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EDT 514 Final Portfolio

Welcome to my EDT 514: Application of Instructional Design final portfolio. The following portfolio is based on a science unit I created entitled “Managing the Great Lakes’ Food Chain.” As an avid fisherman, I was extremely excited to incorporate my knowledge and love of fishing, boating, and the Great Lakes with the State of Michigan’s Fourth Grade Ecosystem Standard. When designing my unit, I utilized the Instruction Systems Design concept, better known as ISD. The ISD process consists of five steps: Analyze, Design, Develop, Implementation, and Evaluation, better known as the ADDIE concept. It is my belief that the ADDIE concept provides instructors with a systematic approach for creating engaging lessons that optimize student learning. As a direct result of taking this course, I feel more confident and knowledgeable as an Instructional Designer. Please enjoy my first ISD unit, below you will find:

1) Project Definition

In this section you will be provided with an overview of my “Managing the Great Lakes’ Food Chain” unit. Listed is information based on my reasoning for designing the unit, detailed information on my work setting, state standards and benchmarks that will be addressed, and a list of informational websites.

2) Content and Learner Analysis

In this section you will find a list of supplemental lessons that work directly across curriculum with this unit. Lessons are organized by subject area, and work directly with Michigan fourth grade state standards and benchmarks and Grade Level Content Expectations (GLCEs). The learner analysis section provides the instructor with specific examples on how to conduct the unit based on specific information taken from data sources and learner characteristics.

3) Instructional Analysis

In this section you will find how an instructional area of the unit is sub-divided. The analysis was designed to introduce fourth grade students to the geography and water usage of the five Great Lakes. Students will learn the characteristics of each Great Lake, and locate native and exotic species, thus linking this to my unit “Managing The Great Lakes’ Food Chain.” Michigan social studies and science standards will be addressed. In the ISD process, every lesson should have clearly defined instructional analysis.

4) Objectives and Domain

In this section you will find how I defined the objectives and domain for a specific lesson, “Zebra Mussels: Friend or Foe?” During this guided discovery lesson, students will develop a further understanding of zebra mussels, an invasive species to the Great Lakes. The Terminal and Enabling objectives are defined for this lesson, each supported by an affective and cognitive goal. In the ISD process, every lesson should have clearly defined Terminal and Enabling objectives supported by affective and cognitive goals.

5) Instructional Materials

In this section you will find examples of the instructional pages I created for my “Managing the Great Lakes’ Food Chain Unit. Each lesson has been created around a specific instructional design technique to maximize student learning.

6) **Evaluations**

In this section you will find formative and summative evaluations used to critique the “Managing the Great Lakes’ Food Chain” unit. The formative evaluation plan was designed utilizing One-to-One Evaluation. The instructor will meet with a DNR Official (expert in the field of study) and randomly selected students (target audience) before the unit begins. Once the unit is complete, the instructor will reflect upon the initial evaluation, and make the necessary changes to make the unit more effective, engaging, and efficient. The summative evaluation allows the learner and the instructor to critique the learning materials utilized throughout the “Managing the Great Lakes’ Food Chain” unit.

Project Definition

“Managing The Great Lakes’ Food Chain”

Overall Description

- **Topic of Choice:**

“Managing The Great Lakes’ Food Chain.”

A science unit designed to introduce fourth grade students to the Great Lakes’ food chain.

- **Description of Learners:**

This unit will target 54 fourth grade students at Frank E. Weiss Elementary. Currently, I teach science to both fourth grade classes at Frank E. Weiss Elementary every Tuesday, Wednesday, and Friday afternoon. A majority of fourth grade students are Caucasian. There is approximately the same number of male and female students. There are seven students who attend resource room for needed assistance.

- **Description of the School Culture and Situation:**

Frank E. Weiss Elementary (Gibraltar School District) is located in Woodhaven, MI. The school is located in a suburban setting, and consists of approximately 330 students. A majority of the student population is Caucasian, which follows the local ethnic trend.

- **Readiness of Learners for this Topic:**

This unit will introduce students to various food chains that exist in nature. Through casual conversation, I have learned that several students enjoy fishing. However, only a small amount of students know about the spread of VHS and exotic species that have invaded the Great Lakes region.

- **Why Did You Choose the Topic?**

I chose this topic based on one of my favorite pastimes, fishing. Currently I live in Grosse Ile, MI, and I love to go fishing with family and friends whenever I have the opportunity. As a fisherman, I am very concerned about the preservation of the Great Lakes. I view the spread of VHS and the invasion of exotic species to be very concerning. As a fourth grade instructor I have the opportunity to incorporate lessons focusing on the fish of the Great Lakes into my science Food Chain unit.

- **Why will your project be unique and original?**

I believe that incorporating fish of the Great Lakes into my Ecosystem unit will provide students with a better understanding of our beautiful lakes. Students are introduced to Michigan history, geography, and business in fourth grade; it seems appropriate to bring an aspect of Michigan’s science into the fourth grade classroom as well. The Great Lakes’ food chain has always had a large impact on our state. In addition, as the students are familiar with the Great Lakes as a result of their proximity to them, it will be easier for the students to grasp the concept of food chains using this method than if the educator chose to use an unfamiliar example (e.g. cave, tundra, or rainforest ecosystems).

Rationale and Ready Resources

- **State Standards:**

This unit will address the following Fourth Grade Science Standards:

[Ecosystems \(LEC\) III.5 \(Click to view the standards\)](#)

1. All students will explain how all parts of an ecosystem are related and how they interact.
 - Identify familiar organisms as part of a food chain or food web and describe their feeding relationships within the web.

2. All students will explain how energy is distributed to living things in an ecosystem.
 - Describe the basic requirements for all living things to maintain their existence.
3. All students will investigate and explain how communities of living things change over a period of time.
 - Design systems that encourage growth of particular plants or animals.
4. All students will explain how humans and the environment interact.
 - Describe positive and negative effects of humans on the environment.

- **Websites Resources:**

1. http://www.michigan.gov/dnr/0,1607,7-153-10364_10950_46202-160980--,00.html - This is a 2007 DNR report detailing the VHS epidemic.
2. http://www.sixwise.com/newsletters/07/07/04/what_you_need_to_know_about_vhs_-_a_vicious_killer_virus_that_is_silently_wiping_out_fish.htm - This article provides individuals with information on VHS.
3. <http://dnr.wi.gov/fish/pages/DATCP%20advisory%20may%202007.pdf> - This website has been provided by the 2007 Wisconsin Fish Advisory providing information on VHS.
4. <http://www.epa.gov/air/oaqps/gr8water/xbrochure/lakes.html> - This website provides detailed information on the Great Lakes region.
5. <http://www.cyfernet.org/cybercamp/thuaug20.html> - This website provides definitions of an underwater food chain.
6. http://www.michigan.gov/dnr/0,1607,7-153-10364_18958---,00.html - This website provides links to help students properly identify Michigan fish.
7. <http://www.great-lakes.org/exotics.html> - This website provides information on exotic species that have invaded the Great Lakes region.
8. http://www.greatlakesdirectory.org/wi/031805_great_lakes.htm - This is a 2005 article stressing the importance of stricter rules and regulations regarding freighters.
9. <http://www.great-lakes.net/envt/flora-fauna/invasive/goby.html> - This website provides a better understanding of one of the Great Lakes' newest invaders, the Goby.
10. http://www.record-eagle.com/local/local_story_242103038.html - An article about invasive species causing both fish and bird deaths in the Great Lakes region.

Content Analysis “Managing The Great Lakes’ Food Chain”

Mathematics

Fractions:

- 1) “What If a Disaster Happens?” – Pretend a particular organism is removed from the food chain, how will other animals be affected? Have students look at different scenarios, and analyze what fraction of the food chain is lost when an organism is removed.
- 2) Recipes – Have students look at fish recipes. Examine the fractions listed in each recipe.

2D & 3D Shapes:

- 1) Fishing Lures – Bring in fishing lures (with the hooks removed for student safety). Have students make a list of the 2D and 3D shapes he/she locates in each lure. Lures play a vital part in the Great Lakes’ food chain. Humans utilize lures to catch fish in order to create a meal.

Social Studies

Economics:

- 1) DNR Fees – The students will take a look at what DNR fees (hunting and fishing licenses, ORV license, State Park fees, etc.) cover. Why do you have to pay to enter a state park?

Geography:

- 1) Know HOMES – In order to understand the Great Lakes’ food chain, students must know the geographic location of each of the five Great Lakes. Students will use the HOMES acronym to help memorize the names of the Great Lakes.
- 2) Digital Videos – Students will watch digital videos via United Streaming to help understand the features of each of the Great Lakes.

State Government:

- 1) Bill to Law Project – Have students draft a bill that would enforce stricter laws on freighters in regards to ballast dumping. Assign students different roles such as citizen, Governor, State Senator and Representative, etc. Role-play to see if the bill becomes a law.

Language Arts

Letter writing:

- 1) Letters to Representatives – Have students write letters to State Representatives sharing his/her concern about the current state of the Great Lakes.

Poetry:

- 1) Write Poems – Use a variety of poetry techniques and have students create poems based on wildlife, the food chain, etc.

Science

Geology

- 1) Examine Terrain - Have students examine the make up of the Michigan terrain. Discuss how glaciers have influenced terrain and land composition.
- 2) Rock Identification – Have students identify the rocks found in different soil, river, and lake samples.

Biology

- 1) Locate Fish – Have students look at fishing reports to locate where the fishing “hot spots” are. For instance, it is well known that Lake Erie is famous for its walleye fishing, and Lake Michigan is famous for its salmon fishing. Have students map the “hot spots.”

Learner Analysis
“Managing The Great Lakes’ Food Chain”

<u>Information Categories</u>	<u>Data Sources</u>	<u>Learner Characteristics</u>
<p>1. Entry Behavior – Students should be able to figure out how organisms obtain energy in a food chain. Students should be able to define vocabulary associated with a food chain.</p>	<p>The teacher can reference every student’s third grade report grade located in the student’s CA-60 folder. Students are introduced to ecosystems in third grade. The teacher can also have a verbal conversation with third grade teachers to help determine entry behaviors.</p>	<p>Entry behaviors will range from complete comprehension to struggling to comprehend the topic. When planning activities, the teacher will pair struggling students with students that comprehend the topic to help struggling students eliminate misconceptions and understand the topic.</p>
<p>2. Prior Knowledge of Topic Area - Students should have prior knowledge of the food chain concept (the transfer of energy, predator/prey relationships, and general knowledge of the organisms linked in a food chain.</p>	<p>The teacher can have students take a quiz and/or test before the unit to determine prior knowledge of food chains.</p>	<p>There will be students who have previously learned misconceptions toward the topic. It is the teacher’s job to try and eliminate all misconceptions in order to help students learn to his/her fullest potential.</p>
<p>3. Attitude toward Content and Potential Delivery System – Before designing instruction the teacher must develop an understanding of his/her students’ attitude toward the topic about to be presented.</p>	<p>The teacher can have students complete an attitude survey ahead to determine potential attitudes.</p>	<p>It is my belief that students will enjoy this topic due to the fact that Weiss Elementary is close to Lake Erie. Many students enjoy fishing and boating.</p> <p>The content will be delivered in a “hands-on” fashion utilizing digital videos when and where applicable. The goal is to actively engage students.</p>
<p>4. Academic Motivation (ARCS) – Instruction must be motivating in order for students to learn at his/her fullest potential.</p>	<p>The teacher can have students complete a survey to determine motivation.</p> <p>The teacher can also determine motivation through observation and conversation with the students.</p>	<p>This unit will provide students with a solid understanding of how the Great Lakes’ ecosystem. I hope this unit will motivate students to explore the Great Lakes region.</p>

<p>5. Educational and Ability Levels – The teacher must determine every student’s educational and ability level prior to designing instruction.</p>	<p>The teacher can reference every student’s previous report cards located in the student’s CA-60 folder.</p>	<p>Almost all of the students attended Weiss Elementary last year. It is believed that the students should have an understanding of an ecosystem regardless of ability level.</p>
<p>6. General Learning Preferences – Determining how students want to learn.</p>	<p>The teacher can determine learning preferences through conversation with the students and/or having students complete an interest survey.</p>	<p>I believe that in order for this unit to be taught to its fullest potential, lessons must be “hands on” and inquiry based.</p>
<p>7. Attitudes toward Training Organization – Understanding students’ feelings toward fellow students, content delivery, and the instructor.</p>	<p>The teacher develops an understanding of attitudes toward training organization through observation.</p>	<p>I believe the reason my students are motivated is due to the fact that I teach with enthusiasm. Students feed off of my energy, and see the importance of understanding a topic. The same enthusiasm will be utilized in this unit to motivate and engage students.</p>
<p>8. Group Characteristics – An understanding of one’s classroom.</p>	<p>The teacher develops an understanding of his/her students’ characteristics through observation.</p>	<p>My class consists of 26 students (14 boys and 12 girls) ranging in from 8 years old to 10 years old. The majority of students are Caucasian, which follows the local ethnic trend. The students live close to Lake Erie and its surrounding parks. The students generally enjoy science and hands on activities.</p>

Instructional Analysis

“Managing The Great Lakes’ Food Chain”

This was designed to introduce fourth grade students to the geography and water usage of the five Great Lakes. Students will learn the characteristics of each Great Lake, and locate native and exotic species, thus linking this to my unit “Managing The Great Lakes’ Food Chain.” Michigan Social Studies and Science Standards will be addressed.

1.0 Lake Huron

1.1 Geography

- 1.1.1 What is the size of the lake in terms of volume?**
 - 1.1.1.1 Third largest of the Great Lakes**
- 1.1.2 Dimensions?**
 - 1.1.2.1 206 miles across east to west**
 - 1.1.2.2 183 miles across north to south**
- 1.1.3 Depth?**
 - 1.1.3.1 Average depth 195 ft. deep**
 - 1.1.3.2 Deepest depth approximately 750 ft. deep**
- 1.1.4 What state(s) and/or countries is this lake bordered by?**
 - 1.1.4.1 Michigan (U.S.) and Canada**
- 1.1.5 What are the connecting waterways?**
 - 1.1.5.1 Straits of Mackinaw and St. Clair River**

1.2 Using the Water

- 1.2.1 Tourism**
 - 1.2.1.1 Lighthouses**
- 1.2.2 Boating**
 - 1.2.2.1 Recreational**
- 1.2.3 Swimming**
 - 1.2.3.1 Beaches**
- 1.2.4 Shipping Channels**
 - 1.2.4.1 Freighters**
- 1.2.5 Fishing**
 - 1.2.5.1 Native Species**
 - 1.2.5.1.1 Bass, Whitefish, Salmon, Steelhead, Walleye, Perch, Brown trout**
 - 1.2.5.2 Exotic Species**
 - 1.2.4.1.2 Goby, Ruffe, Sea Lamprey, and Zebra Mussels**

2.0 Lake Ontario

2.1 Geography

- 2.1.1 What is the size of the lake in terms of volume?**
 - 2.1.1.1 Fourth largest of the Great Lakes**
- 2.1.2 Dimensions?**
 - 2.1.2.1 193 miles across east to west**
 - 2.1.2.2 53 miles across north to south**
- 2.1.3 Depth?**
 - 2.1.3.1 Average depth 283 ft. deep**
 - 2.1.3.2 Deepest depth approximately 802 ft. deep**
- 2.1.4 What state(s) and/or countries is this lake bordered by?**
 - 2.1.4.1 New York (U.S.) and Canada**

- 2.1.5 What are the connecting waterway(s)?
 - 2.1.5.1 Niagara River and St. Lawrence River
- 2.2 Using the Water
 - 2.2.1 Tourism
 - 2.2.1.1 Niagara Falls
 - 2.2.1.2 Lighthouses
 - 2.2.2 Boating
 - 2.2.2.1 Recreational
 - 2.2.3 Swimming
 - 2.2.3.1 Beaches
 - 2.2.4 Shipping Channels
 - 2.2.4.1 Freighters
 - 2.2.5 Fishing
 - 2.2.5.1 Fish
 - 2.2.5.1.1 Native Species
 - 2.2.5.1.1.1 Salmon, Trout, Carp, Salmon, Herring, Sturgeon, Whitefish, Pike, Sucker, Muskellunge, Smelt, Bass, Perch, Walleye
 - 2.2.5.1.2 Exotic Species
 - 2.2.5.1.2.1 Goby and Zebra Mussels

3.0 Lake Michigan

- 3.1 Geography
 - 3.1.1 What is the size of the lake in terms of volume?
 - 3.1.1.1 Second largest of the Great Lakes
 - 3.1.2 Dimensions?
 - 3.1.2.1 118 miles across east to west
 - 3.1.2.2 307 miles across north to south
 - 3.1.3 Depth?
 - 3.1.3.1 Average depth 279 ft. deep
 - 3.1.3.2 Deepest depth approximately 925 ft. deep
 - 3.1.4 What state(s) and/or countries is this lake bordered by?
 - 3.1.4.1 Michigan, Indiana, Illinois, and Wisconsin – All U.S. States
 - 3.1.5 What are the connecting waterway(s)?
 - 3.1.5.1 Straits of Mackinaw
- 3.2 Using the Water
 - 3.2.1 Tourism
 - 3.2.1.1 Lighthouses
 - 3.2.2 Boating
 - 3.2.2.1 Recreational
 - 3.2.3 Swimming
 - 3.2.3.1 Beaches
 - 3.2.4 Shipping Channels
 - 3.2.4.1 Freighters
 - 3.2.5 Fishing
 - 3.2.5.1 Fish
 - 3.2.5.1.1 Native Species

- 3.2.5.1.1.1 Trout, Salmon, Carp, Sturgeon, Whitefish, Sucker,
Muskellunge, Pike, Smelt, Bass, Walleye, Perch
- 3.2.5.1.2 Exotic Species
 - 3.2.5.1.2.1 Goby, Ruffe, Sea Lamprey, and Zebra Mussels

4.0 Lake Erie

4.1 Geography

- 4.1.1 What is the size of the lake in terms of volume?
 - 4.1.1.1 Smallest of the Great Lakes
- 4.1.2 Dimensions?
 - 4.1.2.1 241 miles across east to west
 - 4.1.2.2 57 miles across north to south
- 4.1.3 Depth?
 - 4.1.3.1 Average depth 62 ft. deep
 - 4.1.3.2 Deepest depth approximately 210 ft. deep
- 4.1.4 What state(s) and/or countries is this lake bordered by?
 - 4.1.4.1 Michigan (U.S.), Ohio (U.S.), Pennsylvania (U.S.), and Canada
- 4.1.5 What are the connecting waterway(s)?
 - 4.1.5.1 Detroit River and Niagara River

4.2 Using the Water

- 4.2.1 Tourism
 - 4.2.1.1 Lighthouses
- 4.2.2 Boating
 - 4.2.2.1 Recreational
- 4.2.3 Swimming
 - 4.2.3.1 Beaches
- 4.2.4 Shipping Channels
 - 4.2.4.1 Freighters
- 4.2.5 Fishing
 - 4.2.5.1 Fish
 - 4.2.5.1.1 Native Species
 - 4.2.5.1.1.1 Bass, Whitefish, Salmon, Steelhead, Walleye, Perch, Brown trout
 - 4.2.5.1.2 Exotic Species
 - 4.2.5.1.2.1 Goby, Sea Lamprey, and Zebra Mussels

5.0 Lake Superior

5.1 Geography

- 5.1.1 What is the size of the lake in terms of volume?
 - 5.1.1.1 Largest of the Great Lakes
- 5.1.2 Dimensions?
 - 5.1.2.1 350 miles across east to west
 - 5.1.2.2 160 miles across north to south
- 5.1.3 Depth?
 - 5.1.3.1 Average depth 500 ft. deep
 - 5.1.3.2 Deepest depth approximately 1,332 ft. deep
- 5.1.4 What state(s) and/or countries is this lake bordered by?
 - 5.1.4.1 Michigan (U.S.), Minnesota (U.S.), and Canada

- 5.1.5 What are the connecting waterway(s)?**
 - 5.1.5.1 St. Mary's River**
- 5.2 Using the Water**
 - 5.2.1 Tourism**
 - 5.2.1.1 Lighthouses**
 - 5.2.2 Boating**
 - 5.2.2.1 Recreational**
 - 5.2.3 Swimming**
 - 5.2.3.1 Beaches**
 - 5.2.3.1.1 Water is cold a vast majority of the year**
 - 5.2.4 Shipping Channels**
 - 5.2.4.1 Freighters**
 - 5.2.5 Fishing**
 - 5.2.5.1 Fish**
 - 5.2.5.1.1 Native Species**
 - 5.2.5.1.1.1 Trout, Carp, Salmon, Sturgeon, Whitefish, Sucker, Muskellunge, Pike, Smelt, Bass, Walleye, Perch**
 - 5.2.5.1.2 Exotic Species**
 - 5.2.5.1.2.1 Ruffe, Sea Lamprey, and Zebra Mussels**

Objective & Domain Profile “Managing The Great Lakes’ Food Chain”

“Zebra Mussels, Friend or Foe?” – A lesson designed to eliminate cognitive overload.

Overview of the Lesson

This guided discovery lesson was designed to help students develop a further understanding of zebra mussels, an invasive species to the Great Lakes. In this lesson, students will not be presented with a large amount of new information, thus the student’s working memory will not be overloaded (Clark, p. 51). The students will also be utilizing his/her metacognitive strategies by serving as a real-life scientist to help solve an environmental problem. Metacognition strategies are used to solve problems in a specific career (Clark, p. 190). Michigan Science Standards will be addressed.

Reference:

Clark, R. (2003). “Building Expertise. Cognitive Methods for Training and Performance Improvement.” (2nd ed.) Washington, D.C.: International Society for Performance Improvement.

Terminal Objectives - Expert Level

<i>Domain</i>	<i>TWL – The Learner Will</i>
Cognitive <u>“Evaluate”</u>	The learner will write an essay evaluating whether zebra mussels are beneficial or detrimental to the Great Lakes.
Affective <u>“Characterize”</u>	The learner will characterize zebra mussels based upon negative and positive aspects researched and observed throughout the lesson.

Enabling Objectives - Assume Responsibility Level

<i>Domain</i>	<i>TWL – The Learner Will</i>
Cognitive <u>“Analyze”</u>	The learner will utilize Internet resources to analyze the negative impact of zebra mussels on the Great Lakes’ ecosystem.
Affective <u>“Organize”</u>	The learner will organize a scientific experiment and record observations over the span of several days.

Instructional Pages

“Managing The Great Lakes’ Food Chain”

Receptive Architecture:

In this architecture, the teacher provides the students with mass amounts of visual and auditory information. The instructor hopes that his/her students will obtain the information similar to how a sponge absorbs liquids. Looking at this architecture I envision a traditional high school lecture. A potential advantage of this architecture is that there are students who learn effectively from discussion. However, there are also students who completely “tuned out” the instructor when he/she does not incorporate a variety of multiple intelligences into the lesson. In this classroom students are encouraged to listen, pay attention, and take notes.

In Mr. B’s Classroom

As an educator, I personally try to avoid long lectures at all costs. I hated lectures as a kid, and I can guess that today’s “21st Century-Web 2.0 Students” dislike this architecture as well. When introducing new concepts, I try to keep lectures short with hands-on activities in between. For instance, when introducing three-digit subtraction, I will model the correct procedure to solving a problem on the board only once or twice. After my explanation, I let students work with hands on manipulatives to help solve problems.

Directive Architecture:

In this architecture the teacher provides the students with small amounts of information at a time. The students practice the skill being addressed and are provided with feedback from the teacher. Students continue to gradually build on their skills. Looking at this architecture I envision the teacher taking on the roll of a coach. Similar to a coach, the teacher allows students to learn by practice. Mistakes are corrected right away as students continue to build. The teacher is dedicated to having students correctly understand the concept every step of the way. A potential advantage of this architecture is that misconceptions are taken care of right away. However, this could require more teacher lead instruction to clarify individual misconceptions.

In Mr. B’s Classroom

Being a former football coach, I really like this architecture. I do not expect students to understand every aspect of a new concept right from the get go. Rather you have to start small and continue building. Students must be introduced to a directive step-by-step process when learning multiplication facts. First, students must learn the meaning of multiplication (the addition of groups). Next, students start to memorize the multiplication facts. Eventually with time, students will be able to multiply multi-digit numbers with ease.

Guided Discover Architecture:

In this architecture, the teacher provides the students with lessons that force students to become problem solvers. Lessons are designed around real life situations and/or problems for students to learn through a trial and error method. Looking at this architecture I envision my favorite bounty hunter, Duane “Dog” Chapman. At first if you don’t succeed, never give up, and continue searching for a way to solve the problem. A potential advantage of this architecture is that students learn how to become real life problem solvers. However, there are always students who become frustrated, and quit during trial and error assignments.

In Mr. B’s Classroom

As an educator, I love this architecture because I feel that it is crucial to teach students to learn how to become problem solvers. This method provides an engaging opportunity for students to learn. Some of my favorite

math problems are guess and check problems. This forces students to make an educated guess at solving a problem. If their answer is incorrect, he/she must try again until they find a proper solution to the problem.

Exploratory Architecture:

In this architecture, the teacher allows the students to freely research the topic being discussed. Students are provided with a wide variety of resources to conduct research. A potential advantage of this architecture is that student creativity is encouraged. However, it could become difficult for instructors to develop assessment rubrics with a wide range of student creativity.

In Mr. B's Classroom

I am often impressed to see what students can design/build when he/she is allowed to freely research a topic that is being discussed in the classroom. During this school year, students will be asked to create his/her own presentation highlighting the career of a famous Michigan movie stars, musicians, athletes, etc. I was really impressed with the posters, presentations, artwork, etc. that last year's students came up with. This lesson is an excellent opportunity for my students to show off their creative talent.

The Importance of Memory

As an educator it is my responsibility to find a way to get the information that I am teaching to the students' long-term memory. It is important to utilize a variety of methods incorporating different multiple intelligences to help students understand and store new information. An effective teacher must understand the makeup of his/her classroom. One cannot rely solely on lecturing all day long and hope that students retain every bit of information. It is also crucial that educators do not provide too much information at one time. As an educator and coach, I feel that it is necessary to start small, practice, and build skills over a period of time. Whether a directive step-by-step approach, trial and error method, and/or exploratory method that is being used, it is important that students are actively engaged. In my opinion, an engaged student is a student that remembers.

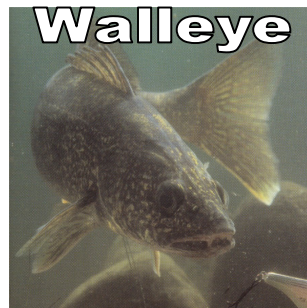
Long-Term Memory - Graduation

In order for me to place graduation into my long-term memory, something funny has to happen. I once heard that people remember information more efficiently when humor is involved. For instance, when I graduated from Grand Valley State University in December of 2003, I remember walking across the stage and my cell phone started to vibrate in my pocket. My brother Kevin was calling me from the stands as I walked across the stage. I remember dying with laughter. I also remember how much taller President Murray was than me, the large Grand Valley banners hanging from the rafters, Van Andel Arena being about half full, our guest speaker Carl Levin, and remembering how I couldn't wait to get the ceremony over and head to T.G.I. Friday's. In order for me to really store information in my long-term memory, I have to link it to humor. I'm guessing that when it comes time for me to graduate from U of M something funny will happen. Either my daughter will rub her food stained hands across my nicely pressed shirt and tie, my brother Kevin will feed me a stupid joke before hand, or my other brother Andy will play some sort of prank on me. In order to retrieve the information, all I will have to do is think back to something funny, and I will start envisioning graduation right away.

VHS: An Underwater Killer

What is VHS?

Have you ever pictured the Great Lakes without fish? For hundreds of years Michigan Anglers have enjoyed using our beautiful waterways to fish. However, today's fish population could be in great jeopardy! The spread of Viral Hemorrhagic Septicemia, better known as VHS, has threatened the health of Michigan's fish population. VHS is a virus that causes fish to bleed internally, thus infecting the fish and causing death. This virus can be spread from lake to lake, potentially affecting the entire Great Lakes' fish population. Do you want to see dead fish floating ashore?



Walleye



Largemouth Bass

<i>Species Affected</i>			
Black crappie	Bluegill	Brown trout	Channel catfish
Chinook salmon	Coho salmon	Chum salmon	Emerald shiner
Rainbow trout	Redhorse sucker	Rock bass	Round goby
Smallmouth bass	Walleye	White bass	White perch
Yellow perch	Rainbow trout	Herring	Largemouth bass
Muskellunge	Pike	Pink salmon	

Areas Where VHS Has Been Reported



A Muskie with VHS.



Pike

Prevention

- Report all sightings of fish with VHS to the DNR
- Do not transfer fish from lake to lake
- Put your catch in a cooler of ice
- Buy your bait from a bait store that is authorized to sell live bait
- Remove visible plants and animals from your boat when leaving a lake
- Clean your boat, bilge, and net(s) regularly

The Michigan Department of Natural Resources (DNR) and the Wisconsin Department of Agriculture provided the information for this page.

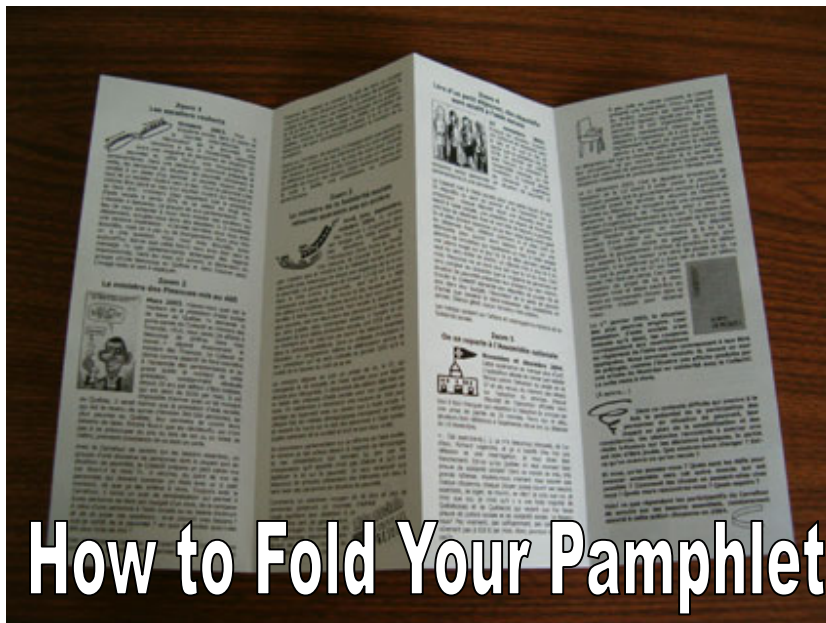
Assignment

Now that you have read the information above, it is your turn to take an active role in helping stop the spread of VHS. Your assignment is to create a pamphlet that better informs Great Lakes' fisherman on VHS. Your pamphlet must include the following:

- A description of VHS. – What is VHS?
- A paragraph detailing why fisherman should be informed of VHS.
- Detail the areas of the Great Lakes region that have been affected.
- What fish are susceptible to VHS?
- How can the spread of VHS be prevented?
- Pictures.
- Color.
- Note where you found your information.

Your pamphlet should be well thought up and creative. This will help you catch the attention of your potential audience (fisherman).

Below is an example that shows you how to fold your pamphlet.



Managing Attention Rationale:

This lesson was designed to better inform students of a virus that is wreaking havoc in the Great Lakes' ecosystem, Viral Hemorrhagic Septicemia (VHS). This instructional page will capture and sustain the attention of fourth grade students, beginning with the attention-grabbing title at the top of the page. The lesson is designed around Clark's (2003) Direct Instructional Architecture. Students are introduced to a small amount of information to build upon. Students are not overloaded with information. Once students have read through the information, a directed assignment is designed to point students on the right course and help eliminate student misconception(s). The information is arranged properly to prevent divided attention. According to Clark, it is important to utilize signals to draw students' attention to key information. Each section provides students with a headline that informs students about the information that he/she will find in each selection. Pictures are also provided to give students a visual representation of various fish, the Great Lakes region, as well as to advise students on how to properly fold a pamphlet. Clark's contiguity principle is also applied. Every picture has a label that is directly attached, rather than placed away from the picture. This principle helps prevent divided attention. It is my belief that this lesson will hold student attention because of the visual aids (pictures) provided and the fact that the information is organized in a logical manner. Students will also have an opportunity to create a meaningful project that could make a difference in the world. It is my belief that when students are provided with meaningful work/projects, he/she will be actively engaged, thus sustaining attention.

Reference

Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement."
(2nd ed.) Washington, D.C.: International Society for Performance Improvement.



Hey fisherman! Do you love to fish? Well if you do, now is the time to get out of your seat and contact a state representative to **put a stop to ballast pollution**. It is crucial that ocean-going freighters have stricter regulations on their ballast tanks. When ocean-going freighters dump their ballast tanks into the Great Lakes, who knows what is being introduced to our waters! Do you enjoy eating walleye or perch? Well if you do, someday you may have to kiss these delicacies good bye! If nothing is done, you might see goby and/or ruffe on a menu! Sounds delicious right? Here is a list of exotic species that have introduced to the Great Lakes via ballast tanks and their negative affects. This is a serious problem!

LOOK WHAT YOUR BOAT BROUGHT!

<u>Exotic Species</u>	<u>Havoc on the Great Lakes:</u>
 <p data-bbox="507 1243 671 1279">Round Goby</p>	<p data-bbox="810 1099 1370 1279">This vicious bottom feeder takes over spawning areas of traditional Great Lakes' fish. The round goby throws the balance of the Great Lakes out of order, causing major problems for native fish.</p>
 <p data-bbox="507 1422 671 1458">Zebra Mussel</p>	<p data-bbox="810 1279 1370 1458">Zebra mussels attach to your boat and/or water equipment. Watch yourself while you swim, zebra mussels can be very sharp!</p>
 <p data-bbox="507 1601 699 1637">Spiny Water Flea</p>	<p data-bbox="810 1458 1370 1637">This invader poses a direct threat the Great Lakes' ecosystem. Armed with small spines, this invader feeds on plankton, which other native fish feed on.</p>
 <p data-bbox="507 1780 582 1814">Ruffe</p>	<p data-bbox="810 1637 1370 1814">This exotic species competes directly with the native species for food. Aggressive behavior discourages predators, such as walleye and/or pike, from attacking.</p>

Assignment: Now that you have read the information, it is time for you to do something! As a responsible environmentalist, your job is to write a letter to a state representative encouraging them to help **put a stop to ballast pollution**. Do you want to swim in a zebra mussel polluted lake, or eat goby? Every voice counts, now let's make yours count too!

Motivational Rationale:

This lesson was designed around Clark's situational-interest model of motivation (Clark, 2003). I believe this page will capture the students' cognitive interest, thus showing the importance of putting a stop to ballast tank pollution. The first paragraph helps students understand the problem. Next, a table is provided to show four examples of exotic species that have been introduced to the Great Lakes via ballast pollution, and their negative affects. Finally, students are given their assignment. The information has been arranged in a coherent fashion. I chose to use a fisherman's conversational tone to motivate those who love fishing, swimming, and/or love the water to take a course of action. The lesson utilizes concrete and vivid language and visuals. Examples of specific language include "vicious bottom feeder" and "armed with spines." These examples help provide students with a better understanding of both the round goby and spiny water flea, thus making their characteristics more memorable. Visual pictures of freighters, the round goby, zebra mussels, the spiny water flea, and the ruffe have been provided to help provide a visual representation. Clark's contiguity principle is also applied. Every picture has a label that is directly attached, rather than placed away from the picture. I believe this instructional page will actively engage fourth grade students, motivating them to help put a stop to ballast tank pollution.

Reference

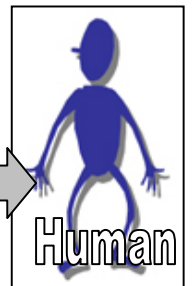
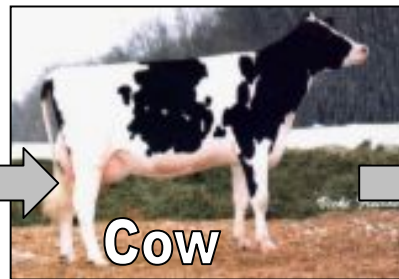
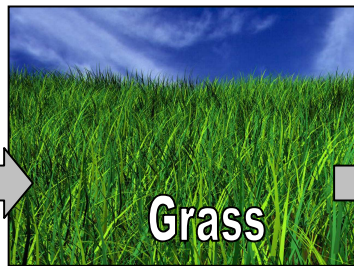
Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement." (2nd ed.) Washington, D.C.: International Society for Performance Improvement.

Let's Think About Lunch!



Let's think about the cheeseburger you had for lunch today, where did the meat (beef) come from? Let's picture the food chain:

1. In order for grass to grow, both water and sunlight are required.
 2. The cow feeds on grass for energy.
 3. The human consumes the beef (cow) when he/she eats a cheeseburger (energy).
- Follow the pictures below to see how living organisms get the food necessary to survive.



Walleye Dinner \$6.99



You have just gone to your favorite restaurant for a "Friday Night Fish Fry." Walleye is on tonight's menu and sounds delicious! But before chowing down you ask yourself, "What does the food chain look like in order for me to consume walleye? How do all the living organisms in this food chain obtain the necessary food to survive?"

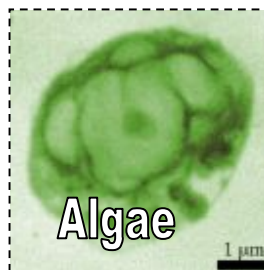
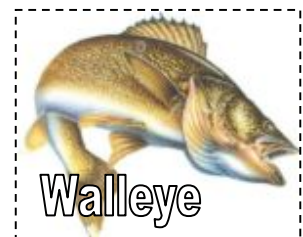
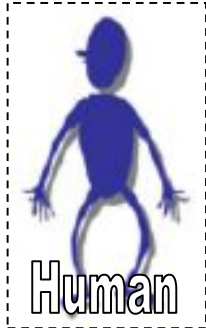
Assignment

Your job is to construct a food chain showing how organisms obtain energy in order for you to consumer walleye for dinner. Follow these steps to construct a food chain:

1. Cut out the figures on the next page.
2. Glue the figures in chronological order on a separate sheet of paper.
3. Add arrows to show how organisms obtain food for survival.
4. Explain the food chain in chronological order.

* Use the example above to help construct your food chain.

Cut Out The Figures



Remember to Add Arrows

Prior Learning Rationale:

This instructional page was designed to leverage students' prior knowledge of food chains. I believe that student attention is obtained through the use of an eye-catching title, "Let's Think About Lunch," and is carried out throughout the entirety of the worksheet. At the beginning of the lesson, students are asked to picture the food chain steps necessary for eating a cheeseburger, thus prior knowledge is activated. Visual aids (pictures) and a written chronological series of steps are provided to explain how the food chain works. This tactic meets the asking and answering pre-questions criteria necessary for connecting to prior knowledge (Clark p. 86). The pictures utilized in the cheeseburger food chain also serve as a comparative advance organizer (Clark p. 87). Students will be able use the provided organizer to help construct their "Walleye Dinner Food Chain" assignment. This lesson avoids activating inappropriate prior knowledge (Clark p. 93). The process of humans obtaining food either by consuming a cheeseburger or walleye dinner, are very similar and a direct connection should be made. A Directive Instructional method was also utilized. In this lesson, students continue to build upon a previously learned topic through a gradual series of procedural tasks (Clark p. 8). In terms of visual aids, the contiguity principle has been applied (Clark p. 77). Every picture has a label that is directly attached, rather than placed away from the picture. I believe that this lesson will effectively tap into students' prior knowledge, engaging and motivating students to construct an accurate Great Lakes' food chain.

References:

Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement." (2nd ed.) Washington, D.C.: International Society for Performance Improvement.

Food Chain Vocabulary

In this lesson, you will learn five key food chain vocabulary terms. You will use the following terminology to help understand and describe the Great Lakes' food chain:

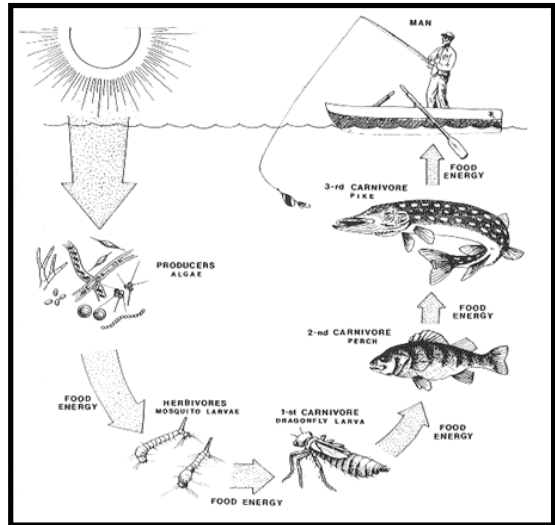
Producer – an organism that makes (produces) its own food for energy.

Consumer – an organism that must eat (consume) other living organisms for energy.

Carnivore – an organism that consumes other animals (meat)

Herbivore – an organism that consumes only plants

Omnivore – an organism that consumes both plants and



Pick 3 Projects!

Choose three projects to complete out of the five provided. Each project works directly with the food chain vocabulary above. Remember to be creative!

Project 1

Journal Entry

How do producers and consumers differ? List several examples of both producers and consumers.

Write three paragraphs in your journal. Each paragraph should be four to five sentences

Project 2

Create a Poster

Create a poster defining the five vocabulary terms above. Include pictures of specific organisms that would be included in each category.

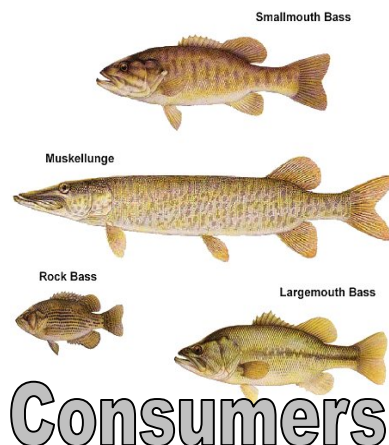
Use color and be creative!

Project 3

Create a Pamphlet

Create an informational pamphlet that defines the vocabulary above. Include pictures of specific organisms that would be included in each category.

Use color and be creative!



Project 4

Write a Poem

Create a poem that defines the vocabulary above. Similar to the poster and pamphlet project, include examples in your poem.

Your poem does not need to rhyme. be creative!

Project 5

Write a Presentation

You are the teacher. Write a presentation that defines the vocabulary above. Make sure you can give specific examples for each vocabulary term. Your job is to teach the terms to the class, and be able to answer questions.

Accelerated Learning Rationale:

This instructional page was designed to accelerate student learning through the use of rehearsal. I believe that information does not reach the long-term memory when rehearsal is not present (Clark p.34). At the beginning of the lesson, students are introduced to five food chain vocabulary terms. A food chain picture is used as a visual aid to help activate prior knowledge. During this assignment, students will choose three activities to help move new information from working memory to his/her long-term memory. It is stated that when students do a task several times, the information is placed in the long-term memory readily available for execution (Clark p. 41). In this lesson, students will take new vocabulary terms, and complete several tasks to help develop an understanding of the terms. I also believe that having students choose his/her own projects allows students to be creative in his/her own individual way, thus creativity, motivation, and the overall quality of work is increased. Visual aids, definitions, and written instructions are set-up to not overload the students working memory. The cognitive load is not excessive, leading to a motivating and positive learning experience (Clark p. 40). The contiguity principle has been applied (Clark p. 77). The food chain picture and pictures of various fish have labels that are directly attached, rather than placed away from the picture. I believe that this lesson will effectively motivate and engage students, moving new information from the students' working memory into his/her long-term memory.

References:

Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement." (2nd ed.) Washington, D.C.: International Society for Performance Improvement.



There is growing concern with the number of invasive species arising in the Great Lakes' region. Many new exotic (invasive) species have been linked to ballast dumping via ocean-going freighters. Examples of exotic species believed to have introduced to the Great Lakes include the goby, zebra mussel, ruffe, and spiny water flea. It has been suggested that putting stricter regulations on ocean-going freighters, in regards to the handling and disposing of ballast, would help prevent introducing new exotic species to the Great Lakes. However, not all exotic species are introduced via ocean-going freighter.

Pretend you are a State Representative, and you are just finding out information about exotic species. What is the proper course of action to take? Fill in the boxes below to help aid in making your decision.



1) EXPLAIN THE PROBLEM IN YOUR OWN WORDS

- In order to make an educated decision about the problem at hand, you must understand the problem. On a separate sheet of paper, explain the problem in your own words. What is the problem? Why do you care about this problem? How does the problem affect you? How does the problem affect others? Write one paragraph.

2) MAKE A "PROS" & "CONS" LIST ABOUT THE PROBLEM.

Remember, "pros" are reasons for, and "cons" are reasons against!

"PROS" – Reasons for having strict freighter laws.

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)

Example – Slow down the number of gobies entering the Great Lakes.

"CONS" – Reasons against having strict freighter laws.

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)

Example – Is it possible to examine every freighter before entering the Great Lakes?



3) WRITE YOUR STANCE

- Now that you have stated the problem in your own words, and created a “Pros” and “Cons” list, you must take a stance. Write a one-page paper on your stance. Remember to state the problem. Include examples from your “Pros” and “Cons” list in your reasoning. What should be done about this problem?



4) RESEARCH YOUR STANCE

- Now that you have developed your stance in regards to the problem, are you the only one that feels this way? Use the Internet and research the topic. Does any one else have the same stance you do? Why do you think he/she has the same stance? What have you learned from your new findings? Would you like to make any changes to your stance?

Meta-Cognition Rationale:

This guided discovery instructional page was designed to build job-specific metacognitive skills through the use of role-play. In this lesson, students will take on the role of a State Representative utilizing his/her metacognitive strategies to solve a real life problem. In today's world, metacognition strategies are used to solve problems in a specific career (Clark, p. 190). The student's attention is grabbed at the top of the instructional page through the use of an "eye catching" title and a visual aid. At the beginning of the lesson, students are introduced to the problem of invasive species due to ballast dumping from ocean-going freighters. Students are then asked to take on the role of a State Representative, and take a stance toward the problem at hand. Next, students are provided with a series of steps to aid in the problem solving process. Students state the problem in his/her own words, create a "Pros" and "Cons" list, write his/her stance, and research his/her stance making changes if need be. Experts utilize a similar approach when creating a stance, thus a metacognitive approach is modeled for the students (Clark p.191). Students also gain metacognitive awareness through comparing his/her own stance to an expert's stance on-line (Clark p.192). The contiguity principle has been applied (Clark p. 77). Visual aids have labels that are directly attached, rather than placed away from the picture. I believe that this lesson will effectively engage students, making them aware of metacognitive approaches necessary for today's job market.

Reference:

Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement." (2nd ed.) Washington, D.C.: International Society for Performance Improvement.

Zebra Mussel Friend or Foe?



Many people view the zebra mussel as a “pain-in-the-neck” invasive species that should not be in our Great Lakes. However, do zebra mussels play an important role in our lakes? You are the scientist; it’s time to research!

Step 1 – The zebra mussel, a foe to the Great Lakes.

Make a list of reasons indicating why zebra mussels hinder the Great Lakes.

- ✓ Use the Internet to research the problem.
- ✓ Remember to answer the following question, “Why do people hate zebra mussels?”



Zebra Mussel

Step 2 – Observing zebra mussels.

For this step, you are going to observe live zebra mussels over a 10-day period.

- ✓ Use a net to retrieve several zebra mussels from the holding tank.
- ✓ Place the zebra mussels inside a bucket.
- ✓ Slowly dump the zebra mussels into the tank with murky water.
- ✓ Use your notebook to record daily changes made inside the tank. Please pay particular attention to water clarity.



Placing the mussels in the tank.

Step 3 – You Decide!

It is now your turn to decide whether the zebra mussel is a friend or foe of the Great Lakes. Write a one-page paper stating your belief.

- ✓ Please take a stand! You must decide if the zebra mussel is a friend or a foe!
- ✓ Remember to include information from your “Foe List.”
- ✓ Remember to include information from your 10-day observation.

Cognitive Overload Rationale:

This guided discovery instructional page was designed to help students develop a further understanding of zebra mussels, an invasive species to the Great Lakes. In this lesson, students will not be presented with a large amount of new information, thus the student's working memory will not be overloaded (Clark, p. 51). The students will also be utilizing his/her metacognitive strategies by serving as a real-life scientist to help solve an environmental problem. Metacognition strategies are used to solve problems in a specific career (Clark, p. 190). The student's attention is grabbed at the top of the instructional page through the use of an "eye catching" title and a visual aid. Information is presented in a sequence of steps to help avoid overload, and all nice-to-know information has been eliminated (Clark, p. 51). The lesson consists of three steps, creating a "Foe List", observing zebra mussels, and developing an opinion. In step one, students research the negative aspects of zebra mussels. Students are allowed to conduct research utilizing the Internet. Next, students will place several zebra mussels in a tank of murky water, and observe the mussels over the span of ten days. Students should note that the water clarity improves over the observed period of time, thus showing how zebra mussels could play an important part in the Great Lakes' ecosystem. Finally, students write a one-page paper defining his/her stance on zebra mussels. Job aids are provided in each step of the process to help bypass the working memory (Clark, p. 47). Instructions have been written in a lean text method, and additional white space has been utilized to avoid overload (Clark, p. 45). The contiguity principle has been applied (Clark p. 77). Visual aids have labels that are directly attached, rather than placed away from the picture. I believe that the information for this lesson is presented in a non-intimidating fashion, thus eliminating cognitive overload.

Reference:

Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement." (2nd ed.) Washington, D.C.: International Society for Performance Improvement.

A New World



Have you ever wondered how the round goby invaded the Great Lakes?

*Obviously they did not swim from their natural habitat to live in the Great Lakes!

Have you ever wondered how a goby is introduced to the Great Lakes?

In this lesson, you are a goby! You will travel from your natural habitat via an ocean-going freighter and be dumped into the Great Lakes.

Complete the following tasks below to describe your voyage from your natural habitat to your "New World."

Task 1 – Describe Your Natural Habitat.

Use the following website - http://www.anstaskforce.gov/spoc/round_goby.php

Write a paragraph detailing the following questions:

1. Where in the world is your natural habitat located?
2. Describe the terrain of your natural habitat.
3. Describe the water temperature and quality of water you prefer.
4. How do you find energy (food)?

Task 2 – Describe Your Voyage.

Use the following websites:

http://www.anstaskforce.gov/spoc/round_goby.php

<http://www.invasivespeciesinfo.gov/aquatics/goby.shtml>

<http://www.jsonline.com/story/index.aspx?id=310561&format=print>

Write a paragraph detailing the following questions:

1. How did you leave your natural habitat?
2. Describe the vessel that you were transported in.
3. Were you stuck in a certain compartment? If so, describe the compartment.
4. How did you escape the vessel?

Task 3 – Describe the "New World"

Use the Internet to describe the Great Lakes.

Write a paragraph detailing the following questions:

1. Is the new water different from your natural habitat?
2. Is the terrain different from your natural habitat?
3. Are there new species of fish?
4. How will you find energy (food)?
5. What must you do to survive?
6. How are other species and humans going to react to you?

Task 4- Share Your Journey!

Congratulations, you have just found a new home in the Great Lakes. Meet with fellow gobies, and share your experiences. Compare and contrast ideas. Once you've shared your ideas with five other gobies, return to your seat and write a paper based on your experience. Remember to include information collected during tasks one through three. You may also add ideas gained from meeting with fellow gobies.

Explicit Rationale:

This guided discovery instructional page was designed utilizing explicit methods to model how an invasive species (round goby) is introduced to the Great Lakes. Students will develop a better understanding of gobies through the use of role-play. The student's attention is grabbed at the top of the instructional page through the use of an "eye catching" title and a visual aid. Elaborative questioning techniques are used to help promote deeper learning. The questions encourage deeper thinking rather than maintenance rehearsal (Clark, p. 123). Elaborative practice exercises are used through out the lesson to actively engage the students (Clark, p. 125). At the beginning of the lesson, students describe the natural habitat of the round goby. Students are then asked to describe the voyage via ocean-going freighter to the Great Lakes. Next, students describe the characteristics of the Great Lakes. Finally, students collaborate with other students, sharing their voyage from natural habitat to the Great Lakes. Student collaboration was added to the lesson because it is believed that students who work together can learn more than students who work alone (Clark, p. 129). The contiguity principle has been applied (Clark p. 77). Visual aids have labels that are directly attached, rather than placed away from the picture. I believe that this lesson will effectively engage students through the use of role-play and explicit methods.

References:

Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement." (2nd ed.) Washington, D.C.: International Society for Performance Improvement.

Walleye (*Stizostedion vitreum*)



Goin' Fishin'!



Everyone knows that Lake Erie is well known for its walleye fishing. People travel from around the country to Lake Erie with the hopes of catching his/her limit and filling the live well. Now it's your turn to go fishing! Before you go, you must plan your trip. Complete the following tasks below to prepare for the experience of a lifetime.



The beautiful
Lake Erie

© 2002 Primal Pictures www.primalpics.com

Task 1 – Get the Weather Report

In order to fish Lake Erie, Mother Nature must cooperate. To keep from loosing your cookies, you want to fish on a day with minimum chop on the water. Use the Internet, and visit the Weather Channel's website. List today's weather condition on Lake Erie. Is it a good day to go fishing?

Weather Condition: _____

Is it a good day to fish? _____

Walleye · Perch · Smallmouth Bass



Task 2 – Select a Charter Boat

To get out on Lake Erie, you must select a charter boat. Surf the Internet and select your charter. Remember charters can be pricey!

Charter Company: _____

Location (City): _____

Price: _____

Write a paragraph explaining why you have selected your charter boat. Please attach a sheet of paper to this worksheet.



Task 3 – Know the Regulations

Use the Internet, and find out the rules and regulations in regards to fishing for walleye on Lake Erie. Be a smart fisherman! You don't want to go to jail! Answer the following questions below.

Fishing Location (Circle): United States or Canada

If fishing in the United States, which state? _____

- Visit that state's DNR Website
- If fishing in Canada, visit the Canadian DNR

The cost of a fishing license? _____

In order to keep a walleye, how long must it be? _____

Limit (The number of walleye you are aloud to keep)? _____

Fine for over fishing or illegal fish? _____

Dates you can take walleye from Lake Erie: _____



Task 4 – Select Your Bait

Use the Internet to figure out what bait you will use. Think about the walleye's place in the Great Lakes' food chain. How does a walleye find energy (food)? Also, think about Lake Erie's water quality. Answer the following questions below.

Bait (Circle): Minnows (Live) or Lures (Artificial)

Price of bait? _____

Quantity needed? _____

Color? _____

Write a paragraph explaining your choice of bait. Please attach a separate sheet of paper to this worksheet.

You are ready to fish!
See you on the lake!

Implicit Rationale:

This guided discovery instructional page was designed utilizing implicit methods, modeling how to prepare for a walleye fishing adventure on Lake Erie. The lesson focuses on teaching process knowledge. The students will research and develop a better understanding of “how to” fish for walleye. Students will use the Internet to research the necessary components, figuring out how the components interact in order to successfully catch walleye (Clark. p.114). The student’s attention is grabbed at the top of the instructional page through the use of an “eye catching” title and visual aids. At the beginning of the lesson, students are informed that he/she must get prepared to go walleye fishing by completing a series of tasks. Each task provides the learner with an opportunity to build mental models and generate self-explanations. It is stated that successful learners are able to produce self-explanations of examples (Clark. p. 110). Students will research weather conditions, charter boats, rules and regulations as stated by the DNR, and how to select the proper bait. An effective analogy has been utilized in the first task to compare weather conditions on a lake to “loosing one’s cookies” (vomiting) on the lake (Clark p.111). Representative graphics have been utilized, all congruent with the instructional content (Clark, p.105). All graphics have text directly attached, thus the contiguity principle has been applied (Clark, p. 77). This helps create a dual-encoding (visual and verbal) mental model (Clark, p. 109). I believe that this lesson will effectively engage students through the use of implicit methods.

References:

Clark, R. (2003). “Building Expertise. Cognitive Methods for Training and Performance Improvement.” (2nd ed.) Washington, D.C.: International Society for Performance Improvement.



A fish with two lamprey attached.

While fishing on the lake, you catch several fish with disgusting lamprey attached to them. You decide to remove each lamprey from the fish, but you don't know if lampreys are dangerous and/or poisonous. Looking closely at the fish, you notice round red spots with blood slowly dripping down the side of each fish. As a knowledgeable fisherman, you become concerned due to the number of fish caught with lamprey attached. Something must be done, but what?

Research Potential Solutions

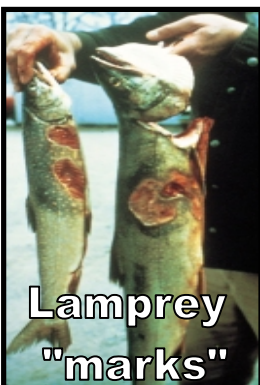
Use the following websites to research potential solutions to help control the sea lamprey population:

- ✓ Marquette Sea Lamprey Management - <http://www.fws.gov/midwest/Marquette/slm2.html>
- ✓ Information on TFM - http://www.glf.org/pubs/FACT_4.pdf
- ✓ Sea lamprey barriers and traps - http://www.glf.org/pubs/FACT_5.pdf

Fill in the Table.

<u>Solutions</u>	Potential risk(s) to the organisms (non-human) linked Great Lakes' ecosystem. Explain.	Potential risk(s) to humans. Explain.	Is this a cost effective solution? Explain.
Chemical (TMF)			
Barrier (Low-head barrier)			
Sterilization (Sterilize lamprey eggs)			

You Explain.



Pick a Solution.

Before this invasive species gets out of hand, you must make a scientific decision.

Choose a solution. Write a paper explaining why your chosen solution will effectively control the sea lamprey population. Incorporate information from the table above.

Problem Solving Rationale:

This guided discovery instructional page was designed utilizing problem-based learning methods. The student's attention is grabbed at the top of the instructional page through the use of an "eye catching" title "Out of Control," and through the use of picture of a fish covered with two sea lamprey (visual aid). I believe that the visual aids incorporated in the lesson amplify the intensity of the problem at hand. The contiguity principle has been applied (Clark p. 77). The visual aids have labels that are directly attached, rather than placed away from the picture. This lesson contains the three main characteristics of problem-centered design. First, the students are drawn to the problem at hand, solving how to control the sea lamprey population. Second, the lesson contains specific tasks that are job specific to solving the task at hand. Finally, the problem is the focal point for teaching the concept, controlling an invasive species population (Clark, p. 162). During the lesson, students take on the role of a concerned scientist. He/she must look at real life approaches and consequences in order to become an expert (Clark, p. 178). At the beginning of the lesson, students review a case problem, a story about catching several fish with "disgusting" lamprey. Case problems are a key ingredient in problem-based learning (Clark, p. 165). Next, the students will be actively engaged analyzing the case problem. The students will locate information on the Internet to come up with an effective solution to controlling the sea lamprey population. A table is utilized to incorporate the "Pebble in the Pond" method. When observing potential solutions, the students will encounter problems with each solution that could possibly lead to a series of additional complex problems (Clark, p. 168). I believe that this lesson will effectively engage students and promote the transfer of information through the use of real life problem.

References:

Clark, R. (2003). "Building Expertise. Cognitive Methods for Training and Performance Improvement." (2nd ed.) Washington, D.C.: International Society for Performance Improvement.

Formative Evaluation Plan **“Managing The Great Lakes’ Food Chain”**

One-to-One Evaluation

This formative evaluation plan was designed based on One-to-One Evaluation method created by Dick, Carey, and Carey (pages 299-301). The instructor will meet with a DNR Official (expert in the field of study) and randomly selected students (target audience) before the unit begins. Once the unit is complete, the instructor will reflect upon the initial evaluation, and make the necessary changes to make the unit more effective, engaging, and efficient.

The instructor and a Department of Natural Resources (DNR) Official will meet prior to piloting the “Managing The Great Lakes’ Food Chain” unit. During the meeting, the DNR Official will evaluate the overall quality and practicality of the unit. This will allow the instructor to make the necessary changes to the unit before hand.

I. Participation by DNR Official

- a. Materials provided to the DNR Official:
 - i. “Managing The Great Lakes’ Food Chain” Overview including:
 1. State standards and benchmarks addressed
 2. Objectives
 3. Pacing chart
 4. Ideas for differentiating instruction
 - a. Novice
 - b. Experienced
 - c. Expert
 - d. Students with special needs
 - ii. Teaching materials:
 1. Visual aids
 - a. Posters/pictures
 - b. Digital Videos, DVDs, VHS
 2. Worksheets/Instructional Pages
 - iii. List of websites to be viewed by students during unit
 - iv. Assessments:
 1. Interest survey
 2. Pre-test/study guide
 3. Post-test
- b. Are there any necessary changes that need to be made to the materials before hand?
 - i. Unit Overview
 1. Are the correct state standards and benchmarks being addressed? Are there more standards and benchmarks that could be incorporated across the curriculum?
 2. Are the unit’s objectives appropriate? Do more objectives need to be added?

3. Is the pacing chart correct? Can the unit be completed in the allotted time frame? Do lessons need to be lengthened, shortened, and/or eliminated?
 4. Is the instructor prepared to differentiate instruction? How will the lesson meet the needs of the advanced Expert? How will the lesson meet the needs of the Novice?
- ii. Teaching Materials
 1. Are the visual aids appropriate and helpful?
 - a. Could the instructor include additional posters, pictures, graphs, and/or charts when teaching the unit?
 - b. Are the unit's media resources (digital video, DVDs, VHS) appropriate? Could different resources be used?
 2. Worksheets/Instructional Pages
 - a. Are all worksheets/instructional pages appropriate? Could additional changes be made to instruction, pictures, and/or tasks?
 - iii. Websites
 1. Are the websites to be used appropriate? Do they contain the necessary information? Could additional websites prove more helpful?
 - iv. Assessments
 1. Are all assessments appropriate? Could changes be made to questions, question format, etc? Will the results be valid? How will the Novice, Experienced, and Expert fair on the test?

After meeting with the DNR Official, the instructor will randomly choose several students from his/her class to observe the unit before hand. Students will look at the overall appearance of the unit, in the effort to make the unit more engaging. This will allow the instructor to make additional changes to the unit before hand if necessary. This method will allow the instructor the opportunity to make the unit more "student friendly."

II. Participation by Students

- a. Materials provided to the students:
 - i. Teaching materials:
 1. Visual aids
 - a. Posters/pictures
 - b. Digital Videos, DVDs, VHS
 2. Worksheets/Instructional Pages
 - ii. List of websites to be viewed by students during unit
 - iii. Assessments:
 1. Interest survey
 2. Pre-test/study guide

- b. Are there any necessary changes that need to be made to the materials before hand?
 - i. Teaching Materials
 1. Are the visual aids appropriate, interesting, and helpful?
 - a. Could the instructor include additional posters, pictures, graphs, and/or charts when teaching the unit?
 - b. Are the unit's media resources (digital video, DVDs, VHS) interesting?
 2. Worksheets/Instructional Pages
 - a. Are all worksheets/instructional pages interesting? Could additional changes be made to instruction, pictures, and/or tasks?
 - ii. Websites
 1. Are the websites to be used interesting? Do they contain the necessary information? Could additional websites prove more helpful?
 - iii. Assessments
 1. Are the shown assessments appropriate? Could changes be made to questions, question format, etc? How will the class fair on the test?

After teaching the "Managing the Great Lakes' Food Chain," the instructor will evaluate the unit. Did the suggestions made by the DNR Official and selected students make the unit more engaging and effective? Do additional changes need to be made?

III. Following the Trial Run

- a. Materials used:
 - i. "Managing The Great Lakes' Food Chain" Overview:
 1. State standards and benchmarks addressed
 - a. Where all standards and benchmarks initially selected addressed?
 2. Objectives
 - a. Did the students meet all of the objectives designed for the unit?
 - b. Does the instructor need to add or remove objectives?
 3. Pacing chart
 - a. Did the unit follow the pacing schedule?
 - b. Do lessons need to be added or removed?
 4. Ideas for differentiating instruction. How did the instructor differentiate instruction for:
 - a. Novice
 - b. Experienced
 - c. Expert
 - d. Students with special needs

- ii. Teaching materials:
 - 1. Visual aids
 - a. Posters/pictures
 - i. Does the instructor need to incorporate additional posters/pictures?
 - b. Digital Videos, DVDs, VHS
 - i. Were the following media sources effective?
 - ii. Does the instructor need to find different movies?
 - 2. Worksheets/Instructional Pages
 - a. Instruction
 - i. Were the instructions clear?
 - ii. Were the tasks too difficult? Too easy?
 - iii. Were the examples hard to understand?
 - b. Engaging
 - i. Were the students engaged?
 - 3. List of websites to be viewed by students during unit
 - a. Were the websites appropriate and helpful?
 - b. Do additional websites need to be added for next time?
 - 4. Assessments:
 - a. Interest survey – Entry Behaviors
 - i. Did students have prior knowledge of:
 - 1. Predator/Prey Relationship
 - 2. Food chains
 - 3. Food webs
 - 4. How organisms obtain energy
 - 5. Plants, animals, and organisms that inhabit the Great Lakes
 - b. Pre-test/study guide
 - i. Was the study guide helpful?
 - ii. Were students prepared for the test?
 - c. Post-test
 - i. Are the scores valid?
 - ii. What areas did the students struggle in?
 - iii. Were the directions/questions confusing?

Once the instructor has evaluated the trial run of the unit, he/she has the following options below to make additional changes to the unit.

IV. Making Additional Changes

- a. Meet with the DNR again. The instructor can bring the following materials to help make changes:
 - i. Pictures of students engaged
 - ii. Student work
 - 1. Assignments with results

2. Assessments with results
 - a. Interest Survey
 - b. Pretest/Study Guide
 - c. Post tests
- iii. A list of standards/benchmarks that were completed and/or not addressed
- iv. A list of objectives that were completed and/or not addressed
- b. Meet with the class as a whole group, and discuss ways to make changes
 - i. Discuss assignments
 1. Which assignments were enjoyable? Which were not?
 2. Were the directions and tasks easy to understand?
 3. Should assignments be removed?
 - ii. Assessments
 1. Did you have prior knowledge of the unit before hand?
 2. Did the Pretest/Study Guide help you prepare for the test?
 3. Was the final test fair?

Reference

Dick, W., Carey, L. & Carey, J. (2005). The systematic design of instruction (6th ed.). Boston, MA: Pearson/Allyn & Bacon.

4. Evaluating Student Attitude

<i>Student Attitude Questions – Student Response</i>	VHS: Underwater Killer	Clean Your Ballast!	Let's Think About Lunch!	Food Chain Vocabulary	What's the Problem?	Zebra Mussel Friend or Foe?	A New World	Going Fishing	Out of Control!
Were you engaged? Did you enjoy the activity?									
Did the activity challenge you? Were you forced to use problem-solving skills?									
Should this lesson be used again in the future?									

This summative evaluation plan was designed based on examples provided by Dick, Carey, and Carey (pages 354 -356). At the conclusion of the unit, the instructor will complete the first two evaluations assessing motivation and intellectual skills. Students will complete the evaluations that judge motor skills and attitude. Once completed, the instructor will compare his/her results with the students' results. The evaluations will make it easier for the instructor (subject matter expert) to judge if the objectives and goals for each lesson were met. I believe that summative evaluation is key to making a unit more efficient, engaging, and efficient.

Reference

Dick, W., Carey, L. & Carey, J. (2005). *The systematic design of instruction* (6th ed.). Boston, MA: Pearson/Allyn & Bacon.