Putting the Pieces Together: Immersion Curriculum Unit Design

Mike Yamakawa, Japanese Immersion Teacher, El Marino Language School, Culver City, California

"The nice thing about doing a crossword puzzle is, you know there is a solution."
Stephen Sondheim

Well, I don't know about you, but I often used to feel like there was *no* solution to the puzzle of teaching in an immersion classroom. For one thing, I thought there were too many pieces in the puzzle to put together as I instructed my students: content standards, target language proficiency, vocabulary development, instructional activities, oral language, culminating projects, assessment. It was challenging to design a curriculum unit that effectively addressed all these components and *intentionally* developed the target language proficiency in my students.

The unit plan format, introduced in this article, has helped me greatly in putting the puzzle together. Before introducing a sample unit plan, let me highlight some key aspects of the design. Immersion research has pointed to a number of shortcomings in how language is taught in the context of content teaching (e.g. Day & Shapson, 1996; Netten & Spain, 1989). Specifically, research has identified a lack of 1) target language (TL) productive skill (speaking and writing) development, 2) TL development related to peer social interactions, and 3) development of accurate TL forms. Lyster (2007) maintains "…that the extent to which content-based teaching is language-rich and discourse-rich clearly affects second language learning outcomes" (p. 4). He further argues "…that second language learning and academic achievement are inextricably linked and thus [should] share equal status in terms of educational objectives" (p. 6). In order to improve TL development in my classroom, I have found the following guiding principles to be very helpful.

Set clear instructional goals for content and language learning.

Upon planning the unit, it is important to have a clear focus and perspective on what the students should learn during the unit. *Content objectives* refer to subject-specific academic knowledge/skills (e.g. students will be able to identify the key components of series and parallel circuits), and *language objectives* refer to a set of vocabulary, sentence structures and functions, and certain literacy skills specific to the target language use in the unit. From the onset, the teacher should have a clear view of how the unit is going to help the students attain these learning goals.

Balance content instruction with target language development.

Immersion instruction is a form of content-based instruction with the aim of immersing our students in the TL for naturalistic second language acquisition. However, we know that our students do not naturally acquire the TL with native-like fluency and accuracy by passively receiving comprehensible input in the classroom. As immersion teachers, we must *intentionally* integrate

language into our content lessons. TL vocabulary development, front-loading, communicative student activities, and literacy development are some ways of integrating TL development. Developing an immersion unit is a balancing act!

Build students' language proficiency by scaffolding.

Our students build their target language proficiency (in listening, speaking, reading, and writing) as they engage in tasks slightly higher than their cognitive ability with the support of an adult or more capable peer (i.e., Vygotsky's (1978) zone of proximal development). It is by stretching and scaffolding that our students learn to internalize the functional use of the target language. Total physical response (TPR), visuals, front-loading, activity structure, and mixed-language ability peer interactions are some of the ways to scaffold for TL production. Indeed, the lesson plan and unit format itself should serve as a scaffolding structure for students to be successful in the end. By creating a ladder of small successes for our students to climb throughout the course of the unit, we should see their motivation for learning the target language increase.

Gradually shift the teacher's role from provider to facilitator.

At the beginning of the unit, the teacher plays an active role as the provider of new content knowledge and the language forms. We engage our students, model and demonstrate new skills, and guide them in the path of mastering their crafts. As our students develop their proficiency in understanding the content and especially in applying their TL use (content vocabulary, sentence structure, etc.), the teacher's role should shift from that of provider to facilitator. Let the students take center stage! Let them do something with the content knowledge and language skills they just learned! We should facilitate such occasions by planning a number of student-centered instructional activities such as group communicative tasks and culminating projects towards the end of the unit.

Designing Immersion Lessons: Unit Plan Format

There are eight puzzle pieces to put together in designing an immersion curriculum unit. I would like to provide a brief summary for each piece.

1. Learning Objectives

This piece is more crucial for teachers than for students. At the beginning of each unit, set clear learning goals, content and language objectives, for your students. The sources for content objectives are state content standards, district curriculum, and teacher-identified student needs. Select several standards that can be bundled together (e.g., teach "food chains" and "the roles that decomposers play in a habitat" in the same unit). Bundling content standards is not only time-efficient but is also effective in helping students make connections among otherwise isolated bodies of knowledge or skills. The sources for language objectives are national/state foreign language standards (National Standards in Foreign Language Education Project, 1999), your program objectives, and teacher-identified student needs. TL literacy objectives can be selected from English Language Arts standards, as well as other foreign language standards and teacher-observed student needs. Many of these objectives ideally transfer across languages, too (e.g., finding main ideas and supporting details).

2. Anticipatory Set

This piece fits in the beginning of the lesson sequence. Here, the teacher attempts to 1) make a connection to students' prior knowledge of the incoming content; 2) motivate students to learn the new concepts; and 3) build students' background knowledge broadly related to the subject matter. Student activities such as the KWL graphic organizer, Quick Write[1], Essential Questions[2] (Wiggins & McTighe, 2005), and simulations, as well as watching a video, going on a field trip, and listening to a guest speaker, help students to simultaneously make connections with what they already know, motivate them to learn the new information, and build a good knowledge base especially for those who come to our classroom with little personal academic enrichment.

3. Front-Loading Target Language

Imagine that you are going to visit Japan in a few weeks, and your Japanese proficiency is, well, good enough to order some entrées at a Japanese restaurant. Would you appreciate a pocket book titled "Japanese for travelers?" Would your confidence level change if you knew the ten "most useful" Japanese expressions? Well, that is what front-loading is all about! This is an intentional TL-building component where the teacher explicitly develops TL vocabulary and sentence forms/expressions that the students will find useful prior to the content input. Science vocabulary such as mimicry, hibernation, camouflage, and migration are essential in understanding the content and thus represent "content-obligatory" language (Snow, Met & Genesee, 1989), but I often find it more appropriate to introduce these words while I unpack the scientific concepts behind them throughout the unit. In contrast, during front-loading, I try to build vocabulary and sentence forms that are more pertinent for everyday use and more transferable to multiple contexts, that is "content-compatible" language (Snow, Met & Genesee, 1989). For this unit on ecosystems, for example, I would review adjectives (sharp/dull (beaks), thick/thin (fur), hot/warm/cold (seasons), etc.) and verbs (find, eat, sleep, pick up, move, hide…). I would introduce or review sentence forms that express a need (____ need(s) _____ because …) and means (_____ helps _____ to _____). Consider planning oral and literacy activities for reinforcement after students learn these vocabulary and sentence forms.

Front-loading is a scaffolding structure suited for the less-proficient TL learners and can help to reinforce language that is already familiar to native speakers (in two-way immersion settings). It raises their confidence level in producing the target language and, therefore, increases their oral participation during the subsequent content lessons. It also aids all students in speaking and writing more accurate and appropriate TL forms when teachers set appropriate expectations during activities.

4. Content Input

Teaching from the textbook is *not* the only way to teach content! In fact, there should be a range of instructional modalities when we impart content knowledge to our students since they don't all learn in the same way. Some of our students learn best kinesthetically (through hands-on learning activities, simulations, and experiments), visually (from PowerPoint slides, videos, photographs, printed-materials, textbooks, articles), and auditorially (by listening to lecture, songs, audio tapes).

- Kinesthetic: Teacher may introduce a hands-on activity on camouflaging by hiding chameleon-shaped paper cut-outs in colors similar to the surroundings. Then, connect with the concept of animal adaptations.

- Kinesthetic: Students may try to pick up lima beans with a spoon, a pair of chopsticks, or a fork (simulating how different types of beaks are suitable for certain food types). Discuss the body parts of animals as adaptation devices.
- Visual: Teacher may show photos of certain animals adapting to their habitats by hibernating, migrating, camouflaging, etc. Develop the concepts of animal adaptations.
- Visual/Auditory: Students may watch (part of) a video on animal adaptations. Discuss the adaptation strategies that they saw in the video afterwards.
- Visual/Auditory: Create a PowerPoint presentation designed to teach animal adaptations. Create a handout that students fill in as they follow your presentation.
- Auditory: Listen to a song with lyrics that describe various animal adaptations.

During an experiment or while viewing a video, the teacher may have the perfect opportunity to introduce and develop the science vocabulary (e.g., migration, adaptation, mimicry). Make sure to plan some oral and literacy activities that will reinforce the content knowledge they just learned.

After learning content through various modalities, students read about it.

- Students now learn about animal adaptations from reading printed material(s).
- Preview the text using a graphic organizer, an excellent tool to prepare students for upcoming text structure and content organization before reading it.
- Generic graphic organizers that support concept-mapping (e.g., Venn Diagram, sequencing, describing, classifying) are also useful in transferring concepts across languages. The CoBaLTT graphic organizers[3] are completely customizable and also provide a scaffold for language learning (see Cammarata, 2005, *ACIE Newsletter* Bridge article).
- Students may read the text in various ways (independent reading, echo reading, guided reading, pair reading) for fluency, accuracy, and comprehension.

5. Target Language Literacy Development

This unit component seeks to build TL literacy skills (reading and writing skills) in the context of the academic content that students just learned. Even for the students with minimal TL background, the content knowledge provides a meaningful context for TL literacy. The teacher can teach reading comprehension, writing, mechanics and grammar, and other literacy skills that are either TL specific or transferable across languages.

Reading Comprehension Strategies

Before reading the text on animal adaptations, the teacher may teach a mini-lesson on reading comprehension strategies, such as recognizing non-fiction text structures, main idea and supporting details, cause and effect relationships, etc. The teacher would model the reading skill first and then guide the students in practicing it until they are independently proficient. In two-way immersion settings, this target language instruction may challenge the native speakers in developing their L1 literacy skills and increase their comprehension.

Writing Strategies

Likewise, the teacher may teach a mini-lesson on writing skills in the context of animal adaptations, banking on science vocabulary and concepts, as well as front-loaded sentence structure(s), already introduced to in the students at this point of the lesson. The teacher may teach how to develop

an informational report or summary, for example. Transferable writing skills learned in the target language should be applied to English writing as well during instructional time in English.

Mechanics and Grammar

Teaching language conventions is essential in developing linguistic fluency and accuracy in TL literacy. Teachers may help their students develop more complex sentence structures, teach verb tenses, or model appropriate punctuations. These language lessons can be either TL specific or transferable across languages and are not taught in isolation. The academic content (i.e., animal adaptations text) should provide the context in which these conventions are both observed and taught.

The teacher should assess students' learning of these literacy skills before moving on to the next segment of the lesson. The students are expected to apply the literacy skills learned in this section to their culminating projects near the end of this unit.

6. Check for Content Understanding

It is important to check the students' understanding of the content objectives before moving on to the culminating project. I made mistakes in starting my students off to make their projects only to discover that the majority of my class had not grasped the scientific concepts that they were supposed to explain in their projects. Since the main purpose of culminating projects is to give students the opportunity to demonstrate and apply their understanding of the content, it is a good idea to informally check their mastery before opening the flood gate, in order to determine if further instruction is needed or if students can work independently.

The teacher may facilitate an activity that gauges the level of understanding of the entire class, and/or administer a simple assessment individually. It is important to note, however, that at this point the teacher is checking for the students' understanding of *the content knowledge* and not their target language proficiency. The assessment should not challenge their TL reading and writing skills. I would not have my students write an essay on what they learned about animal adaptations; my choice of individual assessment formats would be definition-matching, cloze sentences, multiple-choice questions, and/or graphic organizers.

7. Culminating Project

This is the time when students take center stage and perform. At this point of the unit, the students are ready to take the content knowledge and target language skills that they have learned and apply them in creating a product. Examples of such products are "make and take" books, posters, magazines, brochures, radio broadcasts, PowerPoint presentations, play scripts, and so on. These products will be used to assess, via a rubric, students' mastery over the learning objectives of the unit.

Just as it is important to assess their content knowledge before allowing them to work on culminating projects independently, it is also important to check on their ability to produce the TL forms needed for the project itself and for interaction with each other as they negotiate the project task.

Culminating projects serve as a perfect opportunity to have students engage in peer interactions in the TL. Their oral production in the TL should increase as the result of the confidence built up through front-loading, content input and literacy development. The teacher should take on a

facilitating role and create opportunities for students to engage in sustained TL discourse by 1) having the students work in mixed-language ability groups or 2) giving them group collaborative projects in which a small number of group members create a project together. While working on their projects, or any other times during the unit, remind the students to speak *only* in the target language. When the students finish creating the project, they may share their projects with each other, another opportunity for speaking in the TL. Typically, such projects are graded with a rubric that includes criteria to assess both content understanding and language use.

8. Assessment

The last piece of the immersion unit is assessing our students on how they learned both the content knowledge (the content objectives) and the language skills (the language objectives). The teacher may decide on a student's grade based on *formal* assessment(s) (culminating project, end-of-lesson quiz, chapter test) and *informal* assessments (in-class observations, quizzes and other checks for understanding, individual/group worksheets).

The following is an example of a unit constructed with these pieces. It is a 4th grade science unit on ecosystems.

Teaching in an immersion classroom is a high calling. We are expected not only to teach the subjects but also to build TL proficiency in our students. I hope that you will find the curriculum unit plan format useful in your teaching practice.

References

Cammarata, L. (2005). Instructional scaffolding with graphic organizers. *ACIE Newsletter*, 8(2), Bridge Insert, pp. 1-12. Retrieved 11-5-09 at: http://www.carla.umn.edu/immersion/acie/vol8/2005BRIDGE8.2.pdf

Day, E. & Shapson, S. (1996). *Studies in immersion education*. Clevedon, UK: Multilingual Matters.

Lyster, R. (2007). *Learning and teaching languages through content: A counterbalanced approach*. Philadelphia, PA: John Benjamins Publishing Co.

National Standards in Foreign Language Education Project. (1999). *Standards for foreign language learning in the 21st century.* Lawrence, KA: Allen Press, Inc.

Netten, J. & Spain, W. (1989). Student-teacher interaction patterns in the French immersion classroom: Implications for levels of achievement in French language proficiency. *The Canadian Modern Language Review*, 45, 485-501.

Snow, M.A., Met, M. & Genesee, F. (1989). A conceptual framework for the integration of language and content in second/foreign language instruction. *TESOL Quarterly,* 23, 201-217.

Vygotsky, L. S. (1978). *Mind and society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wiggins, G. & McTighe, J. (2005). *Understanding by design* (Expanded 2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Endnotes

1. Information about Quick Write can be found at: *http://forpd.ucf.edu/strategies/quick-write-strategy-Oct08.html*
2. "Essential questions" (Wiggins & McTighe, 2005) are vitally important. They get at the heart of the matter or the essence of the issue. Like content goals, they should guide the development of a curricular unit.
3. The CoBaLTT online, customizable graphic organizers can be found at: *http://www.carla.umn.edu/cobaltt/modules/strategies/gorganizers/index.html*

Immersion Unit Plan: Ecosystems
Life Science 4th Grade

Duration: Forty-Five Minute Lessons Daily Over 3-4 Weeks

Note: The Japanese writing system uses three distinct scripts: hiragana (a syllabary, or alphabet based on syllables), katakana (a syllabary for foreign borrowed words), and Kanji (Chinese characters). In this unit, the Kanji are given in parentheses to show the actual Japanese words that students should be exposed to. The author of this unit chooses to scaffold complex Kanji for his students by also providing the words in hiragana.

1 a. Learning Objectives: Content

Life Sciences Standard 2[1]

Students will demonstrate understanding that:

a. plants are the primary source of matter and energy entering most food chains.

b. producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.

c. decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

Life Sciences Standard 3

Students will demonstrate understanding that:

a. ecosystems can be characterized by their living and nonliving components.

1 b. Learning Objectives: Content-Obligatory Language

Ecosystem Vocabulary

エネルギー、こうごうせい(光合成) にさんかたんそ(二酸化炭素), しょくもつれんさ(食物連鎖)、しょくもつもう(食物網)、せいさんしゃ(生産者)、しょうひしゃ(消費者)、ぶんかいしゃ(分解者)、せいたいけい(生態系)、そうしょくどうぶつ(草食動物)、にくしょくどうぶつ(肉食動物)、ざっしょくどうぶつ(雑食動物)、エネルギーピラミッド (energy, photosynthesis, carbon dioxide, food chain, food web, producer, consumer, decomposer, ecosystem, herbivore, carnivore, omnivore, energy pyramid)

Life Science Related Vocabulary

どうぶつ(動物)、しょくぶつ(植物)、にっこう(日光)、みず(水)、くさ(草)、にく(肉)、むし(虫)、た(食)べる、い(生)きる、し(死)ぬ (animal, plant, sunlight, water, grass, meat, to eat, to live, to die)

Language Functions and Structures

Students will:

- State actions in active voice.
  ____は____を食べます。
  Rabbits eat plants.
- State actions in passive voice.
  _____は_____に食べられます。
  Rabbits are eaten by hawks.
- Use auxiliary verb in forming passive verbs.

- Use compound sentences using coordinate conjunctions.
  ____は____を食べます。そして(でも)、____は____を食べます。
  Rabbits eat plants, and (but) hawks eat rabbits.

1 c. Learning Objectives: Content-Compatible Language

Categorical Terms for Summarizing

そうげんどうぶつ(草原動物)、虫、きのこ、いきもの(生き物) (prairie animals, insects, mushrooms, living things)

Synonyms for Paraphrasing

ゆきわたる(とどく)、つくりだす(つくる)、つうじる(とおす)、土をこやす(いい土をつくる)、むすぶ(つなげる)、なりたつ(できる) Spread (reach), produce (make), via (through), fertilize (enrich the soil), link (connect), consist of (made up of)

Language Functions and Structures

Students will:

- Identify a location.
  ここは_____です。
  This is a forest.
- State animate existence.
  _____には_____がいます。
  Red-tailed hawks live in forests.
- Sequence sentences with connecting words.
  さいしょ(最初)に、_____。つぎ(次)に、_____。そして、_____。さいご(最後)に、_____。
  First, producers create energy. Next, herbivores eat producers. Then, carnivores and omnivores eat herbivores. Finally, decomposers feed on dead organisms and return nutrients back to soil.
- Identify possible cause-effect relationships.
  _____(だ)から、_____だとおも(思)います。
  I think (the chicks died) because there was not enough food for them.
- Hypothesize in past/present tense.
  もしかしたら、____ かもしれません。たぶん、____(だ)からだと思います。
  Perhaps, it was the lack of food. I think it was because they did not have enough food to eat.
- Identify multiple items in a series.
  _____と_____と_____だと思います。
  I think they are sunlight, water, and grass.
- Indicate agreement or disagreement.
  はい、そうだとおもいます。　　いいえ、ちがうと思います。
  Yes, I think so, too. No, I don't think so.
- Explain with because clause.
  なぜかというと、_____(だ)からです。
  It is because plants produce energy by photosynthesis.

1 d. Learning Objectives: Literacy in Japanese and English[2]

Reading Comprehension Standard

Students will:

2.2 Use appropriate strategies when reading for different purposes.

Writing Standard

Students will:

2.4 Write summaries that contain the main ideas of the reading selection and the most significant details.

Written and Oral English Language Conventions

Students will:

1.1 Use simple and compound sentences in writing and speaking.

1.3 Identify and use regular and irregular verbs (in active/passive voice).

1.3 Identify and use coordinating conjunctions in writing and speaking.

Unit Procedures

 = pair/group oral language activity

2. Anticipatory Set: Essential Question

"How do living organisms depend on one another and on their environment for survival?"

Students will:

- Identify cause-effect relationships.
- Hypothesize in past tense.
- Explain with "because" clause.

1. Teacher shows photos of plants and animals native to California and writes key vocabulary on flip chart paper for students to access later. 
2. Then, teacher shows photos of Cassin's auklets that live on the Farallon Islands, CA. Inform students that:
   - Cassin's auklets live much of their lives in the open ocean.
   - In the spring, about 20,000 pairs of these birds migrate to the Farallon Islands, dig deep burrows, and lay their eggs.
   - Adult auklets usually feed their chicks with krill.
   - In 2005 and 2006, almost none of their chicks survived.
3. Teacher asks students what could have possibly caused this.
4. Students discuss in their groups and share out.
5. Then teacher explains that plants and animals may suffer loss as a result of changes in their natural environment. Teacher points to the breakdown of the food chain as the cause of the auklets' massive breeding failure.
6. Teacher shows the food chain (Cassin's auklets → krill → plankton) on a PowerPoint slide.
7. Teacher explains that weak winds and faltering ocean current delayed the seasonal upwelling resulting in less plankton in the water and a lower number of krill that feed on the plankton. The auklets and other seabirds, fish, and mammals are left with a very limited number of krill.
8. Then the teacher writes on the board the Essential Question, "How do living organisms depend on one another and on their environment for survival?"

3 a. Front-Loading Target Language: Content-Obligatory Vocabulary for Food Chain and Ecosystem

Teacher, using visuals and TPR®, reviews the familiar content-obligatory vocabulary for the food chain and ecosystem

動物、植物、にっこう（日光）、水、草、肉、虫、食べる、生きる、死ぬ

(Animal, plant, sunlight, water, grass, meat, to eat, to live, to die)

Reinforcement Activity: What's Missing?

Students will:

- Identify multiple items in a series.
- Indicate agreement or disagreement.

1. Teacher shows the vocabulary pictures on the overhead.
2. Teacher turns off the overhead, takes away a picture, turns it on again, then asks the question, "Which picture is missing?"
3. Students discuss in their groups.
4. Then, teacher picks one student to answer. If the student answers correctly, the student's group receives a point.
5. Teacher increases the number of pictures to take away. ("Now 2 pictures are missing...3 pictures...)
6. Students cannot write down the words; they need to play by memory.

3 b. Front-Loading Target Language: Content-Obligatory Compound Sentence Structure

Using photos of California native plants and animals previously introduced during the anticipatory set, teacher reviews the compound sentence structure(s) with coordinate conjunctions:

____は____を食べます。そして（でも）、____は____を食べます。

Bush rabbits eat manzanitas, and red-tail hawks eat bush rabbits.

Reinforcement Activity: Ticket Champion

Students will:

- State actions in active voice.
- Use compound sentences with coordinate conjunctions.
- Indicate agreement or disagreement.

1. Teacher (T) gives students (Ss) 2-3 tickets.
2. T displays pictures of plants and animals that represent several food chains on the board.
3. Ss roam in the classroom.
4. At T's prompt, Ss make pairs.
5. Looking at the pictures on the board, one student identifies a food chain and shares it with the partner using compound sentences with conjunctions. Switch parts.
6. When Ss finish speaking to each other, they do "rock-paper-scissors" in their pairs.
7. The winner receives a ticket from their partner.
8. Then, Ss pair up with other partners and go through steps 5-7 again.
9. If a student loses all his tickets, he comes to the teacher to receive more tickets.
10. (optional) At the end of the activity, T recognizes the student(s) with the most tickets as "the ticket champion(s)."

3 c. Front-Loading Target Language: Literacy

Students practice writing new content-obligatory vocabulary, language functions, sentence structures and appropriate kanji (Chinese characters that are part of the Japanese writing system) on worksheets.

4 a. Content Input: Experiment/Demonstration (Modality: Kinesthetic)

Students will:

- Use content-obligatory vocabulary (ecosystems).
- State action in active/passive voice.
- Explain with "because" clause.
- Sequence sentences with connecting words.

Simulation: Creating a Food Web

During this activity, teacher introduces the new content-obligatory vocabulary such as: energy, photosynthesis, carbon dioxide, food chain, food web, producer, consumer, decomposer, ecosystem, herbivore, carnivore, and omnivore (in the target language) on the board.

1. Pick one student to be the sun and give the sun a ball of yarn.
2. Review with them that the sun is the source of all energy on earth. Pick another student and give him a picture of a plant. Ask the student portraying the sun to throw the ball of yarn to the plant and begin the food chain (green plant, or producer). The sun holds onto the end of the yarn and tosses the ball of yarn to the plant.
3. Ask the students why the first step of the food chain is plants. Students discuss in their groups and share out their answers.
4. Now pick another student and give him a picture of an herbivore, a plant-eating animal. Ask the plant person to toss the ball of yarn to the herbivore. Be sure the "plant" holds onto the yarn before tossing the ball.
5. Now teacher selects another student to be a carnivore, a meat-eating animal, or an omnivore, an animal that eats both plant and meat. The plant eater tosses the yarn to that animal.
6. The game progresses as each member of the food chain takes turn holding onto the yarn. The sequence stops at the top of the food chain, a predator that has no enemies, such as a hawk.
7. Snip off the yarn and give the ball back to the sun. Start the sequence again. Those who participated before can have another turn, thereby illustrating the growth of a food web. An animal usually has more than one source of food. For example, a bird can eat seeds and insects; or a hawk can eat rabbits or snakes. The coyote and opossum eat nearly everything—plants, animals, and human foods.

Adopted from the website: Food Chains and Webs by Breeding and Zack (http://www.urbanedpartnership.org/uclasp/urban_science/food_chains/breeding.htm)

4 b. Content Input: PowerPoint Presentation (Modality: Visual)

Food Chain/Food Web/Ecosystem

Teacher reviews previous content-obligatory vocabulary, エネルギー(energy), 草食動物(herbivore), 肉食動物(carnivore), 雑食動物(omnivore), 光合成(photosynthesis), にさんかたんそ(carbon dioxide), 食物れんさ(food chain), せいさんしゃ(生産者)(producer), しょうひしゃ(消費者)(consumer), ぶんかいしゃ(分解者)(decomposer), しょくもつもう(食物網)(food web), せいたいけい(生態系)(ecosystem), エネルギーピラミッド(energy pyramid) with PPT slides and videos. Teacher explains how these terms conceptually relate with one another.

Content Reinforcement Activity 1: Science Song (Modality: Auditory)

- The teacher may teach a song to reinforce the content-obligatory vocabulary, sentence structures, and possibly the concepts introduced in the unit.
- Teach the song and revisit it several times. It is a great transitioning tool as well.

Content Reinforcement Activity 2: Find Someone Who

(Content-Compatible Language Integration: question formation, identifying, explaining, hypothesizing, present tense, because clauses)

1. Teacher distributes a sheet with questions on the previously learned content knowledge.
2. Students go around the classroom finding someone who can answer the questions in the target language.
3. Students are responsible for writing down the answers given by classmates.
4. The student who answered the question writes his/her initials next to that question.
5. Students should collect initials on all questions on the sheet.

Find Someone Who...

__ 1. Can name one herbivore, one carnivore, and one omnivore.

_____

__ 2. Can define photosynthesis.

_____

__ 3. Can explain how the sun's energy flows to living organisms through a food chain.

_____

__4. Can predict how the Energy Pyramid might change during a drought.

_____

4 c. Content Input: Literacy (Modality: Visual)

Graphic Organizer

"Structured Overview" graphic organizer from CoBaLTT website: *http://www.carla.umn.edu/cobaltt/modules/strategies/gorganizers/HGO/17H.PDF*

Before reading the text, teacher previews how the incoming text is structured (i.e., topical organization) by completing a graphic organizer with the students.

Reading the Text

1. Teacher distributes the reading text to each student. This teacher-created reading text consists of paragraphs that explain key concepts of ecosystems such as photosynthesis, roles of producers, types of consumers (herbivores, carnivores, and omnivores), roles of decomposers, food chain, food web, ecosystems and the energy pyramid.
2. Students first attempt to read the passage by themselves.
3. Teacher and students "echo" read the passage; teacher reads only 2-3 words at a time.
4. Teacher encourages students to identify any difficult word(s) in the passage that he/she did not understand. Teacher explains these words on the board, and the individual/entire class read(s) these words.
5. Students practice reading the passage in pairs (Buddy Read).
6. Teacher and students echo-read the passage for the last time.
7. (optional) Teacher asks for volunteers to go to the front of the class and read the passage (one student or as a pair).

5 a. Target Language Literacy Development: Writing Compound Sentences with Coordinate Conjunctions

- On chart paper, teacher models how to combine two short sentences with coordinate conjunctions (and/but), using the food chain as the context (e.g. Rattle snakes eat meadow mice, and red-tailed hawks eat rattle snakes).

> かべとかげは、虫を食べます、そして　たぬきはかべとかげを食べます。
> *Fence lizards eat insects, and raccoons eat fence lizards.*
> 雑食動物は、肉も植物も食べます、でも　肉食動物は肉しか食べません。
> *Omnivores eat both meat and plants, but carnivores eat nothing but meat.*

- Students copy the model sentences.
- Then, teacher and students develop a model paragraph on the food chain together (Shared Writing), integrating the content vocabulary, language functions, use of compound sentences and content knowledge.
- Teacher informally checks students' writing before moving on.

5 b. Target Language Literacy Development: Writing Sentences in Active and Passive Voice

- On a PowerPoint slide, teacher shows a food chain: manzanita → insect → lizard → raccoon.
- Then teacher models how to write sentences in active and passive voice, using the food chain as the context (e.g. Insects eat manzanita. Then, insects are eaten by lizards.).

> 虫はマンザニータを食べます。そして、かべとかげは虫を食べます。
> *Insects eat manzanitas, and fence lizards eat insects.*
> 虫はかべとかげに食べられます。
> *Insects are eaten by fence lizards.*

- Teacher shows how Japanese verbs are conjugated with auxiliary verb (~れる) in forming passive verbs.
- Students copy the model sentences.
- Then, teacher and students write more sentences in active/passive voice, using other food chains and food webs as the context. Practice conjugating other verbs to form passive voice (fertilize/fertilized, connect/connected, etc.).
- Finally, students independently practice forming sentences in active and passive voice as they describe other food chains and food webs.
- Teacher informally checks students' writing before moving on.

5 c. Target Language Literacy Development: Reading and Summarizing the Passages

Students will use content-compatible language for summarizing:

- Categorical terms (for paraphrasing)
- Synonyms
- Transitional words (therefore, however, besides)

How to Summarize a Text

- First, teacher selects a passage from the ecosystem text.
- Then, using the text, teacher models how to summarize a passage, following the steps below:
  1. Cross out information that is not important.
  2. Replace a list of things with a generic term (e.g. change "hawks, rabbits, and mice" into "prairie animals").
  3. Paraphrase the paragraph.
  4. Give a title.
  5. Create a topic sentence.

(These steps are written on a poster which is displayed in the classroom.)

- Students copy the model summary.
- Then, teacher selects another passage and guides students in summarizing the passage. This time, students are encouraged to participate in the process.
- After sufficient practice, students now attempt to independently summarize a new passage.
- Teacher collects students' summaries and checks for understanding.

How to Summarize Text

1. Cross out information that is not important
2. Replace a list of things with a generic term
3. Paraphrase the paragraph
4. Give a title
5. Create a topic sentence

6. Check for Content Understanding

Content-Obligatory/Compatible Language Integration
(see language objectives):

- Active /passive voice
- Defining
- Describing
- Sequencing
- Expressing cause-effect
- Use of "because" clause

Heads Together

- Teacher distributes a sheet of paper to each group.
- The sheet has 4 sections: 1) こうごうせい(光合成)(photosynthesis), 2) しょくもつれんさ(食物連鎖)(food chain), 3) しょくもつもう(食物網)(food web) and せいたいけい(生態系)(ecosystem), and 4) エネルギーピラミッド(the energy pyramid)
- Students in the group come up with *anything* they know about each topic, and one member (a capable Japanese writer) writes down what the group members say in the appropriate section within the allotted time limit.
- Each sentence is marked with the initial of the student who contributed the idea.
- Teacher may reward the group with the most number of ideas.
- Teacher collects the paper from each group and checks that the students have learned the content objectives.

7. Culminating Project

Poster Activity: Food Web Poster

- Teacher revisits the essential question, "How do living organisms depend on one another and on their environment for survival?" and reviews the environmental changes that negatively affected the food chain of Cassin's auklets (Cassin's auklets → krill → plankton).

- Teacher explains that one important way that living organisms depend on one another for survival is by being a part of food chains and webs in the ecosystem.
- Students create a poster that shows California ecosystems (on prairie, in desert, in ocean, etc.) and provide a short written summary that explains how the energy from the sun flows through the system. This poster creation/presentation is linked to the essential question that guided the unit.
- In the summary, students should use:
  - content-obligatory vocabulary (e.g., photosynthesis, food chain, food web, producers and consumers, plants, herbivores, carnivores and omnivores)
  - content-obligatory language functions and sentence structures (identifying a place, expressing animate existence, stating actions in compound sentences in active and passive voices)
  - their knowledge of how to answer the essential question
- Teacher assesses the student posters in terms of how they demonstrate 1) understanding of content and 2) mastery of language skills (summarizing the poster and forming compound sentences in active and passive voice). Teacher also assesses student's work habits, punctuality, and creativity with a teacher-made rubric.

Content Reinforcement Activity: "Stayer and Strayer"

1. Half of the class becomes "stayers." Each stayer stays anchored in one location of the classroom, presents his poster and reads his summary to the student (strayer) who comes to him.
2. The other half will become "strayers." Each strayer goes to a stayer and listens to his presentation. When the stayer finishes presenting his poster, the strayer moves to another stayer and listens to the presentation.
3. After awhile, the teacher signals, and now the stayers and strayers switch their roles.
4. All presentations must be in the target language.

8. Assessment

1. Formal Assessment:
   a. End-of-unit test designed to assess both content and language objectives
   b. Application activity product (Food Web Poster) graded with the rubric.
2. Informal Assessment:
   a. Observation grades, in-class worksheets, "Heads Together" group log, independent practice (summary, active and passive voice), etc.

Endnotes

1. Taken from Science Content Standards for California Public Schools, *http://www.cde.ca.gov/be/st/ss/documents/sciencestnd.pdf*
2. Taken from English-Language Arts Content Standards for California Public Schools, *http://www.cde.ca.gov/be/st/ss/documents/elacontentstnds.pdf*