Random or Not?

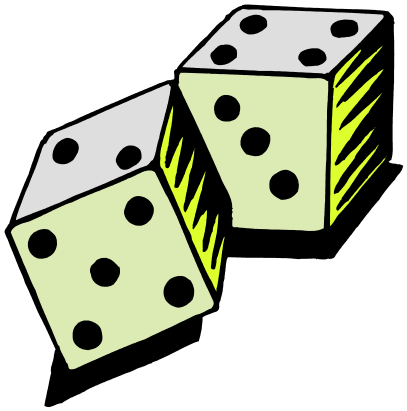
In this activity, the student will learn how to use the RANDOM block in the NXT-G software to write a program for their robot to play a random number of beeps.

Teacher Note: This is an exploration activity to have students determine if the NXT brick they are using beeps at random intervals. After conducting the exploration, then teach the students how to write their own RANDOM block NXT-G program. [Student collection sheet attached at the end of this lesson.]

Objectives:
1. To become familiar with the NXT.
2. To explore the concept of randomness.
3. To investigate how the sample size can influence the conclusion of an experiment.
4. To use exploration to develop a NXT-G program using RANDOM blocks.

Materials
1. NXT bricks
2. touch sensors and leads
3. computer

Time: Approximately 45 minutes



Notes:
1. Before starting this activity, program each NXT. Some bricks should contain the random program while others should contain a non-random program. These would play a series of sound files in a pattern.
2. Mark each brick with a different label.
3. Encourage the students to sample a long enough sequence of numbers that they are able to reach reliable conclusions.
4. The students will notice that the “random” bricks are no so random, after all – each one generates the same sequence of “random” numbers. This observation can lead to a discussion of randomness and also to a discussion of the difficulties involved in having a computer generate a truly random sequence of numbers.

Student Sheet: Random or Not?

Some NXT's beep randomly. Others do not. Can you figure out which is which?

A random beeper

- is equally likely to beep 1, 2, 3, 4 on every turn
- does not follow any sort of repeating pattern
- has each number independent of the ones that came before

Try each NXT and note your results below. To test an NXT, start the program running and press the touch sensor. Each time you press the sensor, you will hear a number of beeps. Press the touch sensor several times and try to decide if the number of beeps is random or not.

Report the results of each run as a string of numbers. For example, the string 1332…would mean that the first time you pressed the touch sensor, the NXT beeped once, the second time it beeped three times, the third time it also beeped three times, and the fourth time it beeped twice. Text the NXT as many times as necessary to decide if the pattern is random or not. If you start a new run, indicate it with a slash. Good luck!

NXT Label	Results	Random or Not?	If not, why?