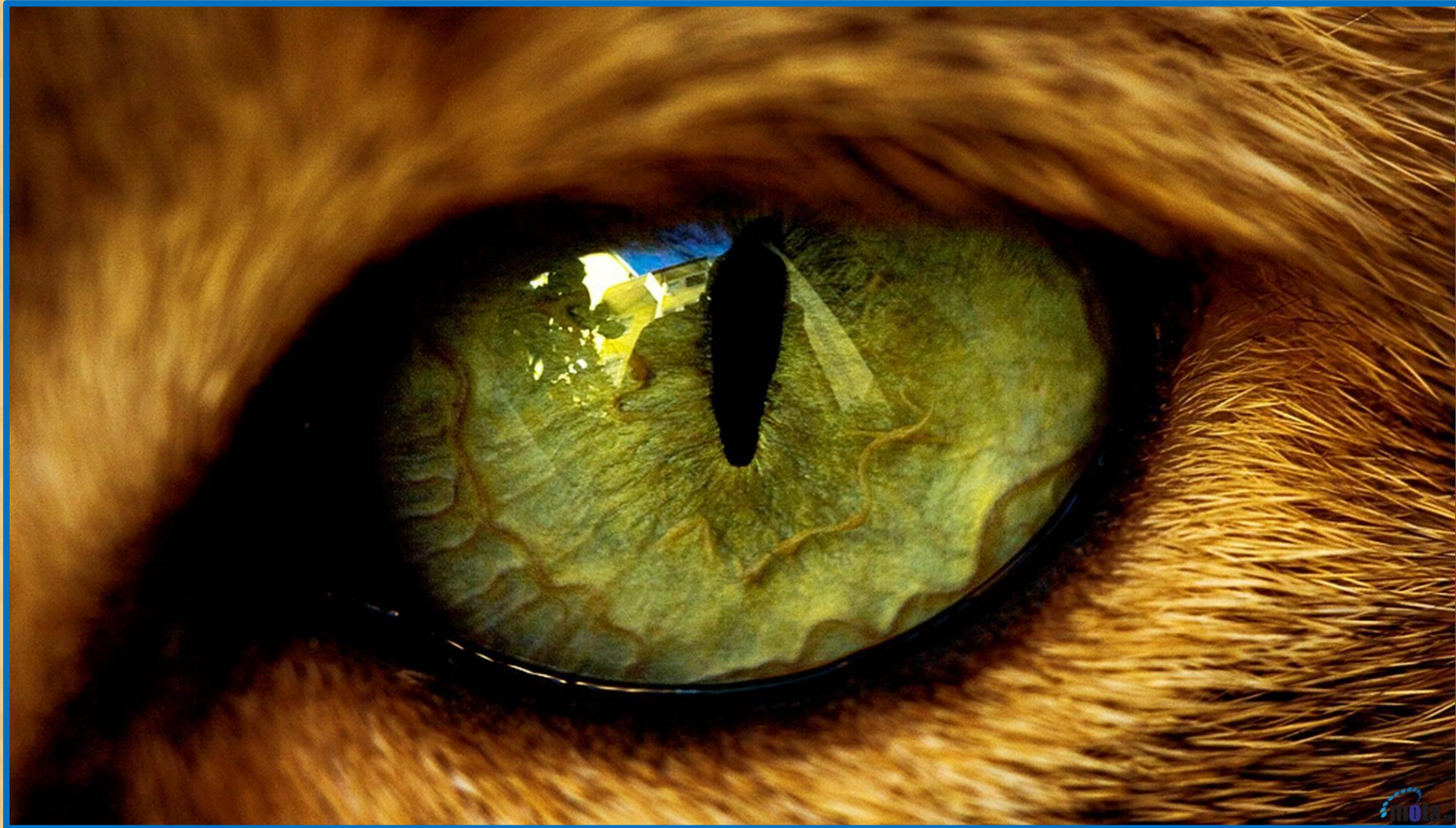


“An Eye for Eyes”



Can you guess
which eyes
belong to
what animal?





Deer



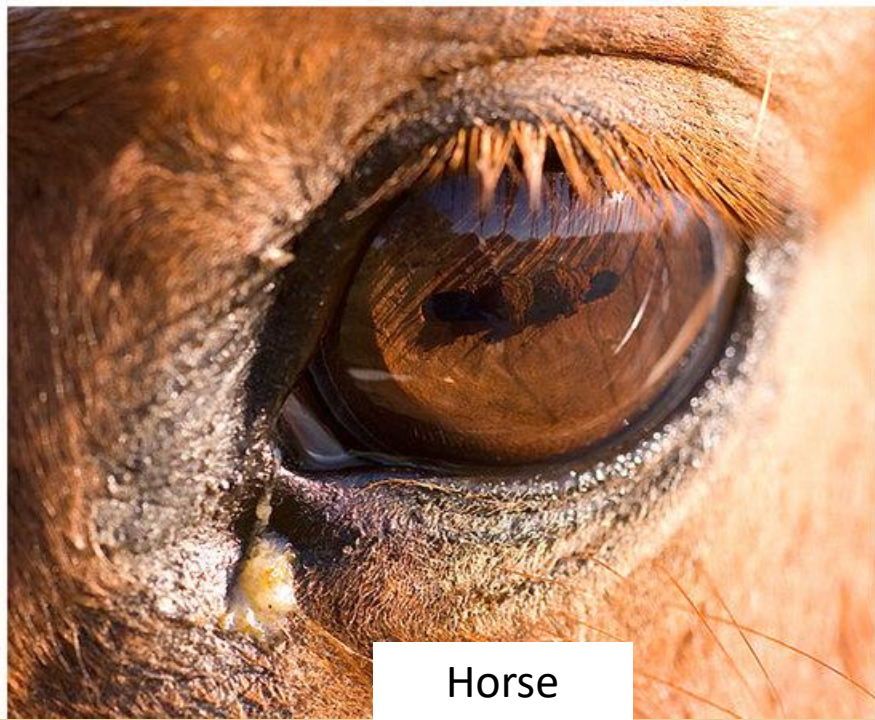
Lion



Goat



Domestic Cat



Horse



Gecko

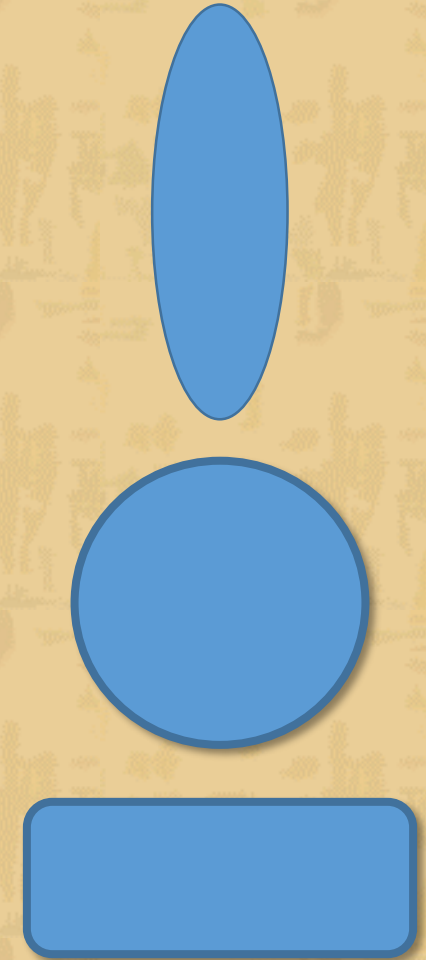
Can you guess why
the pupils are
differently shaped?

The shape of an animal's pupils is a clue to its place in the food chain



They looked at the eyes of 214 different species of land animals, and found a clear relationship between the shape of their pupils and their ecological role.

- Predatory animals that ambush their prey tend to have vertical slit pupils
- Predatory animals that chase their prey tend to have round pupils
- Herbivores that are prey for other animals usually have horizontal pupils



Goats and other grazing animals (like deer, cattle and antelope) that are hunted by predators have a simple strategy for not being eaten: look out for danger and run away if they see it.

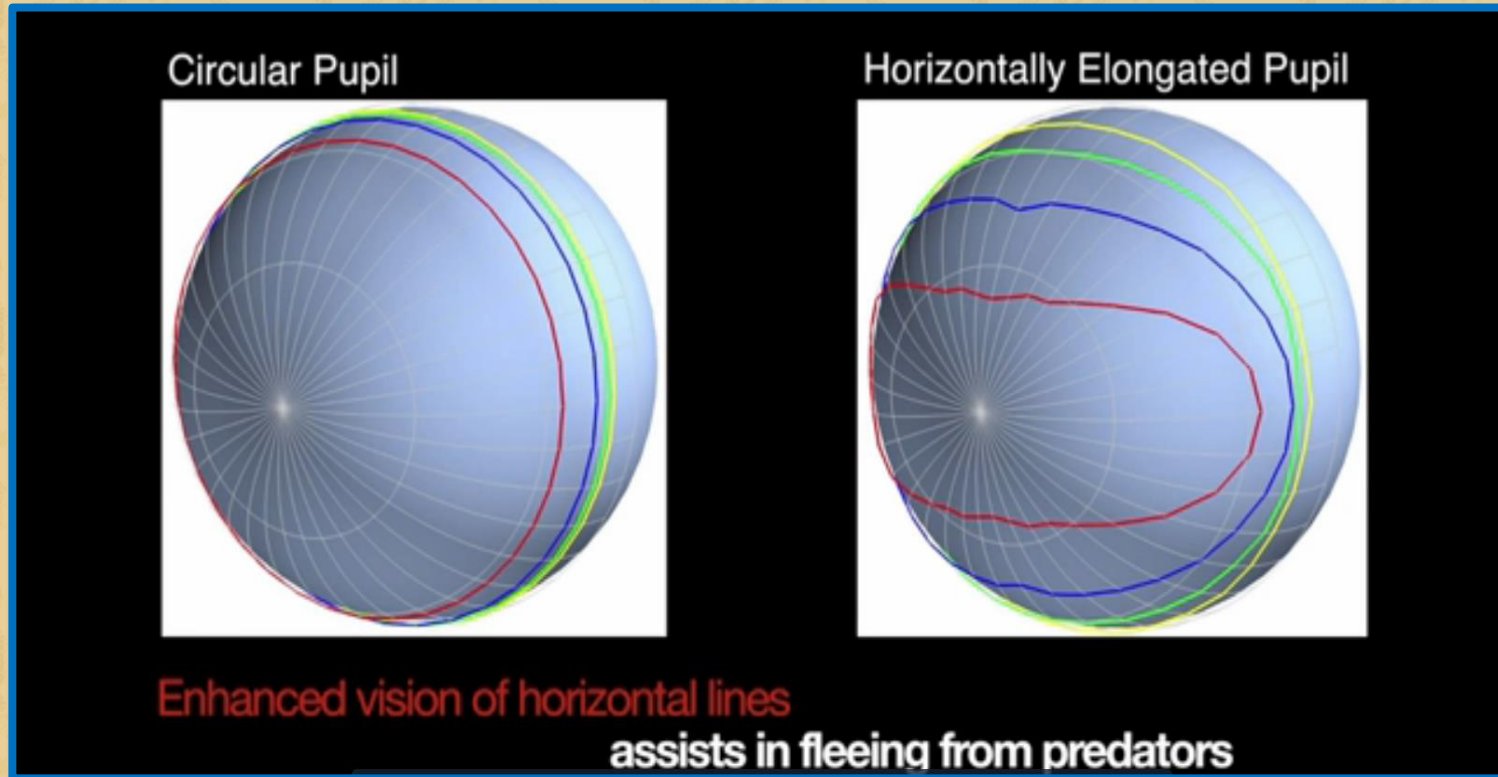
Their eyes need to be able to do two things to support that strategy:

- see panoramically to detect predators that could approach from various directions
- see sufficiently clearly in the forward direction to guide rapid locomotion over potentially rough terrain



Horizontal pupils help, because their shape creates a sharp panoramic view that's wider and shorter than what you'd get with a round or vertical pupil and lets the animal see nearly all around itself.

A long horizontal pupil also enhances the image quality of objects ahead of and behind the animal, and helps the eye capture more light along the ground and less dazzling overhead light.

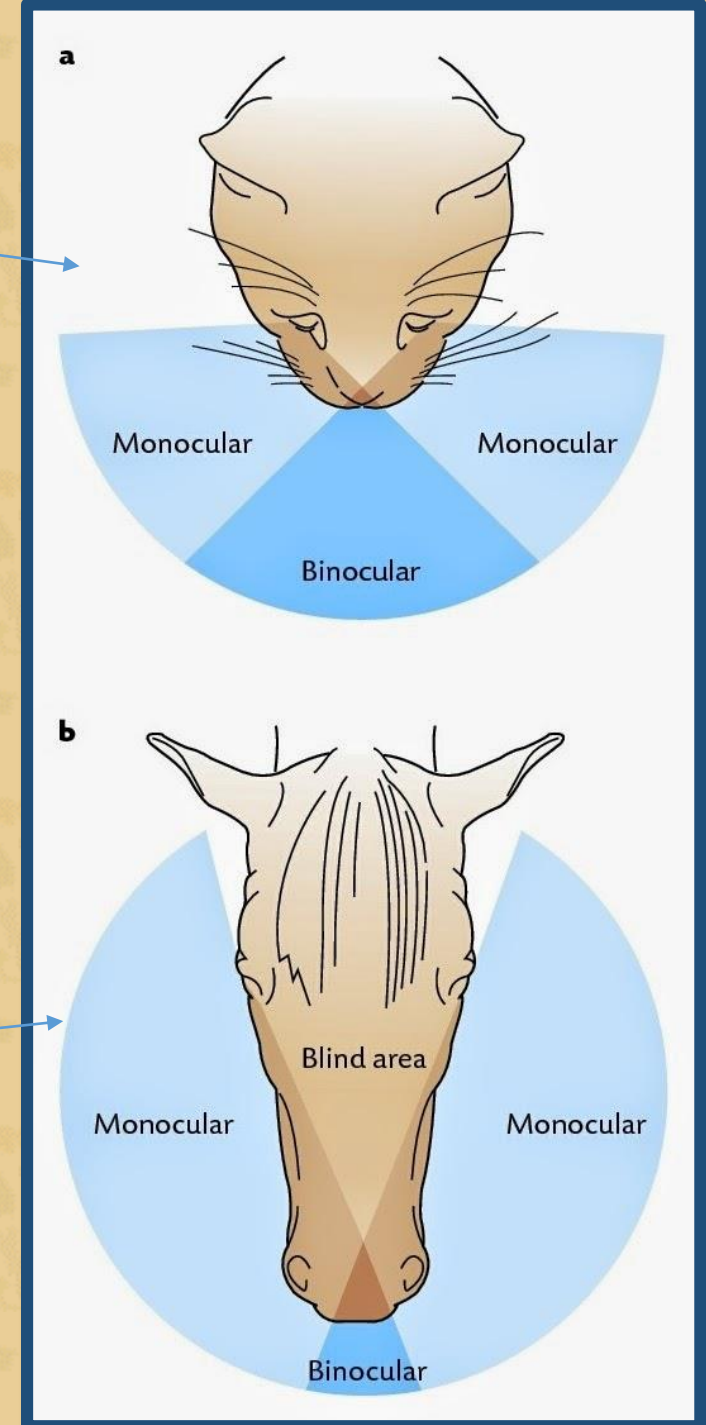


If you have a vertical iris, you're very likely to be an ambush predator.

Vertical slits are great for improving depth perception.

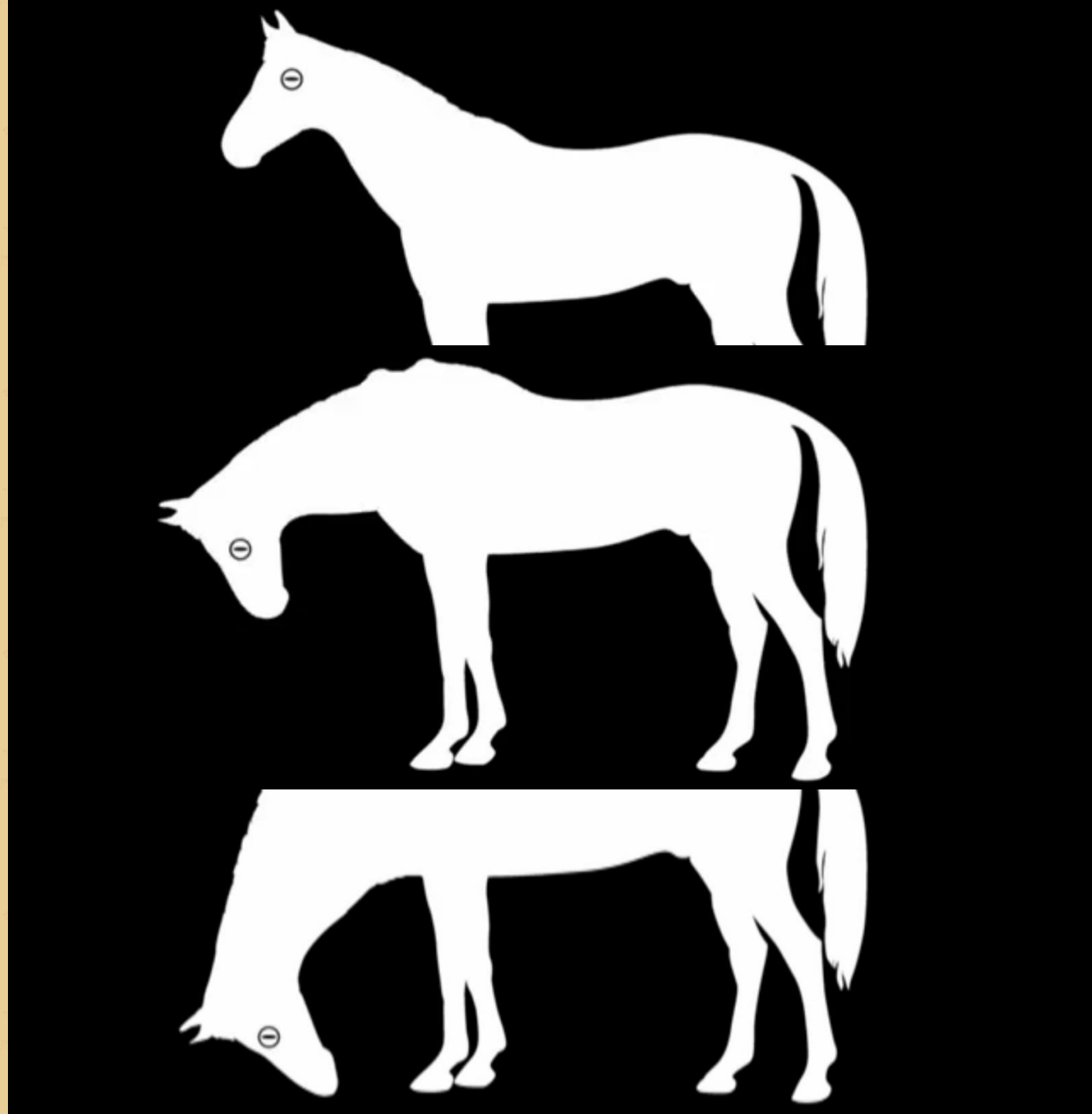
These predators need to accurately judge the distance to their prey, and the vertical slit has optical features that make it ideal for that.

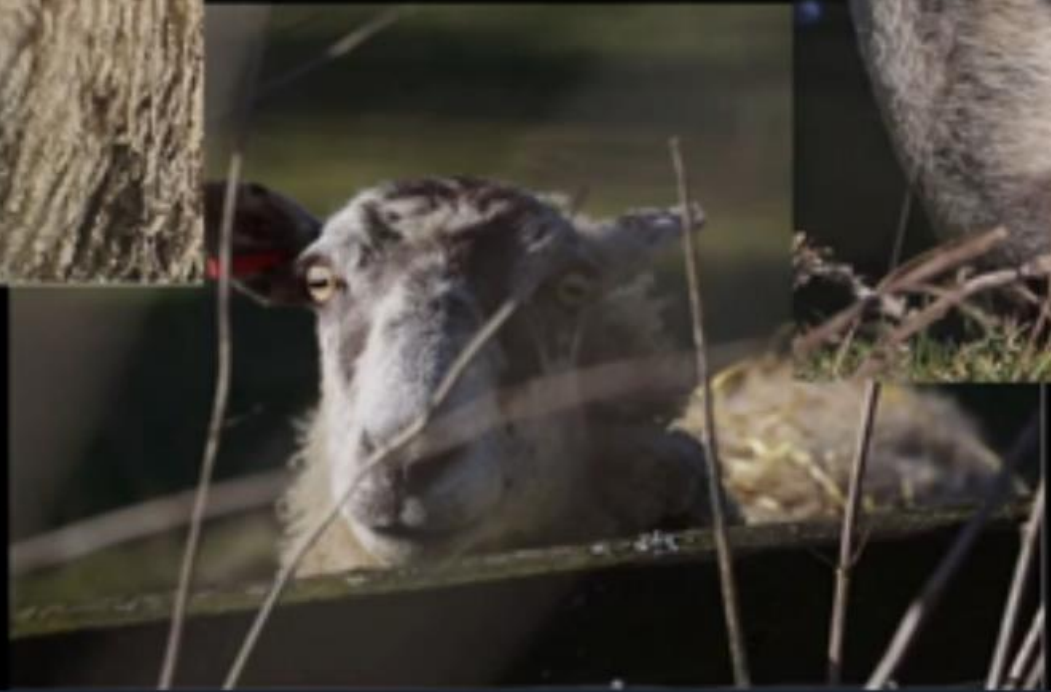
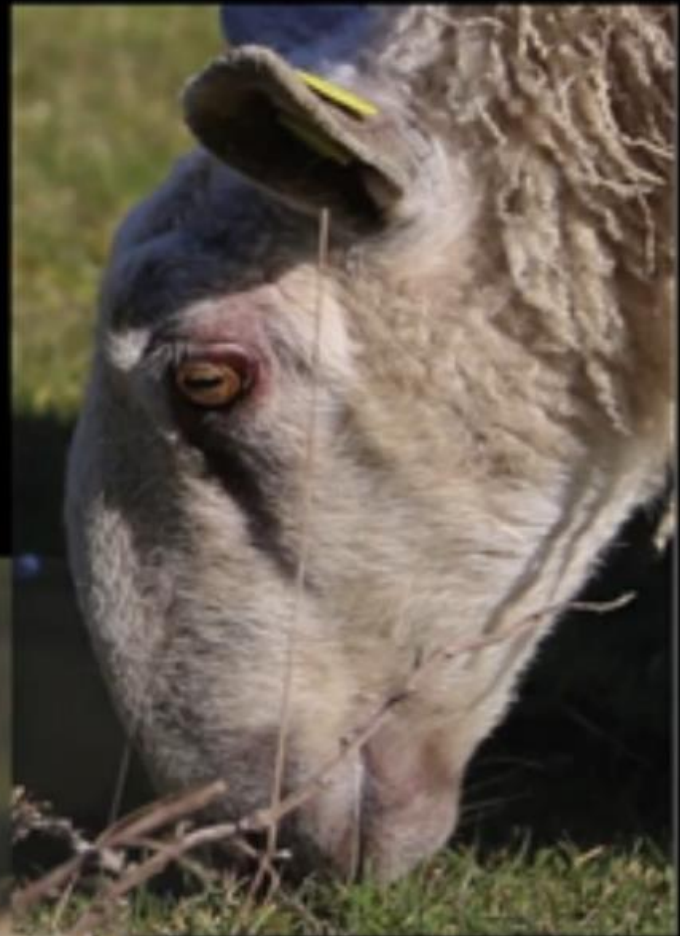
If you have a horizontal iris, you are likely to be a prey animal who needs to watch for approaching predators.

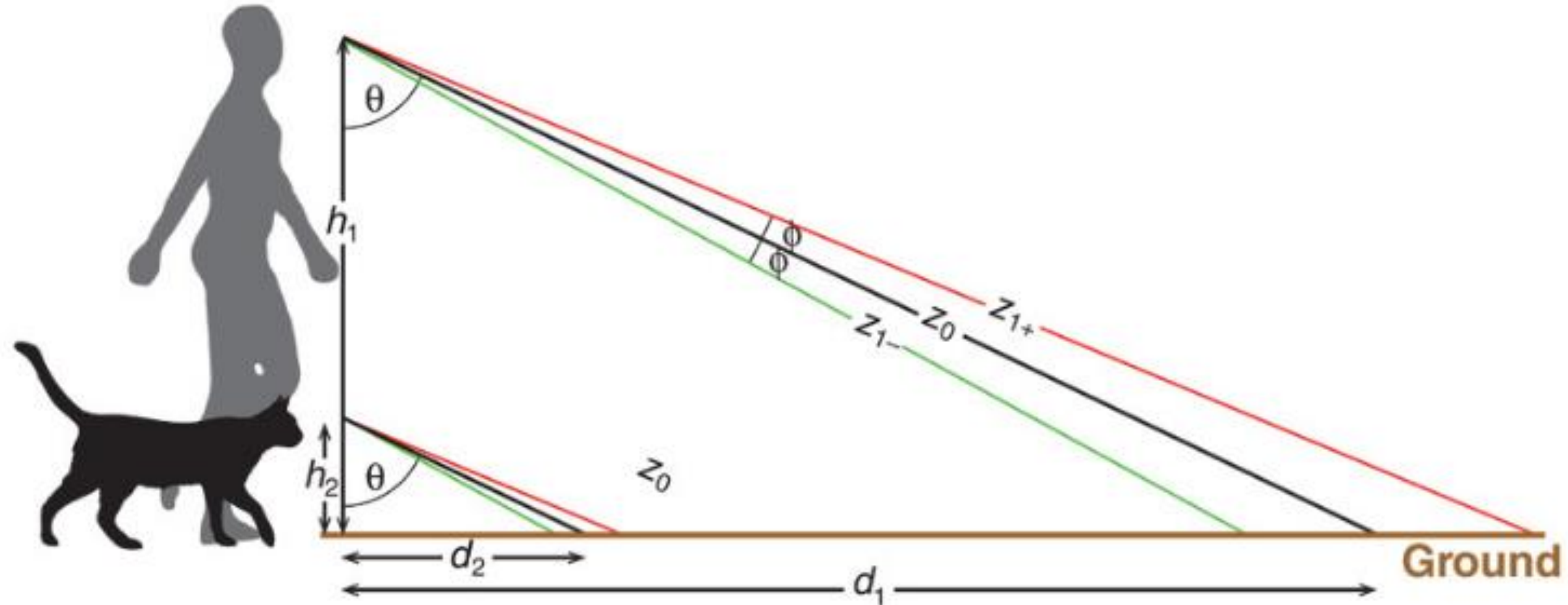


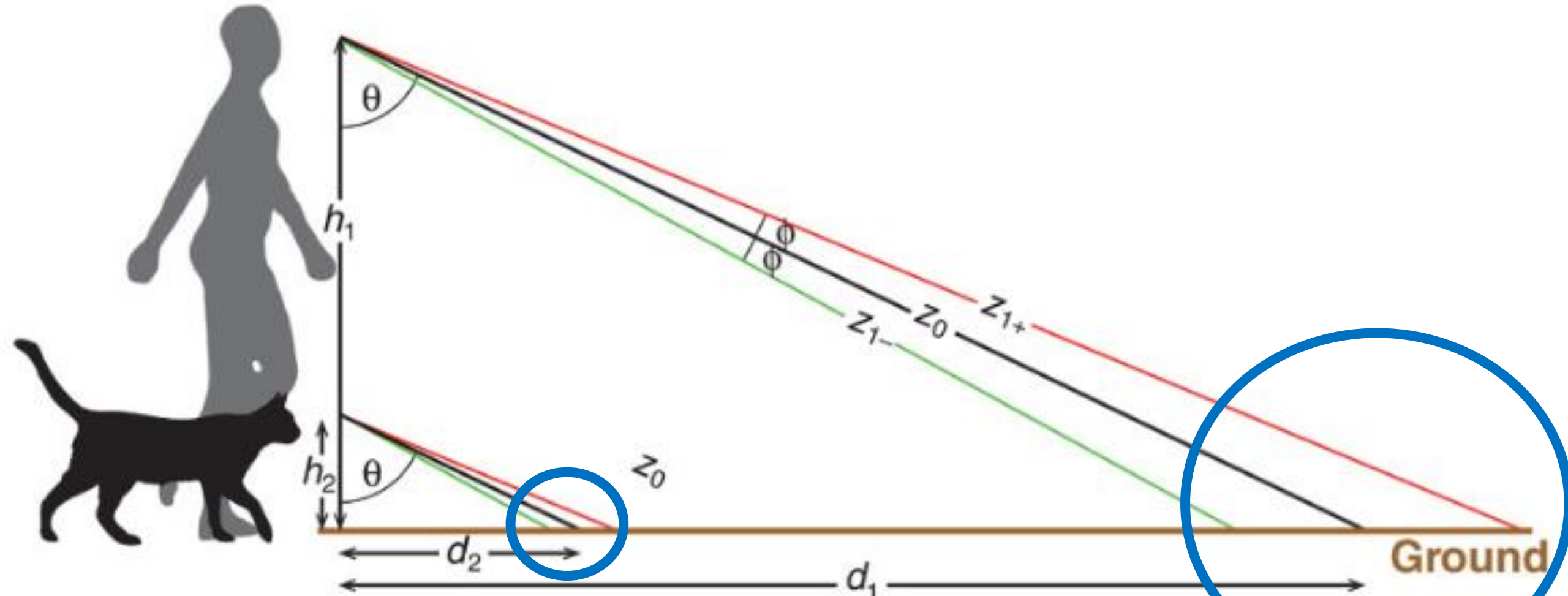
Those benefits don't apply if the pupil stays oriented the same way and becomes vertically aligned when the animal tilts its head to graze.

After watching grazing animals at the zoo, though, they found that their eyes rotate to stay horizontally aligned with the ground whether their heads are upright or face down in the grass.









Depth perception gained from vertical pupils diminishes as animals get farther and farther away from the ground.

So while a small domestic cat has vertical slits, larger predators, like lions and tigers, have round pupils.



But that rule only holds if the animal is short, so its eyes aren't too high off the ground, Sprague says.

"So for example foxes have vertical pupils, but wolves have round pupils," he says.

In general, round pupils seem to be common in taller hunters that actively chase down their prey.





Wolf



Coyote



Fox



Wolf Chases Prey



Coyote Chases Prey



Fox Pounces on Prey

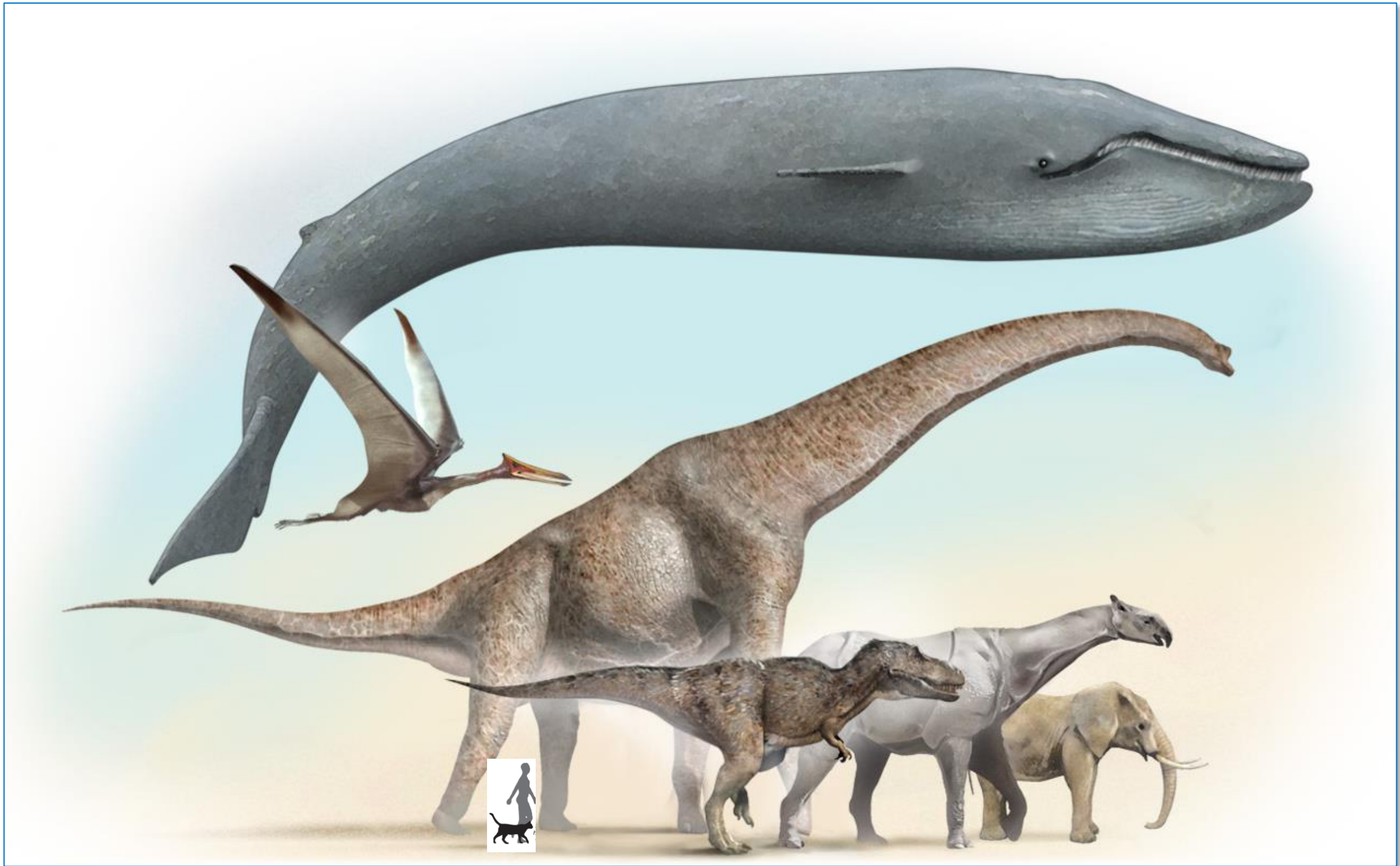
Writers and movie-makers have to imagine the pupil shape of fictional creatures like *Lord Voldemort* in Harry Potter, or the dinosaur *Indominus Rex* in Jurassic World.

Giving their eyes vertical slits may make them look nice and strange, but that's unrealistic, because both of those creatures are sufficiently high off the ground that they probably should have round pupils.



Pupils should be round.

Humans and T. Rex are tall, no need for short-distance stereoscopic accuracy





b-Eye!
Thank you!

Philippine tarsier, nocturnal, small prey animal

