Teaching Classes, Concepts, and Their Names Five Ways

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 Document 8 told what classes, concepts, and their names *are*. Now let’s *teach* them with five (five!) communication formats. Here are guiding ideas.

1. The nervous system (sense organs and brain) (a) uses a routine of *inductive reasoning* to continually *construct*, and (b) a routine of *deductive reasoning* to apply (generalize), test, and revise knowledge of concepts/classes, facts, rule relationships, routines, and behavior. (See table 1.2 for a quick review.) So,

2. It makes sense that we use (a) instructional formats (sequences of teacher-student communication); b) Socratic questions (“How do you know?”); and (c) add-ons (reminders, repetition, highlighting, worked examples) that *assist the nervous system at every logical step*. Otherwise, students will say, “I’m lost.” “I forgot already.” “Borrriiinnng.”

 Table 11.1 below summarizes steps in the routines for constructing and applying knowledge.

<Insert table 11.1 near here.>

Table 11.1. How Excellent Teachers Facilitate Each Step of Knowledge Construction and Application

|  |  |
| --- | --- |
| Steps in the Logic Routines of Knowledge-construction (Inductive Reasoning) and Application (Deductive Reasoning). Our nervous systems... | What the Teacher Does to Facilitate Each Step.In general, the teacher uses MLTV, Socratic questions, and add-ons (chapters 5, 6, and 7). Why? Because this almost ensures that students get “it” quickly and with few errors. |
| 1. *Direct attention* to events (Sds-chapter 4)—teacher’s face, requests, models; text, charts, Nature, and objects; and our own actions. | Teach and review Learning Readiness skills (chapter 9).*Gain attention and frame instruction.* “Everybody, let’s get ready to learn….. Sitting tall looking at my book…. Now we’ll read this sentence.” |
| 2. *Scan and examine* teacher’s face, requests, models; text, charts, Nature, and objects; and our own actions---looking for *information, such as* *features.*  | “Follow my finger as I touch under, and read, each word in this sentence….Here we go.”“Look at this diagram of a cat skeleton. Let’s scan, locate, and identify parts.” |
| 3. *Focuses* (homes in) on Teacher’s face, requests, models; text, charts, Nature, and objects; and our own actions. | *Directs attention.* “Follow my finger as I touch each part of the skeleton and tell its name.”“Follow my finger as I tell what we do at each step of this addition problem.”  |
| *4. Identifies and names features.* “Three straight lines connect and make three corners.”  | “Trace the lines with me. Do they go one way?”*Yes.*“So, the lines are straight lines. Why do we call them straight?”*They go one way.*“Correct. Straight means goes one way.”“Follow my finger. Let’s see what the lines do… They come together and make three corners!… You trace the lines and see what they do…” |
| 5. *Compares events* (examples) feature by feature (steps 3 and 4 above); and identifies which are the *same*, and how. In reading…fun 🡪 Teacher says ffffuhhnnn.fin 🡪 Teacher says fffihhnnn.fins 🡪 Teacher says fffihhnnnzz“When there is f, Teacher says fff.”This is the method of inductive reasoning called *Agreement*. | “Follow my finger as I touch under each letter and say its sound…. fun 🡪 ffffuuhhnnn… and fin 🡪 fffiihhnnn. Which letter makes the words say fffff? Point to it.”*This one…f*“Yes, f makes a word say ffff.” |
| 6. *Contrasts juxtaposed (next to each other) events* (examples vs. *non*examples) and identifies how they are *different*. fun 🡪 Teacher said ffffuhhnnn.sun 🡪 Teacher said ssuhnnn.pins 🡪 Teacher said pihhnnnzz.fins 🡪 Teacher said ffihnzz.“When there is f, Teacher says fff. When there is no f, Teacher does not say fff. When there is s, Teacher says sss.” This is the method of inductive reasoning called *Difference*. | “Follow my finger as I touch under each letter and say its sound…. fun 🡪 ffffuuhhnnn… sun 🡪 say ssuhnnn.”“Which letter makes the word fun say fffff?” *This one…f*“And which letter makes the word sun say ssssuuhhnn?”*This one…s*“Yes, f says ffff and s says ssss! You saw how the letters make the words say different sounds!” |
| 7. Makes a *generalization* (construction) based on inductive logic.  | Student Tammy Tootle says, “So, f *must* say fff. Because (a) whenever f is there, you say fff (agreement); and (b) whenever f is *not* there, you don’t (difference). It’s logical!” |
| 9. *Applies (generalizes) knowledge**to new examples and nonexamples (deduction).*  | “Here are new words made with letters that we know. I’ll show you how we sound them out as we always do, and then we’ll read them fast.”“rust 🡪 rrrruuuust”Sound it out with me.” *rrruuussst*“Sound it out all by yourselves.” *rrruuuust*“Read it fast!” *rust!*“Yes, you sounded out a new word and read it fast!” |

 Okay. Table 11.1 showed the logic steps by which the nervous system constructs knowledge (generalizations, such as f says fff) from examples, and then applies (generalizes) knowledge to new examples. We also saw how teachers communicate so that the nervous system has the information it needs to do each step easily; for example, the teacher points, uses clear examples, tells, reminds, checks that students “get it,” and asks students how they know or asks what they did. Starting now, that is how we will teach concepts, facts, rule relationships, and routines.

 Here are the five ways we’ll teach classes/concepts/names.

<insert table 11.2 near here.>

Table 11.2. Summary of Five Ways to Teach Concepts/Names

1. *With synonyms.* Use synonyms when students don’t need a full definition of a concept/word in a text or presentation. So, we

Tell (model) the synonym and then use it in a sentence. “Other words for turbulent are disorder, unrest, agitation. It was a turbulent meeting—lots of disorder and unrest.”

2. *With a set of examples and nonexamples.* Use this method to teach students the routine for constructing knowledge (definitions) from examples and nonexamples.

Students *scan* examples of *named* triangles and not-triangles; *focus* on features; *identify and list* features; *compare and contrast* the lists; *determine* how triangles are the same (three lines, straight, come together and make three corners) and how not-triangles are missing features shared by the triangles; *construct* a definition that tells the shared features of triangles; *generalize* to new items. “Is this a triangle?” *No.* “How do you know?” *Has four lines, not three…. One line is not straight…. Only two corners.*

3. *With a verbal definition followed by examples and nonexamples.* Use this method when (1) you want students to use definitions to examine and then to determine if and how items are examples; or (2) a concept/class (civilization) has so many features that it is more efficient to list them than to try discovering them all; or (3) the concept is too abstract (health, cosmos) to show examples. So, it’s best just to tell the defining features. Briefly,

The teacher tells, or students look up, the definition of swamp. Then, using the definition, they compare and contrast swamps and not-swamps (lakes, ponds, streams) to confirm the definition and to see why some items are and other items are not examples.

4. *With morphemes*. Students identify parts of words that have meaning. dis (un) entangled (knotted up).

5. *With context.* How a word fits in a sentence may tell its meaning. “The rocket shot into the sky, but its engine *flared out*.” Flared--the engine briefly became bright and then went out.

 Okay, let’s see how to teach classes/concepts/names….

We Teach Concepts/Classes/Names Fully

 Here is how we teach a *new* class/concept/name fully. We want students to remember it and feel smart! Student talk is in italics. Explanatory comments are in brackets. Here is Mr. Ishmael and his class. It goes fast!
1. *Say it.* [Mr. Ishmael writes the word on the board.] “Here’s our new word… paleolithic…. Say it.” Or, “Say paleolithic.” Or “What’s our new word?”...

*paleolithic*
2. *Sound it out, using Model and Lead, if needed.* “Sound out [pause] paleolithic.”

*paaalleeoolliitththic*
[If students need help, Mr. Ishmael uses the correction format in chapter 8--Model-Lead-Retest---like this.]
*Model.* “My turn. Listen. When I touch under the letters, I’ll say the sounds, and I won’t stop between the sounds… paaalleeoolliitththic.”
*Lead.* “Sound it out with me.”…

*paaalleeoolliitththic*.

*Firm it up.* “Again, sound it out with me.”

*paaalleeoolliitththic.*
*Retest/check.* “All by yourselves. Sound it out.”…
*paaalleeoolliitththic.*

*Verification.* “Yes, paaalleeoolliitththic. Now you got it!”
3. *Spell and write the word*. “(Spell/write) paleolithic.” [Correct errors with Model-Lead-Retest.]
4. *Read* paleolithic *fast*. “Read it fast.” [Correct errors as just shown.]
5. *Definition.* “I’ll tell you what (our new word) paleolithic means. Write the definition on your (Frayer Model, Cornell Notes, Guided Notes, 3 x 5 cards.) [Please review these in chapter 7.]

6. *Build Maintenance and Fluency with Class Sprints and Peer-Assisted Learning.* The class says, sounds out, spells, writes, reads and defines a set of earlier words faster! This helps students to think and speak quickly, and to gain confidence.

 Students also work in pairs—peer-assisted learning (Fuchs, Fuchs, Yazdian, & Powell 2002; McMaster, Kung, Han, & Cao (2008) ---reviewing the definitions and doing *fluency sprints*. They use their stacks of Frayer Models or, for ease, 3 x 5 cards. Students make their own fluency decks, with the name on one side and the definition plus examples and nonexamples on the other. The Teacher pal holds up a card and asks the Student pal to read the name, and then to define it. The Teacher pal verifies correct answers or corrects errors using the formats in chapter 8. The Teacher shuffles the deck and goes on.

Billy. “Read this one.”

Milly. “gigantic.”

Billy. “Yes, gigantic…Gigantic means…”

Milly. “Huge, very big.”

Billy. “Yup, you got it…. Next .”

Milly. “Tramel.” [Error.]

Billy. “The word is travvvel. What word?”

Milly. “Travel.”

Billy. “Correct!.. What’s it mean?”

Milly. “To move somewhere, like to travel from Wilmington to Raleigh.”

Billy. “Yup. What’s an example of travel?”

Milly. “Riding in a car to the store. Riding a bicycle from school to home.”

Billy. “Yup, those are traveling. What’s a nonexample of traveling?

Milly. “Uh, taking a nap and not moving anywhere.”

Billy. “Correct again. You know your definitions!”

Billy comes back to the one Milly missed, to firm it up.

The pace is quick. Students switch roles after a few minutes. When they have gone through the deck, they repeat the task, but go faster to build speed and confidence.

Students also review and firm more on their own (as above)

using their decks of 3 x 5 cards.

 Secondary teachers should do the same thing (students make 3 x 5 concepts/vocabulary cards, and review them by themselves and with a peer) to get students engaged from the start, to

take seriously learning concepts/vocabulary, and to build fluent (solid) knowledge.

 *Teachers should not skimp on doing the above.* Third grader Maggie May says, “I’m gonna say it, sound it out, spell it, write it, read it fast, and define it, just like Mr. Ishmael does. I get smarter every day!”

Teaching Classes/Concepts/Names with Synonyms

 Use synonyms when the task (reading text or listening to a lecture) doesn’t require that students learn a *full definition* of a concept/word. Here are two ways to teach synonyms.

Teach New Words Quickly at the Start or When Needed During a Lesson

 Here’s how.

* *Model.* Tell a synonym (that students are likely to know) for a new word. “Another word for succinct is…. brief.”
* *Test/check* that students “got” it. “What’s another word for succinct….” *Brief.*
* *Verification.* “Yup, another word for succinct is brief.”

If that is enough, go on with the lesson, or complete instruction on the new word.

* *Model.* “I’ll use our new word in a sentence. The lecture was succinct.”
* *Test/check.* “Now you make a sentence with succinct.” *His explanation was succinct.*

“What was it?” *Brief.*

* *Verification.* “Yes, you made a sentence with our new word, and you remembered the synonym.”
* Have students write the new word and its synonym on a 3 x 5 card. Review words later in fluency sprints, maybe with peer pals.
* Go on with the lesson.

Teach Several New Words Quickly; for Instance, in a Text

* As you read or as the class reads a portion of text, give quick synonyms, and continue.
* Read the text again, *without* the synonyms.

Example. From the poem, *The second coming* (William Butler Yeats). Written after World War I.

https://www.poetryfoundation.org/poems/43290/the-second-coming

Turning and turning in the widening gyre [*a spiral movement*]

The falcon [*bird of prey*] cannot hear the falconer [*person who controls the falcon, often by sounds*];

Things [*civilization*] fall apart; the centre [*authority*] cannot hold;

Mere anarchy [*lawlessness*] is loosed [*escapes*] upon the world,

The blood-dimmed tide [*violence*] is loosed [*perhaps the Russian Revolution*], and everywhere

The ceremony of innocence is drowned [*chaos returns*]

* To help students remember the words, students write the words and their meanings on 3 x 5 cards, and review periodically.

“What’s a widening gyre?”
“Another word for lawlessness is…..”

*Your turn.*

Please write a script for teaching synonyms both ways.

“We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.” (Preamble to the *Declaration of Independence*)

Here’s our second way to teach classes/concepts/names.

 With a Set of Examples and Nonexamples

 This method teaches students to invent the definition with the *knowledge-construction routine*—the steps on table 11.1. We

* *Show and name examples of a class/concept/name--triangle.* The examples are the *same* in defining features, but *vary* in nondefining features; for instance, red, green, large, small triangles.
* Help students to *scan, focus, identify, tell, and list the features* of *examples*. “All of the shapes Teacher called triangles were made of lines; the lines were straight; the lines came to together to make three corners; but the lines had different colors; lines were thin and some were thick, some were long and some were short.”
* *Compare examples; identify the common features; rule out the varying features*. We want students to “get it” that

The common features are three lines; straight; lines come together and made three corners. These may be the defining features.

Therefore, the ways the examples vary (color, length of lines) logically can’t be part of the definition. Why? Because a shape can be a triangle no matter what the colors or lengths of lines.

* *Contrast the named examples with named nonexamples*; identify features common to all examples but *missing* in the nonexamples. “The nonexamples were made of lines, but not three lines. Some lines were not straight. Some lines did not come together to make three corners. That’s why these are not triangles.”
* *Draw the conclusion (inductive inference) that features shared by examples (but missing in nonexamples) logically define the class/concept/name*. “Triangles are shapes that have (are defined by) three straight lines that come together and make three corners. Colors, lengths, and thickness of lines do not matter.”
* *Now students use the definition to identify new examples (generalization) and nonexamples (discrimination).* “This church roof is a triangle!” “The window does not make a triangle.”

 Here’s an example.

Mr. Knight Templar Teaches the Concept, Mountain, in 6th Grade Science, Using Examples and Nonexamples

 Everybody “knows” what mountains are. Sure, they recognize them, but can they quickly tell which features define the class/concept? Can they tell why other geological forms (plateaus, hills) are not mountains? Most importantly (!), can they tell *how they know* (logically) which formations are mountains and which are not? Probably not. Here is Mr. Templar and his class.

Note. Students are filling out Frayer Models (chapter 7) as instruction moves along.

1. Mr. Templar uses a *range* of examples (the *acquisition set*) that clearly shows the *same* defining features. Examples of mountains are all be made of rock, have slopes and a peak, and are at least 1000 feet above the surface—defining features. *He selects examples whose defining features stand out.*

 How many examples? A half dozen to start seems about right. Maybe some students need more. *Mr. Templar will find out when he gives an acquisition test a little later.*

For example, “I’ll point, and you tell if this is a mountain or not a mountain?”

*I don’t know…. Me, neither.*

“Okay, let’s look at *more* examples and nonexamples.”

2. Examples *vary* in *nondefining* ways. Some mountains have snow and some not, some have glaciers, some have trees and some are bare, some are much taller, some are igneous rock, some are metamorphic rock, some have debris at the base. Mr. Templar “treats” (names them) the same way---“This is a mountain.” *This tells students that the variations don’t matter for the definition and name*.

<Insert Figures 11.1-11.6 near here.>

Figure 11.1. Mountain 1. Figure 11.2. Mountain 2. Figure 11.3. Not Mountain 1.

   

 Figure 11.4. Mountain 3.  Figure 11.5. Not Mountain 2. Figure 11.6. Mountain 4.

   

3. The class then

* *Scans* named examples one after another. “Let’s examine Mountain 1….”
* *Focuses on and identifies (names)* their features—both the features that they *share* (defining features) and how they *vary* (not-defining features).
* States these features as *a description*. “Mountain 3 is 5000 feet above the surrounding land, is made of granite, has one peak, no tree line, and has a glacier on one slope.”
* *Compares* examples, and identifies features that are the *same*: made of rock, slopes, peak, 1000 or more feet above surrounding land. *This helps students begin to construct the concept.*

Abby Rhode reasons, “All of the named examples have the same four features---made of rock, slopes, peaks, and are 1000 or more feet above surrounding land. Mr. Templar named them all mountains. So, logically, these four features *may* be why he called them the same thing.”

* Now the class identifies the features of named examples that *vary* (are not the same) from example to example, and “gets it” that these features *can’t be defining features*. Mr. Templar helps students to continue constructing knowledge. Abby now reasons,

“No matter how high over 1000 feet, what kind of rock (granite, metamorphic), how many peaks, or whether they have trees or snow or debris, Mr. Templar still names these mountains. Therefore, logically, these *varying* features *can’t* be part of the definition of mountain.”

* Now the crucial step. The class examines next to each other (juxtaposed) the features of (a) a named example (“This is a mountain.”) and (b) a named *non*example (“This is not a mountain.”). This way, students easily *contrast* the pair to identify how the common features of examples (made of rock, slopes, peaks, and 1000 or more feet above surrounding land) are missing in the nonexamples (e.g., flat top, or no slope, or made of dirt, or made of shaped mud blocks, or less than 1000 feet above surrounding land).

4. Finally, Mr. Templar helps students to arrange (construct) what they have reasoned into a *verbal definition*. Abby concludes,

“The features that define the name/concept/class of mountains, are: made of rock, slopes, peaks, and are 1000 or more feet above surrounding land. How may peaks, what kinds of rock, how steep the slopes are, debris, snow, and trees are irrelevant. Formations that do *not have all of these* features are not called, and they are not in the class of, mountains.”

This is exactly how we figured out what Moof is in chapter 1.

 Here is what students’ completed Frayer models look like…

<Insert table 11.3 near here.>

Table 11.3. Frayer Model Defining Mountains.

Frayer Models (for definitions of classes/concepts/names) can be used along with

Cornell Notes, Guided Notes, or 3 x 5 cards as the teacher or text talks about mountains.

 **Definition in your own words** **Defining Features** **Not Defining**

Rock, 1000 or more feet above ground. Features shared by all Features by

 Have a pointy top and slopes (downhill). examples. which examples

 Made of rock, have slopes, vary.

 at least 1000 feet above Angle of slopes,

 **Concept**, surrounding land, peak(s). height, kind of

 **Class,** rock, location, bare

 **Name,** or wild life habitat.

 **Mountains**

 **Examples**  **Nonexamples**

Pictures of mountains with and without May have some features of examples but

 vegetation, snow, alone or in a range. are missing some defining features. Pictures of

 plateaus, hills, dirt mounds, cliffs, pyramids.

Pictures of mountains with and without May have some features of examples but

 vegetation, snow, alone or in a range, are missing some defining features. Pictures of

 plateaus, hills, dirt mounds, cliffs, pyramids.

Note. Students might also write the information on Cornell Notes, Guided Notes, or 3 x 5 cards, for use in peer-assisted fluency sprints.

 Imagine how smart and advanced students *at any age* will be when teachers do more than *tell* definitions, but also teach students to find out *how* comparing and contrasting examples and nonexamples *reveals* definitions.

*Your turn.*

 Please write a script for teaching a concept (square, pond) using the method of examples and nonexamples.

 Here’s our third method.

Teaching Classes/Concepts/Names with a Verbal Definition Followed by Examples and Nonexamples

 We use this method when

* We want students to *use definitions to examine items* and then to determine if their features fit (are examples of) the definition. “Hey, this news report is wrong. According to the definition, that’s not an example of insurrection.” Or, “Yeah, that’s a good definition of constitutional monarchy. It includes all of the features we’ve learned.”
* The concept/class has *so many features* *that it makes sense to list them*—that is, to tell the definition.
* The *concept (for instance, health or strength) is abstract*. We can show a picture and say, “This is a healthy person.” But we can’t see healthi*ness* itself. So, it is best first to tell the defining features. “Health is a condition of the…. that consists of (the features)…..”

Here are the logical steps in the communication format.

* *Gain attention and frame instruction.* “Everybody ready to learn?... Sitting tall?.... Great! New concept… deciduous.” Students say, read, spell, and write the word.
* *Model* (tell) the definition---the features that all examples have. Students write the definition on a Frayer Model, Guided Notes, Cornell Notes, or a 3 x 5 card for future review and fluency sprints.

“Totalitarianism (the concept/name to define) is a political system in which the state (the government) controls all aspects of life (rights, morality, work, housing), usually in a single party, suppresses opposition (by imprisonment or death), and uses propaganda to ensure control.”

* *Scan examples* (Nazi Germany, Communist China, North Korea, the former Soviet Union, the former East Germany, Cambodia under the Khmer Rouge) that clearly show the defining features. Model how to scan, focus, identify, tell, and list the features, and then have students do the same.
* Have students *compare the lists of features* of examples, and then identify features that all examples have---as stated in the definition.
* Have students *identify the features that are not shared* by (that vary across) examples. Logically, these are nondefining features. For instance, name (NAZI, Communist, People’s Republic), language, location, size of country.
* Have students *contrast the named examples with named nonexamples* (the United States, France, England, Denmark, Israel) to identify ways that they differ from the definition. These differences *make* the difference between examples (totalitarian) and nonexamples (not totalitarian). “France has multiple political parties, elected representatives, and constitutionally protected rights. So, by definition, it isn’t totalitarianism.”
* Have students *use the definition to examine* and judge (and invent!) new *unnamed* instances—generalization and discrimination.

Here are two examples

Ms. Rodriguez Teaches Straight to Young Children, Using a Verbal Definition Followed by Examples and Nonexamples

 Inez Rodrigues is teaching straight/not straight in a topic (a series of lessons) on lines, shapes, and sizes. The concepts are not that important. What’s important is the *process* of learning definitions; using them to examine instances to see if they are examples or not; to look for and identify shapes in Nature and in buildings; and to invent (draw or assemble) examples. Please read the format along with the class.

1. *Gain attention and frame instruction.*

“Listen, my smart class… Our new concept (class, name, vocabulary word) is straight.”

[Students say, read, spell, and write the new word on a 3 x 5 vocabulary card.]

2. *Model the definition.*

“Listen. Straight means (or, The definition of straight is) goes *only* one way.” [Repeat.]

*Test/check.* “What does straight mean (or What is the definition of straight)?”

*Goes only one way.*

*Verification.*

“Yup, straight means goes *only* one way. You guys remembered the definition. You are good listeners!”

3. *Model examples and nonexamples.*

Ms. R. names examples and nonexamples. She shows that the examples go only one way, and that nonexamples go *more* than one way. Examples vary in nondefining ways.

“Class. Listen up. Here are things that are straight (go only one way) and things that are not straight (do not go *only* one way).”

<Table 11.4 near here.>

Table 11.4. Straight and Not Straight.

 1 2 3 4 5 6 7 8 More?

   

“This (line) “This (pipe) “This (track) “This (track) “This (arrow) “This arrow “This line is This line

is straight. is straight. is straight. is not straight. is straight. It is not not straight. is straight.

It goes only It goes only It goes only It does not go goes only one straight. It It does not It goes

one way.” one way. one way.” only one way.” way.” does not go go only one only one

 only one way. way.

 way.

Ms. R. and the class *trace the lines and say* “Goes one way---straight…. Does not go one way (curves, bends)…not straight.”

4. *Acquisition test.*

The class goes through all of the items at random. Ms. R. asks, “Straight or not straight?”

*Not straight.*

“How do you know?” [Requires students to use the definition,]

*Does not go only one way.*

If students err, she models the definition again, and shows how it applies to the missed item.

“Straight means goes one way. Does this one go one way?”

*No. Two ways.*

“So can it be straight?”
*No. Not straight.*

“Correct. Not straight. You used the definition of straight to tell!”

5. *Generalization and Discrimination Exercises*

Ms. R. now has students examine and identify new examples and nonexamples. First, she models how to do this as she did in table 11.4.

Then she has students examine new items, and use the definition to identify each one.

In later lessons, and as opportunities come up, the class reviews what they have been learning.

“Look at this (rainbow, snake, tower, monkey’s tail, highway, noodle)… Straight or not straight?”

 Here’s another example.

Hinako Kawasaki Teaches Lizard, Using a Verbal Definition Followed by Examples and Nonexamples

 Ms. Kawasaki’s 9th grade biology class at Happy Coyote Charter School is studying swamps in Part 4 (the main business) of a 3-day, 5-Part Lesson in a unit on ecosystems.

 In Part 1, the class watches videos on swamp ecosystems to get students engaged.

*Alligators and huge snakes… Cool…. This swamp is spooky, boy howdy!*

 In Part 2, the class reviews and firms knowledge from earlier lessons on ecosystems, such as definitions on their 3 x 5 cards: ecosystem, forest, arid, cactus, nocturnal, tropical, biotic, abiotic, climate, predator, prey, algae, salinity, precipitation. Students read, write, spell, define, and give examples of the concept names.

 In Part 3, the class gains new knowledge needed for Part 4. They say, read, spell, and write the names and definitions of lizards, toads, snakes, stagnant, turtles, reeds, cypress trees, alligators. Here is Ms. K.’s format for teaching the definition of lizards, followed by examples and nonexamples.

 Ms. K. points to a small, green, scaly animal with a horny spine and a long tail, relaxing on a rock after a hard day hunting bugs. Students say, *Hey! Let’s study that guy! He looks like a monster.* Ms. K., says, “Okay, let’s start with the class of…. lizards.”
1. *Gain attention.*

“Everybody awake and aware? Sitting tall and calm. Looking at your fantastic teacher as she looks at her fantastic class!” [Learning Readiness, chapter 9.]

2. *Frame.*

Here are examples that Ms. K. uses in the *acquisition set.*

<Figure 11.7 near here.> <Figure 11.8 near here.> <Fig 11.9 near here.> <Fig 11.10 near here.>

Figure 11.7. Lizard 1.  Figure 11.8. Lizard 2. Figure 11.9. Lizard 3. Figure 11.10. Lizard 4.

   

<Figure 11.11 near here.>

Figure 11.11. Lizard 5.

 

“Here’s the first class of swamp ecosystem animals we’ll learn. A new name. A new concept. Lizard.” [Ms. K. shows the pictures.]

Students say, read, spell, and write lizard, which Ms. K. writes in the board. This task is easy for 9th graders. Why does Ms. K. do it? The idea is to

build momentum and engagement with a sequence of quick back-and-forth

steps that students enjoy.

“Terrific. Now we’re ready to learn the class/concept/name, lizard.”

3. *Definition of lizard.*

*Model.*

“Listen to the definition of the class/concept of lizards.” [Example 1---Figure 11.7---is on the screen.] “Write the definition on your 3 x 5 card (or Frayer Model, Cornell Notes, Guided Notes) so you can review and firm definitions with your peer partners and on your own.” [Ms. K. points to the features of Lizard 1 as she names them.]

“Lizards (the name of our subject)…are in the larger class of *reptiles* …that have (features that distinguish lizards from not lizards) scaly skins…. moveable eye lids,….external (means outside) ear openings,….most have four legs,….some have spines, horns, and throat fans…and they live in deserts, water, in underground burrows, and in trees.” [Repeat. “Listen again…”]

 “Class, did you notice the three parts of our definition? The name of the *subject* (lizards); then the *larger class* that the subject is in (reptiles); and then the *features* (scaly skin, maybe spines) that make the subject class different from other subject classes, like toads, eels, and larvae. We always define classes/concepts like that.”

* “Subject class name.”
* “The larger class that the subject class is in.”
* “And then the features that define the subject class and distinguish it from other classes.”

*Test/check.*

“Your turn. Read the definition of lizard.”

*Lizards are reptiles that have scaly skins….moveable eye lids,….external ear openings,….most have four legs,….some have spines, horns, and throat fans…and they live in deserts, water, in underground burrows, and in trees.* [If any word is left out, Ms. Kawasaki adds it and has students repeat and write the full definition.]

4. *Explore and discover the defining and nondefining features of examples.*
*a. Refresh the definition.*

“Everybody, look at your (3 x 5 card, Frayer Model, Cornell Notes, Guided Notes) on lizards, and tell what features we are looking for.” [She is teaching students to use the definition as a *guide* for exploring examples and nonexamples.]

*Scaly skins….moveable eye lids,….external ear openings,….maybe have four legs…maybe spines, horns, and throat fans… they live in deserts, water, in underground burrows, and in trees.*

[If the class misses a feature, Ms. K., tells it and has students add it to their list, and repeat.]

*b. Scan, focus, identify, tell, and list the facts---features of each example.*

“Okay, now let’s find and list the fact features of our examples. The list of fact features is a *description*.”

[The class tells and writes the features on table 11.5 below.]

<insert table 11.5 near here.>

Table 11.5. Table of Features (Fact Descriptions) of Lizards.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lizard 1 | Lizard 2 | Lizard 3 | Lizard 4 | Lizard 5 |
| 1. Head—large. 2. Eyes with movable lids on the sides of his head, stick out.  3. Two holes for a nose. 4. Tail. 5. Four legs, front and rear, with large claws.6. Scales on skin. 7. Yellow patches on tan-gray skin. 8. Spines on crest of head.9. No teeth. | 1. Head—large.2. Eyes with movable lids on the sides of his head, stick out. 3. Two holes for a nose. 4. Tail.5. Short legs 6. Four legs, front and rear, with claws. 7. Bumpy scales on skin. Dark stripes on green background8. No spines running along backbone.9. No teeth. | 1. Head—small.2. Small eyes with movable lids on the side of the head. 3. Visible ear holes.4. Small spines running along the backbone.5. Narrow crest on head6. Four short legs, front and rear.7. Scaly skin. White stripes on blue-green background.8. Narrow body.9. On a tree.10. Tail.11. No teeth. | 1. No crest on head.2. Ear holes.3. Eyes with movable lids on the side of head.4. Fan-like crest running head and spine.5. Scaly skin. Green with white spots.6. Thin body.7. Four legs, front and rear.8. On a tree.9. Tail.10. No teeth. | 1. Crest on large head.2. Eyes with movable lids on the sides of his head, stick out.3. Ear holes.4. Tail straight5. Thick body.6. Four legs, front and rear.7. Scaly skin, green.8. On tree.9. No teeth. |

*c. Identify defining (shared) features.*

“Do all of the examples have scaly skins…. movable eye lids,…. external ear openings,…. Maybe four legs… maybe spines, horns, and throat fans…. live in deserts, water, in underground burrows, or in trees.”

*Yup!... The examples fit the definition.*

*d. Identify nondefining (varying) features.*

“Now look at how the examples *vary* in ways that do *not* matter. Is color part of the definition? Check your notes…”

*Nope…*

“How about stripes? Are stripes part of the definition?”

*No, stripes don’t matter.*

“How about spines? Do some lizards have spines and some not, but they are still lizards by the definition?”

*Some have spines…. Some don’t.*

“So, can they be lizards with or without spines?”

*Correct!*

“Do they vary by size of head?”

*Yeah… Some have small heads… Some have big heads.*

“Are they still lizards?”

*Yup.*

“So, does head size matter?”

*No.*

“Make sure you write these *nondefining* features on your (3 x 5 cards, Frayer Notes, Cornell Notes, Guided Notes).”

5. *Exploration and discovery of features of nonexamples.*

[Here is the set of nonexamples that Ms. K. uses.]

<Figure 11.12 near here.> <Fig 11.13 near here.> <Figure 11.14 near here.> <Fig 11.15 near here>

Figure 11.12. Eel 1. Figure 11.13. Eel 2. Figure 11.14. Snake Figure 11.15. Larva

   

*Frame the task.*

“Okay, now we know what examples of lizards look like and how they are the same—the ways that make them—define them as—lizards.”

“Let’s look at animals that are like lizards but are *not* in the class of lizards.”

“Do you know *why* they are not lizards?”

*Because you said so… ... No clue… Hey, I know. Missing defining features!*

“Jenny got it! The big reason they are not lizards is that *they don’t have all of the features of lizards that we learned in the definition and that we just found in the examples.* So, let’s keep exploring. *Let’s look at not-lizards and see how they are different from lizards*.”

*Test/check.*

“What will we look for? Look at your (3 x 5 card, Frayer Model, Cornell Notes, Guided Notes) and tell the features of lizards. We want to see if the not-lizards are missing any of these features. Which features?”

*Scaly skins…. movable eyelids,…. external ear openings,…. maybe have four legs…. maybe spines, horns, and throat fans…. they live in deserts, water, in underground burrows, and in trees.*

“Yes, these are the features we are looking for.”

[Ms. K. has two students come to the screen and point to places where lizard features *would* be. The class tells which lizard features are there or not there. They write what they find on the table below. Note. Ms. K. names each nonexample, but she does not define them for now. The concepts/classes of eels, snakes, and larvae---parts of swamp ecosystems---will be explored next.]

<Insert table 11.6 near here.>

Table 11.6. Table of Features (Fact Descriptions) of Not Lizards.

|  |  |  |  |
| --- | --- | --- | --- |
| Eel 1 | Eel 2 | Snake 1 | Larva 1 |
| 1. Long, thin body.2. No ear holes to see.3. Eyes.4. No fin along its back.5. Teeth.6. No scales.7. No legs. | 1. Long, thin body.2. No visible ear holes.3. Eyes.4. Fins along its back and sides.5. Teeth.6. No scales.7. No legs. | 1. Long, thick, coiled body.2. No visible ear holes.3. Eyes.5. Two fangs.6. Scales; green and yellow speckled skin.7. No legs. | 1. Short segmented body.2. No eyes.3. No ear holes.4. No tail.5. No scales.6. No teeth.7. No legs. |

6. *Contrast examples and nonexamples*

“Okay, class, let’s look at our table of lizards (11.5) and our table of not lizards (11.6). What do lizards *have* that not-lizards *do not have*? Look at your (3 x 5 cards; Frayer Models; Cornell Notes, Guided Notes). Let’s list lizard features.”

*Scaly skins*

*Movable eye-lids.*

*External ear openings.*

*Maybe have four legs.*

*Maybe spines, horns, and throat fans.*

*They live in deserts, water, in underground burrows, and in trees.*

“Now look at the list of lizard features and see which features *the not-lizards do not have*.”

*No scaly skin.*

*Eels have teeth.*

*Eels have a fin on the back.*

*An eel can have fins in front.*

*Eels and snakes have no legs.*

*Lizards are full grown. Larva are not full grown.*

“You have done a terrific job!! I knew you would.”

“Well, let’s do one more class/concept later today. Maybe snakes because snakes are in swamp ecosystems.”

 Once the class has learned the new concepts/names needed to study swamps (snakes, larva, lizards, alligators, plants), they will learn all about swamps in Part 4 of a new lesson. Part 5 might be to invent an ecosystem.

*Your turn.*

 Please write a script for teaching concepts with a verbal definition followed by examples and nonexamples; for instance, triangle, mountain, swamp.

 Here are the last two ways to teach classes/concepts/names. Let’s say students are reading along and they don’t know what a word means. What can they do?

 Well, a dictionary is a good idea! Or looking it up on the internet.

But there are two other ways, and they are useful skills: (1) using word parts to figure out the meaning; or (2) using the context—the sentence or the situation the sentence is about. Let’s start with morphemes

With Morphemes

 Many multi-syllabic words are made of morphemes. Morphemes are word parts that have meaning.

pre = before. prefabricated, pre-read
de = remove or undo. defrost, demented
co = together. comingle, co-teach
tract = hold, grab on. traction, attract
in = put in. inspiration, indent
spire = spirit
tion = a way things are, a way something does. situation, inflation

Here are longer lists of morphemes.

https://education.ufl.edu/patterson/files/2020/05/Morphemes-and-Their-Meanings.pdf https://www.fldoe.org/core/fileparse.php/16294/urlt/morphemeML.pdf

*Your turn.*

What do these morphemes mean? non, ing, re, ation

 We can use a simple format for teaching definitions with morphemes that are in a word.

1. *Gain attention and frame instruction.*

“Everybody, eyes on your amazing teacher. Me.”

“Now, my excellent class, here’s a new word---traction.” [Have students say it, read it, spell and write it.] “I wonder what it means. Let’s figure it out. Write traction (on the front of a 3 x 5 vocabulary card; on a Frayer Model).”

2. *Model.* “Listen. How can we figure out what traction means? Well, look at the word. The tract part means to pull or to dig in or to hold. The tion part means a condition of something, or the way something is. So, traction means a condition where something is holding or pulling or digging in. Again, traction means a condition where something is holding or pulling or digging in. Write that on your (3 x 5 card; Frayer Model).”

*Test/check.* “Your turn. What does traction mean?”

*A condition where something is holding or pulling or digging in.*

You got it! Traction is a condition where something is holding or pulling or digging in.

3. *Application.*

“Let’s use traction in a sentence…. ‘The new tires have a lot of traction in the snow.’ What does the word traction tell you about the tires? What are the tires doing in the snow? Look at your (card; Frayer Model).

*Digging in… holding… pulling.*

*Test/check. “*Are the tires slipping and sliding in the snow?”

*No.*

“Why not. Because the tires have…” [partial prompt]

*Traction!*

“You got it!”

4. *Generalization.*

“Now you make a sentence with traction. How about using the words sneakers and slippery floor?” “Her new sneakers….”

*had traction on the slippery floor.*

“You got it! Her new sneakers had traction. They did not slip. They dug in and held on to the slippery floor.”

*Your turn.*

Make a script for teaching word meanings with morphemes. Maybe start by building on the example above. distract, subtract, tractor.

Teaching Concepts/Classes/Names from the Context

 Sometimes you can help students to figure out what a word means (the concept) by seeing it in relation to other words.

1. *Gain attention and frame the task.*

“Boys and girls, here’s a new word. jetted.” [Have students say, read, spell, and write jetted on a 3 x 5 card or Frayer Model.] “We are going to figure out what jetted means from a sentence that has jetted in it.”

2. *Model.*

“Listen to this sentence. ‘She jetted down the road like a rocket.’ I wonder what jetted means. Well, she jetted like a rocket. How fast do rockets go?”

*Real fast!*

“So, if she jetted down the road like a rocket, she was going…..”

 *real fast.*

“Yup, I think you got it. Another word, rocket, helped us to figure out the word jetted---real fast.

“Let’s see if we can figure out what another word means.

“The word is persist. [Have students say, read, spell, and write persist on a 3 x 5 card or Frayer Model]

“Here’s a sentence that has the word persist. Let’s use the sentence to figure out what persist means. Toby, the group leader, says, ‘Guys, the job is hard. The weather is hot. And we are tired. But if we persist, we will soon be done! So, let’s persist.’ What do you think Toby wants her friends to do? Does she want them to quit?”

*No!*

“Then do what?”

*Keep doing it… not quit… go on…*

“So, what does persist mean?”

*Keep it up… don’t quit… git ‘er done!*

“You got it. Now you use persist in a sentence.”

 It’s a good idea to teach students to define words with morphemes and context (and with dictionaries!): (1) in presentations and readings; and (2) when they are more on their own. For instance,

“Here is Amendment 1 of the Bill of Rights. Let’s see if we can define some of the words by using their morphemes and context.”

Congress shall make no law *respecting* an *establishment* of religion, or *prohibiting* the free exercise *thereof*; or *abridging* the freedom of speech, or of the press; or the right of the people *peaceably* to assemble, and to petition the government for a *redress* of *grievances*.

*Your turn.*

Please write scripts for teaching concepts/words in the above with morphemes and context.

 Okay, that’s it for teaching concepts/classes/names. We will use these methods in our 5-Part Lessons. In the next chapters, we will see how to teach facts, rule relationships, and routines.

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