Summary of Behavior Terms and Guidelines, and Application to Classroom Behavior.

And an Introduction to the Five Phases of Mastery

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 This chapter focuses on

* *Cues to participate*--models, requests, questions, pointing, classroom materials.

“Everyone, watch as I solve this problem.” “Listen to these examples of alliteration.”

“Your turn to read this paragraph.” “Let’s identify the features of this muscle cell.”

* *Reinforcement* for improvements in desirable behavior.

“Yes! Everyone watched me solve this problem. That’s how to learn! Free time!”

* Work on the *five phases of mastery* (five ways that knowledge can improve): *acquisition* of new knowledge (“Here’s the definition of equilibrium.”); *generalization* (“These examples are the same.”) and *discrimination* (“These examples are different.”); *fluency* (quick and smooth use of knowledge); *integration of elements* (for instance, math operations, facts) into wholes (routines such as solving equations, descriptions); and *maintenance* (retaining skill and fluency over time and new learning).

Table 4.1 lists tools for helping students to improve academic skills/knowledge and classroom behavior. <Insert table 4.1 near here.>

 Table 4.1. Tools for Helping Students to Improve Academic Knowledge and Classroom Behavior

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| --- | --- | --- |
| Antecedents. Events (cues) that come before behavior, and that suggest the smart thing to do. These include: | Behavior in Response to Antecedents  | Contingencies of Reinforcement. Connections between behavior and its consequences. The nervous system learns these as *rule relationships* (Do X, and Y happens), which teach a person whether it’s smart to keep doing that behavior.  |
| *Discriminative* stimuli, or Sds.“I’m thirsty” (a setting event). See soda machine. Put money in the slot. Get soda.[How did the sight of the machine become a cue for putting money in the slot?]*S-deltas.* See soda machine that has a stuck can. “I’m not putting money in that!” How did the sight of the machine become an S-delta for not putting money in the slot? *Setting events of two kinds.* Affect how strong Sds and consequences are for us at the moment, and therefore affect what we will do. a. *Establishing (motivating) operations.* Thirsty, hungry, bored, full of energy, happy. Teacher is happy, classroom atmosphere is warm, tasks are engaging. At the same time, we (want, would like) free time, praise, snacks, or exciting activity. And so, *we do the behaviors that we have learned will get these*.“I’m so thirsty that I’ll try the soda machine with the stuck can!”b. *Abolishing (demotivating) operations.*We are tired, unhappy, stressed out, teacher is grumpy, tasks are too hard or boring, the classroom atmosphere is cold—and so we are not inclined to do anything (but to escape and avoid). Or, we’ve had enough food, music, play time, or videos for the moment, and so we are *not inclined* to do the behaviors that get what we don’t want.  | Behavior is movements. It is observable. We can improve *how* we do behavior (that is, use knowledge) in several ways. We can1. *Acquire new knowledge/behavior.* That is, do it with more skill, fewer errors, more often, more independently, for a longer time, with the proper intensity.2. *Apply* (*generalize*) knowledge to more examples, and distinguish (*discriminate between*) examples and nonexamples.3. Become *fluent*; that is, use knowledge quickly, smoothly, easily. 4. *Combine (integrate) knowledge* (such as counting, addition, and subtraction) into larger wholes, such as the long division routine. 5. *Maintain knowledge*; that is, remain skillful and fluent over time and despite acquiring new (interfering?) knowledge.We work on these improvements during *phases of instruction.* | *Positive reinforcement.* Behavior is followed by a satisfying event--success, smiles, praise, free time, the door opens when you pull with enough force, the nail goes in when you hammer straight down. So, we do that behavior again.*Negative reinforcement.* Behavior enables us to escape, avoid, delay, reduce the intensity (painfulness) of, or to shorten aversive events, and so we do the effective behavior more often.*Positive punishment.* Behavior is followed by (for us) aversive events (hammer hits finger, fall when walking on ice, receive rebuke), and so we do that behavior less often---especially if we do *alternativ*e behaviors that *do have* satisfying (reinforcing) results.*Negative punishment*. Behavior is followed by losing (what are for us) positive reinforcers (a fine, no recess, less dessert, lose a relationship), and we do that behavior less often, especially if we do alternative behaviors that have satisfying results. *Response cost* is an example. “Class. You were so noisy during the video. Five minutes less free time. But we’ll try again in a little while.”*Neutral consequences. Extinction.* Nothing much happens. Flip the switch; the light does not go on. Work hard on a problem; teacher does not notice. Work hard but can’t figure it out. Say, “Howdy!” and get a blank stare back. We *might repeat unreinforced behavior* (especially if it used to be reinforced), but we will give up and do another that is more likely to be reinforced. *Noncontingent Reinforcement.* The teacher occasionally hands out or provides reinforcing events “for free.” “You’re a great bunch of kids!” “Cookie time!” “Music video.”\* \* \* \* \* \*Remember, s*etting events* affect how strong the above consequences are at the moment. A person whose desirable behaviors are seldom reinforced, will be strongly reinforced by praise and success.A person who lives in a harsh environment may not be much affected by more “punishment.” See citations in the Reference section. |

Ruby Rose Uses Our Tools

 Come September, Ruby Rose will be teaching a fifth graders at Dancing Coyotes (Coyotes Bailando) Elementary School. Classroom behavior and achievement are problematic. The current teacher says, “These kids don’t want to learn. They won’t stay on task. I tell them over and over, “Listen up!”; “Settle down”; “Look at this map.” But they don’t. Their disruptive behaviors are so stressful!” Ms. Rose observes the class. She takes notes. Building on behavior principles (See the reference section), Ms. Rose uses table 4.1 to improve classroom behavior (engagement and learning) and academic knowledge (the result). Here is how.

Ms. Rose Identifies Targets for Improvement

 Ms. Rose lists *classroom behaviors* and *academic knowledge* to improve, and the *ways* these targets can be improved, as shown in the middle column of table 4.1.

*Some Targets for the Class*

1. Increase vocabulary: say, read, write, and define concepts from readings. Increase both the *size* of vocabulary and *how often* students use new concepts/names. See chapters 10 and 11.

2. Say and follow classroom rules (taught with Model-Lead-Test/check-Verification, chapter 5, and below, and practiced every day) about raising hands rather than talking out; putting away coats and book bags; coming quickly to tables or desks; sitting tall, rather than slouching and talking; speaking with indoor voices; cooperating with requests; paying attention to classroom activities; and “working”/learning steadily. She writes the rules-behaviors on the board *permanently—*as cues (Sds) for desirable behavior. See chapter 9, on learning readiness.

 We’ll mention the Model (I do)-Lead (We do)-Test/check (You do)-Verification (“Yes, you got it!”) format several times in this chapter. Here’s what it looks like. (And see chapter 5.)

*Gain attention.* “Everybody sitting tall ready to learn?... Calm hands? Quiet voices? Looking at your wonderful teacher?... Yes, now we’re ready.”

*Frame instruction.* “Here’s a new letter. When I touch under it, I’ll say its sound.”

*Model.* “Listen, fffff…. Again, fffff.”

*Lead.* “Now when I touch under this letter, we’ll say the sound *together*. Get ready.” (touches)… *ffff…*

“Again.”… *ffff.*

*Test-check.* “Your turn. When I touch under this letter, you say its sound. Get ready.”… *fff*

*Verification.* “Yes, ffff. You said its sound! You’re learning to read!”

3. Increase fluency (accuracy, speed, and ease) at reading sentences and doing math problems.

4. Teach and practice doing knowledge analysis (identify and make a table of concepts, facts, rule relationships, and routines) in text and in Nature. See chapter 1 for a reminder.

*Some Targets for Students*

For Jimmy Flashman. Replace talking out with an *alternative behavior--*raising hand. At first, reinforce every time (*continuous schedule*) and immediately with smiles, approval (“Raising your hand! That’s what I love to see, Jimmy.”), and occasional “surprises” (magazines on motor cycles).

For Rebba McToodle. Increase “steady learning” at reading and math from 10 to 15 minutes. Reinforce with selected activity.

For Bailey, Rodney, Laurie, and Sydney. Increase reading fluency from 100 words correct per minute to 130 correct per minute by November.

 Now that Ms. Rose knows some targets to work on,…

Ms. Rose Makes Sure That the Classroom is an Establishing Operation That Increases Motivation to Learn

 The current teacher’s classroom is not an establishing (motivating) setting (table 4.1). It is the opposite---an abolishing (demotivating) setting. Requests, wall posters, “praise,” activities, desks, and the teacher’s voice and presence do not attract students and make them feel comfortable. Instead, noise, clutter, the presence of the teacher, too-difficult tasks, too little success, too much nagging and threatening---these are *aversive events* to which students are motivated to escape and avoid. No one is to blame. We can’t say, “It’s the kids’ fault!” Or, “The teacher did it!” No, it is a vicious circle. Ms. Rose will break the circle. Here’s how.

*Ms. Rose Replaces Conflict with Mutual Reward Interaction*

 The current teacher and her students are stuck in interaction traps. Instead of mutual reward, which looks like this….

“Okay, class…let’s start reading about dinosaurs.” … *Okay… Yeah…* “I love how you got started so fast.”…. *We like to read…*

… it’s mutual conflict.

“Okay, class…let’s start reading about dinosaurs.” … *Baloney… I hate reading….* “Start reading now!”…. *Ha ha, now she’s mad….* “Okay, no music.”… *Who cares…. At least I’m not reading.*

Ms. Rose saw the following pattern many times during her observations.

*Uncooperative Behavior*

 Over and over, the teacher made a request. “Watch my demonstration.” “Everyone listen.” “Quiet voices.” “Open your books.” “Now let’s start on these problems.” “Jenny, your turn to read the next paragraph.” In response,

* The class, or individual students, did not cooperate. They dawdled, grumbled (“Not again!” “We already did that?”), refused (continued talking; dropped their workbooks on the floor; said, “No!”), or they began but soon start talking, staring out the window, or drumming on their desks.
* Their teacher repeated the request (and students repeated not cooperating), got angry (“What’s the matter with you people?”), threatened and punished (“Okay, no free time!”), or simply dropped the request (“We’ll come back to this later.”)
* The teacher’s reactions *reinforced (strengthened) noncooperation* and other undesirable behaviors. So, students did these behaviors (and their teacher continued to reinforce these behaviors) more often. Why?! She did not know what else to do, and was too stressed to think about it. She simply reacted!

*Other Undesirable Behaviors*

Students often talked out, talked to each other, made jokes, bothered other students, made noises, whined and complained, got out of their seats, told jokes, stared out the window, threw paper wads, or dropped materials on the floor---behaviors that prevented engagement and learning. Why? To escape or avoid aversive activities; to gain attention; to provoke their teacher; or out of boredom. The Reader can probably add more.

* The teacher tried to get students to stop by staring at them (as if to say, “I see and I do not approve!”), requesting, ordering, threatening punishment (“No recess!”), or promising goodies if the students “Settle down and pay attention.”
* However, these reactions reinforced the very behaviors that Teacher did not like.
* As unproductive (conflict) interactions increased, students learned less, which increased the teacher’s stress, and so the teacher became even less likely to notice or reinforce desirable behaviors. The class was stuck. They would have to restart their relationship. Ms. Rose shows how she will do it.

*Mutual Reward Interaction*

 Ms. Rose uses Model-Lead-Test/check-Verification (chapter 5) to teach classroom behavior rules, listed above. She has a permanent list of these rules on the board. Instead of being tense all the time, knowing that students will soon engage in undesirable behavior,….

* *Ms. Rose is on the look-out for just about any desirable behaviors* (students are quiet, steadily doing tasks even for a short time, raising hands, following requests, attending to classroom activities), and she responds enthusiastically. This is called *Differential reinforcement of other behavior* (Cooper, Heron, & Heward, 2020). By no longer reinforcing undesirable behavior, and by frequently reinforcing a wide variety of desirable behavior, Ms. Rose teaches students *many ways* to gain her attention, approval, smiles, and surprises. The more they do these “other” behaviors (and receive gratifying results), they less incentive they have to engage in undesirable ones (which Ms. Rose will no longer reinforce, anyway).
* Ms. Rose will also *differentially reinforce* (a narrower range) *of alternative* behaviors; for instance, hand raising (as an alternative to talking out); attending to classroom activities (as an alternative to staring out the window); and smiling and using a pleasant tone of voice (rather than sounding as if “I don’t care,” while “wearing” a sullen expression).
* And Ms. Rose will *differentially reinforce* (an even narrower range of) *incompatible behavior*; for example, Jenny Pennypacker and Billy Shiner will squeeze a rubber ball when they are tense, instead of drumming on their desks with pencils or fingers; Stan Spade will come to Ms. Rose on the playground and ask for help with the equipment, rather than throwing a tantrum; and Rory Lyon will ask and answers questions (rather than being silent or sullen). See the reference section for Cooper, Heron, & Heward, 2020; Vollmer, Peters, Kronfli, Lloveras, & Ibañez, 2020; Flynn & Lo, 2016; Iannaccone, Hagopian, Javed, Borrero, & Zarcone, 2020; Holden, 2005; and Coy & Kostewicz, 2018.
* Ms. Rose will respond enthusiastically and quickly (to the whole class and to individuals) so that it is obvious that she cares about their desirable behavior. She will smile, nod, give specific praise (“I love the way you are all working steadily.”), make it personal (“You…are smart students… make good choices…. are learning a lot now.”), and vary her words. She put *stars or smiley faces next to the rules-behaviors listed on the board* when the class is quiet, attending, cooperating, and working steadily. “When we get 20 smileys, we’ll see a video of your choice.”

 At first, Ms. Rose will verbally reinforce desirable behavior of the class and individuals *immediately* and just about *every time* (*continuous schedule*). She wants students to *feel the contrast* between the way things were (rare praise and lots of anger from the teacher) and now (the exact opposite). “Gee this is different. It feels good here.” Here are examples. Every time…

* Terry raises his hand instead of calling out.
* Students take their seats faster.
* The group sits tall and calmly when she says, “Get ready to learn” (chapter 9).
* Ned opens his book when asked (because he usually ignores the request).
* The class reads a word correctly from a list on the board. “Yes, prepare! That’s a hard word.”
* The class more completely cleans areas in the classroom. “Yes, the counters are so shiny!!! You are the best cleaner-uppers!”
* Students listen attentively for slightly longer as she reads text to them.
* Jeff raises his hand instead of getting angry when he can’t read a word.
* Stan does five problems (he usually quits at three).

 As desirable behaviors increase, Ms. Rose will *slowly* reinforce less and less often, on a *variable schedule* (once in a while but still pretty often). And the class will get surprise treats, free time, music, and videos when they earn enough smileys.

 At the same time, *Ms. Rose will not react to (accidentally reinforce) undesirable behavior*. She will not stare, act surprised, disappointed, or angry, threaten, punish, repeat herself, or stop an activity. Instead, she will treat undesirable behavior as a *simple error*, rather than as an expression of students’ character. She will handle errors as shown in chapter 8. She will

* Help students to avoid errors with *pre-corrections*, such as reminding students of the rules. “If we are stuck on a problem, do we get angry or do we raise a hand for help? Read the rule on the board.” “Remember, if you are getting tense, squeeze your rubber stress ball…. Got it?... Are we working together?”… *Got it, Ms. Rose.*
* *Correct errors with Model-Retest*. Jimmy Bucket is having trouble with a problem, and starts making noises as he used to do. Ms. Rose will say, “Jimmy. What do we do when we are stuck?... Look at our rules on the board.”… *Raise our hand…* “Correct… Do it.” [His hand goes up.]… “Yes, Jimmy, that’s what I like to see. How can I help you?”
* If needed, Ms. Rose will *reteach* the rule and how to act accordingly, with Model-Lead-Test/check-Verification. “It looks like we’ve forgotten how to come into class, put away our stuff, come to our seats, and show that we are ready to learn. Let’s practice….. Yes!! Now that’s what I call excellent students. Fast and cooperative.”

 Ms. Rose knows that *ignoring alone only results in students trying harder* (escalating) to gain attention or to escape and avoid learning, because they don’t know what else to do. This is called an *extinction burst* (Cooper, Heron, & Heward, 2020). However, students will eventually do unreinforced undesirable behaviors less and less—*if desirable behaviors are reinforced* quickly, often, and with valued reinforcers. Students will experience the contrast between which behaviors have satisfying results and which no longer do.

Since students are beginning to like and trust Ms. Rose, they will be motivated to do more behaviors that please her.

 *What do we learn from Ms. Rose’s work to rebuild a class?* She made it a motivating setting by replacing conflict with mutual reward interaction, and by frequently reinforcing almost any desirable (especially classroom) behaviors. However, it would be much better if students (the previous year) had learned essential Learning Readiness skills from the beginning--such as “sitting tall, ready to learn”; taking turns; and the inquire-discover routine. We work on Learning Readiness in chapter 9. Feel free to take a look.

More Things to Make the Classroom an Establishing (Motivating) Setting

 Ms. Rose makes the classroom a place where student want to be, so that tasks, “rewards,” Ms. Rose herself, and her communications have high value. Here is how.

1. The classroom is orderly. Materials are handy and organized.

2. The lighting is neither too bright nor too dark.

3. Calming music to start the day and during certain tasks.

4. Noise is minimized.

5. Students have enough personal space; for example, at tables and desks.

6. Ms. Rose communicates liking, appreciation, acceptance, and respect for students. She smiles, winks at students, stands close to students for whom this is comforting, gives specific, affirming praise. “You tried hard and you got it. You are persistent!”

7. Lessons on new or harder tasks are short at first.

8. Activities are energizing and challenging. For instance,

* *Fluency sprints*. “Let’s see if you can solve 20 multiplication problems is 5 minutes!”
* *Competitions* among classroom groups (math, defining concepts, spelling words, identifying examples, writing stories), with winners earning extra recess time.
* *Speed cleaning* the classroom.
* *Project-based learning*. For example, (1) building simple birdhouses with pre-cut wood, and integrating measurement and math; (2) collecting plants from home and school yard, identifying their species and parts, describing their life cycles, and pasting these into scrapbooks. See Larmer & Mergendoller, 2010; Condliffe, 2017; Krajcik & Blumenfeld, 2006; Kokotsaki, Menzies, & Wiggins, 2016.

9. Students have some control over activities.

“How many (words can we define, problems can we solve, minutes can we work on…) with lots of energy?” “What are some activities we can earn for doing our (fluency sprints, 20 problems, reading our story)?”

10. All students have a valued “place,” membership, and identity in the classroom, as indicated by being welcomed to the class and to activities, “jobs,” compassion, praise and acknowledgement of effort and success, and correction and protection when students tease or bully.

11. Occasional *noncontingent reinforcement—*snacks, free time, music—that tell students, “Ms. Rose really likes us” (Coy & Kostewicz, 2018).

12. *Telling students which behaviors receive which reinforcers.* For example, “When we do X, we (earn, get to enjoy) Y.” Ms. Rose will make sure that *students do a little of a less-preferred behavior* (solve 15 math problems) *followed by a more-preferred behavior*, such as free time, talk-to-your-neighbor time, popcorn time, longer recess, new video games. Doing the more-preferred behavior reinforces doing the less-preferred behavior. This is the “Premack Principle” (Premack, 1965). We call it “Grandma’s Law” (Homme, 1967), as in “As soon as (you, we) eat a few Brussels Sprouts (*Oh no!*), you can have a big slice of Granny’s apple pie.” *Well, okay, Granny!*

Do 10 problems.

Work on our projects for 30 minutes.

Clean up this side of the room.

Do our fluency sprints.

Do our morning exercises.

Identify 10 figures of speech in today’s poem.

See Homme, deBaca, Devine, Steinhorst, & Rickert, 1963; Premack, 1965; Hosie, Gentile, & Carroll, 1974; Geiger, 1996; and Herrod, Snyder, Hart, Frantz, & Ayres, 2023.

13. *Reduce aversive events*. Students used to engage in behaviors to escape from, avoid, reduce the duration of, and reduce the intensity of classroom activities that were too hard, too long, and uninteresting. So, Ms. Rose will:

* *List* activities that some students or the class finds aversive.
* *Discuss* this, and work towards an *agreement*. “It looks like some math problems are (too hard, no fun at all). How can we make it better? Do fewer problems?... Shorter lessons?... More reinforcement?... More graphic organizers?” See Grandma’s Law, above. Also see, Biddle, 2013; Lemov, 2021.

14. *Eliminate positive punishment.* Here, behavior is followed by aversive events--to teach students not to do the behavior or else it will hurt. This is “aversive control” (Huesmann & Podolski, 2013; Hutchinson, 2022). We find it in prisons, abusive relationships, and in classrooms where students’ problem behaviors are high, desirable are behaviors low, and teachers are trying (unsuccessfully) to establish control and order. Punishment can be useful in reducing certain behaviors, such as self-injury (Erturk, Machalicek, & Drew, 2018; Manente & LaRue, 2017; Shawler, Russo, Hilton, Kahng, Davis, & Dorsey, 2019). However, delivering pain to “make students behave” is immoral, unnecessary, doesn’t work if students are used to an aversive environment, and probably illegal. Positive reinforcement of desirable behavior is the way to go.

15. *Limit negative punishment.* One mild, *temporary*, and useful form of negative punishment is *response cost*, in which positive reinforcers (play time, snacks) are removed or delayed as a consequence of undesirable behavior (pestering another student, not cleaning up after a task). See Cooper, Heron, & Heward, 2020; Forman, 1980; and Sheppard, 1971. Also see research on “logical consequences” and “natural consequences” (Driekurs, 1957; Robichaud, Lessard, Labelle, & Mageau, 2020). However, it is proper to request, model, and positively reinforce even small improvements in desirable behavior—especially if you are using response cost. Otherwise, students have no alternative behaviors!

16. *Associate positive reinforcers with things that are neutral.* Snacks, stories, video time, play, and independent reading are reinforcers (students do things to get these). Therefore, Ms. Rose will deliver praise, smiles, a shoulder pat, a ticket (to the play area), checkmarks or a token (five are needed to watch a video) *right before* students get the known reinforcer. This way, neutral events *may become conditioned (learned) positive reinforcers themselves* (Cooper, Heron, & Heward, 2020)*.* Why? Because *they signal or predict reinforcement to come*. Doing this doubles the number of things that are positive reinforcers for students.

17. *Shaping* means *reinforcing small improvements in how a person or class does a behavior*,listed on table 4.1 (Cooper, Heron, & Heward, 2020). Ms. Rose won’t wait until students do a behavior perfectly—all the right steps, for long enough, fast enough, with nice effort, and in the right places---before she reinforces. There would be so many unreinforced tries that students would give up.

 So, Ms. Rose will *quickly reinforce small improvements.* For instance,

* “I love the way you read two (and later more) sentences by yourself!”
* “You are reading the problem first! [One step in the math routine.] That’s a good way to learn.”
* “I love the way you are sitting so tall [after three minutes into the lesson], ready to learn.” [The group usually slouches after two minutes.]
* “Great clean-up work, class. You picked up more trash than yesterday. We are a terrific clean-up crew!”
* “Yesterday, we did 15 math problems correctly. Today, the group is up to 18. Or goal is 25. We’re almost there! 15 minutes of computer games for you!”

18. *Ms. Rose will teach students to respond to important antecedent events as cues, or Sd’s.* In other words, she will make some events meaningful, significant, important. Ms. Rose will turn the room, her entry, requests, areas, desks and tables, posters, materials, the announcement of next tasks, (and other things and events) into cues (Sd’s) that “set the occasion” for students to attend, focus, engage, cooperate, read, and solve problems. How? Two ways.

* By teaching students *what to do* in response to events that she wants to become Sd’s. For example, with Model-Lead-Test/check-Verification (as shown in chapter 5, and 9-14).

“Boys and girls, when I stand in front of the board say, ‘Show me ready,’ that means let’s get ready to learn. So, we quiet down, sit tall, and look at me…. Okay, here I am. Show me ready!”

“See the rules written on the board?... *Yup… You bet*… They tell us how to behave in our wonderful class. Each morning, we will read our glorious rules… Let’s practice! Read!”

“Our books are not just paper and cardboard. They are full of knowledge to make us smart. When you take out your books, or when you see me take out our books, we will say to ourselves, ‘I’m gonna get real smart now, boy howdy…’ Got it?”… *Got it!...* Okay, take out your science book, look at it, and tell how smart you’re going to get!”

“Look at your cubby holes…. We put our coats and back packs in our cubby holes…. You know how. We practiced… Get ready!... Let’s do it!”

* By reinforcing at least pretty good (accurate, quick, enthusiastic) behavior in response to cues.

“I love how you (got ready so fast when I entered the room!... opened your computers so fast; are watching my demonstration; put your stuff away when you looked at your cubbies).”

 Okay. We’ve looked at *cues* (Sds) that “tell” students to do certain behaviors; at *consequences* that tell students whether it is smart to repeat behaviors; and at *setting events* that affect how motivated students are to respond to cues (“Yeah!” vs. “Not interested”) and how they respond to consequences (“I like that!” vs. “I don’t much care.”). Now let’s look at…

Guidelines Regarding Phases of Mastery

 Please take a quick look at the middle column of table 4.1. Now that Ms. Rose’s class is a motivating setting, she uses behavior principles to plan effective instruction (and therefore students’ learning of) tool skills and content knowledge (chapters 2 and 3) across the five phases of learning.

* Acquisition. New knowledge.
* Generalization and discrimination. Apply knowledge to new examples.
* Fluency. Use knowledge faster, with fewer hesitations, with more confidence.
* Strategic Integration (Kameenui & Simmons, 1990). Combine elements (math operations) into larger wholes, such as routines (long division).
* Maintenance, or retention. Sustain skill.

The result? Her students will become confident; their knowledge will be firm. We work on the five phases in later chapters as we *fully* teach classes/concepts/names, facts, rule-relationships, and routines. Now, let’s see what the phases are.

Acquisition

 Acquisition is the first phase of instruction when we teach a new class/concept/name, facts, a rule relationship, a routine (sequences of steps, as in math), or a behavior (writing numerals, assembling lab equipment).

 Let’s say Ms. Rose is teaching a new concept—swamp ecosystem. Chapter 11 shows how.

* She teaches the *verbal definition*—which tells the defining features. The class examines and compares examples (that clearly show the defining features) and contrasts these with nonexamples (that are missing some of the defining features). She uses Model-Lead-Test/check-Verification, and/or a short lecture, demonstration, or discussion.
* The examples and nonexamples are called the *acquisition set*.
* The class examines acquisition examples (“This is a swamp. Let’s identify its features.”) and nonexamples (“This is not a swamp. It’s a lake. Let’s see how it differs from swamps.”) *one by one*. Then the class identifies examples and nonexamples from the whole acquisition set, and uses the definition to *tell how they know* which is which. This is a *delayed acquisition test.*

“You point to the examples of swamps, and tell what features make them swamps. Then point to nonexamples and tell what features of swamps they are missing.”

Ms. Rose *corrects any errors* (chapter 8), *retests* (which we’ll see later), and comes back to *review and firm*.

Generalization and Discrimination

 This is often the next phase of instruction. Ms. Rose uses new *examples* that are similar to the acquisition examples in essential (defining) ways, and a set of *nonexamples* that differ from the examples. She *models* how to use the definition to examine the examples and nonexamples, and to tell which is which. Then comes the *test/check.* “*Your turn*. Use our definition of toads to *examine* our new, generalization (toads) and our new nontoads (snakes, lizards)---to see if they have the defining features. Then *identify* which are toads and which are not. And then *tell how you know*.” When students err, Ms. Rose reviews the definition and repeats the test.

Strategic Integration (Kameenui & Simmons, 1990)

 This means teaching students to assemble *knowledge elements* into larger wholes, such as routines (sequences of steps, as in doing algebra problems), diagrams, time lines, and explanations. For example,

* Students assemble facts from a story into a description of characters and the plot. We teach facts in chapter 12.
* When students are firm on addition, subtraction, multiplication, and division, Ms. Rose teaches them the routine for solving equations such as 2x + 4= 28. Chapter 14 shows how to teach routines.

Fluency

Fluency is a combination of accuracy, speed, and ease. It leads to confidence. Ms. Rose will work on fluency with all five kinds of knowledge: concepts (“Define these words fast!”); facts (“Let’s say our list of facts a little faster”); generalization and discrimination (“”Let’s see how fast and accurately we can identify new examples of desert plants.”); routines (“Let’s read that paragraph again, a little faster.”), and maintenance (“Here is a set of old and new problems. How many we can do in five minutes.”).

 Students build fluency by going a little faster in “sprints.”

* Fluency “sprints” are short (a minute or so). The class repeats a sprint a few times to firm up weak spots (showed by errors or by hesitation about the next step). For example, “Remember, what we do on one side of the equation we also do on the other. We subtracted 15 from one side. So, what do we do on the other side?”…
* Ms. Rose will challenge the class with an attainable goal. “Let’s read 20 hard words in one minute. Error limit is two.”
* The class can compete with the Ms. Rose.

“Class, you are fast, but I bet I’m faster that you!”

*Ha! You’ll never read faster than us Ms. Rose.*

The class goes faster than Ms. Rose.

 “Okay, class, next time Ms. Rose will beat you for sure. Get ready… Go!”

* Individual students and the group display sprint results on a *chart* showing how many they did with how many errors. <Insert table 4.2 near here.>

Table 4.2. Sprints in a Fluency Session.

 First sprint Second sprint Third sprint

Words read 15 14 18

correctly in one

minute

Errors 4 3 2

 function spindle reduction

 spindle renegade

 restaurant reduction

 renegade

Note: Using methods in chapter 8, Ms. Rose corrects errors after each sprint, and she includes missed items in the next days’ sprints.

* *Students also work in partner pairs*; for example, one student holds up a card (for instance, from a deck of 3 x 5 cards with a word to read or to define; or an addition problem on it; or a part of a plant to identify), and the other student responds. The “Teacher” partner verifies correct answers (“Yes, 43.”) or corrects errors (“20 plus 23 is 43. What is 20 plus 23?”). Missed items are put back in the deck. Then students switch roles. The same thing can be done on example sheets.

 Students can make a table (such as 4.2 above) showing their progress. See the Reference section for articles on peer-assisted learning (PALS).

Maintenance, Or Retention

 Maintenance, or retention, means that a person’s accuracy and speed remain just as strong after the passage of time and the learning of new material (that may interfere with recall of earlier learning). Ms. Rose will assemble a sample (a *maintenance or* *retention set*) of what was taught earlier (during the same lesson, yesterday’s lesson, last weeks’ lessons, last months’ lessons) and students will work on them---words to read, spell, write, and define; examples of animals to identify; problems to solve; rule relationships to apply. Ms. Rose will review both to keep students’ knowledge form and to build students’ confidence. “Oh yeah, I remember these.” She will correct any errors, retest, and come back later to review and firm.

 Well, that’s it for behavior principles and guidelines for helping students to improve academic skills and classroom participation. Now let’s look at the Model-Lead-Test/check-Verification format as one way (along with lecture, demonstration, discussion, and projects) for teaching tool skills and content knowledge.

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