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How are cats so good at landing on their feet?
為何貓咪總能以腳平安落地？

鎖定地面喵星人 高處墜落不怕摔



英文 / Leila Luo 圖 / 123RF



In 2012, a cat in the US city of Boston fell from the 19th floor of a building. Sugar, the cat, survived with a bruised chest. While the story made the news, it wasn't a surprise to veterinarians or biologists. In 1987, a study reviewed 132 cats that had been brought to a New York City emergency veterinary clinic after falls from high-rise buildings. Ninety percent of the cats survived.

2012 年，美國波士頓，寵物貓糖糖從 19 層高樓墜落，僅胸部瘀傷，大難不死。儘管新聞媒體大肆報導此一貓事，對獸醫與生物學家而言，卻是見怪不怪。1987 年，一項檢視紐約市獸醫急診室裡貓咪高樓墜落事件的研究顯示，在 132 起案例中，90% 的貓咪奇蹟生還。

Their survival is simply a matter of physics, evolutionary biology, and physiology. When not living in homes, cats tend to live in trees, so being able to survive falls is a critical thing. Cats have a keen instinct for sensing which way is down. If a falling cat has enough time, it always lands on its feet.

貓咪們在墜樓後得以倖存，單純源於物理學、生理學與進化生物學上的問題。貓在野外生活時，通常棲息於樹木，因此應對從高處摔落的能力，對它們是至關重要的。貓擁有敏銳的本能，可感知墜落時身體何處是朝向地面，只要有足夠的落下時間，牠便能以貓腳著陸。



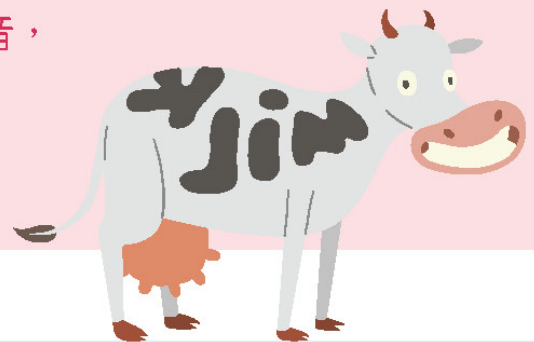
牛兒哞哞話家常

釋譯牛語照護佳

英文 / Andrew Edmunds 圖 / 123RF

Researchers in Australia have discovered that dairy cows have their own language. The team created an app, which they call “Google Translate for cows”, to better understand what the cows are saying when they moo. The research results could help farmers keep their cattle healthy by understanding their moods and translating their individual sounds.

澳洲研究團隊發現乳牛擁有獨特的語言，創建了「牛牛 Google 翻譯」的手機軟體，以此便於了解乳牛哞哞叫聲背後的意義。該研究的結果幫助農民了解乳牛的情緒，並藉由翻譯牠們獨特的聲音，便於照護牛群的健康。



是工作也是享樂

漢達島護林員懷抱無敵景致

英文 / Andrew Edmunds 圖 / 123RF

The Scottish Wildlife Trust is looking for a new wildlife ranger for the remote island of Handa. Those who are interested must be knowledgeable in local marine and terrestrial natural history, and have excellent people skills and organizational abilities. Once chosen, the ranger will enjoy sandy beaches and views from the 120-meter-high cliffs.

蘇格蘭野生動物基金會正為人煙罕至的漢達島招聘護林員。有意應徵者必須精通當地海洋與陸地的自然歷史，並具備出色的社交力與組織力。獲選者將在 120 公尺高的工作場域，享受壯闊的懸崖景觀及浪漫的沙灘美景。



translate (v.) 翻譯

result (n.) 結果

remote (a.) 偏遠的

ability (n.) 能力

cliff (n.) 峭壁

九命怪貓神機妙算

精準開傘墜樓無虞



英文 / Leila Luo 圖 / 123RF

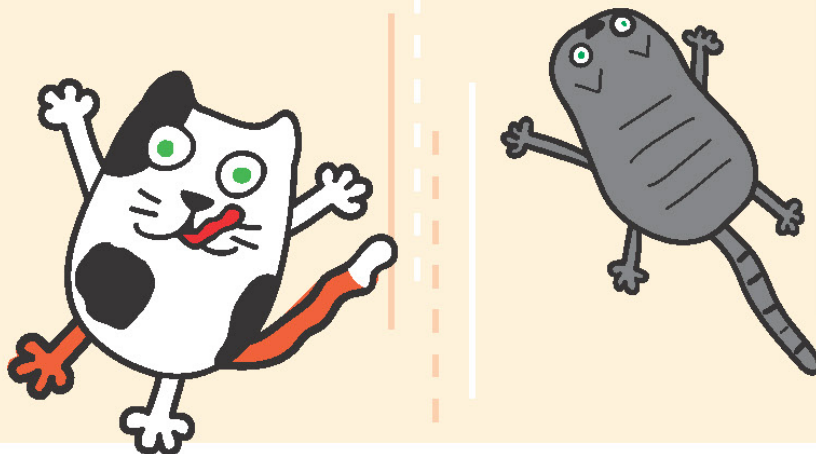


Research into falling cats has shown that cats that fell from two to seven stories up mostly landed feet first. Above seven stories, however, cats used a different technique. They spread out like a parachute and landed belly-first instead. So, how do cats know how to land? Terminal velocity.

就貓咪墜樓應對行為的研究顯示，當貓從 2 到 7 樓高墜落時，通常會以四足著陸；反觀高度超越 7 層樓時，貓則會使用不同的降落技巧：將四肢如降落傘般伸展開來，以肚皮著陸。至於貓咪如何決定以什麼方式落地？答案就在下落時的「終端速度」。

A falling cat speeds up because of gravity until it has fallen the equivalent of five stories. Then, the cat reaches constant terminal velocity at 100 kilometers per hour. Research shows that from the second to seventh floors, cats don't have enough time to reach terminal velocity, so they prepare to land feet first. However, if they hit terminal velocity, their instinct changes and they parachute their limbs.

貓在重力加速度的影響下，墜落速率會不斷地增加，直到高度降至 5 層樓左右，才以每小時 100 公里的定速落下。研究更顯示，倘若貓咪從 2 到 7 樓的高度墜樓，因缺乏充足的時間達到終端速度，牠們會做好以腳著陸的準備；然而，一旦達到每小時 100 公里的終端速度，牠們便會本能地張開四肢，如打開降落傘般安全著陸。



land (v.) 著陸 technique (n.) 技巧 parachute (n.) 降落傘 terminal (a.) 終點的、極限的 equivalent (n.) 等同

失重迷航如何是好？

太空人求教喵星人！

英文 / Leila Luo 圖 / 123RF

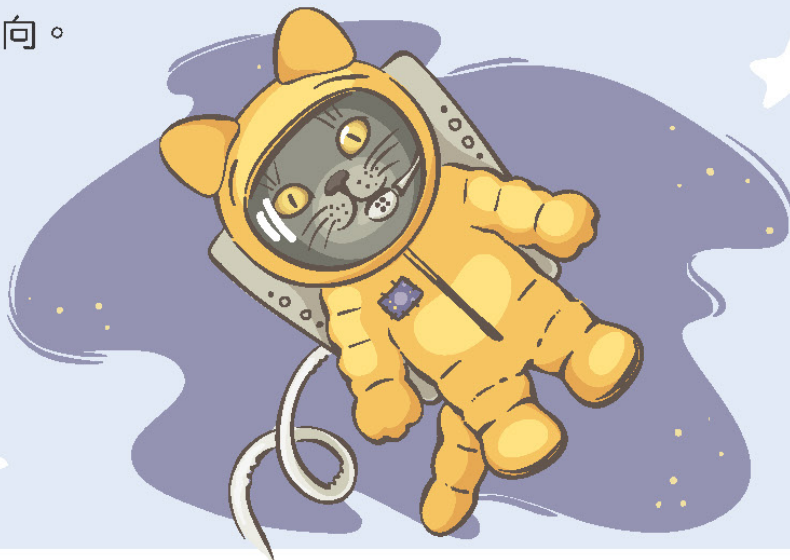
Can the natural movement of cats while falling somehow help our astronauts orient themselves in space without gravity? Mechanical engineering professor Thomas R. Kane wondered that very thought. Earth's gravity helps us know which way is “up” or “down”. Without gravity, astronauts can become disoriented, feeling dizzy or lost.



貓下墜時的自然運動，有機會幫助在無重力環境中的太空人確認方向嗎？機械工程教授湯瑪士・R・凱恩希望發掘此問題的可能性。地球的重力幫助我們分辨上下方位，失去重力的太空人則容易感到頭暈、迷失方向甚至迷航。

Kane did research for NASA during the first space race. In 1969, he figured out how to mathematically explain the way that cats fall, then conducted experiments to imitate the way cats fall. His groundbreaking research was featured in Life magazine. His research results are still used today to make it easier for astronauts to move in space and reorient themselves without equipment.

在第一次太空競賽時期，凱恩為 NASA 進行了研究計畫。1969 年，他以數學解釋貓咪墜落的運動模式，並成功地進行了模擬實驗。他突破性的研究發表於《生活》雜誌上，成果沿用至今，讓太空人於宇宙中移動時，不必竭盡力氣或仰賴裝備，就能控制前進方向。



movement (n.) 動作

orient (v.) 定方位

gravity (n.) 重力

experiment (n.) 實驗

imitate (v.) 模仿

1. How likely is a cat to survive a high fall?
 - a. 1 out of 10
 - b. 9 out of 10
 - c. 1 out of 19
 - d. 9 out of 132
2. What is true about cows according to page 3?
 - a. They have discovered teams.
 - b. They created a software program.
 - c. They have a unique language.
 - d. They help farmers understand moods.
3. What do you need to get the job on page 3?
 - a. a wildlife island
 - b. an understanding of local sea life
 - c. the ability to climb cliffs
 - d. a remote control
4. What word means at the end of or limit of something?
 - a. belly
 - b. gravity
 - c. instinct
 - d. terminal
5. How did cats help astronauts according to page five?
 - a. The mathematics of their falling movements taught astronauts a helpful skill.
 - b. Kane's pet cat raced in space without becoming dizzy.
 - c. NASA gave each astronaut a cat in 1969.
 - d. Cats imitate astronauts so well that they don't need equipment.
6. Critical is to unimportant as ____.
 - a. keen is to dumb
 - b. knowledgeable is to informed
 - c. remote is to distant
 - d. constant is to stable

Cloze Test A

Handa's name has a mixed Gaelic ____ Norse origin. It means "island at the sandy river". In early times, Handa was used as a burial ground ____ people from the mainland so as to avoid the graves being dug ____ by wolves.

Cloze Test B

If you throw a ball ____ the top of a building, will it continue to fall faster and faster? No, it _____. Everything ____ a maximum falling speed, or terminal velocity.

1.b 2.c 3.b 4.d 5.a 6.a

1. 第 2 版文章中 1987 年的研究指出，90% 的貓在墜樓後倖存，因此答案是 (b) 倖存貓 10 中有 9。

2. 第 3 版 1 則報導中，澳洲研究員發現乳牛的獨特語言，並建置了翻譯軟體。

3. 第 3 版第 2 則報導指出，應徵者必須精通當地海洋與陸地的歷史。

4. terminal (a. 終點的、極限的)，捷運、火車路線的終點站是 terminal station；物體在墜落時都會達到恆定速度，此一速度稱作終端速度 (terminal velocity)。其他選項，(a)n. 腹部、(b)n. 地心引力、(c)n. 本能。

5. 凱恩以數學分析貓墜落時的自然運動，該研究結果幫助了太空人在無重力環境下辨識方向。

6. 本題題目 critical(a. 關鍵性的) 與 unimportant(a. 無足輕重的)，詞組關係互為反義詞，恰如 (a) keen(a. 敏銳的) 與 dumb(a. 愚蠢的)。

Cloze Test A

1.and 2.by 3.up

島名源於蓋爾語和古北歐語的漢達島，意為「沙河上的島嶼」。早期，大不列顛島北部的蘇格蘭人，為避免墳墓遭狼群挖掘破壞，將漢達島作為墓地使用。

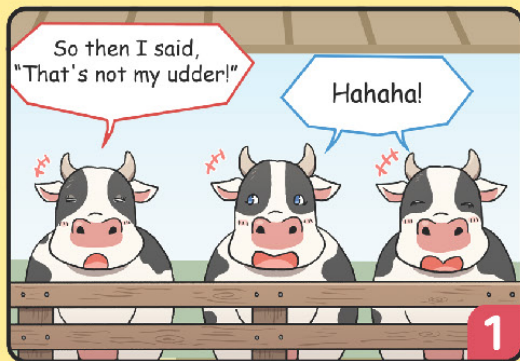
Cloze Test B

1.from 2.won't 3.has

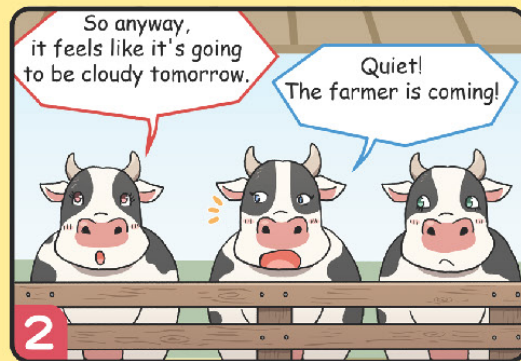
若從樓頂丟下一顆球，它墜落的速度會不斷增加嗎？答案為非。因為任何物體下墜的速度，皆受空氣流體反向的阻力而有極限，此極限的速度即為「終端速度」。

勢均力敵

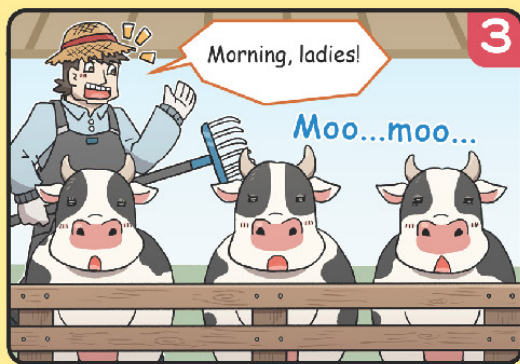
腳本 / Leila Luo 漫畫 / 瀚昇



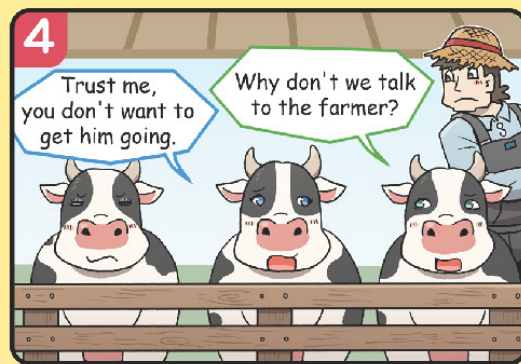
於是我說：「那不是擠奶的地方！」
哈哈！



話說回來，明天感覺會是陰天。
噓！農夫來了！



小姐們，早安！
咩…咩…



為什麼我們不跟農夫說說話？
相信我，你不會想打開話癆的話匣子。

The Rest is History 比薩斜塔就要倒！ 集思廣益扶持它

英文 / Andrew Edmunds 圖 / 123RF

On the 27th of February 1964, Italy asked for suggestions on how to save the famous Leaning Tower of Pisa. Studies showed that the lean was increasing each year and experts warned that the tower could collapse. Suggestions came from all over the world, but it wasn't until 1999 that successful restorative work began.

1964 年 2 月 27 日，義大利欲拯救名勝比薩斜塔，公開向大眾徵求意見。專家研究示警，比薩斜塔的傾斜度年年增加，有倒塌的風險。提案如雪花般從世界各地飛至，但直到 1999 年，才正式啟動有效解決問題的修復方案。

suggestion (n.) 建議

tower (n.) 塔

lean (n/v.) 傾斜

increase (v.) 增加

expert (n.) 專家