**Lower Elementary:**

*Question:* A sea turtle can swim 5 kilometres every 15 minutes. How far can the sea turtle swim in 4 hours?

**Upper Elementary:**

*Question:* An adult blue whale weighs 200 tonnes. An adult Hector’s dolphin weighs 50 kilograms. How many times the weight of the Hector’s dolphin is the blue whale?

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**Middle School:**

*Question:* A giant panda eats 15 kilograms of bamboo per day. If 5 giant pandas live in a sanctuary that produces 70 kilograms of edible bamboo per day and the sanctuary currently has 60 kilograms of edible bamboo available to the pandas, then how long will it take for the pandas to run out of bamboo?

**Algebra and Up:**

*Question:* When a young lemur leaps across the ground, it travels forward 30 decimetres and reaches a height of 10 decimetres in the air. Each leap takes 2 seconds from take-off to landing. Model the lemur’s leap with the equation of a parabola in which ***x*** = the elapsed time in seconds and ***y*** = the height off the ground in feet.

[Hint: A parabola in vertex form is written ***y*** = *a*(***x*** – *h*)2 + *k* when (*h*, *k*) is the vertex.]

**Lower Elementary:**

*Question:* A sea turtle can swim 5 kilometres every 15 minutes. How far can the sea turtle swim in 4 hours?

*Answer:* 80 kilometres

*Solution:* Since 15 minutes is a quarter of an hour, there are 4 15-minute periods in each hour. That means the sea turtle swims 5, 10, 15, 20 kilometres in an hour. So, in 4 hours, the sea turtle swims 20, 40, 60, 80 kilometres.

**Upper Elementary:**

*Question:* An adult blue whale weighs 200 tonnes. An adult Hector’s dolphin weighs 50 kilograms. How many times the weight of the Hector’s dolphin is the blue whale?

*Answer:* 4000 times the weight

*Solution:* A tonne is 1000 kilograms, so 200 tonnes is 200 × 1000 = 200 000 kilograms. If we divide 200 000 by 50, we get 4000. So, the blue whale is 4000 times the weight of the Hector’s dolphin.

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**Middle School:**

*Question:* A giant panda eats 15 kilograms of bamboo per day. If 5 giant pandas live in a sanctuary that produces 70 kilograms of edible bamboo per day and the sanctuary currently has 60 kilograms of edible bamboo available to the pandas, then how long will it take for the pandas to run out of bamboo?

 *Answer:* 12 days

*Solution:* Each day, the 5 pandas eat 15 × 5 = 75 kilograms of bamboo. So, the pandas decrease the amount of bamboo by 75 kilograms each day. The bamboo grows 70 kilograms each day. So, overall, the bamboo decreases by 5 kilograms per day. If the sanctuary currently has 60 kilograms of bamboo, that means that the pandas will run out of bamboo in 60 ÷ 5 = 12 days.

**Algebra and Up:**

*Question:* When a young lemur leaps across the ground, it travels forward 30 decimetres and reaches a height of 10 decimetres in the air. Each leap takes 2 seconds from take-off to landing. Model the lemur’s leap with the equation of a parabola in which ***x*** = the elapsed time in seconds and ***y*** = the height off the ground in feet.

[Hint: A parabola in vertex form is written ***y*** = *a*(***x*** – *h*)2 + *k* when (*h*, *k*) is the vertex.]

 *Answer:*  ***y*** = –10(***x*** – 1)² + 10

*Solution:* The vertex of a parabola that opens down, like the model of the leap, is the highest point. So, the vertex of our model will be (1, 10). To write our equation, we first plug *h* and *k* into our general form: ***y*** = *a*(***x*** – 1)2 + 10. Next, we use a known point on the parabola and plug those values in for ***x*** and ***y***. Let’s use the origin: 0 = *a*(0 – 1)2 + 10. If we solve for *a*, we get *a* = –10. So, our equation that models the leap is ***y*** = –10(***x*** – 1)2 + 10.

Note: Answers may vary with different domains and forms of the equation.