

Washington Military Department

Emergency Management Division

Learning About NATURAL DISASTERS

With Word Games and Puzzles

Grades 3-6

WORD SEARCH PUZZLE EARTHQUAKES

Instructions: The words in the puzzle may be hidden horizontally, vertically, diagonally, forward, or backward. Circle discovered words with different colors, and cross them off the list when you've found them. When all of the words are found, you will know many important terms related to Earthquakes.

Find the Hidden Words!



AFTERSHOCK EARTHQUAKE ENERGY EPICENTER FAULT FOCUS FORESHOCK HAZARD HYPOCENTER INTENSITY LOCATION MAGNITUDE RICHTER SEISMOGRAPH SHAKING TSUNAMI VIBRATION WAVEFORM



TSUNAMIS

Instructions: The words in the puzzle may be hidden horizontally, vertically, diagonally, forward, or backward. Circle discovered words with different colors, and cross them off the list when you've found them. When all of the words are found, you will know many important terms related to Tsunamis.

Find the Hidden Word!

COAST DAMAGE DANGEROUS DESTRUCTIVE DISASTER EARTHQUAKE ENERGY LANDSLIDE METEORITE MONITOR OCEAN PACIFIC POWERRFUL TSUNAMI VOLCANO WARNING WATER WAVE



W A R N 1 NGAHWT O S S DR х N 1 JD ZHA 8 0 T Т N 0 M v L S. 0 D KF Ε MF S R v х 0 J L O A w D L v LEXOL G ٧ ٧ J D L D Т С N Ε А L ΑE К GN T 8 C Ζ S E D G Т s U v Ν ۶ D 8 А N ZQA х А А Е Α Е к ε N ł R S Т M Е NOON R W 1 1 J R Q V D 8 ĒΑ ԼԼ WН 0 TCOO x С ĸ Ċ к 8 w S D 1 A D U D Ε ε Y х Q T А M A G ХС P s R Y 0 Ŧ P N υ L ν. M L в G D Ρ ε 0 t S Z 0 х 0 G G F Ν D ρ D A L 8 U E F А J M к S L К QE U С Y Ζ 7 ΕB Е QTM С Т D J DU S L A DН Y квхноов G F L S 0 Ε G 1 ţ J м F s F J н G <u>٩</u> Ρ F в D Т LC ME R L С UR T S E Ε ε I F Т Т D LK J 1 v TΡ A A G P G Т S A M N м υ Ν κ С L В IWQVGVASUQF Y J в В х E

RICHTER MAGNITUDE SCALE

Instructions: The words in the puzzle may be hidden horizontally, vertically, diagonally, forward, or backward. Circle discovered words with different colors, and cross them off the list when you've found them. When all of the words are found, you will know many important terms related to the Richter Magnitude Scale.

Find the Hidden Word!

AMPLITUDE CALTECH CHARLES EARTHQUAKE ENERGY LOCAL LOGARITHMIC MAGNITUDE MEASURE OSCILLATION RICHTER SEISMOGRAM SEISMOLOGIST SIZE TELESEISMIC TENFOLD VIBRATION

HPARGOMS Y ΗE J 0 t t Е s т ΖE V. R Ε Α εD J T QGM G А V w L R Ż UWO R С Ť D R 0 A Ĺ D W 8 В Ð E S T RRT F w s 1 H F υ Ρ G 6 0 R Ε Т T E s A N U А υ 1 х А M Т G v м Ρ 8 F D v D X A 0 Н 8 S F N Т Т w 0 к ε S G L ου M С ΗР t Q 1 Ν Т D М R MOE L Ť Ň Z t J TNGU A G 0 в OGS D А В NH 0 ο ν Q Α А Р U t 0 Ζ GUE СОКЕ s ĸ L 0 М 1 L t Q. М P Τ Ē ε 1 Ρ v O B A G S х S А R 1 Т **R** B Ρ С ε A Ρ 1 L М C А М L D v 0 J s A s A Y Т L ε 0 Т M Y A L ٧ 0 P М Τ С GGU Ε F GC H D L 1 8 Α GL R R 0 1 Y Е 1 N С Y XR J А 1 z А NGCS OMH ĸ ٩ Т υ ε s N E Z L Т J 1 S ĸ N t R Т С н Т Ε 8 N 0 v L L ОТ TELESE 1 S M ICECDO Т

SEISMIC WAVES

Instructions: The words in the puzzle may be hidden horizontally, vertically, diagonally, forward, or backward. Circle discovered words with different colors, and cross them off the list when you've found them. When all of the words are found, you will know many important terms related to Seismic Waves.

Find the Hidden Word!

ATTENUATE BODY COMPRESSION DILATATION ELASTIC ENERGY LONGITUDINAL LOVE PARTICLE PERPENSICULAR PRIMARY RALEIGH REFLECTED REFRACTED SECONDARY SHEAR SURFACE TRANSVERSE

LBXHJGCOTTARRMGWJ Ŧ 00 Ë YNQB υ ZR υ J J RAEH S ZREF R A С ε DK ε ΤN v L Т 8 R Е Ρ S G В А υ DWF ε R S Ζ В D 0 А ۶ Ξ 8 ε S В G С F H С Z Α 0 1 А Т М R Z ε С DE 0 Т v Т A D X L 0 Y Y L E 8 Y A J v н υ F I Ρ D E ERE W R С Έ S Ţ Ţ 0 1 х S O RS S R D ĸ С A T N 0 ε F v. U N F L A Q н G 8 Y в D E Ð Р L Е S S В А U N J G н х G 2 N 1 0 С Ε v 0 L N R F А Ζ D P RM D 0 İ С 1 İ V. Κ G Ε Y w Т F L U ΕU С Ρ к Т s F U С ٧ Т QU Ŧ A M NL U-Ν LCRR Т D С F Ε н ٧ Ρ J А υ W s в Ρ ΕA A S X к NXK 8 Α J 8 A 8 к Α. F P х 1 I Y v х Y Ţ х zο н R 0 R L F х X Ρ T Т Α Ρ L 8 N 0 T А L t D w TRPCOMPRESSIONGG υ P

MERCALLI INTENSITY SCALE

Instructions: The words in the puzzle may be hidden horizontally, vertically, diagonally, forward, or backward. Circle discovered words with different colors, and cross them off the list when you've found them. When all of the words are found, you will know many important terms related to the Mercalli Intensity Scale.

Find the Hidden Word!							
	DAMAGE	MOVEMENT					
	DESCRIBES	NEUMANN					
	DESTRUCTION	NUMERALS					
	EFFECTS	OBSERVED					
	EYEWITNESS	ROMAN					
	FELT	SUBJECTIVE					
	INTENSITY	TWELVE					
	ISOSEISMAL	WOOD					
	MERCALLI	VIBRATION					

MXAY DOB SE R JU 1 v E D S L Ρ E ε ĸ KWQ ΜW C 8 R С о Ε G J J F Z Ζ С v Y 0 RG н J **Q** X 0 U Y Y v 8 I υ F С А J Ρ 0 U Τ Q G T M N Z L Ρ Т F N Е A С D G Y 0 Q T ٧ Ρ н P Е Ρ N Ε A С Ł W Q А S С κ w U Ν J м С F к U D S T L 1 Ĵ N н Y D S Ρ C Т C ε s ε Т S o υ M Е L Q 1 1 А U L U L s 8 Q Ť N S T S G к А ٧ M 8 к Ť L v Ρ т F 0 s Ε н М A J A L N Ν A ٧ w С ŝ ţ G Е Q s М Н Z Ν 8 D N R v М D D R 2 F S Ε Т L U 0 0 С М D S D х R v F в υc R н к Т L Е F L L İ Y t A А С Т S G L F ε х G S R L I к v G w т Е V м s ٧ Q Α 0 S м А G Ε Е 1 J ţ Ε ĸ S W Р Y MHC 0 İ Т Ô Ν D О L А Ε Ε N U v J N о к S M 0 v Ε M Ε Ν т DE С - 8 ΒΕ S P Ε Z N N. S XRQS

Emergency Planning and Community Right-To-Know

HAZARDOUS MATERIALS

Instructions: The words in the puzzle may be hidden horizontally, vertically, diagonally, forward, or backward. Circle discovered words with different colors, and cross them off the list when you've found them. When all of the words are found, you will know many important terms related to Hazardous Materials.

Find the Hidden Word!

ACCIDENTLEPC (for Local EmergencyCHEMICALSPlanning Committee)COMMUNITYLIQUIDSCORROSIVEMATERIALSEMERGENCYPLANNINGFLAMMABLEPLANGASPREPAREDNESSHAZARDOUSA

PREVENTION RESPONSE RTK (for Right-To-Know) SPILL TANK TOXIC VAPORS

Y C Ρ А 0 M м U Ν L т Y ĸ G L P Ţ Е v Е М U В R N 0 I. N R Ρ z R Т Р Е v Т S 0 R R 0 С w L ε E G Ē С Ρ R N Υ D V M J А А Ρ Ë D С S F Q R L L 0 D G С Ν R С Y Ρ P А M С ₿ υ А х Т L Ν R Е S Р 0 S Ε х F w R Т L N С D Ε А х D E L А Т J L N А Ν Z Т S С С D R 0 А R ĸ D А Q G N S т G Α Y. R 8 N. M O Α H С G Ŧ Ë P L Z s G С Е В U L M L А Е R S s M Т Т R D A 1 А L M D s V P C Ε в н ĸ G А X A E Т Ċ х A L P С P N Ó M Р D V. Ν Ç к т R D Ε ε Т 0 Т S 0 Т А М κ ε С P D Т G U L P С J D V А С F S D U Q L L R S R 0 ٢ А v

Emergency Planning and Community Right-To-Know

HAZARDOUS MATERIALS ACCIDENTS

Instructions: The words in the puzzle may be hidden horizontally, vertically, diagonally, forward, or backward. Circle discovered words with different colors, and cross them off the list when you've found them. When all of the words are found, you will know many important terms related to the Hazardous Materials Accidents.

WALLY FIRE **WISEGUY CHEMICALS** TURTLE **TRAIN KPEPC OLICE** SIP SHELTTER-IN-PLACE TANK **SIREN** SAFETY **EMERGENCY ACCIDENTS PLAN** RESCUE

Find the Hidden Word!

WALL YBHF DE S DNK Ŧ Y UMNODXHK M X G N v IJ GF X S ΜΕ RGE DE Ν С R Y S C UΕ LP Ε WAL R G 0 J Т C C I DE S NT K Т A Η L A L WAE J XF R W I S E G U Y E GQRSP Q 1 С KRO F WΗ Y RRN Т F S QK С D 1 Ρ 0 1 A Ρ E CAI ĸ P MHL NL G L W w w q o CDRPHS 1 NR X J G F ΚE VP GC Ρ 0 L 1 С E Р S A F Т YNS E ΥP А V I Y 0 L ROKRD S AUKC R Ζ Т Р А Т RAI NSDBDHE х H J Ν CALSZJ HEMI С F I R E

Safety Masters for Kids

Survival Tips

If lost in the woods...

Always carry a warm hat, a flashlight, a large red handkerchief, and a plastic whistle on a hike or camping trip. In an outing where the weather might be cold, carry a "space" blanket of reflective Mylar. If you get lost, blow the whistle three times (a distress signal) every time you hear an unusual sound.

Get under a large tree (in a clearing if possible) when you know you are lost. You'll be found more quickly and you won't fall and injure yourself. The the handkerchief to the tree.

* Admit you're lost. Don't be ashamed and don't hide from searchers. Stay where you are. If you keep moving the searchers can't find you. Don't worry about Mom or Dad being angry.

Help searchers find you. Wear a red or orange jacket in the woods. Lie down when a helicopter flies overhead and wave your red handkerehief. Answer if you hear a voice calling you.

In cold weather, place your "space" blanket beneath you and then wrap it around you. Keep warm and dry. If the weather is not too hot and you aren't tired, make crosses or a SOS with broken branches or rocks, or by dragging your foot in the dirt.

If you hear a noise at night, yell. If it is an animal, it will go away.

STAYING SAFE IN THE WOODS

Find the best path through the woods. If you take one path, you will spell the word LOST. If you take another, you will spell SAFE. Write down all the words you find along the paths. Taking different paths will form new words.



Safety Masters for Kids





1		Z		Ű	2			4
	1. H			5				
5						7		
				6				
	9						H	H
10	i ji ji	*1	12					13
14	12		16					
			17		(j)	(j)		
14					9			

Learn walking safety tips as you complete this crossword puzzle.

SOLUTION

Across: 1. house, 3. good, 5. to, 6. learn. 9. be, 11. thee, 14. any, 16. or, 17. we, 18. kiss, 19. walk Down: 1. help, 2. street, 3. go, 4. dark, 7. rules, 9. where, 10. back, 12. how, 13. talk, 15. yes

ACROSS

- If you are being followed, turn into the nearest safe ______ and knock.
- When you need help, a _____ person to ask is a mother with children.
- 5. Always go _____ a crosswalk to cross the street.
- You need to _____ walking safety rules so that you know what to do in case of trouble.
- Always walk with confidence and do not appear to ______ thinking about_other things.
- Walk as close to the side of the road as possible when ______, are no sidewalks.
- Never run into the street for _____ toy or object.
- Walk with a brother, sister, ___ friend whenever possible.
- If is important that ____ know how to protect ourselves when walking.
- Before leaving, be sure to remember to ______. Morn or Dad goodbye!
- 19. Always facing traffic.

DOWN

- If you are in trouble and not near a house, go into a store or public building and ask for _____.
- If you see a person or group of people ahead who make you feel uncomfortable, cross the _____.
- Shortcuts are not always the best way to a specially early in the morning or at dusk.
- 4. Avoid alleys and _____ or secluded areas.
- Follow the safety _____ for crossing streets by listening and looking for traffic.
- Make sure your parents or silter know _____ you are going.
- If you are being followed by a car, turn and go where you were coming from.
- Before leaving, be positive that you know to get to where you are going.
- 13. Do not _____ to strangers.
- If a stranger asks you to go for a ride in his or her car, *never* say ____!

Safety Masters for Kids

Bicycle Safety Crossword



ACROSS:

- 1. Drive your bike on the right side of the _____
- Walk your bike ______ busy intersections and streets.
- A is never allowed on a freeway.
- Slow down when you are an intersection. You might have to stop.
- 14. Try not to ride after dark, but if you must, be sure to a headlight and reflectors on your bike.
- Always look both ways and behind before turning or changing
- 18. Riding a bike can be great _____ if you follow safety rules.
- Always ______ single file, in a straight line, never zigzag.
- Your bicycle will _____ brakes good enough to skid tires.
- Never just _______ your bike on the ground; always park it upright on the kick stand, or in a rack.
- Ride one to a bike. Two on a bike is hard to keep balanced. Visibility _____ very pror.
- 25. Store your hike indoors if _____ all possible.
- 27. Always yield to ______ walking
- 30. Take care of your bike and keep _____ in good repair.
- Avoid broken pavement, litter, loose ________, mud, or leaves. Any of these can cause you to lose control of your bicycle.
- Stunting on the streets is for fools. Even if you are mad, never accept a date out of ______.
- Always give proper hand ______ before you turn.

SOLUTION:

ACROSS: I. street, 4. serves, 8. bicycler 11, al. 14, use. 16. direction, 18, fun, 20, ride, 22, need, 23, drop, 24, is, 25, al, 27. people, 30, it, 31, gravel, 32, anger, 33, signals, 27. people, 30, it, 31, gravel, 32, anger, 33, signals, 8. before, 9, can, 10, cars, 12, trucks, 13, ice, 15, get, 17, idea, 8. before, 9, can, 10, cars, 12, trucks, 13, ice, 15, get, 17, idea, 9, up, 21, dawn, 24, ft's, 26, bc, 28, on, 29, la

DOWN:

- Obey all traffic laws, ______, signals and pavement markings.
- Nover _____ double or carry big packages.
- Listen for traffic behind you. You can't do this with a radio plugged into your _______.
- If your blke was stolen because you forgot to lock it up, that would be a real
- Wherever possible, lock your bike to a post or other stationery object. If you don't, chances are you won't ______a bike for long.
- Parked cars are a constant danger. Make sine you are seen or allow room for a ______door opening.
- At stop signs, make complete stops. Give right of way to pedestrians and vehicles ______ you proceed.
- A moving breyele _____ cause serious injury, even death. Be careful!
- 10. Watch for _____ pulling out from driveway or curb.
- Riding in extremely cold weather can be dangerous because you can't control your bike of there is ______ on the street.
- Safe drivers don't <u>____</u>, hort and they don't wreck their bikes.
- It is not a good _____ to ride in any kind of bad weather.
- When you come out of a driveway or alley—stop! Look <u>the street both ways before you enter.</u>
- If you use your bike to deliver newspapers, you may need to get up at the crack of _____.
- Cive cars and pedestrians the right-of-way. ____an act of courtesy and it is safer, too. (contraction)
- Read the payement. Lanes will ____ marked "left only" or "right only." You must turn in the direction of the arrow.
- You should have a horn or hell ... _ your bike that can be heard 100 feet.
- 29. Do, re, mi, fa, so, ____, tj, do,

Tsunami in a Box!

Rationale

Tsunamis are a series of ocean waves created by the sudden displacement of water by seismic movement of the ocean floor.

Focus

- How are tsunamis generated?
- Do earthquakes occur underwater?

Objectives

Students will be able to:

- 1. Generate a tsunami and observe the results on a model shoreline.
- 2. Relate the analogy of the motion of the lid to the motion of the ocean floor during an earthquake as a means of water displacement and subsequent tsunami generation.
- 3. Explain that not all underwater earthquakes will generate a tsunami.

Materials

- Glass or metal baking pan or plastic shoe box
- One liter of water
- Plastic lid of the type used to re-close coffee or margarine containers
- Punching tool or drawing compass
- Scissors
- String
- Sand
- Erasers, toothpicks, popsicle sticks, and other small object to represent shoreline features
- Book or block of wood to serve as a wedge
- Metric ruler

Procedure

1. Explain to the students:

All tsunamis are generated by a sudden displacement of water. Landslides, submarine slumps, or earthquakes can displace water. It usually requires an earthquake with a magnitude greater than 7 on the Richter scale to generate a significant tsunami. Tsunamis travel from the point of origin at a speed of 300-350 miles an hour. Earthquake (seismic) waves travel 50 times faster than tsunamis, thus seismographs would provide a warning of a potential tsunami within minutes after a large earthquake occurred. This often gives time to prepare for a tsunami after the tsunami warning has been issued.

Continued next page.

2. Ask the students:

- a. Do earthquakes occur underwater? (yes)
- b. How could earthquakes under the ocean ever affect people? (Accept all reasonable answers)
- c. What is a tsunami?
- 3. Begin the class discussion with what the students have already learned from the tsunami curriculum.
- 4. Divide the students into groups, distribute materials, and give the following directions:
 - a. Use the wedge to tilt the box or pan at an angle of about 20 degrees.
 - b. Pour water into the box or pan to cover the lower end, leaving about a third of the box or pan at the upper end dry.
 - c. Pack a layer of sand 2-3cm thick on the dry end of the box or pan to simulate a beach or coastline. Use your hands to mold dunes or drifts. Draw roads parallel to the shore with a stick or your fingers. Build docks and other small, lightweight structures to complete the shore environment. Be creative.
 - d. Punch the plastic lid on one end near the rim to make a hold, and thread it with a piece of string 20cm long. Tie knots to hold the string in place.
 - e. Gently (in order not to make waves) place the plastic onto the bottom at the deep end of the box or pan. Trim to fit if necessary. The string should be next to the low side of the box or pan.
 - f. Have one student use several fingers to hold the plastic down tightly on the shallow end, while another student pulls the string up at the deep end with a rapid movement. Tsunami!

Conclusion

Ask the students:

- 1. What does the sudden motion of the lid represent? (The sudden motion of the ocean floor.)
- 2. Using the lid as an analogy, explain that like the lid, a sudden release of energy as the upward motion of the ocean floor literally pushes the water away in the form of waves, thus a tsunami.
- 3. Remember that not all earthquakes generate tsunamis, only those that significantly displace the ocean floor.

Volcano Erupting!

This project simulates a volcano when it erupts. Using basic household equipment and food products (vinegar and baking soda), combining the liquid mixture will produce carbon dioxide gas. That chemical reaction will in turn produce a bubbly foam that spews out of the bottle. Because the foaming action can be messy, you may want to perform the last step while out-of-doors, or on a large table that is completely covered with newspaper.

Supplies:

- Lots of newspaper
- A large aluminum baking pan
- Baking soda (about 3-4 tablespoons)
- Vinegar (about1/2 cup)
- Liquid dishwashing soap
- Small plastic bottle (pop bottle size)
- Modeling clay
- Funnel
- Measuring spoons and cup
- Red food coloring
- Twigs and small plant branches
 - Small amount of silver glitter

Construction:

- 1. Place the clean, empty bottle on the baking pan
- 2. Mold the modeling clay around the bottle to appear like a mountain large at the bottom, building up towards the top of the bottle. Keep the top of the bottle clean, and don't let any clay fall inside the bottle.
- 3. Decorate the bottle to look like a mountain. Use small plant branches to represent trees.
- 4. Using the clean, dry funnel, pour 3 or 4 tablespoons of baking soda into the bottle. Then add a few drops of dishwashing detergent, the water, and a teaspoon of glitter.
- 5. In a separate container, mix a few drops of red food coloring into the vinegar.







The Eruption!

- Use the funnel to pour the vinegar mixture into the bottle, and quickly remove the funnel.
- Your volcano will erupt immediately!

EARTHQUAKE!

ACROSS

- 1. This is sometimes released during an earthquake--hot!
- 4. ____ Mahal, famous palace
- 7. Sworn statement
- 8. Middle Eastern country with many earthquakes
- 10. Mess up, like paint
- 12. ____-center; heart of the quake
- 13. 'Pack up your troubles in your old ____ bag.'
- 15. Air Conditioning, for short
- 16. Asian city devastated by 1995 earthquake
- 18. Comes after ice- or roller-
- 19. North Carolina (abbr.), a place that doesn't get quakes
- 20. To visualize
- 22. Original Equipment Manufacturer (abbr.)
- 24. Bright, intelligent
- 28. Tidal ____, event sometimes caused by an earthquake
- 30. Sign that something bad is going to happen; some people get these before quakes
- 31. National Public Radio
- 32. Measurement of a car's speed

DOWN

- 1. Slang for leg
- 2. Had for dinner
- 3. The ground does this during an earthquake
- 4. Do Re Me Fa So La __ Do
- 5. I am, You 🔛

SOLUTION:

PCROSS: 1. gas, 4. Taj, 7. oath, 8. Iran, 10. smear, 12. EPI, 13. kit, 15. AC, 16. Kobe, 18. rink, 19. NC, 20. see, 22. OEM, 24. smart, 28. wave, 30. omen, 31. NPR, 32. RPM. DOWU:
16. know, 17. ocean, 21. es, 23. MVP, 25. AMP, 26. REM, 27.

	1	2	3		4	5	6	
7		-+	-		8	+	+	9
10			-	11		12		
			13		14		15	
16	17	į			18			_
19			20	21				
22		23		24		25	26	27
28			29		30			
	31				32			

6. Asian country that suffers many quakes

- 7. Operating System (abbr.)
- 9. To get a little cut
- 11. Northern Ireland (abbr.)
- 14. Slight feeling of an earhtquake, or a sign of worse to come!
- 16. To be aware of, like a fact
- 17. Most earthquakes happen under here
- 21. Sound of the 19th letter of the alphabet
- 23. Most Valuable Player (abbr.)
- 25. Ampere, for short
- 26. Abbreviation for remark
- 27. Tennessee (abbr.)
- 29. Emergency Room