```
                    ┌─────────────────┐
                    │      OCAMP       │
                    └─────────────────┘
                             │
                             ▼
                    ┌─────────────────┐
                    │    Standards     │
                    └─────────────────┘
                      │             │
                      ▼             ▼
          ┌────────────────┐   ┌────────────────┐
          │  3/4 Pre-work  │   │   6 Pre-work   │
          └────────────────┘   └────────────────┘
                      │             │
                      ▼             ▼
                  ┌─────────────────────┐
                  │    Peer Teaching     │
                  └─────────────────────┘
                             │
                             ▼
          ┌─────────────────────────────────────┐
          │              Objectives             │
          └─────────────────────────────────────┘
                             │
                             ▼
                  ┌─────────────────────┐
                  │       Inquiry        │
                  └─────────────────────┘
                      │             │
                      ▼             ▼
          ┌────────────────┐   ┌────────────────┐
          │  3/4 Post-work │   │  6 Post-work   │
          └────────────────┘   └────────────────┘
                      │             │
                      ▼             ▼
                  ┌─────────────────────┐
                  │     Adjustments      │
                  └─────────────────────┘
                             │
                             ▼
                  ┌─────────────────────┐
                  │      Extensions      │
                  └─────────────────────┘
```

Ocean Literacy Principles

1. The Earth has one big ocean with many features.

2. The ocean and life in the ocean shape the features of the Earth.

SC3.3 Scientific inquiry is a process used to explore the natural world using evidence from observations and investigations.

· Students will use a model to explore the impact of erosion on a watershed and the plants and animals that live there.

SC4.2 Interaction and Change: Living andnon-living things undergo changes that involve force and energy.

· Students will use a model to describe the interactions of organisms and the environment where they live.

SC4.3 Scientific inquiry is a process of investigation through questioning,collecting, describing, and examining evidence to explain natural phenomena and artifacts.

· Students will use a model to explore the impact of erosion on a watershed and describe the interactions that occur between the plants and animals that live there.

6.2E.1 Explain the water cycle and the relationship to landforms and weather.

· Students will use a model to guide younger students understanding of how deforestation effects erosion, and watershed health.

6.3S.1 Based on observations and science principles,propose questions or hypotheses that can be examined through scientific investigation. Design and conduct an investigation that uses appropriate tools and techniques to collect relevant data.

· Students will guide younger students in making hypotheses, observations, conclusions,and connections regarding erosion and its impact on the watershed.

6th grade pre-teaching topics

water cycle   rock cycle

watershed   erosion

cooperative learning

6th grade
Erosion Model
Inquiry

Question: How will deforestation affect erosion patterns?

Hypothesis:

The side that does not have the trees, the nutrient soil is going to wash away when it rains, because the trees are technically holding the nutrient soil.

Observations:

- The trees are very tightly packed.
- The other side has very exposed dirt.
- The water looks very clear.
- The water is now very murky.
- The side that was exposed exposed bed rock.
- rills were formed on the side that was expose

Conclusion:

Our Hypothesis was right because the side with trees exposed no bed rock when it rained, but the other side did because the nutrient rich soil washed away.

3rd and 4th grade pre-teaching topics

salmon life cycle

limiting factors

migration

physical characteristics

adaptations

water cycle

watershed

eve now hatched into
alevin, so I have more
blems than dissease, and
ution. Logging could →
t the cool, clean, fresh
ter and oxygen levels.

3rd grade salmon
life cycle writing
sample

Now an adult salmon
in the ocean I have
to avoid sharks, orcas,
seals, large sea birds, polar
and other dangers.
Now growth hormones
tell me its time to
go back to my natal
stream to spawn.
You thought going
down to the ocean
was hard its even harder
going back up is even

harder. Bears, eagles, do
and fishermen blo
my way. Now that I
made it to my spawni
grounds I mate. Unli
most Pacific salmon
I live to spawn aga

Erosion Presentation

Group members will each have a job. The jobs are:

UM ~ **Vocab Master:** This group member will introduce the vocabulary to the 3rd and 4th graders and help them come up with power phrases to remember the meaning of the words. -Nakoma - sub - Maria

MM — **Model Maker:** This group member will help the 3rd and 4th graders set up the model, following the procedure. - Josue - sub - Charlotte + Maria

S — **Scribe:** This group member will record the groups information on the butcher paper as the team moves through the activity with the 3rd and 4th graders. - Angelo - sub - Nakoma

ML — **Model Leader:** This group member will lead the 3rd and 4th graders through the modeling questions and discussion. - Charlotte - sub - Angelo

LW — **Lab Write up Leader:** This group member will lead the 3rd and 4th graders through the lab write up and discussion. - Maria - sub - Charlotte

The objectives of teaching this lesson to the 3rd and 4th graders are:

The students will be able to:
ML (
- Explain how models are used in science
- Explain what the parts of the model being used represent
LW (
- Form a hypothesis for the given question
- Make specific observations
all (
- Draw conclusions
- Make connections between model and real world- especially aquatic animals

(1) **Vocabulary- third and fourth graders will need to have an understanding of the following words. (Vocab Master)** - Nakoma, Lab sheet

Don't give def

What does ___ mean?

- watershed - When water flows from up to down to the sam
- sediment - small pieces of rock, or Earth materials
- deforestation - When humans or nature make trees go away
- deposition - When sediment gets deposited on, in, a water
- erosion - when water, glacier, wind, or chemicals wears away materials

② Model Building Procedure (Model Maker) -Josue, SH

   1. place entire lump of playdough in the center of the lasagna pan, on top of the foam layers.

   2. cover the playdough with soil, packing soil around the playdough.

   3. on half of the mound stick pipe cleaners closely together in rows to cover the entire half. Stick pipe cleaners into the mound far enough to reach the playdough.

③ Model Questions (Model Leader) -Charlotte

Only writen question
1. What is a scientific model? - a smaller version of area or Phen to a place you can't get to
2. Why are models used in science?- to make it easier, instead using a giant space. Speed up time
3. What do the parts of our model represent? (Label diagram on inquiry outline) – Trees, bedrock, top soil, water(River)

④ Record Hypothesis (Lab Write Up Leader) -Maria -*Angelo
Ask the students what they think the answer to the guiding question is. Each student should record their hypothesis on their inquiry outline.
What do you think will happen (why)

⑤ Make and Record "Before" Observations (Lab Write Up Leader) – Maria
(What do you notice?
What is different?

Questions to ask:

Ask in order 1-3
③. What do you notice about the deposition?
①. What do you notice is different about the two sides of the pan?
②. What do the two sides of the mound look like?

⑤+⑥ Sample clean water for dissolved oxeygon
(Model Maker, assits student)

Josue

Why cross-age peer teaching?

* Improved cognition -
peer teacher and learner have similar amounts of prior experience and operate at a more proximal stage of development; this enhances learning and encourages deeper level, higher order thinking
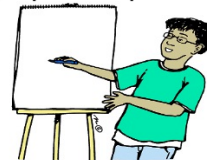
* Improved metacognition -
students reflect more critically on their teaching and learning

* Increased sense of responsibility -
enhances ownership of constructed knowledge through participation in the teaching and learning process

* Enhanced motivation -
creates sense of connection to learning process through participation with peers; learners feel less threatened seeking assistance from similar age peers

* Promotes communication, social, and leardership skills

Why include language objectives in science?

**"The foundation of school success is academic literacy
in English"** (Echevarria, Vogt, & Short, 2008)

* ELL students and students from low socio-economic backgrounds struggle with academic language.

* Taft Elementary School: 27% ELL, 78% Low SES
* Oceanlake Elementary School: 4% ELL, 72% Low SES

* **Sheltered instruction** is a means for making content comprehensible by integrating language and content while infusing sociocultural awareness.

Sheltered Instruction is characterized by:

* Lesson preparation
 - Content and Language objectives defined, displayed, and reviewed with students

* Building background
 - New concepts explicitly linked to background experiences and past learning
 - Key vocabulary emphasized

* Comprehensible input
 - A variety of techniques used to make content clear (e.g., modeling, hands-on)

* Strategies
 - Scaffolding used to assist and support student understanding

Language Objectives:

Students will be able to:
- ·   Verbally explain how models are used in science.
- ·   Verbally explain what the parts of the model represent
- ·   Students will label the parts of the model on a diagram
- ·   Write a hypothesis
- ·   Orally make observations
- ·   Write conclusions drawn from the inquiry

Instructional Objectives (6th grade):

Students will be able to:
- ·   Work cooperatively in a group
- ·   Communicate erosion concepts clearly
- ·   Assist in rephrasing thinking using given vocabulary words
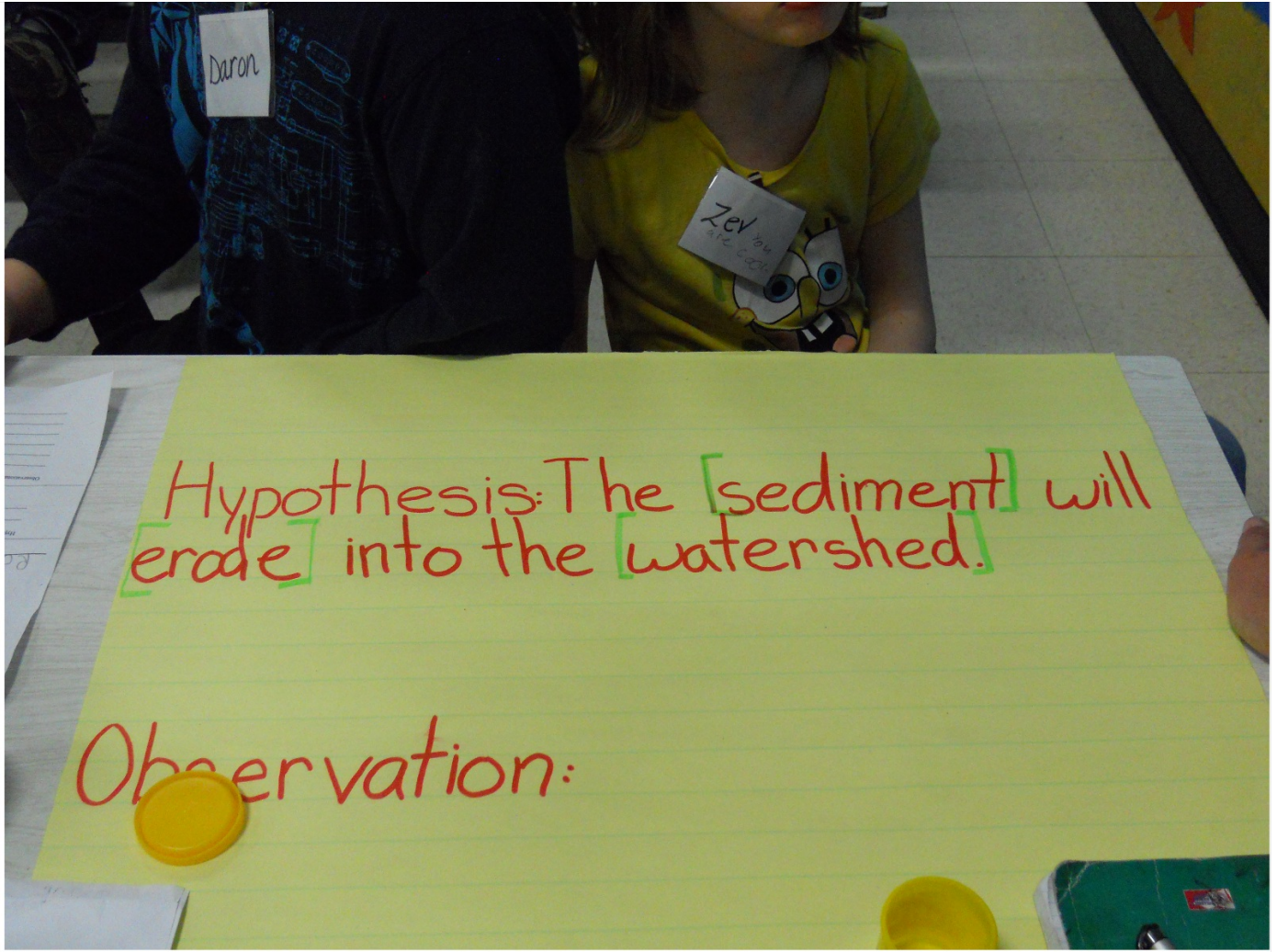
Hypothesis: The [sediment] will [erode] into the [watershed].

Observation:

The peer teaching inquiry specifically allowed for:

* Interaction
- Frequent opportunities for interaction and discussion among students, which encourage elaborated responses about concepts
- Grouping configurations support language and content objectives
- Ample opportunity for students to clarify key concepts

* Practice/application
- Hands-on materials and/or manipulatives provided for students to practice using new content knowledge
- Activities provided apply content and language knowledge
- Activities integrate all language skills (i.e., reading, writing, listening, speaking)

* Lesson delivery
- Content and Language objectives clearly supported by lesson delivery
- Students engaged approximately 90% to 100% of the period
- Pacing of the lesson appropriate to ability levels

* Review/assessment

3rd grade
post-assessment

4-27-11 | effect on a watershe[d]

Yesterday I had a project with some 6th graders from taft to build a model ~~watershed~~ We did it it with playdough ~~for~~ the bedrock. Next we trickled ~~sediment~~ on the bedrock. We used pipe cleaners as trees on the forested side but not the ~~deforstated~~ side. Then, we made a rainstorm when we did it dirt ~~eroded~~ on the ~~deforstated~~ side. We did it because we wanted to see the impact of ~~erosion~~ on a ~~water-shed~~. I thought the ~~sediment~~ would ~~erode~~ on the ~~deforstated~~ side into the ~~watershed~~.

4th grade post-assessment

Erosion Inquiry Cont.

New Story   deposition

Erosion Watershed sediment deforestation

Yesterday, we had a science experiment. We made a scientific model. It was a watershed. We used play-doh as a bedrock for the mountain. We poured soil on it. We put pipe cleaners in as trees. An earwig scurried up a tree. We poured water in. Sediment got in the water. We made it rain. The rain created erosion. There was deposition of dirt into water. One side of the mountain had deforestation by palm-oil companies. All the soil fell of that side. When it rained, the trees were moistened.

Watershed Model

(cup) rain→ mountain (soil)   trees (pipe cleaners)
earwig   sediment   Pan
sediment   bedrock   water
padding   (play doh) (tap water)
(for bedrock)
(foam)

6th grade post-reflection

1 Teaching did help me understand the Erosion Conceps a little better. The reson why is becaus the quesions that they would ask were really good. They were not like really ovious. There guestions had good answers. They made me lern some stuff on erosion. I did not know.

2. My group was able to work well together. If someone was not shure about something other group member would be shure to fill them in.

3. I thought I did my part well. I made shure that I would & not leave the ocean lahe school with out the 3rd and 4th graders knowing all there vocabulary words. I was kind and paid atision to what my group members had to say.

6th grade post-reflection

Teaching did help me understand more about the experiment, because I actually had to think more about it and make up a more simple way to say it. I did get alot of blank stares when I said the original questions like "What do you notice about the deposition?" instead I said "where did all the soil end up, where did they go?" so I had to think harder to make it easier for the kids.

Adjustments

* More time for drawing conclusions and making connections

   Allow opportunity for cross age peer groups to meet after doing reflection writing to share writing and "ah-ha's"

* Pre-teach scientific questioning strategies

   Discuss types of questions, how to scaffold questions, and how to restate responses using key vocabulary

* Logistical improvements

   - Round tables, closer to model lab sheet on wall
   - Mixed-age seating
   - Color coded grouping
   - Room with better acoustics

Resources

beth.parsons@lincoln.k12.or.us
marybeth.guerena@lincoln.k12.or.us
kara.allan@lincoln,k123.or.us

Model Lesson
www.stillysnofish.org

Project Wild Aquatic
www.projectwild.org

Alaska Sea Grant
www.seagrant.uaf.edu

Sheltered Instruction- SIOP model