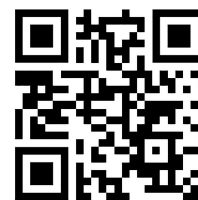




FOR MORE INFORMATION:
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SCAN ME TO VIEW LESSON

HVL LESSON TITLE:

FIGHTING OBSTACLES

DEVELOPED BY: KATHY HIGHTOWER

FIGHTING OBSTACLES

GUIDING QUESTION:

How did obstacles
impact the Allied Forces
on D-Day?

OVERVIEW

Harold McMurran was drafted into the 56th Maintenance Division of the Army. On D-Day, his responsibilities suddenly shifted to infantry. At 7 a.m. on June 6, 1944, McMurran began the fight of his life on the beaches of Normandy.



Subject(s):

Math
Science



WWII Veteran(s):

Harold McMurran



Duration:

1 to 2 classes
(55-70 min.)

FIGHTING OBSTACLES

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“The Germans had just about every inch of that beach covered with machine gun fire. You could see the bullets hitting everywhere in the sand.”

HAROLD MCMURRAN - WWII VETERAN

OVERVIEW

Harold McMurran was drafted into the 56th Maintenance Division of the Army. On D-Day, his responsibilities suddenly shifted to infantry. At 7 a.m. on June 6, 1944, McMurran began the fight of his life on the beaches of Normandy.

HISTORICAL CONTEXT

The Allies and Axis Powers knew they would meet on the shores of France. The Allies set up a decoy force at Calais to throw off the German forces. For months, the Allies had extensively planned the attack at Normandy. By attacking in early June, under a full moon, they hoped to maximize the opportunity to employ air, water, and land attacks. The original date for the attack was June 5th, but British meteorologists were able to persuade the Allied leaders to wait another day because of storms. Conditions were better on the 6th, but many things went wrong. The Allies were tenacious, improvisational, and strategic. Weeks later, they would turn the corner to begin to see the war's end.

OBJECTIVES

At the end of this lesson, students will be able to

- Identify by name some of the obstacles the Germans created at the coastline and consider why their geometric shapes were often destructive to the Allies;
- Appreciate the tactical speed that soldiers had to have to battle the tides and weather; and
- Understand why Omaha Beach itself remains significant because of what remains in the sands; and
- Understand that the iron and steel used in war is important in everyday living.

STANDARDS

MATH

9-12.G-GMD Geometric Measurement and Dimension

Explain volume formulas and use them to solve problems

9-12.G-GMD.35

Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.

9-12.G-GMD.36

Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

9-12.N-Q Quantities Reason quantitatively and use units to solve problems.

9-12.N-Q.4 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

SCIENCE

HS-PS1-2.

Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. [Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen.]

FIGHTING OBSTACLES

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MATERIALS & DOCUMENTS

DOCUMENT A: HAROLD MCMURRAN VIDEO:

Things You Don't Forget: Harold McMurran
<https://www.youtube.com/watch?v=fd8okLRFUeQ>

DOCUMENT B: ARTICLE LINK:

Tour the Battlefields of Normandy: The Obstacles
<https://www.strijdbewijs.nl/hinder/obstacles.htm>

DOCUMENT C:

The Role of German Tetrahedra (Activity Sheet)

DOCUMENT D: ARTICLE LINK:

Astronomy and D Day: The Sun, Moon and Tides at Normandy
<https://skyandtelescope.org/astronomy-news/astronomy-d-day-sun-moon-tides/>

DOCUMENT E:

Trying to Keep Up! Setting the Detonations Before the Tide Rises (Activity Sheet)

DOCUMENT F: ARTICLE LINK:

The geological fingerprint of war in photos - UT News
<https://news.utexas.edu/2012/05/25/the-geological-fingerprint-of-war-in-photos/>

DOCUMENT G: ARTICLE LINK:

Why Does Steel Rust?
<https://capitalsteel.net/blog/steel-faqs>

DOCUMENT H:

The Relevance Of Rust, Iron, and Steel (Activity Sheet)

FOR MORE INFORMATION:
email: info@honoringveteranlegacies.org

PROCEDURES

MATH LESSON: ACTIVITY 01

(15 minutes)

Students will watch the story of Harold McMurran. What were some of the obstacles the soldiers faced on D-Day? How was it evident that the Axis Powers were prepared for their arrival?

ACTIVITY 02 (10 minutes)

In Document B: Tour the Battlefields of Normandy: The Obstacles, students will see some of the sea and beach obstacles used by the Axis Powers and note how the structures could be damaging to the Allies. Students will see how triangular shapes were useful. Then students will use formulas to complete Document C : The Role of German Tetrahedra.

ACTIVITY 03 (15 minutes)

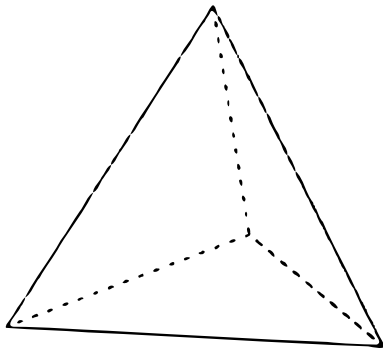
- Students will skim Document D, Astronomy and D Day: The Sun, Moon, and Tides at Normandy.
- After obtaining information from Document D, students will complete Document E, Trying to Keep UP! Setting the Detonations Before the Tides Took Over

SCIENCE LESSON: ACTIVITY 01

(15 minutes)

Students will use Document F to find out why the beach sand at Omaha Beach is different from other beaches in the world. Students will then use Document G to see the relationship between steel, rust, and iron oxide.

Fighting Obstacles Activity Sheet



The Role of German Tetrahedra

The Axis powers had a strategic system of obstacles both under the water and on the beaches of Normandy. Some could be transported from battle to battle. As the Higgins boats approached the beaches, it would be easy to see the large tetrahedrons forming a fence line and stopping tanks or other vehicles. Made of iron and wrapped in concrete, they were unaffected by tides or gunfire.

For the Allies on the beach, the size gave infantry a little protection. The sides of each tetrahedron were between two feet and six feet long. Mines could be attached to them. At Utah Beach, the Germans had 150 tetrahedra as a line of defense. Men and landing craft could be destroyed before infiltration beyond the beach.

Use the properties/formulas for triangular pyramids to answer the following questions.

1. How many side pieces would have been needed to construct 150 tetrahedra?

2. What would be the slant height of a regular tetrahedron with sides 5 feet long?

3. If a tank was approaching a row of dragon's teeth that were each 4 feet tall, what would have been the total surface area confronting the tank?

(Hint: find the length of the sides using 4 feet as the altitude. Then determine the surface area of a face.)

4. If an Allied member of the Naval Combat Demolition Unit was able to get underneath the topmost vertex of a tetrahedron with sides 4.5 feet long to attach an explosive, what would the altitude be?

5. If a 5 foot 7-inch tall Allied soldier planted explosives just under the top of a tetrahedron, would a tetrahedron with sides five feet in length be taller or shorter than the soldier?

Fighting Obstacles Activity Sheet

Document E 

Trying to Keep Up! Setting the Detonations Before the Tides Took Over

How did the tides affect the Allies at Omaha Beach on the morning of D-Day?

FACTS: Approximately 300 - 400 feet of beach existed between low tide and high tide. There were between 5 and 10 yards of the sea wall to reach sand dunes. At the sand dunes, there were 200 yards of beach shelf to climb. At that point, there were 100 - 170 feet to the top of the cliffs to come off the beach.

- Low tide was at 5:23 am and high tide occurred at 10:12 am. On average, during that time, the range of the tide was 18 feet. How many inches per minute did the water rise?

The first infantry to reach the coast arrived at 6:30 am. The Naval Combat Demolition Unit (NCDU), had little time to blow up the obstacles the Germans had set up to slow the advance and kill the Allies.

- The first infantry to reach the coast arrived at 6:30 am. By 7:00 am, the water had already risen 2.4 feet. How many inches per second did the water rise during that time?

- There were 16 main obstacles to eliminate, but the NCDU was only able to take out 31.25 percent of them. How many obstacles remained?

More Information at: <https://skyandtelescope.org/astronomy-news/astronomy-d-day-sun-moon-tides/>

Fighting Obstacles Activity Sheet

The Relevance Of Rust, Iron, and Steel

Just like dirt and other materials, sand differs from place to place. Even though Operation Overlord commenced at Normandy over 75 years ago, remnants of the battle can still be found under one's feet. Scientists have analyzed the sand and found bits of shrapnel up to one millimeter in size.

As beaches are in a constant state of change due to tides, winds, weather, and beachgoers, one may have thought the remnants of war would be at the bottom of the ocean by now. Another factor will eventually take over. The tiny pieces of iron shards are battling the battering of rust. When iron and oxygen connect, Iron Oxide, known as rust, begins to form.

Read the following articles to learn more about what scientists found and the relevance of rust, iron, and steel.

"The Geological Fingerprint of War" from the following link:
<https://news.utexas.edu/2012/05/25/the-geological-fingerprint-of-war/>

"Why Does Steel Rust?" from the following link:
<https://capitalsteel.net/blog/steel-faqs>

Activity Questions

1. What is the most common name for iron oxide?

2. For iron to rust, what is required?

3. Why would shrapnel be in a shard-like form?


4. Why is it important to keep steel and other metal items as unscathed as possible?

5. Why do you think stainless steel is used in cutlery?

Name _____

Date _____

Fighting Obstacles Activity Sheet

Document H 

Complete the Table and Answer the Following Questions?

	COATED WITH WHAT MATERIALS	TWO PRODUCTS MADE WITH THIS TYPE
GALVANIZED		
STAINLESS		
ALUMINUM		

1. What parts of an automobile can be sensitive to rust?

2. How does this impact the value of auto maintenance?
