

Conway's Game of Life

Classroom worksheet · Interactive simulation: <https://lkforge.com/tools/physics/game-of-life/>

Name: _____ Date: _____

Learning objectives

- State the rules of Conway's Game of Life.
- Observe emergent structures from simple rules.
- Classify patterns as still, oscillating, or moving.

Variables to change

- Starting pattern
- Grid size
- Speed

Procedure

1. Draw a small starting pattern and step the simulation forward.
2. Try a blinker, a block, and a glider and watch how each behaves.
3. Experiment with random starts and look for emerging structures.

Observations

Classify each pattern you try as still life, oscillator, or spaceship, and note what emerges from random starts.

Questions

1. State the survival and birth rules.
2. What is a "still life"?

3. What is a glider?
4. Is the Game of Life random?
5. What big idea does it illustrate?

Answer key (instructors)

- **1.** A live cell with 2 or 3 live neighbors survives; a dead cell with exactly 3 live neighbors becomes alive; all others die or stay dead.
- **2.** A stable pattern that never changes, such as a 2×2 block.
- **3.** A small pattern that moves steadily across the grid ("spaceship").
- **4.** No — it is fully deterministic; the next state follows exactly from the current one.
- **5.** Emergence — complex, lifelike behavior arising from a few simple local rules.

Conway's Game of Life evolves a grid by simple neighbor rules (survive on 2–3, born on 3). From these emerge still lifes, oscillators, and moving gliders — a classic demonstration of how simple deterministic rules produce complex, emergent behavior.