

EDUCATIONAL ACTIVITIES

AN IMAX ORIGINAL FILM
COSMIC PICTURE'S
SUPERPOWER DOGS
PRESENTED BY MARS Petcare

Welcome to the Activity Guide for *Superpower Dogs*! As the filmmakers behind this movie, we're thrilled to share some of the amazing things we've learned from the dogs and their human partners we've met along the way.

When we started making this movie, we just couldn't stop asking questions like, "How in the world do these dogs do that? How do they find someone buried in an avalanche or earthquake or detect anxiety or cancer? How can we explain the incredible bond between dogs and us?"

Looking into the world of dogs sparked our curiosity and we hope that it does for our audience as well. There is still so much we don't know about our best friends, but we can learn by observing the dogs in our neighborhood or in our homes.

Hopefully the activities in this guide will go on to inspire a whole new set of questions and that more people will see their pets in a new light. And perhaps some of our viewers will go on to work with dogs or become scientists and veterinarians who help our pets live happier and healthier lives.

But enough from us humans. It's time to let the dogs out!

– Taran Davies, George Duffield, Dominic Cunningham-Reid, Daniel Ferguson
Superpower Dogs Filmmakers



ACTIVITIES OVERVIEW

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Grade levels suggested are general guidelines. Teachers may adapt lessons for their students' needs and interests.





WHAT'S YOUR SUPERPOWER?

Hi! We're Henry, Halo, Reef, Ricochet, Tipper and Tony, the dogs featured in the film Superpower Dogs. You humans say we have superpowers because we can work hard at special tasks, and we love doing the work we do. What's your superpower?



LOOK AT THE ABILITIES AROUND YOU

Look around at the people in your classroom (or your troop, or your family). Who would you go to for help with a tricky math problem? Who could suggest the best word for the story you're writing? Who is best at picking a great song for the video you're directing? Who will score the next goal in the soccer game?

Most people have a passion for certain subjects. We can quickly identify our own strengths or passions, and can often identify the strengths of others from the following list: word strong, number strong, music strong, art strong, sports strong, nature strong, people strong and self strong.

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MATCH THE SUPERPOWER TO THE DOG

Over the past centuries, different dog breeds became good at different things, and dogs continue to be selectively bred in part to excel in those certain skills. We could consider them to be: smelling strong, hearing strong, caregiving strong, bravery strong, energetic strong, retrieving strong, herding strong, swimming strong and snow strong.
Complete this matching activity as you consider superpowers.

WHICH DOG BREED IS COMMONLY BEST KNOWN TO BE "STRONG" IN EACH OF THE FOLLOWING SKILLS?

1. Look at the following photos of different breeds of dogs.
2. Using the photos as hints, match the dog breed to its special skill or strength.

SKILLS

1. Following a scent
2. Water rescue
3. Pulling a sled
4. Caregiving
5. Herding sheep
6. Law enforcement

NOTE:
The breeds shown on this page are not the only ones with these superpowers!

(Answers on pg 27.)



_____ BLOODHOUND



_____ BORDER COLLIE



_____ NEWFOUNDLAND



_____ GOLDEN RETRIEVER



_____ ALASKAN MALAMUTE



_____ GERMAN SHEPHERD

FOR FURTHER EXPLORATION:

We know that many dog breeds, and mixed breeds, too, are great at many skills. What other strengths, skills and superpowers could we add? With your classmates or family, brainstorm a list of dogs' amazing abilities.

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WHAT'S THAT SMELL?







We're Tipper and Tony, the Bloodhounds who help protect endangered species. We use our amazing noses to do our jobs. How well do you know your nose?

HOW SENSITIVE IS YOUR NOSE?



Human beings consider themselves to be pretty good at identifying smells. We can walk into the kitchen and know what's cooking. Dogs, with their smelling superpower, can do much more than this. They can track a lost child's scent trail through a busy city area even 48 hours after the child left. They can detect tiny quantities of drugs or explosives. They can even use their nose to detect avalanche victims buried in snow and help doctors to diagnose certain types of cancer. The cells that are receptive to odors are called olfactory sensory neurons. Not only do dogs have many more of these sensory cells than we do, they also have a proportionately larger part of their brain dedicated to processing this information than we do. And Bloodhounds have millions more cells for odor detection than humans! Combine that with a brain capable of detecting a single odor hours after it was left behind, and you have a superpower.

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CONDUCT A SIMPLE SMELL TEST

Scientists are training dogs to sniff out peanuts or latex products to protect people with severe allergies. What other ways could dogs help protect the people who love them? Try these activities to test your own "scents-abilities"!

TEST YOURSELF AND OTHERS WITH A SIMPLE SMELL TEST.

1. Gather some items from your kitchen with easily identifiable smells such as:


Chocolate chips


Strawberries


Lemons


Mint candies


Vanilla


Ketchup

2. Put small amounts of each item into separate identical containers, then cover them with a tissue to block sight but not smell. Small paper cups work well, because a squeeze can send scent molecules up into the air. Can you and your partners identify each smell? Create a chart showing the smell items and your guesses for each one.



3. Test your ability to identify two smells at once. Get a partner and close your eyes. Have your partner choose two items and hold them both under your nose at the same time. Which items are easy to identify when put together, and which are more difficult? Record your results on your chart and share what you've discovered.

FUN FACT:
Dogs have been trained to sniff for medical conditions such as blood sugar levels in people with diabetes, helping them stay safe and healthy.

FOR FURTHER EXPLORATION:

Test peoples' abilities for identifying the different scents at a distance, perhaps down a hallway or around a corner. Work hard to control for variables outside of your test, such as the amount of the substance or interfering odors. Which scents are easiest to identify at a distance? How far do the scents travel? What other science questions can you investigate regarding your sense of smell?

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MEASUREMENT OF ODORS
WHAT DOES PPM MEAN?

A Bloodhound on the scent of a missing person, or a trained dog helping to detect diseases, can detect a single molecule in a whole snout full of air. This is measured in something scientists call ppm, or parts per million. One scent molecule out of a million is enough to help the Bloodhounds Tipper and Tony in their work to protect endangered wildlife.

JUST HOW *SMALL* IS ONE PART PER MILLION, OR 1 PPM?

1. Let's start with *smaller* numbers: 1 in 1,000. Get about a cup (236 ml) of uncooked rice. Organize your class or family into groups and give each group some rice. Have the groups create a total of 10 piles with exactly 100 grains of rice in each pile. Combine the 10 piles, and you now have 1,000 grains of rice. Next, color 1 grain bright red with a permanent marker, let it dry, and mix it back in to your 1,000 grains. How difficult is it to find the 1 in 1,000?

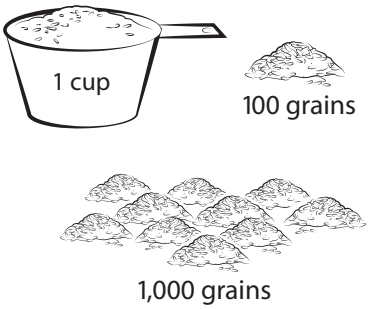
Be sure to complete the "1 in 1,000" activity before you read ahead.

2. How many groups of 1,000 would you need to make 10,000? (Think about it... What's your answer?) That's right: just 10. Rather than counting out 1,000 grains of rice 10 more times (yawn), let's measure the volume of our 1,000 grains. Our 1,000 grains of rice take up about 25 milliliters, or 5 teaspoons. 25 milliliters times 10 = 250 ml, which is about one cup of our rice. Measure out one cup of rice to represent your 10,000 parts, add a red rice grain, and put it all in a jar with a lid. Is it getting harder to find your one red grain in 10,000?

3. How many groups of 10,000 would you need to make 1,000,000? (Think about it... What's your answer?) That's right, 100 times the amount of rice you have now, or 100 cups.

A one-pound (452 g) bag of rice contains about 2 cups (473 ml) of rice, or 20,000 grains. How many bags of 20,000 grains (2 cups) will we need to total 1,000,000 grains (100 cups)? (Think about it... What's your answer?) If you said 50 bags, you're right. Can you imagine finding your one red grain of rice in a sack that weighs as much as a six-year old?

If that grain of rice was a scent molecule, our Bloodhounds could find it in a sniff, thanks to a large part of their nose and a large part of their brain devoted to the job. Dogs have even been tested at identifying scents in the ppb (parts per billion) and ppt (parts per trillion) range.



Can you spot the 1 in 10,000?



FUN FACT:

We could detect a smelly sock in a bedroom, but a dog could detect that smelly sock in a building big enough to hold the Space Shuttle Orbiter!

(And on the subject of smelly socks, dogs in Africa are being trained to detect the disease malaria by smelling socks!)

WHAT'S THAT SOUND?



I'm Halo, the Dutch Shepherd. Now that I've learned to be an official search-and-rescue dog, my ears are very important for helping me do my job. And unlike humans, we are able to raise, turn, tilt and lower our ears. This ability helps us to locate a sound source quickly, like a cry for help, which is a very important skill for working dogs like me. This activity can help you learn more.

HOW CAN THE SHAPE OF A DOG'S EARS HELP WITH HEARING?

How can a different ear shape help the dog focus on smells, rather than distracting sounds?

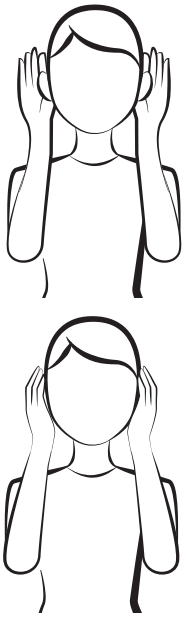
For humans, the outer ear, or pinna, is shaped to help direct sound waves into the ear canal. For a dog with upright ears or "prick ears," such as Halo the Dutch Shepherd, this effect is even greater. Her larger ears do a better job of funneling the sound, and her ears are able to rotate toward the source of the sound because of 18 special muscles on her head. Other dogs, such as Tipper and Tony the Bloodhounds, have floppy ears. These ears block distracting sounds, allowing the dogs to focus on smells.



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TRY OUT
DIFFERENT WAYS OF HEARING

Use your hands to create the shape of dogs' ears, then discover whether they improve your hearing, or muffle the sounds around you.



1. Place your cupped hands just behind your ears to imitate the shape of a dog's upright ears. You'll look more like Yoda than Halo, because we humans have our ears on the sides of our heads rather than up on top, but you'll get the idea.
2. Turn your head with your hand-extension dog ears toward a quiet sound source, such as a ticking clock or a whispering friend. Make sure your cupped hands are tucked in just behind your outer ears, then listen carefully. How much sound do you hear?
3. Next, flatten your hands over your ears so they represent a floppy ear position. Is the sound still as clear?
4. Make adjustments to the position of your hand-extension dog ears until the sound is clearest (aiming up, down, in or out), and look in the mirror. How are your ears positioned? What direction are they facing? Think about it, then complete this observation:





MY HAND-EXTENSION DOG EARS WORK BEST WHEN...

_____

_____

_____

_____

_____

FOR FURTHER EXPLORATION:

Paper ears, such as those used in the "What Are You Saying?" activity, do not direct sound well enough to be effective dog ears. How could you create ears as effective as Halo's ears? What else can you discover about the funnel shape or floppy shape of dogs' ears?

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HOW DO YOU DO THAT?



I'm Reef, the water rescue dog. I'm a Newfoundland, a breed that originated on the island of Newfoundland in Canada. Newfoundland dogs love to work, both in the water and on land.





WHY ARE NEWFOUNDLANDS GOOD AT WATER RESCUE?

Newfoundlands excel at water rescue work for several reasons: they have webbed paws like a duck, they can swim with a powerful breast-like stroke instead of a dog paddle, and they have strong muscles that allow them to tow up to 50 times their own weight. Also, their double-coat of fur helps keep them warm, even in really cold ocean water.

HOW DOES A NEWFOUNDLAND'S FUR COAT HELP IT STAY WARM IN ICY WATER?

Scientists have a theory (a scientific idea) that the main aspect to the Newfoundland's fur that helps the dog stay warm in water is fur with an oily outer coat over a thick and soft inner coat.

How could you test the theory that the oil helps the dog stay warm? Hint: Think about using absorbent paper towel or a scrap of fabric to represent fur covering your finger, and spreadable butter or shortening to represent the oil in the fur. Write your own question, prediction, and method for an experiment, then collect your data and analyze your results. Or, read on and follow our experiment.

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EXPERIMENT TO KEEP YOURSELF WARM







HOW DOES OIL AFFECT YOUR FINGER'S ABILITY TO STAY WARM IN ICE WATER?

PREDICTION

We predict that a fuzzy layer covered in an oily substance...

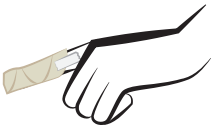
☐ **WILL** or ☐ **WILL NOT** (choose one)

...reduce the sensation of cold compared to a fuzzy layer without the oily substance.

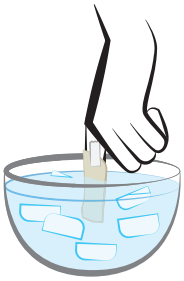
MATERIALS

- strips of paper towel or fabric (fleece works great)
- masking tape
- spreadable butter or shortening
- bowl of ice water

METHOD:









1. Fill a medium-sized bowl with ice water.
2. Wrap one index finger completely, even the fingertip, in a strip of paper towel or fleece fabric, then tape it onto your hand to keep it in place.
3. Do the same on the other hand with a covering of the exact same size, but on this fleeced finger, spread a layer of the oily substance – the butter or shortening.
4. Put the non-oiled finger in the ice water for 1 minute. As you watch the clock, make note of the feeling of cold that your sensory receptors are sending to your brain. How many seconds before your finger feels uncomfortably cold? If you can take it, leave your finger in for an extra minute and observe your sense of cold. Remove your finger before it gets too uncomfortable.
5. Now put the oil-covered finger in the water for one minute and observe your sensations. To prevent frostbite, do not exceed the time allotted. For safety, avoid turning this into a competition to see who can take the cold the longest.

Analyze your results, determining how the layers changed the length of time your fingers could withstand the cold. Consider why the Newfoundland, who has a double coat with soft inner fur and oily outer fur, can withstand the cold ocean temperatures during a water rescue. (And what would happen to a short-haired Chihuahua?)

FOR FURTHER EXPLORATION:

Try this experiment on ten friends and graph the results. Also, research other dogs that have naturally oily fur to help them stay warm in the water or in rain.

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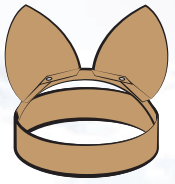
WHAT ARE YOU SAYING?

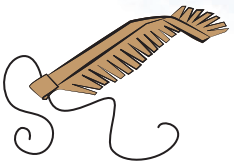


I'm Henry, the avalanche rescue dog. I need my human partners to understand what I'm trying to tell them, so I communicate through my ears, my eyes, my tail, and my whole body. All dogs communicate, if you just know what to look for. This activity can help you learn more.

Dogs are pack animals. They have lived and worked in groups since long before they began living alongside humans. To successfully survive in their team, they have a complex form of wordless communication.

CAN YOU INTERPRET THE MESSAGES OF EARS AND TAILS AND BODY POSITION?





1. Divide your class into three groups: the ear group, the tail group, and the body group. Challenge the ear group and tail group to create props from construction paper or brown paper grocery bags (directions provided on the next page).
2. Have students practice with the position behaviors listed below.
3. Challenge students to form groups of three – one each from the ear, tail and body groups – and attempt to wordlessly communicate with their learned behaviors. Which behaviors were easiest to interpret? Which were the hardest?





Ear, Tail and Body Positions and Behaviors:

Ears
- facing forward
- facing to the sides
- folded back against the head

Tail
- held upright
- wagging
- straight back
- tucked between the legs

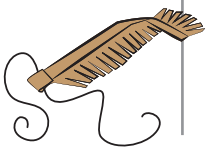
Body
- head up with back straight
- back hunched with head tucked down
- chest down with elbows flat on the ground and head, tail and and rump up

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EAR AND TAIL INSTRUCTIONS & MATCHING GAME

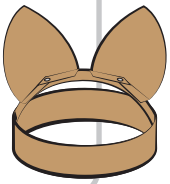
TAIL: Make a tail using paper (such as a paper grocery bag), tape, yarn or string, and scissors.

1. Roll a piece of paper up along the long side until 4 cm (1.5 inches) remain. Flatten the roll, then cut the remaining edge into a fringe.
2. Cut a piece of string that is long enough to fit around your waist with extra to tie in a bow (about 2 meters or 2 yards). Place the center of the string across the bottom edge of the tail, fold the edge up over the string, and tape so the tail can now be tied around your waist.
3. Curl the paper so the tail can be worn curled up or, if you untie the string and switch it around, curled down like a tail tucked between the legs.



EARS: (Template on next page) Make a headband using paper, tape, brass paper fasteners, and scissors. Design your own or use the pattern on page 15.
(For best results, print the template page and use as a stencil to create the ears headband from construction paper, paper grocery bags, or cardstock).

1. Use the two straight strips to create a band that fits around your head (add paper if necessary to lengthen) and attach the third band, with holes, across the top.
2. Cut out the ears, fold on the dotted line, punch the holes in the ears and the top band, and attach ears to the band with paper fasteners, overlapping the holes in each ear.



MATCH THE POSITION OR BEHAVIOR TO THE MEANING

After your group acts out the behaviors, see if you can figure out what dogs might mean. (Answers on page 27.)

Please note that this activity is an entry point to the complex world of dog communication. These positions and their meanings have been simplified for the purpose of this activity.

POSITIONS/BEHAVIORS

EARS

1. Facing forward
2. Facing to the sides
3. Folded back against the head

TAIL

4. Held upright
5. Wagging
6. Tucked between the legs

BODY

7. Head up with back straight
8. Back hunched with head tucked down
9. Chest down with elbows flat on the ground and head and rump up

MEANINGS:

EARS

_____A. I'm hearing something somewhere
_____B. I'm ready to listen to you
_____C. I'm afraid or angry

TAIL

_____D. I'm ready to play
_____E. I'm ready to listen to you
_____F. I'm afraid

BODY

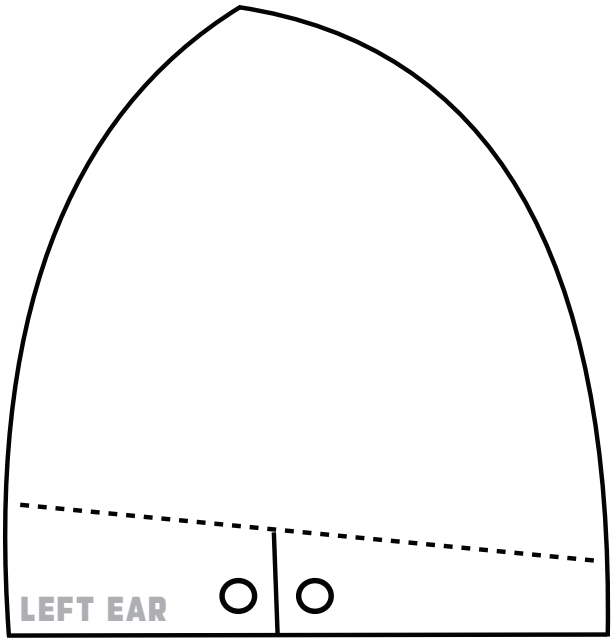
_____G. I'm ready to play
_____H. I'm ready to listen to you
_____I. I'm afraid

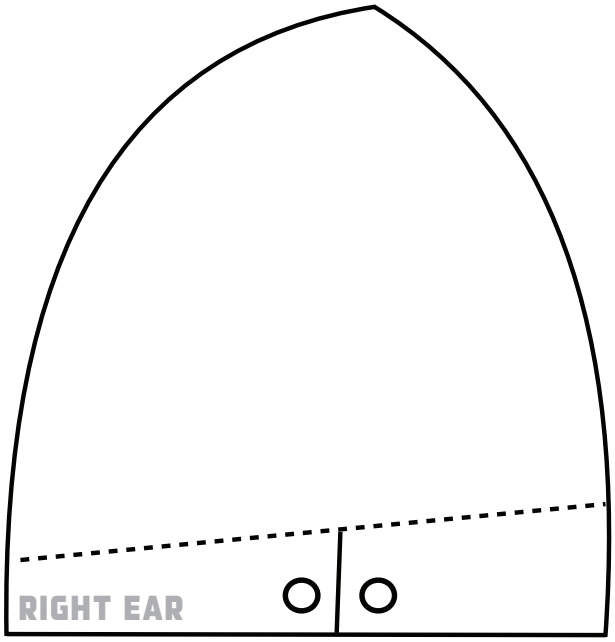
SCIENTIST'S NOTE:

A wagging tail can also signal aggressive behavior in a dog. Always look at the dog's overall body position and behavior to ensure that the dog is looking friendly before interacting with it.

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EAR TEMPLATE





DOG TRAINER'S HAND SIGNALS



I'm Cat, the canine coordinator for Florida Task Force 1 and Halo's mom. I've trained search-and-rescue dogs for almost 20 years. Your dog is capable of understanding much of what you communicate, both with your voice and with your body language.

Many dog owners train their dogs to hand signals, so their dog can operate in noisy environments when they can't hear commands.

Some dog trainers use a technique called "luring." You begin by luring your dog to proper behavior by having them watch your hand, which is holding a little treat. Some trainers begin by using both the voice and hand commands with the treat in hand very close to the dog's nose, eventually removing the treat, then the voice command, when the dog understands. Remember, building trust with your tone of voice is very important with verbal signals, and all verbal and hand signals can be individualized for you and your dog. These are just some of the many variations.

If you don't have a dog, work with a partner in your classroom or family and pretend to train each other with these signals:



SIT

With your dog in front of you, hold your palm out in front of your dog's eyes, then move your hand up to your shoulder. As your dog tips his or her head up, sitting may come naturally, or you may gently touch the rump to guide the dog down.



DOWN

Complete the command for sit, then move your hand from your shoulder down to your thigh. You may need to gently touch the front legs to guide the dog.



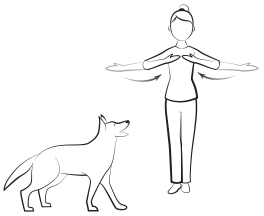
STAND

Hold your hand at your hip with the palm facing the dog, then move your hand behind you, as if inviting the dog to follow.



STAY

Hold your palm facing the dog's nose.



COME

Hold your arms straight out from your shoulders, then bring your hands in to your chest.

When you've learned the signals, play a game of "Simon Says."

1. With one person as the trainer and all other people in the group as the puppies, the trainer calls out "Simon Says" and then shows a signal.
2. All puppies properly performing the command stay in the game; misbehaving puppies are out.
3. Occasionally the trainer gives a command without saying "Simon Says." In this case, puppies should do nothing and any puppy who moves is out.
4. The last puppy remaining in the game becomes the new trainer.

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WHERE SHOULD I LIVE?

I'm Reef, the water rescue dog. I am a large, active dog. A small apartment may not be the best place for me to live with you. Can you guess why? This activity can help you learn more.

Different breeds of dogs have different activity levels and interests. Dogs who need lots of challenges and exercise may begin to misbehave in living conditions without activities. People wanting to adopt a new dog need to be aware of how to make the best choice, whether choosing a mixed breed dog or a purebred dog.

CAN YOU MATCH THE DOG TO ITS BEST-FIT HOME?

In the boxes below, place the number of the dog that best matches the family described. (Answers on page 27.)

FAMILIES LOOKING TO ADOPT A DOG:

A. We live in a house with a yard and want a dog who will play fetch, go on long walks, and cuddle. ☐

B. We live on a farm and need a dog who can play with us and help us out with some farm animal chores. ☐

C. We are older, no longer very active and live in an apartment, and would like a quiet dog to snuggle and keep us company, ☐

DOGS LOOKING FOR A FAMILY:

1



I am a small mixed-breed dog, similar to a Cocker Spaniel. I am happy in a small space. I am content snuggling on your lap.

2



I am a medium sized Border Collie. I need lots and lots of exercise, lots of challenges, and lots of interaction with humans and other animals.

3



I am a medium sized mixed breed dog with some Golden Retriever and some mystery breed genes. I love to run and go for walks, but I'm happy to rest at your side while you read a book or play a game. I am easy to train and happy to please you.

WHICH DOG MIGHT BE THE BEST FIT FOR EACH FAMILY?

Look around your neighborhood – who has which type of dog? What living conditions make the best match for each dog? If you are thinking of adding a dog to your family, consider your local pet shelter first. Many wonderful dogs are waiting for their forever families – that could be you! And how will you care for your companion? Make the "My Dog Promise" (below) and learn about pet care.

Always remember that no matter what the size of the house or the dog, what is most important is the amount of time the dog gets to play, go on walks and socialize.

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HOW TO CARE FOR YOUR PET



If you are considering adding an animal companion to your family, or already have one, make sure you are able to meet the needs of the animal.

Think of your own needs in order to consider the needs of your pet. Talk with your family or classmates and make a list of our primary needs. All living things need: air, water, food, and space. So does your dog! Food that is healthy for you, however, may not be healthy for your dog. Work with your veterinarian (pet doctor) to learn about the best pet food for your dog. Examples of human foods that are dangerous for dogs include chocolate, candy, grapes and raisins.

We all also need: love, activity, play, shelter, health care, and challenges. What else will your new friend need? How will you provide your new companion with the things he or she needs? Why are each of the points listed in the "My Pet Promise" important, particularly the regular visits, at least once a year, to the veterinarian? Did you know that dogs, just like humans, can develop tooth and gum disease? This is one more reason to make sure your dog has regular veterinarian check-ups, just like you do with your doctor and dentist. And remember to include your dog and other pets in your Family Emergency Preparedness Plan. Why would you need to do that? What would you include in your plan? Remember to count your pets when considering your water allocation.

Have a discussion about the points in the "My Pet Promise," then create a poster or give a presentation to your class.

Have a pet? If you do, make the "My Pet Care Promise" below:

THE PET CARE PLEDGE

I, _____ promise to care for my pet and provide...
Name

- ✔ **Healthy pet food and water**
- ✔ **Lots of playtime**
- ✔ **Social time with other people or dogs**
- ✔ **Plenty of daily exercise**
- ✔ **A warm, safe place to sleep**
- ✔ **Lots of love and affection**
- ✔ **Proper identification**
- ✔ **Regular visits to the veterinarian**

paste a photo of your pet(s) here

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This pledge is adapted from the Banfield Pet Hospital "My Pet Promise."

HOW LONG WILL I BE A PUPPY?



I'm Ricochet, the surf and therapy dog. Dogs can start their training to become a service dog as young puppies, but how long does puppyhood last? This activity can help you learn more.



HOW DOES A DOG'S BREED AFFECT THE TIME TO REACH FULL-GROWN SIZE?

Scientists have discovered that a dog's breed size can help determine how long a dog needs to grow to its full-grown size. Complete this graphing activity and guess which growth rate belongs to each dog size.

1. Plot these coordinates of dog growth of weight in kilograms on the graph (next page).
2. Use five different colors, or perhaps five different line styles, to connect the points representing the five dog breeds from the groupings of toy, small, medium, large and giant sizes. Look to see when each line flattens out to see when each dog breed reaches its full-grown size.

	BREED A	BREED B	BREED C	BREED D	BREED E
	weight in kilograms				
BIRTH	0.28	0.23	0.45	0.68	0.17
2 MONTHS	3.17	1.36	8.16	9.98	1.02
4 MONTHS	9.53	4.08	17.24	24.95	1.87
6 MONTHS	13.61	5.9	24.95	38.55	2.49
8 MONTHS	15.87	6.8	28.12	45.36	2.95
12 MONTHS	17.24	7.71	31.75	58.97	2.95
18 MONTHS	17.24	7.71	34.02	65.77	2.95
24 MONTHS	17.24	7.71	34.02	68.04	2.95

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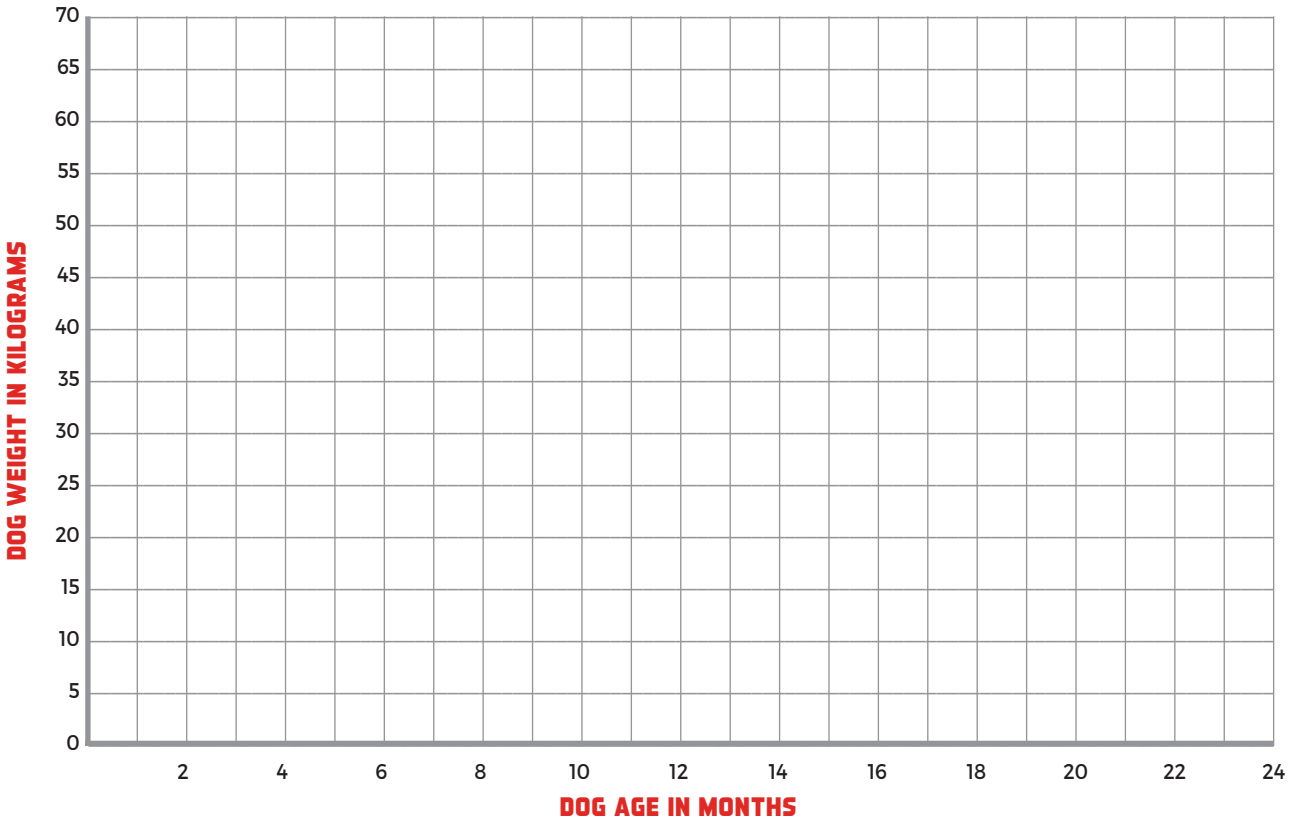
HOW BREED AFFECTS GROWTH

WHICH BREED IS FIRST TO REACH FULL-GROWN SIZE? WHICH IS LAST?

Using the chart on the previous page, match the breeds to their growth curves, plotting them on the chart below. (Answers on pg 27.)

TOY BREED: TOY POODLE	BREED A
SMALL BREED: MINIATURE SCHNAUZER	BREED B
MEDIUM BREED: SPRINGER SPANIEL	BREED C
LARGE BREED: GERMAN SHEPHERD	BREED D
GIANT BREED: GREAT DANE	BREED E





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WHAT KIND OF DOG AM I?



We're Tipper and Tony, the Bloodhounds. Our smelling superpower is a genetic ability we inherited from our ancestors, including our parents and grandparents.

Did you know that dogs, as a group, are the most diverse (varied) kind of mammal? Over four hundred different types of purebred dogs are recognized worldwide, such as Cocker Spaniels, Poodles, Labradors, Pugs and Beagles. There are also countless numbers of "designer" dogs, or mixes of two purebreds, including the Cockapoo, the Labradoodle and the Puggle, plus other mixed breed dogs that can be a combination of two or more breeds. These dogs have all inherited traits from their parents, grandparents and other ancestors, such as head and nose length, ear shape, and coat (fur) color and type. What kind of dog diversity exists in your neighborhood?

WHAT TRAITS ARE MOST COMMON IN THE DIVERSE DOG POPULATION IN YOUR NEIGHBORHOOD?

Go on a dog diversity search in your neighborhood to find out which of the basic inherited traits listed below are most common.

1. Gather a team of friends and decide on an area in your neighborhood to investigate, perhaps the local dog park, if you live in a city, or the four-block area around your school.
2. Walk through the area and observe, from a safe distance, the dogs you encounter. Make notes on the chart to record the traits of each dog for head and nose length, ear type, and coat color, length and type.
3. Compute your totals. Which traits are most common in your area? Which are least common?

Dog	Head and Nose Length			Ear Type		Color					Coat Length		Coat Type	
Name/place or human companion	long	medium	short	upright	floppy	black	brown	golden	white	mixed/ other	long	short	straight	wavy
Totals														

FOR FURTHER EXPLORATION:

Conduct the same research in a different area. Are your results the same?

HAVE WE MET?

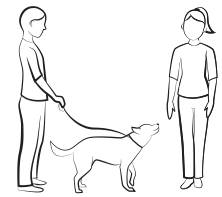
I'm Henry, the avalanche rescue dog. I've got a question for you: Do you remember when you were little and people would greet you by patting you on the head?

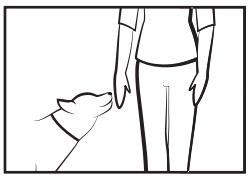


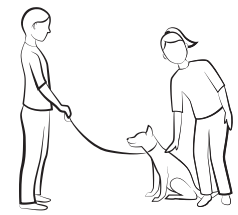
You probably didn't mind at first, but later wished people wouldn't do it. We dogs would like you to know that some of us feel exactly the same way! And if we're just meeting you for the first time, we don't have an easy way to communicate that to you. We would like you to learn the greeting that is best for us and is safest for you. This activity can help you learn more.

WHAT IS THE BEST WAY TO SAFELY GREET A DOG?

1. Team up into groups of three, with one person playing the part of the dog, one person playing the dog's human companion, and one person playing the person who'd like to meet the dog. Practice these steps, taking turns in the three different roles, until you feel comfortable with the procedure.
2. First and most importantly, ask the dog's human companion for permission to interact with the dog before you even approach it. Not all dogs are comfortable with new people.
3. Turn your body sideways to the dog, and avoid leaning over the dog, so you don't look threatening.
4. Let the dog come toward you as you stand still.
5. Allow the dog to sniff the back of your hand so he or she feels like you've been properly introduced (be sure to keep your hand near your side, not outstretched or pushed into their face).
6. If the dog seems happy to "say hello," give him or her a gentle stroke on the side, slowly and away from the face (when practicing with people, give a pat on the back!).







Just so you know, some dogs feel that you are being bossy if you look directly into their eyes if they haven't had a chance to sniff you yet, so avoid staring at them directly in the eye as you greet them. Ask the human companion for the dog's name, then repeat it, to help the dog feel that you are friendly. That's important to us dogs. Thanks for listening, and I hope you meet lots of great dogs out there.

Safety is important, so if you see a dog without its human companion, tell an adult, but don't try to pet it or catch it yourself. Remember, a startled dog may feel the need to protect its human companion. Your calm actions help a dog feel comfortable.



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WILL YOU WORK WITH ME?

I'm Ricochet, the surf and therapy dog. My human partners and I enjoy working hard together at our jobs. Would you be interested in a career with dogs? Do you know what kinds of careers are available? This activity can help you learn more.

EXPLORE THE WIDE WORLD OF CAREERS WITH DOGS

Off the top of your head, make a list of **people** who have the pleasure of working with dogs for a living. Next, make a list of **places** where you might see dogs working. Form a learning group with your classmates and compare lists. What are the places or people that your classmates mentioned most often? Which are most unique?

Next, with your group, and looking at your lists, brainstorm careers that involve dogs. How many can your group think of? Compare your list with dog careers that you find online. Don't forget careers like animal rights lawyers or scientists that work to research medical conditions of dogs or to improve nutrition.

Choose one of those careers listed and do some research – what training or education is necessary for this career? What does the work entail? Find members of your community who work with dogs and interview them, or invite them to make a presentation to your class. Maybe, when you grow up, you, too, will have the chance to work with a Superpower Dog.



Photo credit: Jerod Harris





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WILL YOU PLAY WITH ME?

I'm Halo, the search-and-rescue dog. I work hard helping people, but I also need to play! Play is a more important reward to me than a treat, and I especially love my pull toy that has become known to the Superpower Dogs movie people as "Mr. Firehose."

Do you have a dog who loves to play? Or would you like to help dogs who are waiting to be adopted at your local animal shelter? Create two similar pull toys for dogs, then investigate their physical properties before you share them with your four-legged friends.

DOGS AND TOYS

Dogs come in a wide variety of shapes and sizes, but they all need to play. Why do you think that is? Scientists have found that play helps to keep your dog physically and mentally healthy, builds a bond of trust and understanding with your dog, and helps your dog learn. Some dogs even find play to be more of a reward than food. Staff at animal shelters say dogs awaiting adoption may be offered two to three toys per day for comfort and play. The toys are washed each day, and damaged toys are replaced, so lots of safe toys are always welcome. You can create and donate toys to the shelter!







SAFETY FIRST!

Always stay with the dog as it interacts with the toy, and remove the toy if it becomes frayed or damaged to avoid harm to the dog. Also watch that the dog's teeth do not become stuck in the fabric and be sure to play gently, never lifting the dog off the ground and spinning them around. .

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MAKE YOUR OWN PULL TOY

Some dogs like stretchy pull toys, while others prefer a firmer toy. Try making these two styles of toys, then predict which style will stretch the least and which will stretch the most.

WHICH PULL TOY WILL STRETCH THE MOST?

1. Find your fabric. For durability, we suggest outgrown blue jeans or fleece.
2. Cut strips of the fabric. You will need seven strips measuring about 10 centimeters (4 inches) by about 1 meter (1 yard). For a "fair test," be sure to use the exact same kind of fabric for all seven strips of fabric.
3. Tie three of the strips together with an overhand knot, then braid the strips tightly together, finishing with another overhand knot.
4. Tie the remaining four strips together with an overhand knot and weave them together tightly using the four-strand square stitch method for making lanyards, also known as gimp or boondoggle. Directions are on the following page.

PREDICT:

Which pull toy will stretch the most? By how much?

_____

_____

_____



BRAID STITCH

5. Measure each toy in its relaxed position. How long is it?
6. With a partner, stretch each toy with the same amount of pull and measure again.

COMPARE:

Which pull toy stretched the most? By how much?

_____

_____

_____



4-STRAND SQUARE STITCH

FOR FURTHER EXPLORATION:

Do the stretch test with different types of fabrics. Then get permission from a dog's human companions to play with the dog and test how well your pull toy works. Be sure to have an adult help you make certain the toy is made with a very safe, durable fabric before using it to play with the dog, or before donating it to your local animal shelter.

Decide which toy you and your dog tester prefer, then make more for your local shelter! Remember, many successful working dogs were rescued from animal shelters, so your donated toys may comfort a dog before it, too, goes on to do wonderful things for others.

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SQUARE STITCH LANYARD INSTRUCTIONS

To make the four-strand square stitch lanyard pull toy, start with four strips of fleece, about 10 cm (4 inches) wide and about one meter (about one yard) long.

1. Start the lanyard by stacking your four strips on top of each other. (Figure 1)
2. Tie an overhand knot by making a loop and pulling the ends through. (Figure 2)
3. Spread the four strips out in a square, one top, one bottom, one left and one right, with the knot in the center. (Figure 3)
4. Fold the top strip down. (Figure 4)
5. Fold the left strip across the first strip. (Figure 5)
6. Fold the bottom strip up across the second strip. (Figure 6)
7. Fold the right strip over, then through the loop from the first strip. Pull all strips. (Figure 7)
8. Make sure all strips are equally tight. (Figure 8)
9. Repeat the steps, starting with the strip now on top. Pull everything tight each time. Keep going until you have about 20 cm (8 inches) left, then tie another overhand knot to finish it off.

For a variation, add a loop midway for strips of fabric measuring about 1.5 meters (54 inches) in length (like the example on the previous page).

For other variations, go to the website for Boondoogle Man and check out the variety of stitches you can use, substituting fabric for the plastic lanyard lace.


FIGURE 1


FIGURE 2


FIGURE 3


FIGURE 4


FIGURE 5

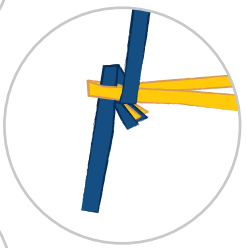

FIGURE 6


FIGURE 7


FIGURE 8

DID YOU KNOW?

Dogs can see the colors yellow and blue, but not red or green, according to scientists.

ANSWER KEYS

ACTIVITY 1: WHAT'S YOUR SUPERPOWER?

Match the Superpower to the Dog:

Following a scent - Bloodhound
Water rescue - Newfoundland
Pulling a sled - Alaskan Malamute
Caregiving - Golden Retriever
Herding sheep - Border Collie
Law enforcement - German Shepherd

ACTIVITY 5: WHAT ARE YOU SAYING?

Match the dog body part position or behavior to the meaning:

1 b, 2 a, 3 c, 4 e, 5 d, 6 f, 7 g, 8 l, 9 h

ACTIVITY 6: WHERE SHOULD I LIVE?

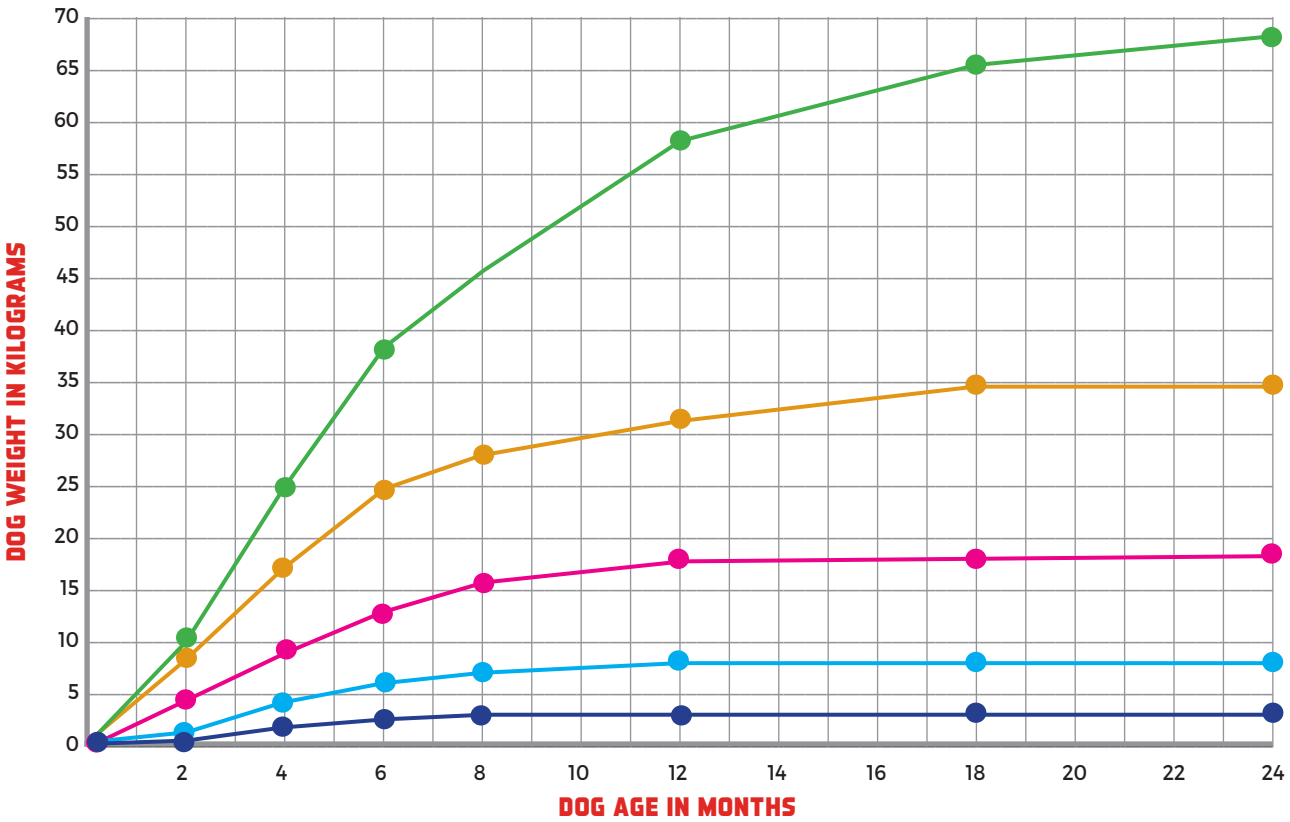
Match the dog to the home where it will be happiest:

1. C, 2. B, 3. A

ACTIVITY 7: HOW LONG WILL I BE A PUPPY?

Solve a graphing activity to compare dog breed growth rates:

BREED A Springer Spaniel / **BREED B** Miniature Schnauzer / **BREED C** German Shepherd / **BREED D** Great Dane / **BREED E** Toy Poodle



EDUCATIONAL STANDARDS ALIGNMENT

The *Superpower Dogs* Activity Guide supports the classroom treatment of the following Life Science Standards for kindergarten through eighth grade:

NEXT GENERATION SCIENCE STANDARDS

Grade 3 – Life Science: Inheritance and Variation of Traits: Life Cycles and Traits

Activity 1: What's Your Superpower?

Consider why different breeds of dogs have been bred for the specific traits of their parents.

3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

Grade 3 – Interdependent Relationships in Ecosystems: Environmental Impacts on Organisms

Activity 4: How Do You Do That?

Conduct a test to discover why a Newfoundland's oily layer of fur helps protect it from the cold of the ocean during a water rescue.

3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Grade 4 – Structure, Function, and Information Processing

Activity 4: How Do You Do That?

Conduct a test to discover why a Newfoundland's oily layer of fur helps protect it from the cold of the ocean during a water rescue

4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Grade 4 – Structure, Function, and Information Processing

Activities 2 and 3: What's That Smell? and What's That Sound?

Conduct investigations on ears and hearing, and noses and smelling.

4-LS1-2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

Middle School – Structure, Function, and Information Processing

Activities 2 and 3: What's That Smell? and What's That Sound?

Conduct investigations on ears and hearing, and noses and smelling.

MS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

COMMON CORE STANDARDS

Grade 5 – Math: Graphing

Activity 7: How Long Will I Be A Puppy?

Graph data sets to compare dog breed growth rates.

CCSS.MATH.CONTENT.5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

CCSS.MATH.CONTENT.5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

RESOURCES

PRINT RESOURCES

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To learn more, visit superpowerdogs.com

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Eukanuba®
Wisdom Panel™ Canine DNA Tests
Whistle®
Sonya Heritage, Certified Dog Trainer
Kristian "Cat" Labrada, Certified Dog Trainer
Teresa MacPherson, Certified Dog Trainer

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