Edu.Cat

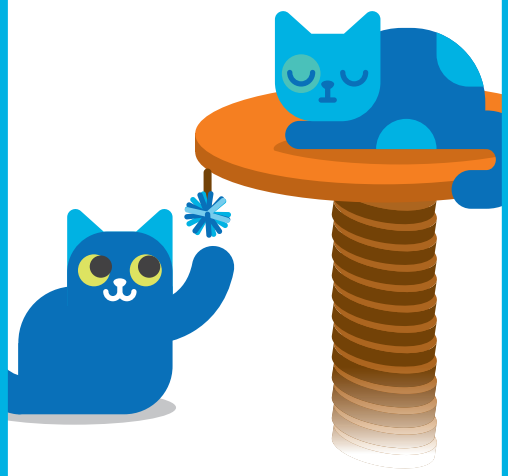
STEM Challenge

Student Book

LEVEL 2B

Name:





TenLives

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About Ten Lives

Ten Lives is a leader in cat management and operates Tasmania's largest cat shelter taking into our care all lost, stray, unwanted, wild and feral cats. Ten Lives receives no government funding and relies on funds generated from our own operations and the support of the general community through donations and bequests.

Operating for over seventy years Ten Lives has cared for tens of thousands of cats and kittens. In kitten season we have on average one cat or kitten coming into our care every 30 minutes during our 7 day a week operation.

By changing the way we collectively care for cats, we are benefiting not only cats but also members of our community and the environment.

Ten Lives has an independent board and has a professional and dedicated team that ensure Ten Lives is a sustainable organisation for the long term.

Ten Lives objectives are:

- To promote and improve the welfare of cats and kittens.
- To promote responsible cat ownership and humane animal welfare principles.
- To shift public attitude towards the welfare of their cats in order to reduce the number of stray, abandoned, lost, unwanted or feral cats.
- To provide education throughout schools and the general public to create positive outcomes for cats, the environment and communities.
- To reduce unnecessary euthanasia of cats and kittens.

Ten Lives promotes responsible cat ownership and all cats adopted are microchipped, de-sexed, vaccinated and have received all necessary veterinary care.

Ten Lives plays a leading role in cat management and works with all levels of government, community groups, education and research institutions, conservation groups and business.

Ten Lives believes that education is key to creating long term social change in the way we care for our cats, the community and our environment.

Ten Lives

About Edu.Cat

Edu.Cat is an Australian-first STEM education program focusing on issues surrounding cat welfare, cat management and the positive and negative impact cats have on individuals, communities and wildlife. The subject matter of the program (cats) is tangible and appealing to students whilst the presentations and STEM Challenges and additional work book activities engage students in areas of Science, Technologies, Engineering and Maths, inspiring students in these professional fields and empowering them to make positive choices in cat ownership.

Edu.Cat was developed in Tasmania by Ten Lives and is available to all schools. The program includes complete Australian Curriculum - linked suggested unit plans for Kinder to Yr 6 students in 4 levels. 1A, 1B, 2A, 2B: 1A = K/P; 1B = Yr 1/2; 2A = Yr 3 /4; 2 B = Yrs 5 /6. However, any level might be presented due to the needs and background knowledge of students. As students progress through the program, they engage in new and exciting inquiry-based learning and STEM Challenges to build on information they have learnt in previous years.

Ten Lives provides teachers with all supporting resources: Teacher Guides, Students Books, STEM Challenges and additional activities linked to the Australian Curriculum and the Early Years Learning Framework.

All **Edu.Cat** curriculum-linked presentations are tailored to specific year levels and to the needs of individual schools which is highly desirable for teachers, as well as being engaging for students.

Enquiries can be made for kittens to attend **Edu.Cat** sessions as an additional component to the program, subject to availability.

Ten Lives also offers schools the opportunity to book a behind the scenes tour of Ten Lives, Tasmania's largest cat shelter.

Edu.Cat paves the way for students to:

- **inquire**
- **problem solve**
- **design**
- **create**
- **evaluate**
- **work as a team**
- **innovate**
- **be inspired**
- **participate in cooperative learning**
- **engage in STEM**



Cats, the experts in hunting

Cats are carnivores. To survive in the wild without the help of humans, cats need to be successful hunters. Their physical features and enhanced senses are key to their hunting success.

Cats are fast and powerful, from a sitting start they can spring up to nine times their height. They are also very flexible and can narrow their shoulders and chest to squeeze through tight spaces. While chasing and catching prey, they can make sudden changes in direction and rotate their bodies to land on their feet.



duben/123RF

The challenge

In teams, design and construct a cat toy from recycled materials. The toy needs to be suited to the cat's hunting adaptations.

OR as a question - What is the best, safe toy you can design specifically for a cat to play with?

Working as a team can be a challenge. Here are some different roles people take in teams.

Ideas generator – Suggests many different ideas. Does not think about the details or how it is done.

Evaluator – Checks in with the task to see if the project is on track. If off track, that is OK: they will let everyone know and provide feedback.

Problem solver – Asks questions such as: What if we....? Maybe we can....? I wonder if we change this, move that... would it...?

Details person – Often the one finishing the task. Asks questions like: Will it work? What materials do we need? Where can we get those materials? Is there a simpler way?

How do you like to work in a team?



What do you think you are good at?

The engineering design process



Factors to consider when designing a cat toy

Needs of the animal

Does it provide physical and mental exercise?

Does it improve brain function (problem-solving) and social interaction?

Does it add to their quality of life?

Is it safe for cats to play with?

Needs of the owner

Is it quiet or does it make a pleasant sound?

Is it durable and safe?

Is it good value for money?

Does it reinforce the human-cat bond?

How does a cat like to play? Like it is catching prey!

A cat's instinct is to hunt to survive; even well-fed pet cats are driven by their instinct to hunt, they simply cannot help themselves.

Domestic pet cats, especially kittens, love to play with toys and other cats and kittens. This type of play helps them practise their hunting skills.

Pet cats and kittens like to play with toys that resemble prey, and they play more when they are hungry.

Domestic pet cats may simply enjoy a hunting game.

Let's keep them entertained at home so they don't need to hunt living things for fun.



Funix/123RF



Creativo 123RF



ASK:
Define the problem

Questions our team is wondering...

1. _____

2. _____

3. _____

What is the best toy you can design specifically for a pet cat?



IMAGINE:
Brainstorm possible solutions...

Do your own research
... search for the best cat toys

Here are a few links to get you started

www.petplay.com/awards/

catsareontop.com/best-toys-for-cats/ Best 15 Cat Toys of 2017

www.amazon.com/Best-Sellers-Pet-Supplies-Cat-Toys/zgbs/pet-supplies/2975303011

www.pinterest.com.au/lacey_pentland/diy-homemade-cat-toys/?lp=true

Have you thought of these simple ideas?

- Round, plastic shower curtain rings.
- Ping-pong balls and plastic practice golf balls with holes. Try putting one in a dry bathtub; for many cats, the captive ball is much more fun than one that disappears under the sofa.
- Paper bags with any handles removed. Paper bags are good for pouncing, hiding and interactive play.
- Empty cardboard tubes from toilet paper and paper towels; unwind a little cardboard to get them started.
- Cardboard boxes. Fasten some together with strong packing tape and cut out doors and windows to make a fun cat playhouse.

Like children, cats become bored with their toys, so rotate toys often to keep them exciting.

'Hide and seek' is a fun game for cats to play. 'Found' toys are often much more attractive than a toy that is obviously introduced.

Provide toys that offer a variety of uses —

- at least one toy to carry
- one to wrestle with
- one to roll
- one to snuggle with.



Lufimorgan / 123RF

These items are not cat toys

Don't allow cats to reach these things:

- String, wool, cotton, ribbon and dental floss
- Paper clips
- Pins and needles
- Rubber bands and hair ties
- Plastic bags, especially drycleaner bags (a cat could suffocate inside)
- Anything else that your cat might chew, including electrical cords.

Other choking risks:

- Small eyes and noses on soft toys can be swallowed or inhaled.
- Plastic bits can break apart, leaving sharp edges which can cut stomachs and intestines on the inside.
- Stuffing can be made of cotton, kapok, polyester fibres, plastic, or foam beads. These materials can be dangerous to cats and kittens if swallowed or eaten.
- Check all toys for wear and tear daily. If a toy is broken, bin it.

Cat toys with long cords or dangly bits are for supervised play only and must be stored in a catproof cupboard when you aren't around to control the stick.

When not in use, put dangly toys like this away in a cupboard that cats/kittens cannot open.



Ukususha / 123RF

Tinsel, Christmas lights and most of the fun stuff on Christmas trees, are dangerous to cats. Cellophane grass used to line Easter baskets is also dangerous.

Balls of wool and string may look innocent enough. However, due to the design of a cat's tongue, which has fine backward facing barbs, it is very easy for cats to ingest wool as they try to get it out of their mouth. Wool, once swallowed, can cause a blockage or serious damage to the intestines, which can be life threatening.



Fieldsphotos / 123RF

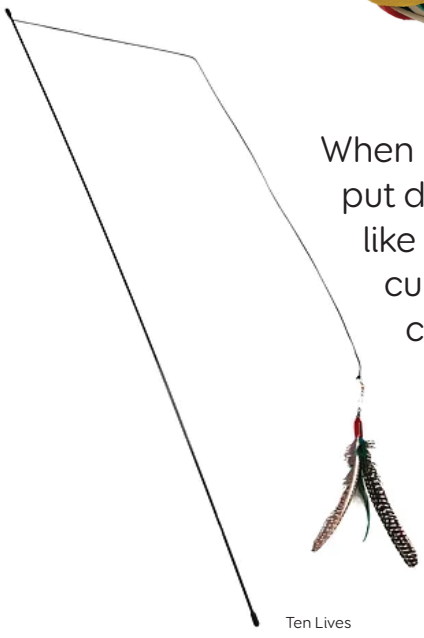


Belchonock / 123RF

Tritooth / 123RF

Rubber bands and hair elastics/ties are choking hazards, and cats should not play with them as toys.

Keep these items safely away from cats in a draw or container with a secure lid.



Ten Lives

When not in use, put dangly toys like this away in a cupboard that cats/kittens cannot open.

Fill in this table to think about how your toy design meets a cat's adaptations to hunting

Part of your toy design	Cat's hunting features
Example: soft fabric toy filled with cat-safe toy filling	Example: use sharp claws and teeth to catch 'prey'

How cats' senses are adapted to hunting

Sight

- Cats' short noses allow them to use both eyes at once, this is called binocular vision. This gives cats better vision to accurately work out the distance and aim required to catch prey.
- Cats have exceptionally good eyesight, day and night, and will prey on whatever wildlife is around at that time.
- Cats have split pupils that get bigger and smaller much faster than round pupils.
- When cats' pupils are in the slit position, it affects how clearly they can see - some things will be out of focus. Cats can see clearly from 30 cm up to 35 metres away, but distances less than or more than this will be blurry. Cats also have a blind spot under their nose.
- Scientists believe cats can recognise blues, greens and yellows fairly well but cannot distinguish reds very well. Take a look at this video online to see how cats see the world. https://www.businessinsider.com.au/how-cats-see-world-unlike-what-you-thought-2017-1?r=US&IR=T



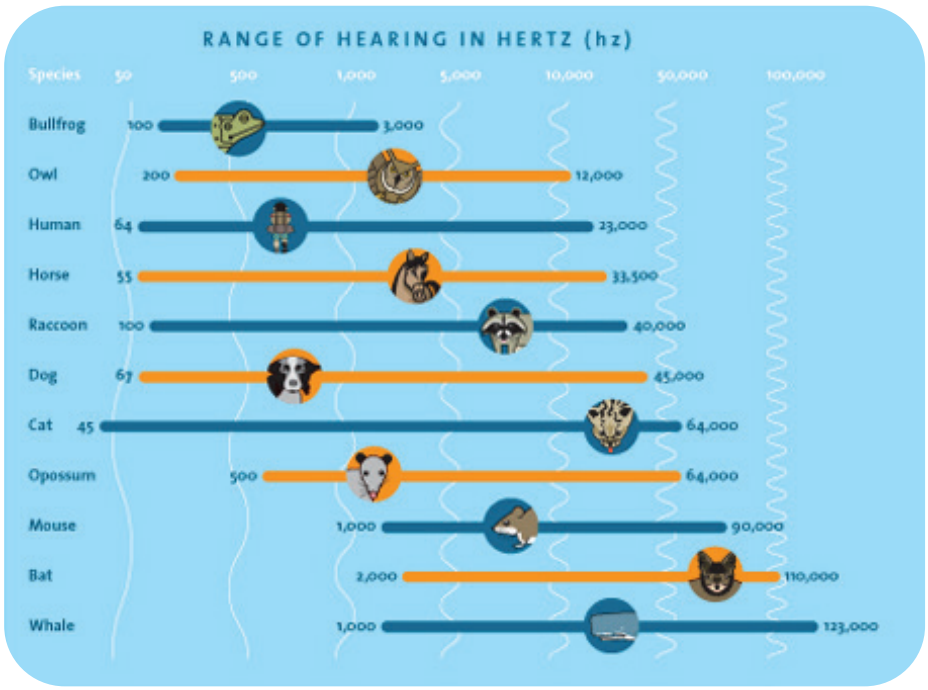
Erika8213 / 123RF

Hearing

- Cats have very sensitive hearing and can hear very high-pitched (ultrasonic) sounds that dogs and humans cannot hear. Their super hearing allows them to detect the location of rodents who communicate using ultrasonic sounds.
- Cats have 32 muscles in each ear, which allows them to move their ears incredibly precisely. The dexterity of a cat's ear is like the dexterity of a human hand.
- Cats can move each ear 180 degrees, independently of each other, at the same time. This allows cats to track the direction sounds are coming from to help them find their prey to within 7-8 cm.
- A cat's ear shape is parabolic to a degree - like a satellite dish. This shape helps to amplify sounds, allowing cats to hear fainter, further-away sounds - most cats can hear sounds from over 1.6 km away.

Dog Vs Cats

Cats have better hearing than dogs. Not only can they hear higher frequencies but they can distinguish a sound's tone and locate its source far better too. With 30 different muscles, the cat can rotate each of its ears 180 degrees and position one ear or both facing any sound the cat detects. Sound gets funnelled down to a cat's middle ear so effectively that from a metre away it can easily distinguish the sound of you opening the cat food.



infographiclist.files.wordpress.com

Touch

- Cats whiskers are very sensitive. Whiskers are located above their eyes, and on their chin, cheeks and the back of their lower front legs.
- There are about 12 whiskers on each side of the muzzle, although some cats have more. These are the longest whiskers on a cat's body.
- Unlike human hair, whiskers are deeply embedded and connected to the nervous system. This allows a cat to detect the precise location, size and texture of an object its whiskers brush against, even in the dark.
- Whiskers also detect changes in air currents, helping cats detect approaching dangers.
- A small muscle 'sling' attached to each of the whiskers of a cat's muzzle allows them to move independently of the others, or they can move all the whiskers together.
- Playing with or pulling a cat's sensitive whiskers can be painful for a cat.
- Cats also learn about their environment through their fur and the paw pads on their feet, which are strong but sensitive. These pads are like our finger tips: they are loaded with touch receptors and allow cats to evaluate temperatures as well as the texture, location and liveliness of caught prey.



Record-breaker: Whiskers the Cat boasts facial hair measuring a staggering 12 inches (30.48 cm) from tip to tip

Source: http://www.dailymail.co.uk/news/article-2579169/Adorable-homeless-cat-thought-longest-whiskers-Britain-measure-12-INCHES.html

Smell

- Cats rely on their acute sense of smell to provide them with information about the world around them. With approximately 200 million scent receptors in their nasal cavity a cat's sense of smell guides them to prey, tells them if food is edible or toxic and can even help find their home if lost. Humans only have approximately 5 million scent receptors and dogs vary from 147 million to 300 million depending on the breed; the bigger the dogs nose the more scent receptors.
- Providing familiar items used by your cat and/or using calming pheromones like Feliway are important when cats are stressed, moving to a new house, boarding etc. The familiar smells of these items help reassure the cat that everything is ok. Their acute sense of smell is also why it is best to avoid strong smelling sprays and other products in your home and to use unscented natural litter. Keep litter trays exceptionally clean; if you think your cats litter tray smells clean, your cat may not agree.



Vitalytyagnov/123RF

Taste

- Cats have 473 taste buds on their tongues compared to humans who have 9,000. Cats also lack taste buds that can detect sweet food. The smell of food stimulates cats to eat rather than the flavor of food. This is one of the reasons why cats with respiratory infections (cat flu), other nasal blockages or injuries stop eating: If they can't smell their food, they won't get hungry.



Vitalytyagnov/123RF

STEM Challenge part 1:
PLAN: Think, sketch and label

Sketch a plan of your cat toy design.
Make sure you label all its features. Work as a team.

STEM Challenge part 2: **IMPROVE:** Adjust your design to make it better

Meet with another team to present your sketch and listen to their feedback. Then swap.

Using complete sentences, explain what changes you will make to your design based on the feedback. Sketch ideas and label features.

STEM Challenge part 3: **CREATE:** Make it

1. Using recycled materials from home, create your cat toy from your detailed design plan.
2. Where possible, test and modify your design (at home with a pet cat). Video the results to present to class and discuss what improvements you made.
3. Present cat toys to your whole class or school community.
4. Reflect and celebrate.

Add a photo of your captivating cat toy here

Further reading

Cats: The adaptable hunter

Cats can be divided into 3 groups:

Domestic cats - are owned, pet cats that rely on humans to provide for them. Even well fed pet cats will hunt.

Domestic pet cat hofmeester/123RF





Stray cat kapongza/123RF

Stray cats - are unowned cats that roam cities, towns and some rural areas.

They generally live in areas where they can access a food source to supplement what they are able catch. They may or may not be friendly to people.

Feral cats — survive without any human contact or assistance. They live, hunt and reproduce in the wild.

The cats in the 3 groups are all the same species, and individual cats may move between these groups. For example, a domestic cat that is abandoned and finds a food source, such as someone who will feed it but not take ownership of it, will become a stray cat. Kittens from a female stray cat, that has found a good food source will either:

- become domestic if taken in by humans and socialised before 8 weeks old
- remain as strays
- if their food source dries up, become feral cats and move into bushland to hunt.



Feral cat image courtesy of the Invasive Animal CRC

Feral Cats

- Feral cats are exceptional hunters and pose a significant threat to the survival of many native species including small mammals, birds and reptiles.
- Feral cats have been implicated in the extinction of some Australian native animals.
- They mainly eat small native and introduced mammals, but also birds, lizards and insects.
- When a feral cat catches prey, it will eat the entire animal, including the bones.
- Feral cats can be found everywhere, including deserts, forests, woodlands and grasslands.



dbrus / 123RF

- Their physical features and senses allow them to survive in Australia's harshest conditions. Cats are found in 99% of Australia, including many offshore islands.
- The number of feral cats in Australia is impossible to calculate because of variation of the numbers of cats living in different environments, and the way the population fluctuates with prey availability and climate. The number of native Australian animals killed by feral cats each night is also difficult to calculate, due to differences in the size of prey.
- Feral cats are generally nocturnal and will rest during the day in den sites such as hollow logs, piles of debris, rabbit warrens or dense scrub.
- A feral cat's average life expectancy is about 3 to 5 years.



dbrus / 123RF

Discarded cats suffer in the wild

- Thousands of homeless domestic and stray cats roam Tasmania. Many of them suffer trying to survive in and around our suburbs.
- They spend most of their time looking for food and security, avoiding danger, fighting, marking territory, breeding and raising young. They may suffer from: diseases such as cat flu, feline parvovirus, feline aids or feline leukemia; fleas, intestinal worms and other parasite infestations; injuries from fighting.
- They are at greater risk of being hit by a car, attacked by dogs or hurt by people.
- Their life expectancy is dramatically reduced from approximately 21 years for a well-cared for indoor domestic pet cat, to 3-5 years for a stray. The oldest confirmed pet cat lifespan is 38 years.
- Unknowingly, well intentioned people increase the homeless pet cat problem by occasionally feeding the local stray without taking full ownership.
- Shelters across Tasmania receive thousands of unwanted domestic, stray and feral cats and kittens every year. Many of these cats and kittens are malnourished and sick with cat flu, upset stomachs, feline aids or leukemia. They have skin diseases like flea allergy dermatitis or ringworm, and are suffering from parasites like worms, fleas, mites and ticks.
- Kittens that have not been socialised (bonded with humans) before eight weeks old are difficult to tame to become pets.
- The suffering and subsequent consequences of discarded pet cats and kittens is a worldwide issue.
- The role of euthanasing unwanted domestic, stray and feral cats and kittens falls to those who care the most — the employees of animal shelters. This is a task that can take a terrible personal toll.



goce / 123RF

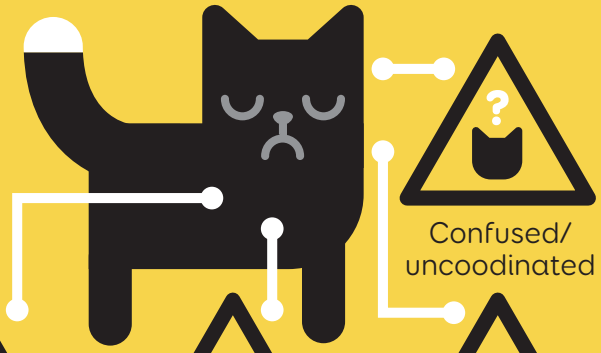
POISON SAFETY AT HOME FOR CATS

Common cat poisons

- Dog flea treatments
- Human Medicine
- Antifreeze
- Household chemicals
- Lillies
- Human Foods

Symptoms of poisoning

The symptoms of poisoning aren't always obvious and can vary, but there are a few of the most common signs...



- Confused/ uncoodinated
- Fitting/ seizures
- Difficulty breathing
- Vomiting
- Drooling

What should I do if I think my cat has been poisoned?

DO:

- Take them to the vet immediately
- Show your vet labels or samples of the suspected poison, if known
- Keep other pets away from source

DO NOT:

- Try to make your cat vomit or feed them salt water
- Wait for the symptoms to stop or assume they will go away
- Panic

Prevention is better than a visit to the vets!

Remember, keep poisonous substances out of cats' reach - ideally stored in a sealed container or closed cupboard or shed.

This list and advice is not exhaustive.
For further advice please consult your vet
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(England and Wales) and SC037711 (Scotland). COM.2406

Cat Language



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What you can do to help?

- Cats can live up to 21 years, so owning a cat is a long-term commitment.
- As a general rule treat kittens for fleas straight away and treat for worms from 2 weeks of age. Talk to your local veterinarian about which products are safe to use on kittens younger than 8 weeks of age. All other pets need to be treated as well.
- Vaccinations protect pets from a range of diseases which can be life threatening. Kittens should have their first vaccination between 6 - 8 weeks of age.
- Desexing male and female kittens can be done from 8 - 10 weeks of age.
- Provide your cat or kitten with a collar, id tag and microchip, even if they live indoors.
- Think about keeping your cat or kitten in an enclosure or indoors: this keeps them safe from being lost, injured, killed or abused. It will also keep your neighbours happy and protect the wildlife.
- Encourage people you know to make good choices for the care of their cat/s, their community and the environment.
- Where possible kittens should remain with their mother until 8 - 10 weeks of age. This gives them the best opportunity to develop physically and socially.
- Encourage owners of unwanted cats and kittens to surrender them to a reputable shelter instead of giving them away.
- Anyone can sell or give away a cat or kitten but legally it must be at least 8 weeks old, microchipped, desexed, wormed and vaccinated. Cats sold between registered breeders and genuine show cats are exempt.
- Do not take free or cheap kittens unless they are already desexed, microchipped and vaccinated.
- Never dump or abandon a cat or kitten (it is against the law).
- Call your local animal shelter for help on how to care for your cat/kitten or how to find a new home for your cat/kitten if you can no longer care for them.
- If you are eligible, National Desexing Network may help by reducing desexing fees. For more information go to www.ndn.org.au or phone: 1300 368 992

Vocabulary list

Binocular vision - both eyes are used at the same time to see a single image

Carnivore - an animal that gets its food from eating and killing other animals. They do not eat plants

Dexterity - the ability to perform an action quickly

Discarded - cast aside, get rid of, throw away

Domestic - no longer wild; tame

Embedded - fixed (an object) firmly and deeply in a surrounding mass

Euthanase - to kill gently, as with an injection performed by a vet

Feral - in a wild state, especially after escape from captivity or domestication

Interaction - communication or direct involvement with someone or something

Muzzle - the part of an animal's face that sticks out, including the nose and mouth

Parabolic - a shape that focuses energy, such as sound waves, to a point (such as an eardrum)

Predator - an animal that preys on others.

Prey - an animal hunted or caught for food, especially by a carnivorous animal

Stray cats - unowned cats that roam cities, towns and some rural areas. They generally live in areas where they can access a food source to supplement what they are able catch. They may or may not be friendly to people.

Ultrasonic sounds - sounds that are too high pitched to be heard by the human ear



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