



## Stars Have Stories – *How fast do stars move?*

### Week Five - At Home Activities

#### How fast can you throw?

*Presented by the UWM Alumni Association and UWM Manfred Olson Planetarium.*



This week we talked about the speed of stars, but let's find out how fast you are! Try either of these fun activities with members of your family. You'll need a ball, tape measure, chalk or tape, and a stopwatch (most cell phones have one) for both activities.



#### Activity 1 – Throw a ball at a wall

- Start by measuring 17 feet 7 inches from a wall outside (best to find one with no windows) and mark a line there with chalk or tape
- Stand on the line and have someone be ready to start the timer when you throw
- Throw the ball towards the wall and record the time in seconds that it takes to hit the wall (stop the timer when the ball hits the wall)
- Finally, take 12 and divide it by your time in seconds. This tells you how fast you threw the ball in miles per hour!

**FUN FACT:** The record for fastest pitch is held by Aroldis Chapman at 105.1 miles/hour.

#### Activity 2 – Roll a ball underhand as far as you can

- This activity works best if you can stand on a smooth flat surface like a sidewalk.

-Start by drawing a line with chalk or use one of the seams between sidewalk slabs.

- Stand about two large steps behind the line and roll a ball toward the line. Your helper should start a stopwatch when the ball crosses the line and stop it when the ball comes to rest. Then, use a tape measure to find how far the ball rolled from the line.

-Now, we'll use math to figure out your speed in miles per hour – the same way that cars measure their speed! (Don't worry, you can use a calculator on the cell phone to help...)

-First, divide your total number of inches measured by 39.37 – this is how many inches are in each meter. This number will give you the total distance your ball traveled in meters. Write that number down - you'll use it in the equation below to figure out your speed.

- Now, multiply your number of meters by 4.5. Write that number down.



- Next, divide that number by the time in seconds you measured with your stopwatch. That answer is your speed in miles per hour!

**Here is the full equation you just used:  $\text{speed (in miles/hour)} = 4.5 \times (\text{distance in meters}) / (\text{time in seconds})$**

For example, Dr. Jean's son rolled a ball that landed 1,128 inches away from the line in 7.85 seconds.

- Divide 1,128 (total number of inches) / 39.37 = 28.65 meters

- Multiply 28.65 meters x 4.5 = 128.93

- Divide 128.93 x 7.85 seconds = 16.4 miles per hour - Dr. Jean's son threw a ball at 16.4 miles per hour.

**Here is his equation:  $16.4 \text{ miles per hour} = 4.5 \times 28.65 (\text{distance in meters}) / 7.85 (\text{time in seconds})$**

For other fun activities including virtual tours of the night sky and Dr. Jean telling her story about Hercules, check our UWM Planetarium website: <https://uwm.edu/planetarium/>