Snow Day Phone Chain

On Thursday January 20th the Pocono Mountain region experienced the first big snow storm of the new millennium. Many schools closed because of the slippery conditions and cold weather.

School closings are announced on local TV and radio stations but sometimes you have to watch or listen for a long time before they announce your school. Carlin's dad is the principal and that means that Carlin gets early notification of closings.

Carlin will then call her best friends, Frank and Habart. Frank calls his friends Julie and Kory. Hobart calls Laura and Marcellus. The phone tree continues with Julie calling Nihaar and Saloni and Kory calling Tara and Vincent and so on. Since you don't know these people, it isn't really important to know their names. What you need to know is that each person will call exactly two other people.

Carlin finds out that there is no school and makes his first call at 6:00 am. We are going to assume that everyone wants to get back to sleep as soon as possible so they are not going to chat. Each call takes only one minute.

By 6:05 how many students will be warned of the school closure?

How many phone calls will be made by 6:05?

Extensions:

- Ten minutes later, at 6:10 am, everyone on the phone chain is back in bed. How many phone calls were made?
- What time would the last calls be made if the phone chain were extended to include all 1000 students at the school?
- This problem is related to Fibonacci's sequence of multiplying rabbits except that the rabbits reproduce on the first two time steps rather than the second and third time steps. How does this sequence increase compare to the Fibonacci sequence?

The Math in This Problem:

Related to the Fibonacci sequence of multiplying rabbits, this math puzzle introduces students to a simple finite series involving the powers of two, which can be calculated by finding the sum of the terms in the sequence. Snow Day Phone Chain will present students with the total number of terms, which will be used to formulate sequences and to figure out their respective summations.