STEP AWAY FROM THE TEXTBOOK!

Landforms & Oceans

Activities, Parodies, Games, Jokes, Review Sheets, "3-D Templates", Cold Reading Passages, and much more!

- Continental & Oceanic Landforms
- Changes to the Earth’s Surface
- Natural Processes & Human Influence
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Thank you to Joann Wood for contributing ideas, inspiration, and original work to this project.

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Cover illustration by Zach Franzen.

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“A teacher who is attempting to teach without inspiring the pupil with a desire to learn is hammering on cold iron.”

—Horace Mann (1796-1859)
“The Father of American Public Education”
Over the next few pages I will share some of my personal classroom secrets that are sure to engage and excite your students!

Here's how it works:

The left-hand page includes the song parody, activity, poem, game, etc. for you to share with your students.

The right-hand page includes my personal commentary, including the reasons I've had success with this exercise, any key directions, and other tid-bits that might be helpful.

***The exercises on the next few pages are great to use for this topic area, but you can easily modify them to use for other topics and even subject areas. The simple format and extra notes that are provided will really help with this!
Classroom Game

**Landforms "Zip Around" Game**

**Description:** “Zip Around” game to review oceanic and continental landforms

**Instructions:** One student asks the question on their card, and the student with the appropriate card reads the answer. That student then asks his or her question, and the “zip around” continues. Use as a review tool for the end of a unit, or end of the year.

<table>
<thead>
<tr>
<th>I am an ocean.</th>
<th>I am a volcano.</th>
<th>I am a river.</th>
<th>I am a mountain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is an opening in the earth’s surface from which lava flows.</td>
<td>What is a large, flowing body of water that empties into an ocean?</td>
<td>What is a high point on the earth’s surface that is taller than the nearby areas?</td>
<td>What is a low point between higher areas such as mountains?</td>
</tr>
<tr>
<td>I am a valley.</td>
<td>I am a stream.</td>
<td>I am a glacier.</td>
<td>I am a canyon.</td>
</tr>
<tr>
<td>What is a small, flowing body of water that empties into larger rivers?</td>
<td>What is a huge sheet of ice that covers the land?</td>
<td>What is a deep valley with very steep sides?</td>
<td>What is a large body of salt water that connects to an ocean or is completely surrounded by land?</td>
</tr>
<tr>
<td>I am a sea.</td>
<td>I am an island.</td>
<td>I am a cavern.</td>
<td>I am a lake.</td>
</tr>
<tr>
<td>What is an area of land that is surrounded by water on all sides?</td>
<td>What is an underground chamber carved out over time by water?</td>
<td>What is a body of freshwater surrounded on all sides by land?</td>
<td>What is a large body of salt water that takes up most of the earth’s surface?</td>
</tr>
</tbody>
</table>
All students love to play games for review! This is fast-paced and it helps get the blood flowing (and brain working). This review game is a quick informal assessment that’s great for end-of-unit or end-of-year. It can also be adjusted to review as much, or as little, information as you want.

Cut out the cards and give one to each student. If there are extras, I have volunteers take more than one. Pick one student to stand up and read the QUESTION aloud on their card. Whoever in the class has the answer stands up and reads only the ANSWER. You tell them if they are right. If they are, they then read their question and so on.

Essentially, you will be “zipping” around the room with the questions and answers! The first time you do the game, it might take a little while, but you will be amazed how fast they get used to it!

I time the class to see if they can “beat their time”. You will find students helping each other – which in turn helps everyone! I have had classes zip all the way around in less than a minute. I suggest bringing the same game back at the end of the year and have the class try to beat its time from earlier in the year (it will take a while to get back up to speed).
Review Matrix

Landforms Chart

Description: A matrix to study characteristics of different landforms

Instructions: A review matrix that can be cut into puzzle pieces and pasted back together

<table>
<thead>
<tr>
<th>Characteristics of Landforms</th>
<th>Continental Slope</th>
<th>Canyon</th>
<th>Volcano</th>
<th>Rift Zone</th>
<th>Plains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining Characteristic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geological make-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Also known as:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Your students must cut these squares out and paste them back together in the correct order.

<table>
<thead>
<tr>
<th></th>
<th>Continental Slope</th>
<th>Canyon</th>
<th>Volcano</th>
<th>Rift Zone</th>
<th>Plains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining Characteristic</td>
<td>A mild slope prior to a sharp drop-off</td>
<td>Steep sides</td>
<td>Hot lava and molten rock</td>
<td>Low elevation surrounded by high elevations</td>
<td>Flat land covered with grass</td>
</tr>
<tr>
<td>Location</td>
<td>Under the ocean, near the shore</td>
<td>Many locations, most famous is Grand Canyon</td>
<td>Many locations, famous ones are Mt. Fuji &amp; Mt. St. Helens</td>
<td>Located in the mid-oceanic ridge</td>
<td>Many locations, such as Great Plains in the U.S.</td>
</tr>
<tr>
<td>Geological make-up</td>
<td>Sand and Rock</td>
<td>Rocks carved out by rivers</td>
<td>A mountain w/ an opening in the earth’s crust</td>
<td>Sand &amp; rock, site of underwater volcanic activity</td>
<td>Fertile soil, covered w/ grass</td>
</tr>
<tr>
<td>Also known as:</td>
<td>Continental Crust</td>
<td>Gorge, cliffs</td>
<td>Seamount (if underwater)</td>
<td>An underwater valley</td>
<td>Prairies, grasslands</td>
</tr>
</tbody>
</table>
Some of My Thoughts...

Why I think this is a great exercise...

This is a simple, easy to understand review tool that is hands-on, which is always a plus. It can be used as a quick assessment piece at the end of the unit or as a study guide. Also, from an ELA standpoint, it is a chance for students to learn about using description words (“steep”, “molten”, “fertile”, etc.) to correctly fill out the chart. I have also found that no matter the age, students love a little “cutting and gluing” once in a while!

The Step-by-Step in the classroom...

Students cut out the boxes inside the matrix that is already filled out. They then match the descriptions to the correct column and row on the blank matrix so that it fits correctly. The completed matrix can be used as an assessment or as a study guide.

I use literacy stations in my classroom and I put blank matrices at a station for them to complete after we’ve gone over a lesson.

Lesson Learned:

The first time you complete this with the class, walk around and make sure they are gluing things into the correct places - especially if they are bringing it home as a study guide! It is also a great form of assessment.
Classroom Game

Landforms & Oceans

**Description:** Students must figure out which continental or oceanic landform they are (based on a note card taped to their back) by asking other students.

**Instructions:** The teacher makes cards with the following names (or, if your class has gone into depth with other terms, you can substitute them) written on each card. Each student gets a card taped to their back and they get to ask up to 20 questions to determine what they are.

- Barrier Islands
- Estuary
- River
- Ocean
- Lake
- Continental Shelf
- Continental Slope
- Mid-Oceanic Ridge
- Oceanic Trench
- Ocean Basin
- Valley
- Mountain Range
- Canyon
- Cavern
- Volcano
- Plains

Divide the class into two groups and have one group do the exercise while the other is out of the room. The groups can “race” to see who can have all of the members complete the exercise the fastest.
I love this activity. It allows students to get up and move around, and it also has the excitement of solving a mystery. It’s easy to keep students on task because they all want to be the first to figure out which landform they’ve been assigned.

This can be used as a great review for any subject or topic that has a slew of vocabulary words for students to learn (in this case, it’s the different landforms).

Each student has a specific word taped to their back (they don’t know what it is), and they must ask questions to other students to figure out “who” or “what” they are.

You can easily monitor this exercise to be sure that students are asking the right questions and to see if they are able to respond correctly to the answers they are given.

This is so easy that, once students know how to play, feel free to try it with different subjects and topics. For example, in social studies you can tape the name of key figures in history to your students’ backs, and they must figure out who they are.
Song Parody

Waves, Currents, & Tides

**Description:** A song used to help students understand all the oceanic waves, currents, and tides

**Instructions:** Sung to the tune of “The Wheels on the Bus…”

---

The Ocean Water
*(Sung to the tune of “The Wheels on the Bus”)*

The waves in the ocean have a crest and trough, Crest and trough, crest and trough.
The waves in the ocean have a crest and trough As they come onto the shore.

The currents in the ocean are always moving Always moving, always moving.
The currents in the ocean are always moving In this direction or that.

The tides in the ocean go high and low, High and low, high and low.
The tides in the ocean go high and low, Two times a day.
Some of My Thoughts...

Why I think this is a great exercise...

This quick song covers waves, currents, and tides. It’s a great mnemonic device to distinguish between the three, especially when you throw in the hand motions. Not to mention it adds some enthusiasm to the classroom and gets the blood flowing.

The Step-by-Step in the classroom...

I always recommend “reading” the songs before singing. This allows struggling readers to make sure they know the words and gives students a chance to ask questions about any vocabulary they need to know before singing. After all, the purpose of this song is to help students understand specific terms within the science standards.

Reading it as a class also allows you to address poetic language in the songs and integrate those ELA standards.

We reviewed the song as a poem, discussing stanzas, rhythm, and rhyming scheme – all ELA standards. We then sang it and it became our poem of the week. By doing so, it became a subtle reminder throughout the day about what we were learning in science class.

Taking it a step further:

After a lesson on the waves, currents, and tides, my students drew posters where they displayed and labeled each item. By doing this exercise and singing the song a few more times (at random throughout the year), I think they were all very comfortable with the topic.
Ok, here’s the deal. My name is Mel, but my close friends call me “Messy Mel.” I think it’s their way of showing respect.

I’m a construction worker by day and a scientist by night (well, an “honorary” scientist, anyway).

I know that science is full of fancy terms, concepts, and theories. And that’s just the basics.

Well, I’m about as basic as you can get. Let me break down some of that scientific jargon in a way that’s easy to understand and remember.

Like I said, I’m no rocket scientist (for what it’s worth, my dear Mother used to tell me I had rocks in my head), but I might be just what you need!
LANDFORMS. They are forms of land. See...there’s a reason I’m a scientist.

Here are a few “forms of land” you might already be familiar with...

A. **Mesa** - flat-topped hill
B. **Plateau** - area of high, flat land
C. **Archipelago** - island cluster
D. **Island** - land surrounded by water
E. **River Mouth** - where a river flows into a large body of water
F. **Beach** - sand along the shoreline
G. **River** - path of flowing water
H. **Plain** - wide, flat land
I. **Mountain** - high, steep land

Let’s take a closer look at the oceanic landforms. Check out my nifty illustration....

You can imagine my disappointment when I realized that “continental” didn’t refer to a free, hot breakfast. Unfortunately, no... continental means “part of the continent,” or simply “land.”

Landforms can either be **continental** or **oceanic**. Believe it or not, the landforms are the same, but they’re called different names depending on whether they’re on land or under water. Let’s compare, shall we?

### LANDFORM SHOW-DOWN

<table>
<thead>
<tr>
<th><strong>Continental</strong></th>
<th><strong>Ocean</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Valley</td>
<td>Rift</td>
<td>Low land between hills</td>
</tr>
<tr>
<td>Canyon</td>
<td>Trench</td>
<td>Deep valley with steep sides</td>
</tr>
<tr>
<td>Volcano</td>
<td>Seamount</td>
<td>Opening in Earth’s surface</td>
</tr>
<tr>
<td>Mountain Range</td>
<td>Mid-ocean Ridge</td>
<td>High-rising land</td>
</tr>
<tr>
<td>Plains</td>
<td>Abyssal Plains</td>
<td>Large, flat areas of land</td>
</tr>
</tbody>
</table>

Let’s take a closer look at the oceanic landforms. Check out my nifty illustration....
Ahh... sun & surf. I've needed a vacation. Being a super genius can really wear a person out. The repeated movement of water sounds so peaceful. I need to pay attention to the rise and fall of the water level so I don't get trapped in a flowing stream of water. (I know this may be hard to believe, but I'm not an Olympic swimmer.)

What am I talking about, you ask? Well, even if you didn't just ask that, I'm going to explain it anyway. Behold, my definition list.

**Wave** - The repeated movement of water
- The high part of a wave is the crest and the low part is the trough
- Most waves are caused by wind
- When a wave curls over, it forms a breaker

**Current** - A flowing stream of water
- Currents can be found near the surface or deep below
- Currents can be warm or cold, depending on whether they come from the tropics or the polar latitudes

**Tide** - The rise and fall of the water level
- Tides rise and fall twice a day
- Tides are caused by the gravity of the moon when the Earth rotates

Uh-oh... the tide's coming in. I should tell you about the ocean shore zone before my head is under water.

1. **Beach**
The shoreline, where land meets ocean
Shorelines are always changing due to wind and water.

2. **Estuary**
Where rivers mix with ocean water
High tide brings sea life into the estuaries.

3. **Barrier Islands**
Islands with sandy beaches
They protect the mainland from the direct effects of waves

4. **Inlet**
Area of water between barrier islands
The water level changes with the tides
First, let’s get one thing straight. Natural processes can be **constructive**, meaning they create (like a flood creating a new lake) or **deconstructive**, meaning they destroy (like a landslide removing the face of a mountain). Sometimes they can be both. For example, an underwater volcanic eruption that creates an island is constructive, while a volcanic eruption that destroys a forest is destructive.

We live in a changing world. I know from experience. I was just having a lovely picnic with my cat Rusty when suddenly, **BAM** -- a crazy hurricane hit.

Okay, so maybe it’s just a rainstorm and not a hurricane, but it just shows how we can’t control Earth’s **natural processes**.

This rainstorm is happening quickly. It might even turn into a flood. Some processes, however, are very slow. Since my lunch is spoiled, I might as well tell you about these different processes...

**Flood:** Floods occur when large amounts of water cover areas that are normally dry. A flood can both erode soil and transport it to new places, sometimes leaving rich soil deposits.

**Landslide:** A landslide is a large movement of land due to gravity. Sometimes heavy rains can loosen the soil, making it easier for it to break away from the ground. Landslides can cause some serious damage, like wiping out buildings and power lines.

**Earthquake:** Earthquakes are major vibrations that occur due to sudden movements of the Earth. The magnitude of earthquakes can vary greatly, with some only causing a light shake and others causing whole cities to crumble.

**Volcanic Eruption:** Volcanoes are mountains with an opening into the Earth’s crust. Magma and gases can reach the surface, causing an eruption, which can completely destroy the surrounding areas.

**Natural Processes**

- **Weathering**
  - Weathering is the breaking down of rocks due to wind, water, ice, plant growth, etc.

- **Erosion**
  - Erosion happens when sediment is moved by water, wind, ice, or gravity.

- **Deposition**
  - Deposition occurs when something is deposited by water, wind, or ice. (The sea shells above were deposited on the beach by the ocean.)

Great. As soon as I come inside and get dry, a volcano explodes in my backyard. Just my luck. At least the molten rock will give my yard an interesting makeover.
My dear mother always told me not to be wasteful — that’s why I pride myself in **conservation**, which just means I make wise choices (but we already knew I was full of wisdom). For example, if I wear this shirt for a whole week, I can conserve the water that would be needed to wash an entire load of laundry. Mom would be proud.

But water’s not the only thing humans can try to conserve. There are many other **natural resources** found on Earth, such as:

- **Air**
- **Coal**
- **Trees**
- **Oil**
- **Rocks & Minerals**
- **Soil**

The less we use, the longer they will last. That’s my philosophy on laundry detergent.

I know this may come as a shock to you, but (on the flip-side of conservation) humans can also have negative effects on the planet. Think about **pollution**, which is anything that harms the environment.

I hope you were sitting down for that.

As a top-notch construction worker, I know a lot about working with the environment. Take this here community my crew and I have been working on...

We’ve taken the utmost care in protecting the Earth by taking smart steps like getting rid of our trash and left-over building materials properly, instead of burning everything (which can release toxic fumes), or dumping it in a river (which could contaminate the local water supply), or the ocean (which could harm marine life).

Luckily, there are many beneficial things we can do for the Earth. I’m sure you’ve heard of the saying “**Reduce, Reuse, Recycle.**”

Another positive thing we can do is plant trees and bushes, which not only helps the air but also the surrounding soil. Maybe one day you can get your azalea bushes to look as good as mine.

- **Reduce**—Like when I should eat only one pizza instead of two
- **Reuse**—I always carry a hanky in my back pocket, so I don’t have to carry a whole box of tissues
- **Recycle**—Like when I used old newspapers to wrap my mother’s birthday present
Display or make copies of the diagram shown above and have your students review it. If they were making the journey from Point A to Point B, what landforms and water features would they cross along the way? The list should include items like islands, peninsulas, rivers, streams, mountains, valleys, canyons, ponds, lakes, etc.

Go over which features they might need more information about to identify (for example: a desert), or might not easily be seen on the diagram (for example: caverns under the ground)?

As a class, discuss which of the different landforms and water features listed above can be commonly found in the area surrounding your school.
Activity - "A Day at the Beach" (tides & currents)

One of the most popular vacation destinations for many students is the beach. As a class, pick the closest beach to the school, even if it is several hours away.

Remind your students that, in order to enjoy a day at the beach, it is important to know about the beach conditions. Discuss which body of water the beach is bordering, and whether it is on an island or a coastline.

Using a weather report (via the internet), find out when it will be low tide and high tide at that particular beach. Briefly discuss the conditions that determine the tidal changes.

As a class, discuss how the weather, tidal changes, and currents will have an impact on ordinary beach activities (swimming, surfing, fishing, sun tanning, etc.). Remember that the amount of beach available for recreation will get smaller during high tide. It will also result in stronger currents and higher waves.

Activity - Landform Concentration

Have your students group into pairs and play the game Matching (also known as "Concentration") by comparing features of the land and ocean floor.

Each group should have ten small cards labeled with either a landform or an oceanic feature. The students lay the cards face down, and alternate picking two cards. If the cards match (see below), the student gets a point and removes the cards. If they don't match, the student returns the cards face down.

The matching cards should be as follows (land feature & comparable ocean feature):

- Canyon → Trench
- Valley → Rift
- Volcano → Seamount
- Mountain Range → Mid-Oceanic Ridge
- Flatlands → Abyssal Plain

To earn the point, your students should be able to identify which is a land feature and which is an oceanic feature. They should also be able to define the feature and tell where it is usually located.
Activity – Choose a Landform

As a class, list up to five different types of landforms that can be found within your state. Here are a few common ones (but there are many more from which to choose):

- mountains
- islands
- rivers
- lakes
- valleys
- plains
- deserts
- beaches
- deltas
- caverns
- canyons
- peninsulas

Divide your students up into several groups, and assign each group one of the chosen landforms. The group must first research the landform within the state, and briefly present it to the class.

Next, each group must decide how their chosen landform came to exist. Make sure they consider the following items:

- Movement of lithospheric plates
- Activity along plate boundaries
- Seismic activity and earthquakes
- Movement of water on the Earth's surface
- Ocean currents and tides, and shifting of the ocean over time (exposing more land)
- Formation of different rock types over time
- Changes in climate and conditions on the Earth's surface over time

Lastly, each group must predict how their landform might change in the future, and why. They should consider both man-made factors and natural factors (as shown below).

**Factors that can cause changes to land and water features**

<table>
<thead>
<tr>
<th><strong>Human Factors</strong></th>
<th><strong>Natural Factors</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction / Development</td>
<td>Erosion / Weathering / Deposition</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Rapid Changes (earthquakes, floods, volcanoes, etc.)</td>
</tr>
<tr>
<td>Mining / Extracting Natural Resources</td>
<td>Shaping from ocean currents, tides, &amp; flowing water</td>
</tr>
<tr>
<td>Pollution / Careless behaviors</td>
<td>Climatic changes and natural weather conditions</td>
</tr>
</tbody>
</table>
Landforms & Oceans

Q: Who is the only person who would be happy to be caught in a “landslide”?
A: A politician who is winning an election
(a bit of a trick question, but a great lead into landslides, floods, earthquakes, etc.)

Q: What did the ocean say to the beach?
A: Nothing, it just waved.
(A classic and a good introduction to waves, currents, and tides)

Q: What did one mountain say to the other mountain?
A: Let’s meet in the valley.
(it’s silly, but it is a fun lead into your discussion of continental landforms)

Q: What travels across wide oceans, climbs high mountains, navigates through deserts and jungles—yet always stays in the corner.
A: A stamp
(this one’s a classic, and it can lighten up a conversation about the location of geographical features)

Teacher: Who can tell me what the Great Plains are?
Student: Well let’s see... there’s the F-16, the Concorde, and the 747.
(a bit predictable, but it works well when reviewing vocabulary dealing with landforms)

Teacher: Can you think of something so large that it can reach from one continent to another?
Student: Of course...the ocean.
(a great riddle to use at the beginning of your unit on the oceans)

Teacher: We’ve learned about the continental shelf and continental slope, as well as the abyssal plain and oceanic trenches. Now, who can tell me what sits on the bottom of the ocean floor and shakes?
Student: A nervous wreck
(referring to a ship wreck, of course... this is a terrible joke, but hopefully it will get a polite laugh)
“He’s blown his top!”

Luckily, this is only a figure of speech. It is highly uncommon for a person to lose their temper to such an extent that their head literally blows off. So, where did the odd phrase come from? Well, people may not actually blow their tops, but there are things that do—volcanoes.

As far as phrases go, this one really fits. A person who’s “blown his top” can be dangerous, and so can a volcano. There are over 1,500 volcanoes in existence, and over 500 of them have “blown their tops” at one time or another. The result can be devastating—hot ash and molten lava spill out and destroy any surrounding areas.

Before an active volcano erupts, it’s common for it to let out steam for a time before it blows. Sometimes, the steam is just a false alarm, or it is able to let out enough steam that an all-out eruption isn’t necessary. From this occurrence, the phrase “He’s just letting off steam” originated. This is to say that a person is just venting their frustrations, which can be a good thing. After all, if he doesn’t do that, he may just “blow his top!”

“Because it’s there!” —George Mallory (1924)

When asked the question of why he would ever attempt to climb Mount Everest, mountaineer George Mallory gave a simple and famous answer: “Because it’s there!” Mallory had already led a major British expedition up the north side of the world’s highest peak in 1921, and he was preparing for another attempt in 1924.

Unfortunately, Mallory would never make it down from his second attempt. Although he expected a tough climb, he was met with extremely harsh conditions, including strong winds, avalanches, and cold temperatures. Mallory and his climbing partner, Andrew Irvine, disappeared. Their bodies were not found until over seventy years later at an elevation of about 27,000 feet above sea level. It is still unknown whether they actually made it to the summit.

Remarkably, nobody else would successfully climb to the peak of Mount Everest until 1953—nearly thirty years after Mallory’s attempt—when a British expedition led by John Hunt made it to the top. By the year 2000, nearly 700 people had conquered the rigorous mountain, and almost 150 had lost their lives in an attempt. Yet, all of them shared George Mallory’s reason for undertaking such a dangerous task: “Because it’s there!”
**Need a Landform? Just Build One!**

*A little about the construction of the Panama Canal*

Sailing around the tip of South America was no fun at all. It was a ridiculously long way, the weather was unpredictable, and the ocean currents were brutal as the Atlantic met the Pacific. And it just didn’t seem necessary—a small canal through Nicaragua or Panama would immediately cut the distance in half.

This talk had been around for a long time—most of the time it was just in the “wouldn’t it be nice” category. Then, in 1848, “Gold Fever” swept across the United States and people started flocking from the east coast to the west. Most took the wagon trail, but some preferred the boat ride. You can imagine their frustration when they had to sail all of the way around South America just to make the trip. With the growing potential for trade in the United States between the East and West, taking such a long trip just wasn’t feasible.

Surprisingly, it was the French who decided to make the big move. In 1881, a French company began to dig a sea-level canal across Panama. They had played a large part in building the Suez Canal across Egypt in 1860s, so the French were no rookies to the game. However, the canal in Panama brought on new challenges. Disease was rampant, the terrain was rugged, and there were huge financial troubles—in 1889, the French closed shop and decided to abandon the construction of the canal.

This opened the doors for the United States. At first, the Americans had been more interested in a canal through Nicaragua, but the French had already done much of the legwork in Panama. When President Theodore Roosevelt expressed his support of a Panama Canal, the argument was settled. The last piece of the puzzle was to get the okay from Colombia, which occupied the nation of Panama. With a large sum of money, the United States didn’t think that that would be too difficult.

However, the Colombian senate didn’t cooperate. Recognizing that their opportunity for international protection was slipping away, Panama decided to revolt against Colombia in November 1903. Of course, under normal circumstances, the Panamanians wouldn’t stand a chance. But this situation was a little different than normal.

On November 3, 1903, Panama staged its revolt against Colombia. Soon after, Colombian troops noticed a United States warship (fully prepared to back the Panamanians) sitting in their harbor. Wisely, the Colombians decided not to try to thwart the revolt.

Three days later, the new republic of Panama *(under United States protection)* was recognized. Conveniently, this allowed the United States to begin construction on the Panama Canal. The first stages started in 1906, but it was hard to see any progress. The Americans didn’t want to make the mistakes that the French had made, so the first few years were dedicated to disease control, detailed surveys, and setting up temporary facilities.
The French had planned to build a sea-level canal, but that really wasn’t a good idea. While the Atlantic Ocean tides varied by less than a foot, the Pacific Ocean tides ranged by twelve feet. The United States decided to build a set of locks. These would control and maneuver the elevation of the water in certain areas.

Eight years and over $300,000,000 later (not to mention the removal of 240 million cubic yards of dirt), the Panama Canal was unofficially opened for business. As suspected, it was a huge benefit to ships needing to cross from the Atlantic Ocean to the Pacific.

Because the Panama Canal is so critical in transportation, the rights to it have become a sensitive issue. Formally — based on a treaty in 1979 — the canal is an area of permanent neutrality.

Famous Examples of **MAN-MADE LANDFORMS**

The *Rice Terraces of the Philippine Cordilleras* are a series of ancient, sprawling man-made terraces (step-like platforms) carved into mountainsides for the purpose of planting rice. These terraces are between 2,000 and 6,000 years old and are believed to have been built mostly by hand by ancestors of the indigenous Batad people. Often referred to as the “Eighth Wonder of the World,” the terraces cover about 4,000 square miles and rise 5,000 feet above sea level.

The *Great Pyramid of Giza* in the Giza Necropolis of Egypt is the oldest and only surviving structure of the “Seven Wonders of the Ancient World.” It was built between 2580 and 2560 B.C., most likely as a tomb for the Egyptian Pharaoh Khufu, and was the tallest man-made structure in the world for over 3,800 years. Inside the pyramid are both ascending and descending passages to three chambers. The pyramid was once covered in smooth casing stones, but today only the underlying structure remains.

The *Hoover Dam*, a concrete arch-gravity dam in the Black Canyon of the Colorado River between Arizona and Nevada, was built between 1931 and 1936 during the presidency of Franklin D. Roosevelt. Its grueling construction involved thousands of workers and cost hundreds of lives. The dam impounds *Lake Mead*, the largest man-made reservoir in the United States, with about 9.28 trillion gallons of water. The dam is also useful in controlling floods, providing irrigation water, and producing hydroelectric power.

The *Palm Islands* off the shore of Dubai, United Arab Emirates (in the Persian Gulf), are a group of three artificial islands in the shape of palm trees topped by crescents. Creation of the “Palm Trilogy” – the Palm Jumeirah, Palm Jebel Ali, and Palm Deira – began in 2001 and will eventually house large numbers of residential, leisure, and entertainment centers. The maximization of shoreline on the islands will add 323 miles to the beaches of Dubai. With even more additions still in the works, this project will become the largest man-made development in the world.
Break the code to reveal the definitions for each term! Each definition has a different "code." Not all letters will be used.

### Shoreline:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|   |   |   |   |   |   |   |   | 8 |   |   |   |   | 14 |   |   |   |   |   |   |   |   |   |   |   | 10 |

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### Barrier Island:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   | 12 |   |   |   |   |   |   |   |   | 18 |   | 19 |

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### Estuary:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|   |   |   |   |   |   |   |   | 19 |   |   |   |   | 7 |   |   |   |   |   |   | 16 | 10 | 25 |

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Section 5

Feel free to make copies of the puzzles to distribute to your students for review

Ocean Shore Zone

Shoreline:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 7 | 13| 22| 19| 8 | 24| 14| 21| 23| 15| 6 | 17| 10| 6 | 19| 7 | 20| 23| 21| 12| 11| 8 | 20| 4 | 3 |

Where the Land Meets the Ocean

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 10| 8 | 19| 15| 19| 17| 8 | 19| 24| 7 | 21| 22| 14| 19| 19| 17| 6 | 17| 8 | 19| 23| 13| 19| 7 | 21| 10| 12|

Barrier Island:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 15| 7 | 1 | 4 | 25| 12| 22| 9 | 14| 26| 13| 8 | 10| 18| 19| 3 | 24| 7 | 21| 22| 13| 15| 16| 10| 12|

Water Surrounded Land With Sandy Beaches

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 19| 15| 10| 25| 13| 8 | 18| 13| 26| 18| 14| 4 | 25| 14| 4 | 9 | 15| 14| 4 | 19| 22| 10| 12|
| 8 | 15| 14| 4 | 3 | 7 | 25| 15| 1 | 12| 25| 8 |

Estuary:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 20| 19| 26| 23| 24| 7 | 11| 21| 13| 15| 16| 10| 25| 23| 26| 13| 20| 13| 24| 10| 26| 13| 25| 22|

Where a River Meets the Ocean

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 25| 23| 26| 13| 26| 20| 13| 24| 10| 26| 13| 7 | 26| 26| 16| 15| 16| 23| 26| 21| 19| 26| 20| 11|

Inlets:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 9 | 19| 12| 21| 24| 8 | 25| 22| 20| 18| 5 | 1 | 16| 9 | 1 | 21| 18| 19| 21| 1 | 16| 21| 21| 22|

Areas of Water Between Islands

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 9 | 18| 21| 9 | 5 | 20| 24| 16| 9 | 1 | 21| 18| 19| 21| 1 | 16| 21| 21| 22| 8 | 5 | 25| 9 | 22| 12| 5 |
Continental & Oceanic Landforms

Solve the crossword puzzle using the clues below.

Natural Processes

Find the terms in the word search puzzle. Enter the remaining letters on the blank lines below to spell a message!

**ACROSS**

1  Deep valley (Continental)
5  Low land between hills (Oceanic)
7  High-rising land, 2 words (Continental)
8  Lava-flowing opening (Continental)
9  Flat land (Continental)

**DOWN**

2  Flat land (Oceanic)
3  High-rising land, 2 words (Oceanic)
4  Lava-flowing opening (Oceanic)
6  Deep valley (Oceanic)
8  Low land between hills (Continental)

**Clues for Crossword Puzzle**

Across:

1. Deep valley (Continental)
5. Low land between hills (Oceanic)
7. High-rising land, 2 words (Continental)
8. Lava-flowing opening (Continental)
9. Flat land (Continental)

Down:

2. Flat land (Oceanic)
3. High-rising land, 2 words (Oceanic)
4. Lava-flowing opening (Oceanic)
6. Deep valley (Oceanic)
8. Low land between hills (Continental)

---

**Clues for Word Search Puzzle**

Constructive
Erosion
Landslides
Volcanoes
Earthquakes
Landforms
Deposition
Floods
Oceans
Weathering
Sediment
Landforms & Natural Processes

Feel free to make copies of the puzzles to distribute to your students for review.

**ACROSS**
1. Deep valley (Continental)
2. Flat land (Oceanic)
3. High-rising land, 2 words (Oceanic)
4. Lava-flowing opening (Oceanic)
5. Low land between hills (Oceanic)
6. Deep valley (Oceanic)
7. High-rising land, 2 words (Continental)
8. Lava-flowing opening (Continental)
9. Flat land (Continental)

**DOWN**
2. Flat land (Oceanic)
3. High-rising land, 2 words (Oceanic)
4. Lava-flowing opening (Oceanic)
6. Deep valley (Oceanic)
8. Low land between hills (Continental)

**ACROSS**
1. CANYON
2. MOUNTAIN RANGE
3. PROVINCE
4. LAKE

**DOWN**
1. MOUNTAIN RANGE
2. PLAINS
3. VOLCANO
4. RIDGE
5. CANYON
6. MOUNTAIN RANGE
7. PLAINS
8. VOLCANO
9. RIDGE

**ACROSS**
1. ConstrucFigve
2. Erosion
3. Landslides
4. Volcanoes
5. Earthquakes
6. Landforms
7. Deposition
8. Floods
9. Oceans
10. Weathering
11. Sediment

**DOWN**
1. Ocean Waves
2. Leave Shells
3. On the Beach
4. Through Deposition
Why 3-D Templates?

Our 3-D Templates give students a hands-on way to interact with information. This kinesthetic technique engages the learner while the information is being presented, and also helps in the processing and cognitive organization of it. To put it another way:

“Tell me and I’ll forget; show me and I may remember; involve me and I’ll understand.”

Landforms

This template is a great way to identify key land and water features, and to compare them with one another. While some examples have been included, the template can be easily be modified to recognize other continental and oceanic landforms. Once completed, the 3-D Template will make a great review sheet!

Watch as it “Unfolds”

Step 1: Students cut and fold the template so that only the top half is showing. In the box, they write an example of each landform.

Step 2: Students unfold the template. Under each section they write a short description of the landform, as well as a visual representation of how that feature might be shown on a map or diagram.

Repeat the step to fill out each panel.

The template is provided on the next page. Make copies to hand out to your students.
Draw how this land feature might be shown on a map or diagram:

**Famous Example:**

Description:

- **Mountains**
- **Canyons**
- **Caverns**
- **Plains**
- **Lakes**
- **Canyons**
- **Mountains**
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