

TILT-A-WHIRL -- CHAOS IN ACTION!!

When you hang a stone from a string, pull it aside, let go, and the stone swings back and forth in an almost exactly repeating way. These repetitions are so regular that you can keep pretty good time with such a simple toy. In fact, if you look inside a grandfather's clock, you'll see that the thing that "ticks" is a lot like a stone hanging from a string.

The repetitive swinging of a stone hanging from a string is very predictable. After you watch it for awhile, it gets kind of boring. There are many things in nature that repeat like a swinging stone. For

example, the sun comes up every day, the moon is full every month, the temperature gets hot every summer, your heart beats about once every second (at least, if you are sitting still and not watching a horror movie). Those things, just like the swinging stone, are predictable.

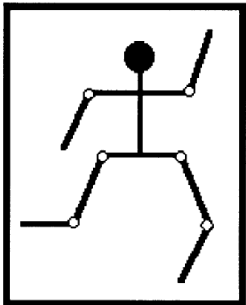
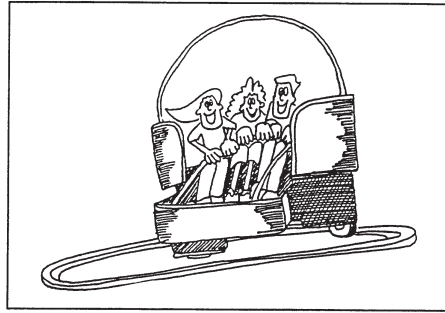
On the other hand, there are lots of other things that don't repeat in such a nice fashion and are very unpredictable. Some examples are the gurgling ripples in a rushing stream, the stretching and puffing of clouds blown by the wind, the flickering of a candle's flame, and the faces of a pair of dice that come up when you roll them.

Why do you suppose that some things are so regular and others so unruly? Maybe some parts of nature are governed by rules and are tame while other parts are run by luck and chance and are wild. Maybe.

But, hold on a second. If you make a gurgling stream slow down enough, the gurgles go away. And if you make the flame burn in just the right way, it becomes as smooth and regular as can be. Hmm.

But, the situation's more complicated still. The summer is hot every year, all right, but never quite the same — sometimes boiling, sometimes okay. And if you time your heartbeat very carefully you'll find it isn't regular either — sometimes it's a little fast, sometimes a little slow.

There are good reasons to believe that tame and wild behaviors are both governed by rules — they are opposite sides of the same coin. People are beginning to realize that some things that appear to be run by chance and to be unpredictable (streams and flames and hearts are all examples) actually march to the same kind of rules as the swinging stone. We call such unruliness "chaos."



You may have seen a toy like the one pictured in the box. Its arms are free to flail about, as are its legs. The whole body rotates around a pivot in its chest. When you give the toy a good spin around its pivot, the arms and legs go every which way without any seeming rhyme or reason. If you give it a gentle spin, the arms and legs swing back and forth in a regular, repetitive manner. In both cases, the arms and legs go where rigid rules tell them to go. The wild, unpredictable behavior in this toy isn't due to chance. It's chaos.

The Tilt-a-Whirl ride at Lagoon is similar to this toy. Notice how unpredictable the ride feels. Pick a spot on the ground. Every time you pass that spot, jot down (if you can) which way you're facing. Later, after you can think straight again, look at your record. Does it seem repetitive or irregular? The irregularity of the Tilt-a-Whirl is not due to some genie playing chance with you. This ride obeys rigid rules. The unexpected whips and turns you

just experienced are chaos.

(So here's an interesting question for you to ponder when you have nothing better to do: When you have an accident or you have a little good luck or it rains when it isn't supposed to or you decide to eat a hot dog instead of a piece of pizza, is that because of chance, or are you doing a chaotic dance just like the toy?)