

CURIOSITY AT HOME

JUMP FOR JOY



*How far can you jump compared to other animals?
Explore animal movement by comparing your jump distance with other members of the animal kingdom.*

MATERIALS

- Measuring tape
- Masking tape
- Marker
- Pens or pencils
- Paper or science notebook for making predictions and recording data
- Flat area to jump
- **Optional:** Stack of heavy books



PROCEDURE

- Measure out a distance of 10 feet for your “track” and lay down a 10 foot piece of tape. Make marks on the tape with a marker or small pieces of tape at 1-foot intervals.
- Using the chart on this page, make a prediction for the jump length for the following animals—rabbit, elephant, flea, kangaroo, cricket, grasshopper, lemur, dog, bobcat, frog, and yourself! Record these predictions here or in your science notebook. Remember that some animals may be able to jump longer than your 10-foot track!
- Stand at the end of the tape. From a standing position, jump as far as you can.
- Record your distance with your initials on tape. Record in your science notebook.
- Challenge other members of your household to make a prediction of their own jump length and test it out! Record their data.
- Take a look at the actual jump length table on the following page. Using this animal data, mark the jump length for each animal on your 10 foot tape (where you can!). How close were your predictions?

| Animal | Jumping Distance Prediction (in feet) |
|-------------|---------------------------------------|
| Rabbit | |
| Elephant | |
| Flea | |
| Kangaroo | |
| Cricket | |
| Grasshopper | |
| Lemur | |
| Dog | |
| Bobcat | |
| Frog | |
| You | |



Experiment continued on next page...



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PACIFIC
SCIENCE
CENTER



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TRY THIS

Why do big animals, like elephants, have such short jumping distances?

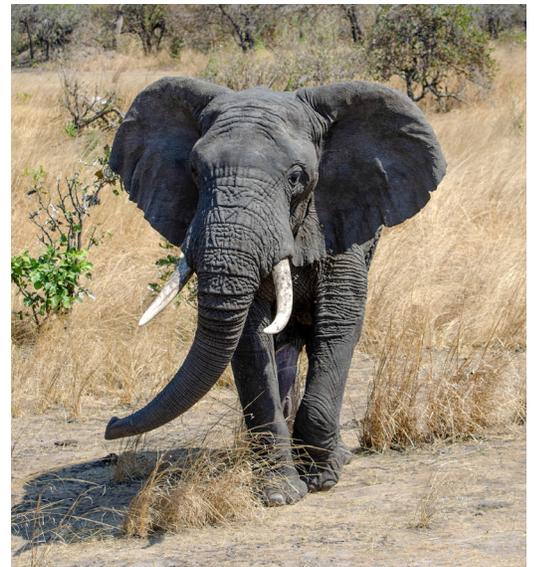
- Hold on to a stack of heavy books, and (carefully) repeat your experiment. Record your new jump distance and the distances of your household members. How are they different than your first measurements?
- Larger animals weigh more, and eventually big animals can weigh so much that the amount of muscle they have does isn't enough for them to jump. Holding a stack of books is like being an elephant; we still have lots of muscle, but the extra weight makes it much more difficult to jump!
- Can you increase your jumping distance? How does your distance change if you take a running start? Repeat your experiment with this change.

DID YOU KNOW?

Many factors determine the distance that an animal is able to jump, including running speed, take-off velocity, muscle strength, and weight. Animals specialized for jumping usually have a high muscle-mass-to-weight ratio and the ability to reach high running speeds prior to takeoff.

While an elephant has a lot of muscle, it also weighs 10,000 pounds, so its muscle-mass-to-weight ratio is not large enough for jumping. In fact, elephants can't jump. A flea has much less muscle than an elephant but it only weighs approximately 1 milligram. Therefore, fleas can jump very far compared to their body size. Some physical adaptations for jumping farther include long legs, larger leg muscles, and extra joints. A great example is a frog, which has all three of these adaptations!

| Animal | Jumping Distance Prediction (in feet) |
|-------------|---------------------------------------|
| Rabbit | 9 ft. |
| Elephant | 0 ft. |
| Flea | 3 ft |
| Kangaroo | 30 ft. |
| Cricket | 4 ft. |
| Grasshopper | 5 ft. |
| Lemur | 25 ft. |
| Dog | 7 ft. |
| Bobcat | 8 ft. |
| Frog | 6 ft. |



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6–8 GRADE EXPLORATION

VERTICAL JUMP:

- Challenge members of your household to a vertical jump test.
- Measure how high you can jump vertically from standing. You can create a “ruler” on the wall with masking tape or hold a piece of tape in your hand and stick it to the wall to mark your jump height and then measure with your measuring tape.
- Record jump height for each member of your household.
- Create a table in your science notebook to record the height and age of each member of your household next to their vertical and horizontal jump lengths. Do either of these variables seem to affect jump height?
- What other variables can you incorporate into your assessment?

ADAPTATIONS:

Not all animals can jump, and some can jump much farther than others. The ability to jump is an example of an adaptation. An adaptation is an evolutionary change that makes an organism better suited to its environment.

Jumping is energy-intensive and can tire an animal quickly, so animals with adaptations to jump farther generally have a good reason to do so.

- Why is it important for some animals to be able to jump far?
- Consider animals that jump vertically. What benefit or advantage does this provide?
- For each of the animals that you made jump length predictions, write in your science notebook some ideas about how being able to jump high or far might benefit them.

Experiment continued on next page...



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6–8 GRADE EXPLORATION

IF YOU WERE A FLEA:

- A flea can jump 220 times its body length.
- How far could you jump if you were a flea? Multiply your body length (in feet) x 220 to calculate this distance.
- Once you calculate the distance, use a map to estimate a location approximately that distance from your current location. Most maps will have a legend to help you approximate this distance.
- Using the table below, calculate how far you could jump if you were each animal.



| Animal | Number of body lengths this animal can jump. | Distance you could jump if you were that animal. <i>Your body length in ft. x the number in the second column.</i> | Approximate location you could jump to <i>For example, a nearby grocery store, park, or a neighbor's house)</i> |
|-------------|--|---|--|
| Flea | 220 | | |
| Rabbit | 7 | | |
| Kangaroo | 6 | | |
| Grasshopper | 20 | | |
| Lemur | 17 | | |
| Frog | 24 | | |



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