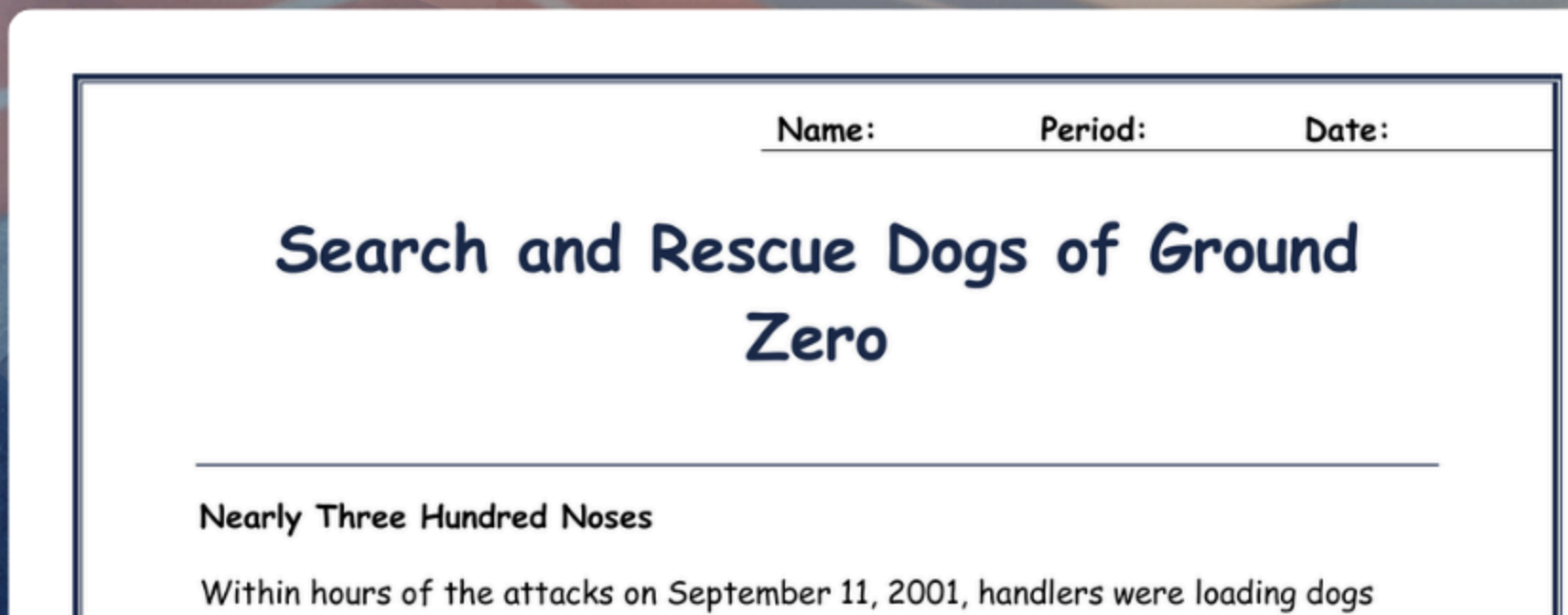
NO PREP

Search and Rescue Dogs of Ground Zero

Nearly Three Hundred Noses

Includes: Student reading, case study, differentiated questions, teacher key



Name: Period: Date:

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Within hours of the attacks on September 11, 2001, handlers were loading dogs into trucks and cargo planes and pointing them toward New York, Arlington, and a field in Pennsylvania. Estimates vary, but roughly 300 search and rescue dogs worked the three sites in the days and weeks that followed, making it one of the largest canine deployments in American history. Some belonged to federal urban search and rescue task forces organized by the Federal Emergency Management Agency, teams that train together for years and travel as a unit with engineers, medics, and structural specialists. Others came from state police, fire departments, and volunteer organizations, and a few handlers simply drove through the night with a certified dog in the back seat and presented themselves at a checkpoint. The site they entered was unlike any training problem. The debris pile at the World Trade Center covered sixteen acres and rose several stories high in places, laced with voids, jagged steel, broken glass, and fires burning underneath. Smoke and dust hung in the air continuously. Handlers worked their dogs in shifts of roughly twelve hours, sending them across surfaces that shifted underfoot and could collapse into a void without warning. A dog on that pile was not a pet in a vest. It was a piece of search equipment that could go where a human could not fit, move faster than a camera on a pole, and cover in fifteen minutes an area that would take a line of workers hours to clear by hand.

Built to Smell

The reason a dog is worth that risk is anatomy. A human nose carries roughly six million olfactory receptors, the specialized nerve endings that detect airborne molecules. Depending on the breed, a dog carries between 220 million and 300 million. The portion of the brain devoted to processing smell is proportionally about forty times larger in a dog than in a person. The difference is not only a matter of counting receptors, though. A dog's nose is engineered to sort air. When a dog inhales normally, most of the air travels to the lungs, but a shelf of tissue inside the nose diverts part of each breath into a separate chamber called the olfactory recess, where scent molecules collect against the receptors instead of being flushed straight back out. When the dog exhales, the air leaves through slits on the sides of the nostrils rather than out the front, so the outgoing breath does not blow away the scent the dog is trying to read. A searching dog sniffs five to ten times per second, and each sniff pulls a fresh sample into that chamber. Dogs also possess a second sensory structure, the vomeronasal organ, which detects heavier chemical signals that ordinary receptors miss. Together these features let a trained dog detect substances at concentrations measured in parts per trillion and distinguish one person's scent from another's in a place where thousands of people had been, which is precisely the problem Ground Zero presented.

Two Kinds of Search

Search dogs are not interchangeable, and the difference matters on a disaster site. A live-find dog, sometimes called an air-scenting dog, is trained to locate living human scent and to ignore everything else, including the scent of the dead. It works off leash, ranges across an area, and lifts its head to read scent carried on moving air rather than following a track on the ground. When it locates a living person it gives a trained alert, usually a hard bark held at the spot until the handler arrives. A human remains detection dog is trained on the opposite target and alerts on the deceased, often with a quieter signal such as sitting or lying down, because a bark carries an urgency that rescuers should not act on. A third

type, the trailing dog, follows one specific person's scent from a known starting point and is used more often in missing person cases than in building collapses. The distinction protects rescuers from wasted effort and false hope. If a live-find dog and a remains dog both alerted the same way, crews would tear open a void at enormous risk without knowing what they were digging toward. Certification for federal task force work is demanding. A dog must search rubble piles it has never seen, ignore food, noise, machinery, and strangers, alert only on the correct target, and repeat that performance for evaluators on demand. Handlers train for years to reach that standard, and the partnership is the point: the dog supplies the nose, and the handler supplies the judgment about what the dog's behavior means in a place full of confusing signals.

The Job That Broke Their Hearts

What made Ground Zero so difficult for the dogs was not the danger but the silence. Only about twenty people were pulled alive from the World Trade Center rubble, and the last survivor was recovered roughly twenty-seven hours after the collapse. After that first day the live-find dogs, trained and rewarded for locating the living, searched shift after shift and found no one. A working dog reads its handler closely, and handlers on the pile were exhausted and grieving. Several later described their dogs growing listless and losing interest in the search, and some handlers said they arranged for a volunteer to hide in the rubble so a dog could make a find and be praised. Behavior specialists have debated how widespread that practice really was, but the underlying problem is not in dispute: a dog trained on success does not understand a search that never succeeds. The physical toll was real as well. Dogs cut their paws on glass and steel, burned their pads on hot debris, breathed the same dust as the workers around them, and needed constant water in the heat coming off the pile. Veterinary teams set up at the site to treat injuries, flush eyes, and wash chemicals off coats at the end of every shift, a routine called decontamination that protected both the dogs and the handlers who lived with them. Handlers also carried the emotional weight home. Many later said

their dog was the only member of the team who could not be told what had happened, and that explaining nothing while asking for everything was the hardest part of the deployment.

What Happened to Them Afterward

Because the dogs breathed the same contaminated air as the human responders, veterinarians expected to see a wave of illness, and a long-term study was launched to find out. Researchers at the University of Pennsylvania School of Veterinary Medicine, led by Dr. Cynthia Otto, followed roughly 95 dogs deployed to the 9/11 sites and compared them to about 55 similar working dogs that had not been deployed. The teams collected blood samples, chest X-rays, and health histories for more than a decade, and many of the dogs were examined after death as well. The results surprised almost everyone. The deployed dogs did not show significantly higher rates of serious respiratory disease or cancer than the comparison group, and their median lifespan was similar. Researchers have offered several possible explanations, including the dogs' lower position in the air relative to blowing dust, differences in canine and human respiratory anatomy, and the decontamination routines performed after every shift. The finding did not close the subject so much as launch a field. The study became one of the longest health investigations of working dogs ever conducted, and in 2012 Dr. Otto founded a research center devoted to the science of detection dogs. Bretagne, a golden retriever who searched the pile as a two-year-old, became the last known surviving 9/11 search dog and died in 2016 at the age of sixteen, escorted out by a line of firefighters standing at attention.

Key Information: Search and Rescue Dogs of Ground Zero

Detail	Information
Dogs deployed	About 300 across the three attack sites
Olfactory receptors	220 to 300 million in dogs; about 6 million in humans
Sniff rate while searching	Five to ten sniffs per second
Live-find dog	Alerts on living people, usually with a sustained bark
Human remains detection dog	Alerts on the deceased, usually with a quiet signal

Survivors found in the rubble	About 20, the last about 27 hours after the collapse
Penn Vet health study	About 95 deployed dogs compared with 55 control dogs
Study result	No significant rise in serious illness or early death

Case Study: Twelve Hours on the Pile

Marisol Vega, 41, is a firefighter and certified handler from Ohio. On September 14 she and her Labrador retriever, Juno, are assigned a section of debris near the South Tower footprint. Juno works off leash for six hours, crossing steel and broken glass, pausing twice at voids before moving on. She does not alert. She does not alert on the second shift either, or the third, or the fourth. By the fifth day Juno stops ranging ahead and starts checking over her shoulder for Marisol every few steps. "She thinks she is failing," Marisol tells the team veterinarian that night, while a technician flushes grit from Juno's eyes and checks a cut on her front left pad. "She has never gone this long without finding someone." The next morning another handler offers to hide in a cleared section of rubble so Juno can search, find a living person, and be praised for it. Marisol thinks about it for a long moment before she answers.

1. Using the reading, explain why Juno's behavior changed after five days even though she was uninjured.

_____

_____

2. What are the arguments for and against staging a find for Juno, and what would you advise Marisol to do?

_____

_____

Multiple Choice

1. Why does a dog's exhaled breath not blow away the scent it is tracking?
    a) The dog holds its breath while searching
    b) Air leaves through slits on the sides of the nostrils
    c) Exhaled air is too warm to move scent molecules
    d) The vomeronasal organ seals the nostrils during a sniff

2. How does a human remains detection dog usually differ from a live-find dog?
    a) It works on a leash instead of ranging off leash
    b) It is trained only on one specific person's scent
    c) It alerts quietly rather than with an urgent bark
    d) It searches by following tracks left on the ground

3. What did the University of Pennsylvania study find about the deployed dogs?
    a) They developed lung disease at roughly twice the expected rate
    b) They lived significantly longer than the comparison dogs did
    c) Their health records were too incomplete to analyze
    d) They showed no significant rise in serious illness or early death

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ air-scenting dog	A) Federally organized team of handlers, engineers, and medics that deploys as a unit
2. ___ olfactory recess	B) Trained behavior, such as a bark or a sit, that reports a find to the handler

3. ___ decontamination	C) Chamber inside the nose where scent molecules collect against receptors
4. ___ urban search and rescue task force	D) End-of-shift routine of washing chemicals and debris off a working dog
5. ___ alert	E) Dog trained to find living people by reading scent carried on moving air

Fill-in-the-Blank

1. A dog carries up to 300 million _____ receptors in its nose.

2. A searching dog takes five to ten _____ every single second.

3. The Penn Vet study compared deployed dogs with a _____ group.

Short Answer

Answer each question in 2-4 complete sentences.

1. Explain why a dog could search parts of the debris pile that human rescuers could not.

_____

_____

_____

2. Why did handlers worry about their dogs' motivation more than their injuries?

_____

_____

_____

3. Why was a comparison group of undeployed dogs necessary in the health study?

_____

_____

_____