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Subject/level: Earth Science Grade 8

Lesson: Erosion and Deposition by running water

Standard, Benchmark, Indicator	<p>Standard 4: The student will develop an understanding of energy in the earth system, geochemical cycles, the formation and organization of the earth system, the dynamics of the earth/moon/sun system, and the organization and development of the universe.</p> <p>Benchmark 1: The student will develop an understanding of the sources of energy that power the subsystems and cycles of the dynamic earth: the geosphere, hydrosphere, atmosphere and biosphere.</p> <p>1. understands constructive and destructive processes, including weathering, erosion and deposition, dynamically reshape the surface of the earth.</p> <p>b. Water, glaciers, winds, waves, and gravity are weathering and erosion agents.</p>
Unit Goal	Students will understand the causes and formations of rocks and soils due to weathering, erosion and deposition.
Unit Objective	Upon completion of the unit, students will apply their knowledge of formations and their destructive processes with the construction of a project with a score of 7 out of 10 on a rubric.
Lesson Objective	After this lesson, students will identify the causes and effects of alluvial fan, flood plain and delta formation in the lab with 75% accuracy.
Essential Question	Is it wise to construct these deltas? What else could be constructed? What are some possible suggestions for improvement on the construction of deltas so that we provide the least amount of impact on the local ecosystems?
Materials / visuals / equipment / sources	Computer, projector, sound, fan, water, dirt, saran wrap, Styrofoam plates, cups, bucket, graphic organizers http://www.science-class.net/Graphic_Organizers/GO_erosion_consequence.pdf cause/effect http://water.usgs.gov/wsc/glossary.html <i>Maton, A., LaHart, D., Hopkins J., Warner M., Johnson S., Wright J. Prentice Hall: Exploring Earth Science. 1997. Prentice Hall. Upper Saddle River, New Jersey</i>

Minutes	Activity
Guarded Vocabulary	Alluvial Fan Drainage Basin Deposition Delta Watershed Flood Plain Erosion
8 min. V, A	<p>*8 Groups of 3 for lab. *I have 2 students with learning disabilities. *One student with a hearing disability.</p> <p>Activities: <u>Anticipatory Set:</u> (T) Has anyone traveled to Colorado? (S) A few raise their hands (T) Have you had the chance to go white water rafting? (S) Yes, it's awesome, no but I wanted to. (T) Yeah, its pretty exhilarating stuff. Well today we're going to talk about those rough wild rivers, we're going to discuss erosion and deposition of running water. Is it possible for humans to aid in erosion or deposition of running water? (S) yes, no (T) Yes it is and does happen. Earth has its natural way of eroding and depositing material to change the surface of the Earth, but it also has another impact to deal with, humans. What is one issue that is really big in the news about humans having a hand in speeding up erosion? It has to do with rising sea levels. (S) Global warming (T) Exactly, please keep in mind there are many views to this issue but the data shows that the Earth is warming up and at a rate that is faster than the normal rate of climate change. Earth's temperature does change up and down over thousands of years but it is at such a rising rate now that species are having a hard time keeping up. Generally a species will find a way to evolve slowly with the climate change if it is gradual but the rate is fast becoming too great for species to keep up. So what does this have to do with erosion and running water? The answer is lots. Glaciers melt when the temperature is too great, that will cause rising seawaters, which will cause coastal erosion. How do we protect our delta ecosystems when the water washes away more and more sediment? With more water readily available in the hydrologic cycle because of glacial melting, will there be increased flooding? How will we, the human race, be affected by all of our own environmental actions? Those are just a few questions I want you to think about as we move through today's lesson and we'll discuss it more tomorrow. (T) We're going to focus on a few terms that deal with deposits of rivers. I need you to know the cause and effects of alluvial fan, flood plain and delta by the end of today's lesson. First I need to fill you in on a few background terms of erosion and deposition.</p>
10 min.	<u>Lecture:</u>

<p>V, A</p>	<p><i>Adaptation: Students with LD will benefit from visuals on powerpoint and question answer on the cause and effects, so that it is seen, heard and read. Student with hearing disability will have the powerpoint as a visual to follow along in the lesson.</i></p> <p>(T) Alright so let's start out by looking at erosion. Erosion is the products of weathering moved from one place to another. The number one agent of erosion on the surface of the Earth is running water. So we are talking about moving a product such as soil, rock and possibly debris from one place to another by water. This means that with erosion comes deposition. That material is being moved somewhere else and deposited there, it does not simply disappear.</p> <p>(T) Next we are going to look at a drainage system. Class does a river of water move uphill or downhill?</p> <p>(S) downhill</p> <p>(T) Yes, downhill and that is due to gravity. So when we have a network, meaning an area that is connected, of rivers, streams and gullies this is called a drainage basin. You may also hear it called a watershed. The difference between a watershed and drainage system is that the watershed separates each drainage system. The way this works is the little streams drain into bigger ones and those bigger ones drain into the main river. The reason they all drain into this main river is because it is the lowest elevation point of all the system. The water all moves from an area of high elevation to low elevation or downhill. The area in which all of this takes place is called the drainage basin. But drainage basin(or system) and watershed are often interchangeable and in the United States the area of drainage is called a watershed and other countries define it as a drainage basin with the watershed being the area that separates each drainage basin.</p> <p>(T) Let's look into deposits of rivers and figure out how they form.</p> <p>(T) So first up is alluvial fans. In an alluvial fan a river is flowing downhill from a mountain gathering sediment as it goes. It hits a plain and its speed greatly decreases. Because of this decrease in speed it loses a lot of the sediment the river was carrying. This builds up and spreads out to form a fan-like shape. Raise your hand and read me the cause and effect of this then please.</p> <p>(S) What causes this deposition? A river that has hit a plain and lost speed. What is the effect? The sediment is deposited and the deposit spreads out in a fan-like shape.</p> <p>(T) Thank you, so how can you remember this? (<i>As speaking, demonstrating with a fan</i>) A river hits the plain and slows down and drops its sediment in a fanlike shape.</p> <p>(T) Next up, we have deltas. A delta is where sediment is deposited at the mouth of a large river that is flowing into a lake or ocean. When it hits the large body of water the speed drops off and therefore it cannot carry as much and drops or deposits most of its sediment that the river picked up along the way. This sediment can build up over time as well. Raise your hand and read me the cause and effect of this then please.</p> <p>(S) What causes this? A loss in speed as the river hits a large body of water. What is the effect? Sediment is deposited and builds up</p> <p>(T) Yes, so how do we remember this one. Well its shape is a bit like this</p>
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<p>10 min. V, A, T</p>	<p>particular type of coral (fan coral). As the sediment deposits it appears as though it is not in any orderly form and has more sediment in some places than others. (T) Flood plain, last one. This is a flat area on both sides of a mature river. During flood events, like a heavy rain or snowmelt, the river overflows its banks onto the flood plain where the river deposits sediment. Repeating of these events can cause sediment buildup on the plain. Raise your hand and read me the cause and effect of this then please. (S) What causes it? A flat area on either side of a river. What is the effect? Sediment deposited on the plain when the river overflows its banks. (T) Thank you, ok so how will we remember this one? What's this a picture of? (S) halfpipe (T) Exactly, so think of a halfpipe when you think of flood plain they have a very similar shape and hopefully you will think flat. And if I were to put a river through this halfpipe where would it be? (S) Through the middle (T) Yes, straight through the middle here with the flood plain on either side. <i>Transition:</i> (T) Okay if you will please get a pencil handy we are going to move into an activity. First I want you to look at this handout. (<i>Handout Graphic Organizer</i>)</p> <p><u>Lab Activity:</u> <i>Adaptation: Students with LD will benefit by the groupwork and help from paras if needed as well as the hands-on experience. Student with hearing disability will have all the instructions up on the big screen for the lab.</i> (T) In the box where it says something about the overarching theme, we are going to fill that in now. The overarching theme for these three that you cannot put down as a cause below is they all begin as erosion by running water and end with deposition. (T) Okay with that down I need you to group into teams of 3 and listen up to our 'bird of caution' for today's lab. (<i>play music on slide</i>) (T) Okay so with our lab today the bird of caution tells us do not DUMP water over dirt, slowly pour a little amount. Any mess you make YOU will clean up. (T) Alright with this lab you are going to be pouring a little bit of water over your mountain of dirt and observing what happens. You should be able to identify at least one of the three terms of river deposition we discussed. You need to then continue to follow the instructions I will put up on the screen. As you move along fill in the cause and effect of each term, this is due at the end of the hour. First thing when you get your supplies is to put the saran wrap on the table, the plate on top and build your dirt mound on the plate. Now in your groups send one person up to collect your supplies. (<i>students come up to gather dirt, foam plate, saran wrap</i>) Send a different person up to collect a cup. Then get started. (<i>students come up to get a cup and teacher tells them how full to fill it</i>)</p>
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<p>2 min. A</p>	<p><i>(students begin lab and teacher moves around to observe and answer questions)</i> <i>Transition:</i> (T) Alright it's time to start cleaning up now. Please simply fold the saran wrap into the middle and carefully take to the trash. Bring your cups back up to the front for re-use. <i>(students begin cleaning up)</i></p> <p><u>Closure:</u> (T) So a few things about the lab, there is always things that may skew the data, like improper mound building, too much water, etc. But you all did an excellent job and your graphic organizers looked good. Now, raise your hand if you can tell me what were the three forms of river deposition that we talked about today? (S) Alluvial fan, flood plain, delta (T) Correct! And the erosion that leads to this deposition is by running water, our overarching cause you wrote down. Pass your sheets to the front please and your homework for tonight is to read the next section on erosion by glaciers.</p>
<p>Evaluation Questions</p>	<p>How can I improve this lesson for future classes? Was the erosion lab well understood? What is the most difficult concept for students to grasp and how can I make it easier for them?</p>
<p>Handouts</p>	<p>Graphic Organizer: cause and effect of river deposition terms</p>
<p>Overheads</p>	<p>Powerpoint</p>
<p>Assignment for next class period</p>	<p>Next lesson: erosion by glaciers Read Ch. 15, section 5 in <u>Exploring Earth Science</u></p>

Running Water-Erosion Lab

Name: _____ Date: _____

Overarching cause of all:

Agents (Types) of Deposition by rivers:	
Type:	Effect:
Cause:	

Lab Instructions

- Gather all materials
- Lay down saran wrap and put plate on top of it
- Build dirt mound then pour water slowly directly over the peak of the mound
- Watch for sediment deposition
- On the graphic organizer, write the three terms we discussed down the side under types, one per box.
- Circle the type of river deposition you just made and fill in the cause and effect (Hint: we talked about it in lecture)
- Place your ocean piece at the bottom of the dirt mound, on the side where the water flowed down.
- Underline what river deposition is now taking place and fill in the cause and effect
- Remove the ocean and build a second dirt mound across from your first one
- Pour a small amount of water in between these two mounds as your river.
- What type of river deposition have you just created? Put a star beside it on your paper and fill in the cause and effect