Differentiation Team Meeting
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10 Takeaways: Differentiated Instructional Strategies

1. Stations
2. Agendas
3. Complex Instruction
4. Orbital Studies
5. Tiered Activities
6. Small Group Instruction
7. Compacting
8. Choice Boards
9. Literature and Discussion Circles
10. Jigsaw

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Instructional Strategies That Support Differentiation

Only teachers who utilize a variety of instructional models will be successful in maximizing the achievement of all students. . . . Teachers need to "play to" students' strengths and to mitigate students' learning weaknesses. This can be done only through the use of instructional variety.

Thomas J. Lasley and Thomas J. Matczynski,
Strategies for Teaching in a Diverse Society

There's nothing inherently good or bad about instructional strategies. They are, in essence, the "buckets" teachers can use to deliver content, process, or products. Yet some buckets are better suited than others to achieve a particular goal. The buckets can be used artfully or clumsily as part of well-conceived or poorly conceived lesson plans and delivery. In addition, virtually all buckets can be used in ways that ignore student learning differences, or they can become part of a larger system that appropriately responds to those differences. As Hattie (2009) reminds us, it's not a particular instructional method or script that will make a difference in student learning, it's getting more precise about how students are progressing in their learning and then using that information to personalize learning. It's about choosing the strategy that will work best for a given learner at a given time.

For example, it would be grossly inefficient to use the instructional strategy called group investigation to introduce 3rd graders to the concept of fractions. Similarly, it would be ineffective to ask high school students to develop a stance on the ethical issue of genetic engineering using the instructional strategy called concept attainment. It makes no sense to expect a student who is learning English to benefit from a compelling web demonstration that is presented in English. Consider the nest of strategies we describe as cooperative learning: they have often fallen short of expectations not because of a deficiency in the strategies themselves but because teachers apply them shallowly.

Expert teachers generally are comfortable with a wide range of instructional strategies, and they vary them skillfully with the nature of the learning task and learners' needs (Berliner, 1986; Stronge, 2002). When correctly used, many instructional strategies invite teachers to respond to students' differences in readiness, interest, or learning profile. Some instructional strategies last only a short time during a lesson and require little planning; others help teachers shape an entire way of life in the classroom and require extensive planning and ongoing reflection. Whereas some strategies emphasize organization or arrangement of students for learning, others focus predominantly on the nature of instruction itself.

There are many avenues to creating an instructionally responsive classroom. As you read about instructional strategies in this chapter and the next, observe how teachers use them to create classrooms where students have the opportunity to work at a comfortable pace, at an individually challenging degree of difficulty, in learning modes that match learning profiles, and with applications that are personally intriguing.

As in the previous chapter, the instructional strategies are described in actual classroom scenarios and then analyzed according to what the teacher is differentiating, how the teacher is differentiating, and why the teacher is differentiating.

Stations

Stations are different spots in the classroom where students work on various tasks simultaneously. They can be used with students of every age and in all subjects. They can be a frequent or occasional part of the learning process. They can be formal or informal. They can be distinguished by signs,

symbols, or colors, or the teacher simply can ask groups of students to move to particular parts of the room. (A strategy that is both like and different from stations is centers, which are discussed and illustrated in Chapter 8.)

For the purposes of differentiated instruction, stations allow different students to work with different tasks. They invite flexible grouping because not all students need to go to all stations all the time. Not all students need to spend the same amount of time at each station, either. Further, even when all students do go to every station, assignments at each station can vary from day to day based on who will rotate there. Stations also lend themselves to a good balance of teacher choice and student choice. On some days, the teacher decides who will go to a particular station, what work they will do when they get there, and the working conditions that must prevail while they are there. On other days, students can make these decisions. On still other days, the teacher may set some of the parameters, but the student can choose the rest.

Grade 4 Math: Stations

At the beginning of the year, math assessments show that Ms. Minor's 4th graders are "all over the place" with computation of whole numbers. She has presented the children with a variety of tasks involving computation at varying degrees of sophistication and in varied contexts, which has helped her assess their starting points. She has discovered that these learners represent quite a range of readiness, from two or three years below grade expectations to an equal distance above grade level.

Some of her 4th graders still have difficulty with basic math facts and algorithms, or rules of computation in addition or subtraction. These students are really lost with multiplication beyond rote memory of multiplication tables. Other students have a good understanding of the algorithms of number computation for addition, subtraction, and multiplication; they just need opportunities to apply their understandings in varied situations. These students also are ready to begin a formal exploration of division. Still other students no longer find the three basic operations either interesting or challenging as presented by the grade-level math text. Many of these students have an "instinctive" understanding of division. Some of them have had formal teaching about it, or they have taught themselves how to divide.

Another consideration for Ms. Minor is that her students' attention spans vary. Some can lose themselves in math tasks for lengthy periods; others find

10 minutes of concentrated work a strain. Further, she has discovered that length of attention span is not always a function of competency.

To begin the year, Ms. Minor gradually introduces her students to five learning stations, which are really just areas of the room. Each day, students look at a pegboard with nails that represent the five stations in the room. Key tags with student names hang in the various sections of the pegboard to let students know where to begin math class.

Station 1 is The Teaching Station. Students in Station 1 have direct instruction with the teacher. They meet with her near the whiteboard, and she teaches them and guides their work on a topic in number computation. Often, she leaves students in this group to work at the whiteboard or in pairs on the floor. They solve problems or practice skills as she circulates among the other stations. Students at Station 1 record their work at the station by finding their name on a clipboard chart and checking the date and kind of computation on which they worked.

Station 2 is Proof Place. Students in Station 2 use manipulatives or drawn representations to work with number computation and to explain and defend their work. This station helps students understand why numbers and number computations work as they do. They are assigned to the station with a partner, but first they work alone with a computation or series of computations in a folder with their name on it. They time their individual work with a five-minute digital timer. Then the partners share the tasks they were working on, how they decided what operation to use, and why they think their answers are correct. They may "prove" their work with drawings, diagrams, or manipulatives. Their partner checks their understanding by asking them to use a second method for thinking about their answer. Proof Place has posted prompts for students, such as the following:

> Use estimation to show whether your answer is probably right. Show me a diagram or picture that proves your way of thinking about the problem is right. Use the checkers in this cup to show the way you worked the problem is right.

Ultimately, students can check their partner's work with a calculator to see if answers agree. When they're done, students complete an audit card and attach it to the paper, alongside their work. The audit card says

> Today [student's name] worked on problems using [name of computation] and proved the method by using [diagrams, objects]. My partner was [name].

> The method we used to check my work was [estimation, objects, drawings]. When we checked with the calculator, it said [I was right, I need to think about this some more].

Students date the cards and leave the work and cards in a box at the station. They also sign out of the station on a chart, writing the date, checking the kind of computation, and checking the method they used to show their thinking.

Station 3 is Practice Plaza. At this station, students develop comfort, accuracy, and speed in a particular kind of computation using teacher-generated tasks, computer programs, apps that offer game-based practice on a range of math skills, or a textbook. When necessary, they check their work using an answer key, calculator, or computer. Finally, they write a self-evaluation of their work, referring, if necessary, to sample language at the station. They leave their signed and dated work in the appropriate box at the station; computer-based work generates a report for the teacher. They also find their name on a chart at the station. It asks for the date, the kind of computation they practiced, the number of problems attempted, and the number correct.

Students in Station 4, The Shop, work with math applications. The Shop is run by a man named Mr. Fuddle, who always seems to need their help. Items in the shop vary from time to time, as do tasks on which students work. But students always work with some facet of running a store or shopping at a store, and they always help Mr. Fuddle, who has somehow gotten himself into another mess.

Sometimes at The Shop, students "buy" from online or paper catalogs. Sometimes they make decisions about what to sell in the store and how much to buy based on a specified budget. Sometimes they count inventory and group items, and sometimes they make change for a series of purchases. Changing objects, varying tasks, and the presence of poor old Mr. Fuddle make going to The Shop fun. The Shop makes math something that is useful in the everyday world. When leaving The Shop, students write notes or e-mails to Mr. Fuddle, dating them and describing what problem he has gotten himself into, what they did to solve it, and what he should do next time to avoid the problem. They leave their notes in Mr. Fuddle's mailbox at the station or mail them to him in care of their teacher's school e-mail account.

Station 5 is Project Place. Here students work alone, in pairs, or in small groups to complete long-term projects that require the use of mathematics in a variety of forms. The length of projects and the topics vary. Sometimes projects deal with classroom issues such as designing a center, redesigning the classroom, or conducting and reporting surveys about students. Sometimes they deal with sports, outer space, literature, or writing. Sometimes the teacher thinks of project ideas. Sometimes students do. What all projects have in common is that students use mathematics in a way that connects it to a larger world and in a way that piques student interest. Students keep project logs in which they make two entries whenever they are at Project Place. At the beginning of class, they summarize what they have done so far on their project, and they set goals for the day. At the end of class, they write about how they did with their goals and their next steps. Their project logs stay at the project center in a file box.

Some days, Ms. Minor teaches whole-class math lessons, conducts whole-class reviews, plays whole-class math games, or runs whole-class "contests." On those days, no student names are on the pegboard. Occasionally, one or two stations are "closed for the day." Most days, however, students are assigned to one of the five stations to work. All students go to all stations in the course of a week or 10 days. Not all students spend the same amount of time at each station in a given two-week period, and not all students rotate through the stations in the same order. Sometimes students work at a station with students of similar readiness, and sometimes they work with students of differing readiness.

Ms. Minor uses students' record-keeping forms, work, and planning logs along with periodic formal assessments to assign students to stations. One day, for example, she worked at The Teaching Station with six students to review multiplication of two-digit numbers. Two of those students stayed at the station for a second day, and she added two students who had been working fairly well with two-digit multiplication but had been sick and absent for several days. Of the four students who left The Teaching Station, two went to Proof Place (along with several other pairs of students who were working on a variety of computations). Two others went to Practice Plaza to hone their computation of two-digit numbers. At Project Place, eight students worked on three different long-term projects. In each of the three groups, some members were at other stations that day. Students understand

that often group members will work in other places. Project logs help all members of a group keep up with one another's progress on the joint effort.

Ms. Minor is keenly aware of the content standards that her students are expected to reach, and she always plans with those in mind. When students are lagging behind with math proficiency, she works with them on knowledge, skills, and understanding targeted at closing the gaps that make it impossible for them to move ahead. At the same time, she plans tasks, homework, and direct instruction sessions to introduce students to the content that typically comes next in the learning sequence. When students demonstrate advanced math proficiency, she plans tasks, homework, and direct instruction that extend student understanding, increase the challenge level, or introduce content that typically comes next in the learning sequence.

Differentiating what? Ms. Minor differentiates both content and process at The Teaching Station, Proof Place, Practice Plaza, and The Shop. All students work with math reasoning, math application, and math practice; the particular operations, their degree of difficulty, and the degree of difficulty of activities are varied to provide a good fit for students based on Ms. Minor's ongoing assessment of their strengths and needs. She also differentiates products at Project Place. These vary in complexity, duration, group composition, skills required, and other variables, based on her continual assessment of learners' needs.

Differentiating how? Ms. Minor differentiates predominantly by student readiness at Stations 1 through 4, with students of similar readiness working on tasks at a similar difficulty level. Station 5 often, but not always, involves students of varying readiness working on projects together. Station 4 (The Shop) addresses interest by varying materials and problems based on the different materials. Station 5 (Project Place) always places a strong emphasis on student interest. It offers a wide range of project options and modes of expression. The various ways to think about and demonstrate math reasoning in Proof Place address her students' different learning profile needs and the fact that they will grasp math through different approaches.

Differentiating why? Essential understandings and skills about math operations are more accessible to students when presented at their readiness levels. Motivation is high because of the variety of approaches to learning math, varied materials and product options, and the opportunity to work with a variety of students. Targeted use of stations makes both teaching and learning more efficient than it could be with whole-class instruction or if

all students spent the same amount of time at each station and completed the same work at each station.

Other considerations. Ms. Minor uses stations in a way that accentuates the concept of flexible grouping. Even in The Teaching Place, where students receive similar direct instruction, they stay for different amounts of time. At Stations 2 through 4, students of varied readiness levels may work at the same station but on different tasks. Also, because rotation does not progress in a certain order, and because the length of assignment to a center varies with student need, students have a sense that "everyone does a bunch of different things" in their math class. They have no sense of specific, ability-based math groups. An additional layer of ambiguity about why students work in a given spot at a given time is added as the teacher sometimes assigns students to The Shop based on interest (for example, sending students who like sports to The Shop on a day when materials and tasks revolve around ordering, inventorying, or purchasing athletic materials) and by student choice in math application projects at Project Place.

Agendas

An agenda is a personalized list of tasks that a particular student must complete in a specified time (see Figure 7.1). Student agendas throughout a course will have similar and dissimilar elements. A teacher usually creates an agenda that will last a student two to three weeks, but the duration can vary. The teacher develops a new agenda when the previous one is completed.

Generally, students determine the order in which they will complete agenda items. A particular time in the day is set aside as "agenda time." In elementary classrooms and block-scheduled secondary classrooms, teachers often select the first part of the day or block. In other classes, agendas are used once a week or as anchor activities when students complete other assigned work.

While students work on their agendas, the teacher has great freedom to move among individual students, coaching and monitoring their understanding and progress. The teacher also can take advantage of agenda time to assemble small groups of students who need guided work or direct instruction with a particular concept or skill. Agendas can also be used for homework rather than classwork, for both classwork and homework, or for an anchor activity when students complete assigned classwork.

Figure 7.1 A Personal Agenda

Teacher and Student Initials at Successful Completion	Task	Special Instructions
	Complete a computer animation showing how a volcano works.	Be sure to show scientific accuracy in your explanation of the animation.
	Read your personal-choice biography.	Keep a reading log of your progress.
	Practice adding fractions by completing the green assignment at the computer station.	Come to the teacher or a classmate for help if you get stuck.
	Complete research for an article on why volcanoes are where they are for our science newsletter. Write the article. Have the editor review it with you. Revise as needed.	Watch your punctuation and spelling! Don't let them affect your great skill at organizing ideas.
	Compete at least two spelling cycles.	

Grade 5 (Various Subjects): Agendas

As students enter their classroom each morning, they put away their jackets and books, say hello to classmates and their teacher, Ms. Clayter, and go to the box that holds their agenda folders. After morning announcements, each student completes a daily planning log, which contains the student's goals for completing the day's agenda tasks. Students who know they need teacher assistance can write a request for a conference on the board above the agenda box. Students then move to various parts of the room to begin working on their tasks.

Many students work alone with reading, writing, math, or independent investigations. In several places in the room, students cluster in twos or threes, often on carpet squares, to complete collaborative tasks.

After Ms. Clayter circulates to make certain everyone begins work in a focused and orderly manner, she calls three boys to sit with her on the floor near the bookshelves. For the next several minutes, she discusses the computer animation of a volcano they completed the day before. She tells

the boys she thought their graphics were really impressive. They agree. She then asks them to review the written goals for the task. Among those is the goal that anyone who views the animation will come away with a clear understanding of what makes a volcano erupt. With her guidance, the boys admit that their labels and annotation for the animation fell short of this goal. She leaves them to write a plan, which they must present to her, to ensure their work meets all objectives.

Ms. Clayter then moves to a pair of students coauthoring poems. She has paired the two students to work with poetry as part of their agendas because each has something important to teach the other. Jenna is highly imaginative and uses language like a paintbrush to make images for her readers, but she lacks persistence when it comes to polishing her work. Han is less fluent with her imagery, in part because English is her second language. She moved to the United States in 2nd grade. On the other hand, Han's love of poetry is electric, and her work ethic is immense. The two girls enjoy working together, and Ms. Clayter knows they can strengthen each other's writing. She asks them to read aloud their latest piece of writing, tells them several things she finds effective in the poem, and leaves them with two challenges to think about as they work for the remainder of agenda time.

Two boys who need additional practice with math are working on a mystery that asks them to select and use appropriate operations to solve a math problem. The math required is at a relatively basic level, but the mystery format is inviting. The boys keep a record of mysteries they solve to get "promotions points" that will earn them certificates and badges as math detectives.

As Ms. Clayter creates student agendas, she has four goals: developing student work that focuses on essential learning outcomes in one or more core content areas, building on strengths, shoring up deficits, and fostering independence. Thus, each student's agenda includes work in each of these areas. In a two- to three-week agenda cycle, all students are likely to work in several subject areas—in each instance with practice, application, or transfer of essential knowledge, understanding, or skills. They'll work with some things they love and some they could do without. All students will set and monitor daily and weekly goals. All will work alone and with peers. All will meet with the teacher informally and formally throughout the agenda period, both at the teacher's request and at their own.

Ms. Clayter finds agendas a great way to attend to student differences in readiness, interest, and learning profile. At this one time in the day, she

can extend and support student growth in all subject areas. Her students love the calm way to ease into the school day, the variety, and the sense of autonomy the agendas provide.

Differentiating what? Using student agendas allows Ms. Clayter to differentiate virtually anything. She can differentiate content by varying materials, subjects, topics within subjects, and degree of teacher support. She can differentiate process or sense making by varying the degree of difficulty of tasks as well as ways students make sense of ideas. Agendas also allow for pacing variation. Students can have differing amounts of time to make sense of a particular skill or concept. Agendas also facilitate product differentiation by providing time for students to work on long-term products in class where the teacher can monitor and coach their planning, research, quality of thought, and production.

Differentiating how? Agendas allow great flexibility for modifications based on student readiness, interest, and learning profile. Ms. Clayter can form like-readiness or mixed-readiness groups. She can form groups of students whose skills in a particular area lag, or she can form groups with students who have long since mastered basic expectations. She can point individual students toward materials and tasks they will find appropriately challenging. She can vary working conditions and modes through which students can explore and express learning. Students may work either independently or collaboratively. Agendas also enable her to tap into student interests. Agenda time provides a tailor-made chance to have one student work with fractions through music, another with fractions through baseball trading cards, and still another with fractions through stock market reports.

Differentiating why? Ms. Clayter is a relatively new teacher. Her students have shown her a wide range of interests and needs in all subjects, and figuring out how to modify curriculum and instruction in every subject all day long is a bit of a challenge for her. Using agendas allows Ms. Clayter to concentrate her efforts at differentiation during one time of the day and still be effective in addressing a great array of student needs. She finds she can achieve most of the goals of differentiation through agendas, and she does so in a way that makes her planning more manageable at this point in her career than if she tried to differentiate lessons in multiple subjects throughout the day.

Complex Instruction

Complex instruction is a strategy that responds to the sorts of academic ranges that frequently exist in classrooms that are academically, culturally, and linguistically heterogeneous (Cohen, 1994; Watanabe, 2012). Its goal is to establish equity of learning opportunity for all students in the context of intellectually challenging materials and through the use of small instructional groups. Like most promising classroom approaches, complex instruction is itself complex, and it requires considerable reflection and planning. The payoff, however, can be immense. It helps establish a classroom in which the contributions of every individual are prized by all, and high-level instruction is standard fare for all learners.

Complex instruction tasks

- Require students to work together in small, heterogeneous groups;
- Are designed to draw upon the intellectual strengths of each student in the group;
- Are open-ended;
- Are intrinsically interesting to students;
- Allow for a variety of solutions and solution routes;
- Involve real objects;
- Provide materials and instructions in multiple languages (if students in the class represent varied language groups);
- Integrate reading and writing in ways that make them an important means to accomplishing a desirable goal;
- Draw upon multiple abilities in a real-world way;
- Use multimedia; and
- Require many different talents in order to be completed adequately.

An effective complex instruction task *does not*

- Have a single right answer;
- Allow for completion more efficiently by one or two students than by the whole group;
- Reflect low-level thinking; or
- Involve simple memorization of routine learning.

Teachers who use complex instruction move among groups as they work, asking students questions about the work, probing their thinking,

and facilitating understanding. Over time, teachers also delegate increasing authority for learning to students. They then support students in developing the skills needed to manage the authority well.

Two additional—and vital—teacher roles are discovering students' intellectual strengths and "assignment of status." Cohen (1994) reflects that traditional cooperative groups often fail because students know who is "good at school" and who is not. Those who are good are given (or take) responsibility for successful completion of group tasks. Those who are not "good at school" relinquish (or have taken from them) responsibility for successful completion of academic tasks. This, says Cohen, stems from the fact that many school tasks are highly dependent on encoding, decoding, computation, and memorization. Those things become synonymous with school success in the minds of students as well as teachers.

Complex instruction seeks tasks that call on a much wider range of intellectual skills, such as generating ideas, asking probing questions, representing ideas symbolically, using rhythm to interpret or express ideas, hypothesizing, and planning. Teachers study students continually and systematically to identify individual strengths, then design complex instruction tasks that call upon various student abilities.

In "assignment of status," teachers seek key moments in group work when a student (often one not perceived as "successful" by peers) makes a worthwhile comment or suggestion. The teacher articulates to the group what he heard the student say and why he feels it is a contribution to the work of the whole group. Students begin to see peers in a different light, and they also begin to develop a vocabulary that reflects a wide range of intellectual strengths. Finally, in presenting complex instruction tasks to the class, the teacher leads the students in listing the full range of intellectual tasks required for successful completion of the work. This helps them understand that all students have some of the required strengths but no one has all of them.

Grade 10 English: Complex Instruction

In Ms. McCleary's 10th grade English classes, students have been studying how writers' lives and works intertwine. They have read a variety of types of literature this year, including poetry, and they've looked at writing as "mirror and metaphor." That is, they have explored how a piece of writing can become a metaphor for a larger idea, and they have explored how writing

Figure 7.2 A Sample Complex Instruction Task Card

We have been working with how writers' lives (and ours) are often metaphors, which they (we) create through actions and deeds—including writing. We have also looked at how good authors hold up a mirror to readers, allowing readers to reflect upon their own lives and feelings. Robert Frost wrote a poem called "The Road Not Taken." Your task is to analyze the poem as a metaphor for Frost's life and as a mirror of our own. Here are the steps:

1. Find the poem, read it, interpret it, and reach consensus about what's going on in it and what it means.
2. Research Frost's life, making a "stepping stones" diagram similar to the one you created for your own life earlier this month.
3. Develop a soundscape that takes us along Frost's "journey in the woods." Use music; found sounds; sound effects; and appropriate mime, body sculpture, or narration to help your audience understand the feelings that a "journeyer in the woods" would experience as he or she came to straight places, landmarks, or decision points. Be sure you develop a script for your presentation.
4. Create an "overlay" of Frost's life and the poem, using words and images in such a way that they represent the metaphorical relationship between the two.
5. Transfer the key ideas in the poem to the life and experience of a noted person about whom we are all likely to know a little but could learn a little more. Your "transfer" must clearly draw a relationship between the person and the poem and clearly communicate to classmates how literature can help us understand ourselves.
6. Be certain that your final products demonstrate your understanding of metaphor and mirror, the relationship between varied art forms in communicating human meaning, and details of the people and poem with whom/which you are working.

As usual, you should appoint a group convener, materials monitor, recorder, and time monitor. Determine the best role for each person in your group. Remember, everyone has strengths to contribute to your group's success, and no one has all the strengths needed. Because your time is limited, you should develop a written work plan, including a time line and group conference times. Be ready to share assessment criteria for your group's work (required elements as well as your group's sense of what makes a high-quality presentation). Your group may have up to 20 minutes to make its presentation to one other group plus a 10-minute question exchange with students who serve as your audience and for whom you are an audience.

Orbital Studies

Chris Stevenson (1992, 1997) suggests orbital studies as an ideal way to address both commonalities and differences among middle-level learners. Indeed, the strategy appears easily adapted to learners at all levels. *Orbital studies* are independent investigations, generally of three to six weeks. They

"orbit," or revolve, around some facet of the curriculum. Students select their own topics for orbitals, and they work with guidance and coaching from the teacher to develop more expertise both on the topic and on the process of becoming an independent investigator. Teachers can design rubrics or other criteria for success so that important knowledge, understandings, and skills from course goals are integrated into the orbital products. This allows students to pursue topics that matter to them while seeing how what they learn in class transfers to or connects with a world beyond the classroom.

Orbitals are based on the premise that all learners are dignified by developing and sharing knowledge and skills. This strategy is not unlike the merit badge system in Scouting, except that in orbital studies students develop their own topics rather than select from a prescribed list, and the topics stem from the curriculum. Stevenson (2001) suggests that initial lists of potential topics be derived from surveys of student interest and augmented by suggestions from parents and mentors (or even by perusing the Yellow Pages online or on paper).

Grade 6 (Various Subjects): Orbital Studies

Sixth graders at Hand Middle School like how orbital studies are interesting and help them be independent. Teachers also like orbitals for the way this strategy integrates the curriculum and lets them see learners at work in their areas of strength and interest.

Hand's 6th grade teachers developed a website on orbital studies, explaining to students and their families what an orbital study is, why it is important, how it works, and possible resources. Each teacher reviews the website with students in all classes in the fall, when orbitals begin, and also sends the link to students' families. The website describes general characteristics of an orbital:

- An orbital study focuses on a topic of student interest related to some facet of the curriculum.
- Important learning goals from class will be embedded in the orbital study, including key writing goals.
- A student may work on an orbital study for three to six weeks.
- Teachers help students develop a clear question for study, a plan for research, a method of presentation, and criteria for quality.
- Successfully completing an orbital includes keeping a log of time spent on the study, resources used, ideas and skills gained through the study, and how ideas and skills from class were used in the orbital. In addition,

the student must make a 10- to 20-minute presentation to at least 5 peers, providing a single-page handout or visual presentation for the audience and using some sort of display or demonstration. The student also must develop and use a way to get peer feedback on the content and presentation.

Throughout the year, each teacher on the team works with individuals and small groups to help them select and focus on a topic, keep a log, find and use resource materials (including print, electronic, and human), plan and use time, measure progress against established criteria for success, make effective oral presentations, and distill key ideas for the handout or visual. This is done through mini-workshops with small groups of students who have extra time when a task is completed or via online planning sessions using apps that allow students to work with peers and check in with the teacher outside of the classroom.

All teachers assume responsibility for helping students with planning, research, time management, and presentation, but they also serve as consultants for orbitals in their own areas of interest or expertise. For example, a math teacher may be a science fiction fan, or an English teacher may know a great deal about jazz. Teachers and students alike enjoy the fact that teachers have and can share interests and skills in areas they do not teach.

A student invites a teacher to serve as consultant. Teachers generally will accept the invitation, unless they are already involved in a large number of consultations. In that case, the teacher suggests another option from the team of teachers. All teachers on the team make a special effort to help students see how orbital studies connect what is learned in class to their own talent and interest areas. They also help students see how orbitals can be used to connect various subjects. Students must complete at least one successful orbital study in a year, but may do multiple orbitals. Because the topics are personal and interesting, and because teacher support is abundant, most students keep an orbital study going much of the year.

Here is what's going on right now:

- Takisha is working on a digital "talking mural" of unsung U.S. heroes and heroines, which ties her love of art and portraiture to the study of U.S. history. She is researching little-known male and female heroes of varied races and ages who made a difference for the United States. Her mural will reflect that research. Her flair for the dramatic inspired her to write a script that she will record herself as a soundtrack for the digital mural.

- Semaj is building a rocket, which calls on him to extend his knowledge of both science and math. It also lets him use his hands in the process, an opportunity he finds too infrequently in school.
- Jake and Ellie are creating a comic book that incorporates the key elements of literature. They are developing a science fiction plot they'd like to see in literature in school.
- Lexie is working on her tennis game at a park near her house. This extension of physical education is allowing her to learn from an 8th grader who volunteered to help her improve her serve and strokes. The lessons are video recorded by a couple of her friends and her dad. Throughout the process, she compares her videos with those of professionals (provided by her physical education teacher). She ultimately will share what she has learned with peers also interested in tennis.
- David, who is passionate about soccer, is learning about countries that have been World Cup soccer champions, an extension of his studies of geography and culture.
- Louis is studying ethnic cooking, connecting studies of geography and culture. He also feels it's important to learn to cook so he can entertain friends when he gets older and has his own apartment. In the meantime, he tries out what he learns on his family and friends, and he is developing his own digital cookbook.

Much of the work on orbitals is completed at home. However, there is some time in each subject devoted to working on orbital research and related skills. Students know that when classwork is completed, they may use the extra time to work on their orbital studies. Teachers also work with the school's media specialist and art teacher to provide support and resources for students who may not find those things readily available at home. Every third Friday in one class, students present orbitals they have completed. Peers may sign up to attend a presentation in which they are interested, much like adults select sessions at a conference. All attendees provide feedback for the presenters. Students not attending a presentation may work on their own projects, catch up on missed classwork, or use the time to get peer help with some of their work.

All four of the 6th grade classrooms maintain areas designated and arranged for orbital presentations. Other areas are designated and set up for quiet work done by individuals or in pairs. If a student in the work area does not have a work plan for the class period, the teacher will provide appropriate

work. When there are several orbitals ready for presentation, two classrooms are designated for presentation only, one for individual or paired work, and one for teacher assistance with work in any subject.

Following their reading and review of orbital study presentations, teachers share the summaries with other teachers on the team. The team makes a concerted effort to connect what students are learning about in their orbital studies with what they continue to learn in class. When teachers miss an opportunity—or sometimes before they seize it—students often remind them of the connections. Many of the orbital presentations are captured on video so that students in subsequent years can use them as idea generators or models of quality.

Differentiating what? Orbital studies allow differentiation of content (because students select their own topics and research materials), process (because students develop their own study plans), and product (because students can select from a wide range of options about how to express their learning). In orbital studies, content, process, and product are differentiated by student choice rather than by teacher choice. Teachers, however, play an active role in coaching students for success in understanding, preparation, and presentation and in ensuring that students apply essential content goals in their orbital work.

Differentiating how? Orbitals focus on differentiation by student interest (because of topic choice and mode of expressing learning) and learning profile (because of the opportunity to determine working conditions and/or intelligence preference). Again, the teacher assumes a key role in monitoring student choices and progress and coaching for high-quality outcomes.

Differentiating why? Students are energized by school and the learning process when it belongs to them and when they can shine in what they love to do. Orbitals allow students to exercise choice in what to study and how to share what they learn and to transfer important ideas and skills from their classes into other domains. Orbitals also provide teachers a systematic way to help young learners become more independent in their learning.

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Craftsmen, whether professional or amateur, remind us that choosing the right tool for a job makes a powerful difference in the product outcome. Selecting the right instructional strategies in the classroom likewise impacts the quality of the learning experience the teacher will provide to students.

It is important to match the strategy to the requirements of the curriculum and the needs of the learner and to know whether the goal is to differentiate content, process, or product. It matters that teachers know when it makes sense to respond to learners' readiness, interest, or approach to learning and that they grasp why a particular approach will benefit the learning of particular students.

think about what a cathedral is and what it reveals about the people and the time it represents.

Differentiating how? Interest and learning profile are the predominant emphases of differentiation. Students can select the investigation that seems most intriguing to them, specialize in an area of intelligence preference, select working conditions, and make many choices about how to express what they learn. The teacher supports some readiness differentiation by initially providing resource materials at a range of reading levels.

Differentiating why? By introducing a topic of study through various intelligence- and interest-based lenses, Ms. Boutchard taps into student strengths and prior experiences. Thus, she enhances motivation, success, and understanding of the same subject among students whose learning profiles and interests differ in important ways. Despite the different modes of learning, however, each student comes away from the entry point investigations with some common understandings of the time period and people of the Middle Ages. This will help them connect and make sense of facts, concepts, and principles in the rest of the unit.

Tiered Activities

Tiered activities are useful when a teacher wants to ensure that students with different degrees of learning proficiency work with the same essential ideas and use the same key knowledge and skills. In other words, tiering is a readiness-based strategy. For example, a student who struggles with reading or has a difficult time with abstract thinking nonetheless needs to make sense of the pivotal concepts and principles in a given article or story. A student who is advanced well beyond grade expectations in that same subject needs to find genuine challenge in working with the same key content. A one-size-fits-all activity is unlikely to help either struggling or grade-level learners come to own important ideas, nor will it extend the understanding of students with great knowledge and skill in the area.

Using tiered activities allows all students to focus on essential knowledge, understandings, and skills, but at different levels of complexity, abstractness, open-endedness, and independence. By keeping the focus of the activity the same but providing routes of access at varying degrees of difficulty, the teacher maximizes the likelihood that each student comes away with pivotal skills and understandings and all students are appropriately challenged.

Here are the steps for developing a tiered activity (see also Figure 8.5).

1. Select the knowledge, understandings (concepts, generalizations), and skills that will be the focus of the activity for all learners. These are the elements the teacher knows are essential to helping students build a framework of meaning.

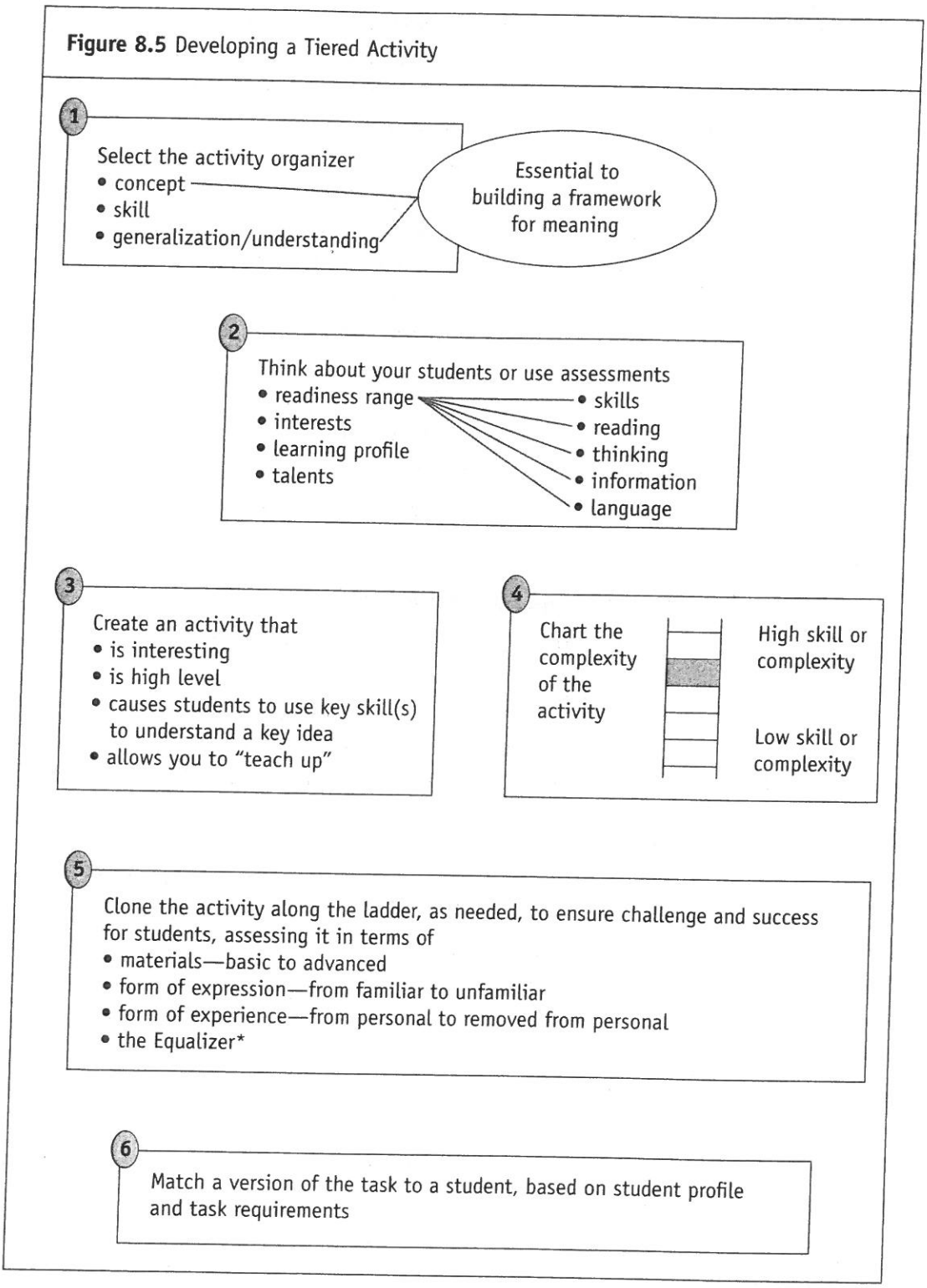
2. Think about the students for whom you are planning the activity. Use formative assessment (e.g., exit cards, journal entries, homework, class activities) related to the upcoming lesson to help you understand students' range of readiness for the topic. Add to that your awareness of students' particular strengths, approaches to learning, and interests. This need not be an involved process. Think of it as an outgrowth of persistent formative assessment and informal study of students.

3. Create an activity, or draw on one you've successfully used in the past. It should be interesting, require high-level thought, and clearly focus on elements that will cause students to use key skills to understand a key idea. Although you may begin planning at any number of starting points, it's wise to begin by creating an advanced task. "Teaching up" is far more likely to benefit a very broad range of students than is beginning with a more basic-level task and making adjustments from that point. When you design an assignment for advanced students first and then create versions of the task with varied degrees of scaffolding to support other students, you're more likely to provide all students with a rich, complex learning experience that's focused on meaning-making and understanding.

4. Chart the complexity of the activity. Think about, or actually draw, a ladder. The top rung represents students with very high skill and high complexity of understanding of the topic. The bottom rung represents students with low skill and low complexity of understanding of the topic. Where would your lesson be on the ladder? In other words, will it really stretch your most advanced students? Is it likely to challenge grade-level students or only those whose skills and understanding are currently at a more fundamental level? Once you visualize this kind of ladder, you can see who needs another version of the lesson. Again, "teaching up" is the most promising approach to tiering.

5. "Clone" the activity along the ladder to provide different versions at different degrees of difficulty. There is no magic number of versions.

Figure 8.5 Developing a Tiered Activity



* See the Appendix, p. 185

the approach they found most interesting. Students felt free to work in a way that seemed fun or intriguing, and they benefited from sharing their experiences both with peers who selected the same approach and with peers who elected to work in the other two ways.

Other Strategies That Invite Differentiation

A myriad of instructional and management strategies invite teachers to break classes into smaller learning units. Although all units call for whole-class learning, at times subdividing the class based on students' readiness, interests, and approaches to learning enables the teacher to think about variation in student needs. These groupings should ensure that all students work with engaging, high-level tasks focused squarely on essential content and that they work regularly with a wide variety of peers.

The following are just a few of the many strategies that invite differentiation. Add your own favorite strategies to the list. This list should be endless; it should grow as we become more expert at creating academically responsive classrooms. In fact, it's often the case that the strategies teachers invent are better suited to their students and content areas than the strategies they borrow from other sources.

Small-Group Instruction

A powerful strategy for addressing students' varied learning needs is the use of small groups for teaching, practice, or discussion. When a teacher's classroom observations and formative assessment indicate that some students are lagging behind in key content proficiency, lack prerequisite content, have misunderstandings about how the content works, or are advanced with essential content, small-group instruction provides a simple and direct way to reteach, review, provide focused and supervised practice, clarify misunderstandings, or extend student proficiency. Small groups are also useful in making interest-based connections with essential knowledge, understanding, and skill.

Some students simply learn better and participate more actively in small, teacher-led groups than in the class as a whole. Use of small groups can also be a helpful source of formative assessment for the teacher. Small-group sessions don't need to be long, but they need to be focused on the next steps in learning for particular students so that students are able to move ahead in

their knowledge, understanding, and skill more effectively and efficiently as a result of their participation in the small-group setting. It's also important for students who are not in the small-group setting at a given time to know how to work productively on meaningful work while the teacher is occupied with others, including how to get help when the teacher is not available and what to do if they complete their work before the class reconvenes.

Compacting

Compacting, or *curriculum compacting* (Reis, Burns, & Renzulli, 1992), encourages teachers to assess students before beginning a unit of study or development of a skill. Students who do well on the pre-assessment (getting as much as three-quarters correct) should not have to continue to work on what they already know. With three-stage compacting, teachers document (1) what students already know (and evidence for that conclusion), (2) what the pre-assessment indicates students do not know about the topic or skill (and plans for how they will learn those things), and (3) a plan for meaningful and challenging use of the time students will "buy" because they already know much of the topic or skill. Compacting begins with a focus on student readiness and ends with an emphasis on student interest.

Choice Boards

Choice boards are well suited to dealing with readiness and interest differences among students. Teachers place changing assignments in permanent pockets on choice boards; by asking a student to make a work selection from a particular row, the teacher targets work toward student need and at the same time allows student choice. For young nonreaders, cards can be coded with icons or colors. For older students, the cards may use words to designate a task or area of the room. In either case, full instructions for the task are given at the place the student works, not on the choice board itself. Put another way, the choice board simply allows the teacher to "direct traffic."

Literature and Discussion Circles

Literature circles (Daniels, 2002) are a student-centered approach to discussing fiction in which students meet in small groups to talk about what they are reading. This strategy is designed to enhance student understanding of the piece of literature; to develop skills in the areas of comprehension, text analysis, and oral expression; and to shift leadership of meaningful discussions

from teacher to students. Typically, students select the books they will read and discuss, so books and discussions will vary across groups. Each student plays a key role (e.g., discussion facilitator, summarizer, connector, vocabulary builder, text finder) in the literature circle, and roles rotate within a circle over a period of time. Students receive descriptions of role expectations and parameters for the discussions. The idea of literature circles is easily adaptable to any subject area or kind of text. It is flexible; teachers can assign texts or allow student choice of texts (although choice is an important aspect of the original conception), rotate roles or assign roles based on student interests and strengths, and so on.

Jigsaw

Jigsaw (www.jigsaw.org) is a three-stage collaborative strategy:

1. The teacher introduces students to a topic or idea the Jigsaw groups will explore and establishes the working directions and conditions for the groups, so that students will know what they will need to do for the Jigsaw to succeed.

2. Students meet in "home base" groups where they examine directions and materials for the upcoming task; groups will work together as a team to learn about the aspects of the topic assigned to them. Each group should have roughly the same number of students, and the overall task needs to have as many parts as there are students in the group. (If some groups have an additional member, then two members of that group work with the same topic.) Once students in the home base groups are clear on their goals and work, they divide into "expert groups" (or "study groups"). In the expert groups, students use print, video, or electronic resources to find out about their topic or question. Members of an expert group ultimately discuss what they have learned, sharing information and insights so that each member benefits from the work of other members as well as from his or her own work.

3. Students in the expert groups return to their home base groups and share what they have learned with peers who have learned about other aspects of the topic. It's often helpful for students to have mechanisms for recording, organizing, and reflecting on what they learn from their own work as well as that of their peers and for the teacher to follow with a class discussion that formalizes and solidifies important information and ideas.

Jigsaw allows for differentiation in response to readiness by varying resources based on student language or reading level and assigning topics by

complexity. It allows for differentiation by interest by making it possible for students to work in expert groups based on aspects of the topic that are most relevant or appealing to them. Jigsaw working conditions allow for individual as well as collaborative work.

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Some instructional strategies are quite flexible and can address a variety of both content and student needs. For example, learning contracts can help teachers address student readiness, interest, or learning profile, and that can be useful in differentiating content, process, or product. Some other strategies serve a more specialized function. Concept attainment, for instance, is most likely to help teachers address readiness needs for students who do not already have a grasp of the content it introduces. Some instructional strategies—for example, small-group instruction or mini-workshops—are classroom workhorses that require minimal teacher preparation time and can be used often to benefit learning. Others—for example, orbital studies, independent studies, or entry points—lend themselves to occasional use and often necessitate more extended teacher preparation. A goal of the teacher over time should be to develop an extensive tool kit of strategies that facilitate teaching and enhance learning at any point in a learning cycle.