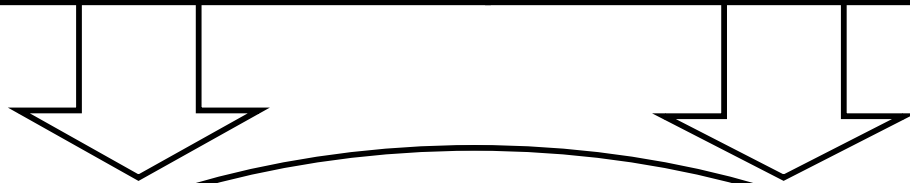
- What Content Standards and Performance Indicators am I expected to cover?

Essential Content:

- What content is essential for students to meet the Content Standard/Performance Indicator(s)?
- Could I create a concept-based learning goal to allow more flexibility in specific content?
- What content do students need to function independently in the future both in this class and beyond?

Essential Skills:

- What skills are essential for students to meet the Content Standard/Performance Indicator(s)?
- What skills do students need to function independently in the future both in this class and beyond?



Differentiated Learning Strategies:

- What are different strategies that could apply to the learning goals?
- Based on prior assignments or inventories, where will students struggle the most with this assignment and how many different approaches could I offer to help them?
- How can I support students to be thoughtful about their choice of learning strategy?
- Do students understand their choices?
- What is the greatest variety of skills I could offer?
- What is the greatest variety of content I could offer?
- How can I ensure that students connect their choices to prior shared differentiation experiences?
- Do the choices all prepare students to become more independent in the future?



Level 3: Students Design Inquiry and Implement Strategies for Solutions

Maine Learning Results:

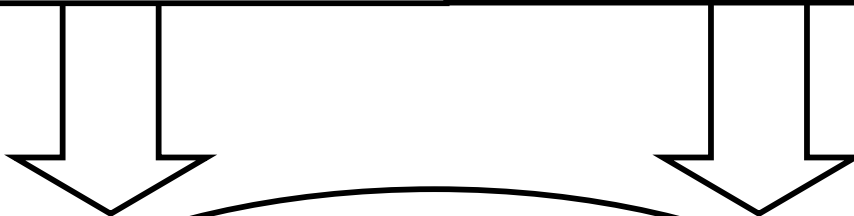
- What Content Standards and Performance Indicators am I expected to cover?

Essential Content:

- Is there essential content I need to consider when I design my problem?
- What is most important to me now that I could incorporate in my design?
- How could I connect past content to my current design?
- How can I access the content I need to pursue solving my problem?

Essential Skills:

- Are there essential skills I need to incorporate in my problem?
- What skills will I need to use to solve the problem I am designing?
- Are there particular steps or strategies I should consider when I am using these skills?
- How can I best express what I have learned?



Differentiated Learning Strategies:

- What learning strategies would enhance my learning around this project?
- What are some learning strategies we have used in past classroom projects?
- How can I build reflection about learning strategies into my project design?



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