

Vacuum v1.005.007 Rules and Game Manual

This is the complete rules and interface manual for **Vacuum v1.005.007**. It includes the full action rules, pressure system, turn sequence, board-collapse rules, online controls, and reference tables.

Vacuum is a turn-based abstract strategy game for 2 to 4 players. Players build pressure with pebbles, compress pressure into stones, collide stones into boulders, and reshape the board edge while trying to keep enough final-move options alive to stay in the game.

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Quick Start

1. Open `Vacuum.html`.
2. Choose **2 Players**, **3 Players**, or **4 Players** in the new-game dialog. See [Starting a Game](#).
3. On your turn, use a lit button in the right panel. Buttons that are not legal right now are disabled. See [Action Buttons](#).
4. Actions are organized by stage:
 - [Stage 1: Movement Actions](#)
 - [Stage 2: Core Actions](#)
 - [Stage 3: Final Actions](#)
5. You must finish the turn with one [Final Action](#), then press [Commit](#).
6. Hover board squares to read the [Pressure Values](#) in the left panel.
7. Hover or focus action buttons to read the left-panel [Rules](#).
8. Right-click anywhere in the app for [Open Manual](#), [Save Game](#), and [Load Game](#).

The most important beginner rule is this: **buttons tell you what is currently legal**. If a button is dark/disabled, that action has no legal use right now or you have already advanced past its stage.

Objective

The goal is to be the last active player remaining.

Players can leave the game by:

- [Resigning](#).
- Having no legal [Final Action](#) when their turn begins.

When all but one player are eliminated, the remaining player wins.

See [Winning, Losing, and Elimination](#) for the full details.

Core Idea

Vacuum is about pressure and timing.

You create and move **pebbles**, compress pebbles into **stones**, collide stones into **boulders**, and use pressure to win fights. The game is not just about having pieces; it is about where those pieces are and how much pressure they project around a target square.

The main strategic loop is:

- Use [Vacuum Move](#) and [Extend Supply Chain](#) to create pebbles.
- Use [Supply Chain](#), [Pebble Entrench](#), [Pebble Retreat](#), and [Teleport](#) to position pebbles.
- Use [Stone Creation](#) to compress pebble formations into stones.
- Use [Cast Stone](#) to collide stones and create boulders.
- Use [Boulder Move](#) and [Boulder Chain](#) to turn prepared pebble roads into emergency boulder mobility.
- Use [Pebble War](#), [Reduction Attack](#), and [Boulder attacks](#) to break enemy formations.
- Use [Perimeter Move](#) to reshape the edge of the board.
- Use [Resign Piece](#) to turn your material neutral where the position is uncontested or your pressure still wins.

The board can shift from quiet positioning to sudden collapse very quickly. A single point of pressure imbalance can open a line, and a prepared boulder road can turn a slow defensive anchor into a fast crisis response.

Starting a Game

When no saved game is loaded, Vacuum opens a **New game** modal and asks for the number of players.

You may choose:

- **2 Players**
- **3 Players**
- **4 Players**

The game starts with an empty board. There are no starting pieces. Players must create their first material through actions such as [Vacuum Move](#), [Perimeter Move](#), and later [Extend Supply Chain](#).

Red starts.

See also:

- [Player Colors and Perimeters](#)
 - [Home Pedestals](#)
 - [Turn Structure](#)
-

The Three Panels

The interface has three main areas in landscape view. In portrait view the same areas are rearranged so the board remains large and playable.

Left / top information panel

In landscape view, this is the left panel. In portrait view, it becomes the top information shelf.

The information panel is one vertically scrollable stack of four independently collapsible sections:

- **Info**, containing the game description, current player, turn, move, and the color/player assignments.
- [Pressure Values](#).
- [Rules](#).
- **Log**.
- A draggable resize handle. In landscape it is on the right edge. In portrait it is on the bottom edge. See [Resizable Information Panel](#).

Click a section title to open or close it. Each title shows + when closed and – when open. Any combination of sections may be open. When the only open sections are Rules and/or Log, compact Top and Bottom buttons appear beside the Vacuum title to move through the shared stack quickly.

Center panel

The center panel contains the board.

Hovering board squares updates [Pressure Values](#). Clicking board squares selects sources and targets for actions. Many actions also support drag-and-release targeting. See [Clicking, Dragging, and Source Highlighting](#).

Right / bottom command panel

In landscape view, this is the right panel. In portrait view, it becomes a bottom command tray.

The command panel contains:

- [Undo](#)
- [Commit](#)
- [Stage 1 buttons](#)
- [Stage 2 buttons](#)
- [Stage 3 buttons](#)

Only currently legal actions are lit and enabled.

Portrait Layout

When the browser window is tall and narrow, Vacuum switches to portrait layout automatically.

Portrait layout uses:

- A top information shelf containing the same collapsible Info, Pressure Values, Rules, and Log stack used in landscape.
- The board in the center, kept as large and square as the available space allows.
- A bottom command tray with three columns: Stage 1, Stage 2, and Controls / Stage 3.

In the Controls / Stage 3 column, **Undo** and **Commit** stay on the same row and Stage 3 actions sit below them.

Portrait uses the same single scrolling stack as landscape. The four sections remain independently collapsible.

Action Buttons

The right panel actions are organized by stage. A button lights when the current player may legally use that action at the current stage of the turn. Disabled buttons are not available right now.

Hovering, focusing, or clicking an action button updates the left-panel [Rules](#). A past stage is dimmed as a complete section, but its buttons remain hover-readable so Rules can still explain them.

See also [Stage 1: Movement Actions](#), [Stage 2: Core Actions](#), and [Stage 3: Final Actions](#).

Title, Turn Number, and Move Number

The visible title line shows the Vacuum version. Game description, host, current player, turn number, move number, and player/color assignments are grouped in the collapsible **Info** section. A local game identifies its host as **Local Game**.

Version

The version number identifies the current build. The full manual can also be opened from the right-click menu.

Turn number

The turn number counts successful [Commit](#) presses. It is not tied to one color. It is the total number of committed player turns so far.

Move number

The move number is the current turn's undo snapshot count. In practical terms, it is the number of saved move segments in the current turn.

Most completed actions add one undo snapshot. [Supply Chain](#) and [Boulder Chain](#) can add multiple snapshots because they undo one segment at a time.

See also:

- [Undo and Commit](#)
 - [Turn Structure](#)
-

Status

The current status appears at the top of the right-click **Diagnostics** panel and gives short messages about the current action.

It tells you things like:

- Which action is selected.
- What kind of source or target is expected.
- Whether a move succeeded.
- Why a move failed.
- Whether a player was eliminated.

For full action rules, use [Rules](#) and this manual.

Rules

The **Rules** section in the left panel shows player-facing help for the button you hover, focus, or click.

Rules are meant to explain the action in human terms: what you are trying to do, what kind of source/target is needed, and what stage you go to afterward.

Use Rules while playing. They are especially useful for:

- [Stone Creation](#)
- [Cast Stone](#)
- [Boulder Move](#)
- [Begin Supply Chain](#)
- [Perimeter Slide](#)

Pressure Values and Diagnostics

Hovering a board square updates the left-panel **Pressure Values** box. It shows:

- The square's row and column.
- Pressure values centered on that square for each remaining active player.
- Neutral pressure if neutral pieces exist.

The pressure readout is target-centered. This matters because [Pebble War](#) and [Boulder attack](#) compare pressure around the target square, not around the attacking source.

See [Pressure Value](#) for the calculation.

Choose **Diagnostics** from the right-click menu to open the technical log. The panel includes **Copy Log** and **Clear Log**; clicking anywhere outside it closes it.

Right-Click Menu, Display, and Navigation

Right-click anywhere in the app to open the custom Vacuum menu.

The menu always provides the main display/navigation tools:

- **About Vacuum** appears first.
- **Expand Board Display / Restore Board Display** maximizes board space. Expand measures the board with both panels visible, each panel hidden separately, and both hidden. It keeps every panel whose removal would not actually make the board larger.
- **Go to Lobby** returns to the Vacuum Lobby. The small on-screen Lobby button remains available too; while a return is in progress it changes to **Loading...**
- **Manual** opens this manual in a new tab.
- **Diagnostics** opens the diagnostic log with Copy Log and Clear Log controls.
- **Ocean Motion: On / Off** controls the GPU-rendered water behind the board. The current shoreline bends the apparent flow and produces subtle contact and wake effects. The preference is saved in this browser, animation pauses while the page is hidden, and reduced-motion browser preferences receive a static ocean.

- **Ambient** is a volume slider for the ocean and the soft baseline hum of powered Teleports.
- **Effects** is a separate volume slider for selection, valid-target, rejection, Teleport, and sinking sounds. Both sliders run from Off to full, default to 50 percent on a browser with no saved preference, and remember their settings.
- **Enable / Disable Turn Notifications** appears for a seated online player.
- **Get New Recovery Key** appears when a full account is signed in. Creating a new key requires confirmation and permanently invalidates the old key.
- **Delete Game** has its own separated section near the bottom and appears only to the host of a signed-in online game. After confirmation, it permanently removes the Lobby game and the saved live board state for every player, then returns to the Lobby.
- **Resign Game** is isolated at the very bottom. Its two-step yellow-to-red safety remains in effect.

During a live Lobby game, local/free-table commands are hidden. Local/free-table play retains Save Game, Load Game, and the older room utilities.

Manual

Manual opens `Vacuum_rules.html` in a new browser tab. **Back to Game** closes that manual tab and returns you to the game tab; if a browser blocks scripted closing because the manual was opened directly, it falls back to the game page. This document is the full rules and interface reference. The left-panel [Rules](#) section provides shorter reminders for the action you are currently looking at.

Save Game

Save Game creates a .png image of the current board position. The image works as a visual thumbnail so you can recognize a save file by looking at it.

The full Vacuum save JSON is embedded inside the PNG. That means the PNG can be loaded later through **Load Game**.

The save includes:

- Board terrain.
- Pebble stacks.
- Stones.

- Boulders.
- Active players.
- Eliminated players.
- Teleport recharging states.
- Current player.
- Current stage.
- Turn number.
- Undo/move-segment history.
- Move log.

The older plain JSON save command is no longer shown in the right-click menu. **Save Game** now means the visual PNG save.

Load Game

Load Game opens a file picker. Choose a compatible Vacuum save .png file. Older .vacuum.json and .json saves may still load for backward compatibility.

Loading replaces the current board state. The loaded game also becomes the current autosaved game, so refreshing or reopening the page continues from the loaded position.

See also:

- [Undo and Commit](#)
- [Winning, Losing, and Elimination](#)

Phase Two Online Rooms

Vacuum v1.005.007 supports authenticated online games through the Lobby and Waiting Room while retaining local save/load play.

Online seats are offered in the order **Red, Green, Orange, Yellow**. This changes only the order in which seats are offered; each color keeps its fixed corner and home pedestal. Red and Green are opposite corners. In a two-player game those are the only active perimeters; Orange joins in a three-player game and Yellow joins in a four-player game. Unclaimed starting perimeters are already beneath the ocean when play begins.

Seat changes remain local until **Apply**. When all required seats are filled and the current account controls Red, Apply becomes the green **Start Game** button. One click applies any

pending seat changes, starts the room, and opens the board. If another color fills the final seat, that player Applies normally and Red starts the game.

- **Create Online Room** creates a short room code, adds it to the page URL, connects to the room server, and sends the current game state when the connection opens.
- **Join Online Room** accepts a room code or room link and connects this browser to that room.
- **Copy Room Link** copies the current room URL so it can be sent to another player.
- **Leave Online Room** disconnects from the room while leaving the current board playable locally.

Online rooms require the included Cloudflare Worker and Durable Object files. If the game is opened directly from disk as a local file, online room commands report that the hosted version is required.

Moves are revision-checked by the Worker before becoming authoritative. If a competing tab changes the board first, Vacuum reloads the latest confirmed state instead of overwriting it. If the connection drops, the game attempts to reconnect and restore the room's saved board.

When a seated player opens the board while another color has the turn, a centered **Not Your Turn** card calls attention to the handoff. It can be dragged aside, does not block board inspection, includes a Lobby button, and disappears automatically when one of that player's colors receives the turn. The login inactivity timer continues to count down.

Resizable Information Panel

The information panel can be resized, and its divider is controlled only by the player.

In landscape view, drag the handle on the right edge of the left information panel. The chosen width is saved locally. Window resizing and orientation changes do not push the divider inward or rewrite that preference.

In portrait view, drag the horizontal handle at the bottom of the top information shelf. Portrait has its own saved shelf height. The entire collapsible left-panel stack shares one vertical scrollbar.

Switching between landscape and portrait restores the saved size for that orientation. When the pointer is in the resize zone, the cursor changes to show the resize direction.

Clicking, Dragging, and Source Highlighting

Most source-and-target actions support two control styles.

Click-click

1. Click the action button.
2. Click a valid source.
3. Click a valid target.

Drag-release

1. Click the action button.
2. Press down on a valid source.
3. Drag to a target.
4. Release.

The game treats pressing down on a valid source as source selection. You do not need to first click the source and then start dragging from it.

Source highlighting

When a source is selected, the square's colored surface slowly breathes outward while the pieces remain their normal size. Selecting a valid source gives a short rising cue. A valid target gives a distinct ping; an invalid target gives a louder rejection sound. On a chain move, each accepted target becomes the new visible source without replaying the source cue.

The source effect clears when:

- The move completes.
- A new source is selected.
- The action is canceled.
- Undo restores a previous state.

Count cycling

Some pebble actions let you click the same source repeatedly to cycle the number of pebbles used.

Count cycling applies to:

- [Pebble Entrench](#)
 - [Begin Supply Chain](#)
 - [Reduction Attack](#)
-

Undo and Commit

Undo

Undo reverses moves within the current turn.

Most actions undo as one complete action.

Two actions are segment-based:

- [Begin Supply Chain](#)
- [Boulder Chain](#)

Those actions can contain several linked steps, so undo backs up one link at a time.

Undo is only for the current turn. Once you press [Commit](#), the turn is passed and that committed turn cannot be undone.

Commit

Commit ends the current player's turn after a [Final Action](#) has been completed.

Commit becomes available only after Stage 3 resolves and the turn reaches the commit state.

Commit cannot be undone.

When you commit:

- The turn number increases by 1.
 - The next remaining player becomes current player.
 - The current turn's undo history is cleared.
 - Pedestals belonging to the new current player finish recharging.
 - The game checks whether the new player has any legal final move. See [No-final-move elimination](#).
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Board Overview

The board is a 12 × 12 grid with a shaped playable area.

There are four kinds of terrain:

- [Barren](#) / void space.
- [Perimeter](#).
- [Board](#).
- [Pedestal](#).

Only non-barren tiles are playable.

Rows and columns shown in diagnostics are zero-based: row 0 through row 11, column 0 through column 11.

Tile Types

Barren / void

Barren space is not playable.

Pieces generally cannot move into barren space. [Perimeter Move](#) is the exception: it slides a perimeter tile outward into adjacent barren space, leaving barren space in the tile's wake.

Barren space has pressure multiplier 0.

Perimeter tiles

Perimeter tiles are the colored edge tiles around the board. They are playable.

Perimeter tiles have pressure multiplier 1.

Perimeter tiles are also used by [Perimeter Move](#).

Board tiles

Board tiles are the main interior playable tiles.

Board tiles have pressure multiplier 2.

Pedestal tiles

Pedestals are the four special inner-corner tiles.

Pedestals have pressure multiplier 4.

Pedestals are used by [Teleport](#). They are also powerful pressure anchors because of the high multiplier.

Player Colors and Perimeters

Vacuum supports up to four players.

Seat order	Color	Perimeter region
1st	Red	Upper-left perimeter
2nd	Green	Lower-right perimeter
3rd	Orange	Upper-right perimeter
4th	Yellow	Lower-left perimeter

In games with fewer than four players, unused perimeter colors deploy their sinking animation at

Turn 0, Move 0, with two unused perimeters starting about half a second apart. They then remain faintly visible beneath the ocean but are mechanically void. Reloading before the first move may replay this opening presentation. A two-player game keeps the diagonal Red and Green perimeters; a three-player game also keeps Orange.

Home Pedestals

Each player has a home pedestal. Home pedestals are mainly relevant to [Cast Stone](#), because a stone that travels the full cast distance may hook one square toward its owner's pedestal.

Seat order	Color	Home pedestal
1st	Red	Upper-left pedestal
2nd	Green	Lower-right pedestal
3rd	Orange	Upper-right pedestal
4th	Yellow	Lower-left pedestal

See [Cast Stone: Hook](#) for the exact rule.

Pieces

There are three active piece types:

- [Pebbles](#)
- [Stones](#)
- [Boulders](#)

There can also be [Neutral Pieces](#) after resignation.

Pebbles

Pebbles are the basic material of the game.

A pebble has base value 1 before terrain multiplier.

A tile can hold up to 4 pebbles total.

Pebbles are used for:

- [Pebble Entrench](#)
- [Pebble Retreat](#)
- [Extend Supply Chain](#)
- [Begin Supply Chain](#)
- [Reduction Attack](#)
- [Stone Creation](#)
- [Pebble War](#)
- [Teleport](#), when one of your active pieces sits on a pedestal
- [Vacuum Move](#), which creates a pebble
- [Boulder Chain](#), where own pebbles are consumed as prepared road

Pebbles are fragile but flexible. They are also the only piece type that can stack.

Stones

Stones are compressed force.

A stone has base value 3 before terrain multiplier.

A stone is created by [Stone Creation](#). Stones can then be moved with [Cast Stone](#).

Stones are not just stronger pebbles. They do not use [Supply Chain](#), [Pebble War](#), or [Reduction Attack](#). Their main destiny is to become or support boulders.

A stone can be removed by:

- Being struck by a non-neutral stone during [Cast Stone](#), forming a [Boulder](#).

- Being taken by a successful [Boulder attack](#).
-

Boulders

Boulders are maximum-density pieces.

A boulder has base value 9 before terrain multiplier.

Boulders are formed when a cast stone strikes a non-neutral stone. See [Cast Stone](#).

Boulders are slow unless prepared. A normal [Boulder Move](#) moves one adjacent square. A [Boulder Chain](#) lets a boulder burn through your own pebble road for extra movement.

A boulder can attack opponent pebbles, stones, or boulders through [Boulder attack](#) if its owner wins the target-centered [Pressure Value](#) comparison.

A boulder can be removed by a successful enemy [Boulder attack](#).

Neutral Pieces

Pieces become neutral either through full-player resignation or the Stage 3 [Resign Piece](#) action.

Neutral pieces:

- Block many movement and targeting rules.
- Are not controlled by any player.
- Are not active attack targets.
- Can appear in [Pressure Values](#) as neutral pressure.
- Form physical walls when the board checks for sealed regions.
- Remain visibly suspended, but inert, if the terrain beneath them sinks.

Neutral pieces help preserve the shape and consequences of the resigned player's position without allowing anyone to command those pieces.

See [Resignation](#).

Pressure Value

Pressure value is the game's combat math.

Pressure is always measured **centered on a target square**.

To calculate a player's pressure centered on a square:

1. Look at the center square and the eight neighboring squares around it.
2. For each square in that 3×3 area, count that player's pieces on that square:
 - Pebble = 1 base value.
 - Stone = 3 base value.
 - Boulder = 9 base value.
3. Multiply each square's piece base value by that square's terrain multiplier:
 - Perimeter = $\times 1$.
 - Board = $\times 2$.
 - Pedestal = $\times 4$.
 - Barren = $\times 0$.
4. Add the results.

Example: a boulder on a pedestal contributes $9 \times 4 = 36$ pressure from that square.

Pressure is used by:

- [Pebble War](#)
- [Boulder attack](#)
- [Contested Resign Piece targets](#)
- [Pressure Values](#)

Pressure is not just material count. Terrain matters a lot.

Turn Structure

Each turn begins at Stage 1 and eventually ends with [Commit](#).

There are three action stages plus the commit state:

1. [Stage 1: Movement Actions](#)
2. [Stage 2: Core Actions](#)
3. [Stage 3: Final Actions](#)
4. [Commit](#)

You are not forced to use every stage. You may choose any lit action in your current stage or a later stage. Choosing a later-stage action skips the earlier unused stages for that turn.

Once an action advances you to a later stage, you cannot go back to earlier stages unless you use [Undo](#).

Stage 1 result

Every Stage 1 action advances to Stage 2 after resolving.

Stage 1 actions:

- [Pebble Entrench](#)
- [Pebble Retreat](#)
- [Extend Supply Chain](#)
- [Cast Stone](#)
- [Boulder Move](#)
- [Pebble Attack](#)

Stage 2 result

Stage 2 actions behave differently:

- [Supply Chain](#) may continue in Stage 2 or exit to Stage 3.
- [Reduction Attack](#) advances to Stage 3.
- [Stone Creation](#) stays in Stage 2.
- [Pebble War](#) stays in Stage 2.
- [Teleport](#) stays in Stage 2.

Because Stone Creation, Pebble War, and Teleport keep you in Stage 2, you may be able to perform multiple core actions in one turn if legal.

Stage 3 result

Stage 3 actions are final actions.

After [Vacuum Move](#), [Perimeter Move](#), or [Resign Piece](#), you go to [Commit](#).

Stage 1: Movement Actions

Stage 1 is about movement, positioning, material growth through extension, and high-impact relocation.

Every Stage 1 action advances to [Stage 2](#).

Stage 1 actions are:

- [Pebble Entrench](#)
 - [Pebble Retreat](#)
 - [Extend Supply Chain](#)
 - [Cast Stone](#)
 - [Boulder Move](#)
 - [Pebble Attack](#)
-

Pebble Entrench

[Back to Stage 1](#) · [See Pebbles](#)

Pebble Entrench adds one pebble to one of your existing pebble stacks. It is a compact reinforcement action rather than a movement action.

Source

Choose a playable tile containing your pebbles.

The tile must contain:

- 1, 2, or 3 of your pebbles.
- Room for one more pebble without exceeding the 4-pebble tile limit.

A four-pebble stack cannot entrench. A tile blocked by neutral pebbles, a stone, or a boulder is not a legal entrench target.

Target

Pebble Entrench has no separate destination tile. The chosen source tile is also the target.

Result

One new pebble of your color is added to the chosen tile.

After Pebble Entrench resolves, you go to [Stage 2](#).

Pebble Retreat

[Back to Stage 1](#) · [See Pebbles](#)

Pebble Retreat moves a whole pebble unit exactly two squares without moving closer to any active opponent piece.

Source

Choose a tile containing your pebbles.

The whole movable pebble unit retreats together.

Target

The target must be:

- Playable.
- Empty.
- Exactly two king-steps away from the source.

A king-step uses Chebyshev distance: horizontal, vertical, and diagonal steps all count as one.

Path

At least one middle square must allow the retreat path.

The middle square may be:

- Empty and playable.
- Occupied only by your pebbles, if there is enough room for the retreating unit to pass through without exceeding the 4-pebble tile limit.

The middle square blocks retreat if it contains:

- Enemy pebbles.
- Neutral pieces.
- A stone.
- A boulder.
- Barren space.
- Too many friendly pebbles for the retreating unit to pass through.

No moving closer

The retreat destination cannot be closer to any active opponent piece than the source was.

Result

The pebble unit moves to the target.

After Pebble Retreat resolves, you go to [Stage 2](#).

Extend Supply Chain

[Back to Stage 1](#) · [See Supply Chain](#)

Extend Supply Chain creates one new pebble from a two-pebble line.

This action is important because it makes Stage 1 an economy choice: using another Stage 1 action means you are not using Stage 1 to create a new pebble.

Required shape

You need two touching single pebbles of your color.

The selected source must be one of those single pebbles.

Target

The target must be:

- Empty.
- Playable.
- Directly beyond the two touching single pebbles in a straight line.

In other words, the move extends a two-pebble line into a three-pebble line.

Result

A new pebble of your color is created on the target.

After Extend Supply Chain resolves, you go to [Stage 2](#).

Cast Stone

[Back to Stage 1](#) · [See Stones](#) · [See Boulders](#)

Cast Stone throws one of your stones in a straight line.

Source

Choose one of your stones.

Direction

Choose one of eight straight directions:

- North.
- South.
- East.
- West.
- The four diagonals.

The clicked or dragged target only chooses the direction. The stone may stop before reaching that exact square.

Cast distance

The stone travels up to three squares in the chosen direction.

It stops before normal blockers:

- Barren space.
- Off-board space.
- Pebbles.
- Boulders.
- Neutral stones.

Boulder collision

If the moving stone hits a non-neutral stone, both stones become one boulder on the struck stone's square.

The struck stone may be:

- Your own stone.
- An active opponent's stone.

The resulting boulder belongs to the player who cast the moving stone.

Hook

If the stone reaches the full third square without stopping or forming a boulder, it may hook one square toward its owner's [Home Pedestal](#).

The hook only happens if the home pedestal is in a straight row, column, or diagonal from that third square.

The hook follows the same collision rules as the main cast:

- It may move into open space.
- It may form a boulder by striking a non-neutral stone.
- It is blocked by ordinary blockers.

Result

The stone either moves, forms a boulder, or stops before obstruction.

After Cast Stone resolves, you go to [Stage 2](#).

Boulder Move

[Back to Stage 1](#) · [See Boulders](#) · [See Pressure Value](#)

Boulder Move gives a boulder four possible behaviors:

- [Normal boulder movement](#)
- [Boulder attack](#)
- [Boulder sacrifice](#)
- [Boulder Chain](#)

Normal boulder movement

A boulder may move one square in any direction to an empty playable square.

After a normal empty-square Boulder Move, you go to [Stage 2](#).

Boulder attack

A boulder may move one square into an adjacent enemy-occupied square if its owner wins the target-centered [Pressure Value](#) comparison.

A boulder can attack opponent:

- Pebbles.
- Stones.
- Boulders.

The attack target cannot contain neutral pieces or your own pieces.

The pressure comparison is centered on the target square. Your pressure must be strictly greater than the defender's pressure for your boulder to survive and take the target.

If the attack succeeds:

- The defending player's pieces on that square are removed.
- The attacking boulder moves into the target square.
- You go to [Stage 2](#).

Boulder sacrifice

If your boulder moves against an adjacent enemy boulder and does not win the pressure comparison, the move becomes a sacrifice instead of a failed attack.

- Your attacking boulder is removed.
- The defending enemy boulder is removed.
- No boulder moves into the target square.
- You go to [Stage 2](#).

Boulder sacrifice applies only to boulder against enemy boulder. It does not let a boulder sacrifice against pebbles or stones, and it cannot happen during [Boulder Chain](#).

Boulder Chain

A boulder may move onto an adjacent square containing only your own pebbles.

Those pebbles are consumed. The boulder moves onto that square and enters Boulder Chain mode.

Boulder Chain represents preparation: a pebble road, supply line, or work crew being spent to drag or shove the boulder where it is desperately needed.

While Boulder Chain is active:

- The boulder may continue moving one adjacent square at a time onto your own pebble squares.
- Each step consumes the pebbles on the square it enters.
- It cannot move to empty space.
- It cannot attack.
- It cannot enter enemy, neutral, stone, or boulder squares.

Click **Exit Boulder Chain** when you are done. Exiting Boulder Chain advances to [Stage 2](#).

Undo during Boulder Chain backs up one consumed segment at a time. See [Undo and Commit](#).

Pebble Attack

[Back to Stage 1](#) · [See Pressure Value](#)

Pebble Attack is a once-per-turn Stage 1 pressure strike. It lets a selected number of pebbles attack an adjacent enemy-occupied square if your target-centered pressure is strictly greater.

Source

Choose one of your pebble stacks. Click the source again to cycle how many pebbles will attack.

Target

The target must be adjacent and must contain an active enemy piece. Pebble Attack may target pebbles, stones, or boulders.

Pressure check

The pressure comparison is centered on the target square. Your attacking pressure must be strictly greater than the defender's pressure. Equal pressure is not enough and does not cause mutual destruction.

Result

- The defeated enemy pieces on the target are removed.
 - The selected attacking pebbles move into the target square.
 - You go to [Stage 2](#).
-

Teleport

[Back to Stage 2](#) · [See Pedestal Tiles](#)

Teleport swaps the contents of two pedestals.

A powered pedestal carries soft electrical arcs and contributes to the ambient hum. Selecting it intensifies the arcs and expands only the glowing tile surface; the arc path and pieces stay in place.

Source

The source must be a pedestal containing one of your active pieces: pebble, stone, or boulder.

Neutral pieces block Teleport. A pedestal containing only neutral pieces, or only enemy pieces, is not a valid source.

The source pedestal cannot be recharging.

Target

The target may be any pedestal, including the same pedestal.

The target pedestal cannot:

- Be recharging.
- Contain neutral pieces.

Result

The contents of the source and target pedestals are swapped.

Both endpoints flash and a heavy impact marks the transfer. Their arcs disappear while they recharge; the former red warning pulse is not used.

The involved pedestals begin recharging for the teleporting player.

They finish recharging at the beginning of that same player's next turn.

After Teleport resolves, you remain in [Stage 2](#).

Stage 2: Core Actions

Stage 2 is where most tactical and economic work happens.

Stage 2 actions are:

- [Begin Supply Chain](#)
- [Reduction Attack](#)
- [Stone Creation](#)
- [Pebble War](#)
- [Teleport](#)

Stage 2 actions do not all advance the turn the same way.

Action	Stage result
Supply Chain	Continues in Stage 2, or exits to Stage 3 if moved into empty space
Reduction Attack	Advances to Stage 3
Stone Creation	Stays in Stage 2
Pebble War	Stays in Stage 2

Because Stone Creation and Pebble War leave you in Stage 2, one turn can sometimes contain several core actions.

Supply Chain

[Back to Stage 2](#) · [See Extend Supply Chain](#)

Supply Chain moves pebbles through connected friendly pebble positions.

It is a Stage 2 action.

Source

Choose a tile containing your pebbles.

Click the same source to cycle how many pebbles move.

While Supply Chain is active, you can also click another valid source to switch to that source without exiting and re-entering the action.

Chain movement onto friendly pebbles

You may move selected pebbles to an adjacent playable tile containing your pebbles if there is enough room on the target.

The tile limit is still 4 pebbles total.

When you move onto your own occupied tile:

- The moved pebbles join that tile.
- The target becomes the new source.
- Supply Chain stays active.
- You remain in Stage 2; if another legal Pebble War target remains, Pebble War stays active.

Empty-square exit

You may move selected pebbles into an adjacent empty playable square.

This exits Supply Chain and advances to [Stage 3](#).

Important restriction: when exiting into an empty square, you must leave at least one of your pebbles behind on the source.

That means:

- A single pebble cannot Supply Chain into an empty square.
- A three-pebble source may move one or two pebbles into empty space, but not all three.

This keeps Supply Chain from becoming a fake extra movement action. It must still preserve the feeling of extending a chain.

Exit button

Click **Exit Supply Chain** to stop chaining without moving into an empty square.

Manual exit leaves you in Stage 2.

Undo

Supply Chain stores undo snapshots per link. Undo reverses one chain segment at a time.

Reduction Attack

[Back to Stage 2](#) · [See Pebbles](#)

Reduction Attack spends your pebbles to remove the same number of adjacent opponent pebbles.

Both sides lose the selected number of pebbles.

Source

Choose a tile containing your pebbles.

Click the source repeatedly to cycle the attack count.

Target

The target must be an adjacent playable tile containing active opponent pebbles.

Neutral pebbles are not valid targets.

Count limits

Let:

- A = number of your pebbles on the source.
- D = number of opponent pebbles on the target.
- N = selected attack count.

The selected attack count must follow these limits:

- If $A < D$, you may spend 1 through A pebbles.
- If $A = D$, you may spend 1 through D pebbles. Equal stacks can wipe each other out.
- If $A > D$, you may spend only 1 through $D - 1$ pebbles. A larger attacker cannot completely wipe a smaller defender with Reduction Attack.

Examples:

- 2 attacking 4 may spend 1 or 2.
- 4 attacking 2 may spend only 1.
- 2 attacking 2 may spend 1 or 2.
- 4 attacking 1 is not a legal Reduction Attack.

Result

The selected number of your pebbles is removed from the source. The same number of opponent pebbles is removed from the target.

After Reduction Attack resolves, you go to [Stage 3](#).

Stone Creation

[Back to Stage 2](#) · [See Stones](#)

Stone Creation compresses surrounding pebble pressure into one stone.

This action stays in [Stage 2](#) after resolving.

Target

The target must be:

- Empty.
- Playable.

Neighbor area

Look at the eight neighboring squares around the target.

Only pebbles matter for the creation test. Stones, boulders, and terrain pressure do not count for the creation test.

Side coverage requirement

Your neighboring pebbles must cover at least three neighboring sides of the target.

The four sides are:

- North.
- South.
- East.
- West.

Orthogonal pebbles cover their obvious side.

Diagonal pebbles can help cover one of the two sides they touch.

A straight three-pebble line does not satisfy the spirit of this rule by itself. The formation must

meaningfully surround the target from at least three sides, not merely line up through it.

Pebble dominance requirement

Your neighboring pebble count must be at least three more than all other neighboring pebbles combined.

Formula:

`your neighboring pebbles >= other neighboring pebbles + 3`

Other neighboring pebbles include all other active players' pebbles and neutral pebbles.

Result

If Stone Creation succeeds:

- One stone of your color is created on the target.
 - All of your pebbles in the eight neighboring squares are removed.
 - Other players' pebbles remain.
 - You remain in Stage 2.
-

Pebble War

[Back to Stage 2](#) · [See Pressure Value](#)

Pebble War moves a whole pebble unit into an adjacent opponent pebble unit if your target-centered pressure wins.

Pebble War is a repeatable Stage 2 mode. After a successful attack, the attacking unit becomes the next source if it still has legal adjacent targets. You can keep gobbling through a chain, exit Pebble War, or choose another legal action.

Source

Choose one of your pebble units.

The whole unit attacks together. You do not choose a partial count.

Target

The target must be adjacent and must contain active opponent pebbles.

Neutral pebbles are not valid Pebble War targets.

Pressure check

Compare pressure values centered on the target square.

Only the attacking player and the chosen defending player matter for this comparison.

Your pressure must be strictly greater than the defender's pressure.

See [Pressure Value](#).

Result

If Pebble War succeeds:

- The defending pebble unit is removed.
- The source square becomes empty.
- The entire attacking unit moves toward the target, but the war costs one attacking pebble for each completed battle.
- If a lone pebble attacks, it is spent while destroying the entire defending stack, leaving both source and target empty.
- You remain in Stage 2.

Examples: four pebbles attacking $A \rightarrow B \rightarrow C$ leave three on B and then two on C. Three attacking pebbles become two after one battle; two become one.

In multiplayer edge cases, third-party pebbles on the target do not help either side in the pressure comparison, but they still occupy space and can prevent the attacking unit from fitting.

Stage 3: Final Actions

Stage 3 is the final-action stage.

A turn must eventually complete one final action before [Commit](#) becomes available.

Stage 3 actions are:

- [Vacuum Move](#)
- [Perimeter Slide](#)
- [Resign Piece](#)

After any final action resolves, you go to [Commit](#).

Vacuum Move

[Back to Stage 3](#)

Vacuum Move creates one pebble in an empty vacuum space.

You must first select **Vacuum Move**, then choose the target square. Clicking a valid vacuum square without selecting the action does not perform the move.

Target

The target must be:

- Empty.
- Playable.
- Contained in at least one valid 3×3 vacuum area.

Vacuum area

A valid vacuum area is a 3×3 area where:

- The center of the 3×3 area is playable.
- Every playable tile in the 3×3 area is empty.
- Outer cells may be playable, barren, or off-board.

The target does not have to be the center of the 3×3 area. It only has to belong to at least one valid empty 3×3 area.

Result

One pebble of your color is created on the target.

After Vacuum Move resolves, you go to [Commit](#).

Perimeter Move

[Back to Stage 3](#) · [See Perimeter Tiles](#)

Perimeter Move slides an eligible perimeter tile outward into an adjacent barren space.

A barren space is left in the tile's wake, changing the shape of the board edge.

Source

The source must be a perimeter square containing at least one of your pieces: a pebble, stone, boulder, or combination.

The source cannot contain neutral pieces.

The source must orthogonally touch a barren space. Diagonal contact is not enough.

Target

The target must be a directly attached barren square.

Only orthogonal barren spaces count.

Result

The selected perimeter tile slides into the barren space and carries its contents with it.

The old source square becomes barren.

The moved square must remain physically connected to the bulk of the main board, either directly or through other perimeter squares.

After Perimeter Move resolves, you go to [Commit](#).

Resign Piece

[Back to Stage 3](#)

Choose a playable square containing one or more of your pieces. Every piece you own on that square - pebbles, stones, boulders, or any combination - becomes neutral. Other players' pieces on the square are unchanged.

The square is **uncontested** when none of its eight neighboring squares contains an active opponent piece. Your own pieces and already-neutral pieces do not contest it. An uncontested square may be resigned without a pressure check.

If an active opponent is adjacent, your target-centered pressure, including the pieces being resigned and their terrain, must be strictly greater than every adjacent active opponent's pressure.

If those were your last controlled pieces, the action eliminates you. The action may also complete a neutral wall and trigger a sealed-region collapse before Commit. Undo restores both the pieces and any collapse.

Sealed Regions and Collapse

Neutral-occupied squares are physical walls. After relevant actions, Vacuum checks whether a perimeter-containing region still has a physical path to the bulk of the main board. Diagonal steps count as paths.

A currently legal Teleport crossing the boundary also connects the regions. A recharging Teleport does not.

A sealed region sinks immediately. Its terrain lowers, shrinks, and fades over roughly two seconds with a short stagger between squares, then remains faintly visible beneath the moving ocean while becoming mechanically void. The original submerged shape is saved with the game. Meanwhile, ordinary pieces in it disappear. Neutral pieces remain visible at their former height but become inert. Neutral wall pieces on surviving land remain in place. Collapse can cascade and remains reversible by Undo until Commit.

The ocean extends across the full open playfield. Black grid lines are drawn only between two surviving squares, so the line around a submerged square disappears with that square instead of showing through the water.

Winning, Losing, and Elimination

Players can leave the game in several ways.

Resignation

A player may resign completely with **Resign Game** at the bottom of the right-click menu. The first click changes the yellow button to red. A second single click opens the existing confirmation. Double-clicking does not confirm, and clicking elsewhere disarms the button back to yellow.

If only one player remains after the resignation, that player wins.

If two or more players remain, the resigning player is eliminated and their pieces become [Neutral Pieces](#). Play continues with the next remaining player.

No-final-move elimination

At the beginning of a player's turn, the game checks whether that player has any legal final action.

Final actions are:

- [Vacuum Move](#)
- [Perimeter Slide](#)
- [Resign Piece](#)

If the player has no legal Vacuum Move, Perimeter Slide, or Resign Piece, that player is eliminated. Squares inside a region that has already sunk do not count as possible moves.

If more than one player remains, the game advances to the next remaining player and checks again as needed.

Having no pieces

A player is not eliminated merely because that player currently has no pieces. Elimination is based on having no legal final action. Resigning your last controlled piece will normally eliminate you because it leaves you without a future action.

Winning

When only one active player remains, that player wins.

In an online game, Vacuum preserves the final board and returns players to the Lobby instead of starting another game in place. The finished game remains available as a read-only **Game Over** entry for seven days. The Lobby identifies the winning player by display name, while the frozen board identifies the winning color. The winner panel can be dragged by its title so you can inspect the final board and use interface controls such as Log; it is kept inside the browser window when dragged or when the window is resized. A drag symbol in its upper-right corner makes that behavior visible; the Not Your Turn panel uses the same cue.

Action Summary Table

Action	Stage	Main purpose	Stage result
Pebble Entrench	1	Add one pebble to a 1–3 pebble stack	Stage 2
Pebble Retreat	1	Move a whole pebble unit exactly two squares away from danger	Stage 2
Extend Supply Chain	1	Create a new pebble from a two-single-pebble line	Stage 2
Cast Stone	1	Throw a stone up to three squares, possibly forming a boulder	Stage 2
Boulder Move	1	Move, attack, or burn pebble road with a boulder	Stage 2 after exiting/finishing
Teleport	1	Swap contents between pedestals	Stage 2
Supply Chain	2	Move pebbles through friendly chain positions	Stage 2 or Stage 3
Reduction Attack	2	Trade your pebbles to reduce enemy pebbles	Stage 3
Stone Creation	2	Compress surrounding pebbles into a stone	Stay Stage 2

Action	Stage	Main purpose	Stage result
Pebble War	2	Use pressure to move a pebble unit into an enemy pebble unit	Stay Stage 2
Vacuum Move	3	Create a pebble in an empty vacuum space	Commit
Perimeter Move	3	Slide perimeter tile into barren space	Commit
Resign Piece	3	Turn every one of your pieces on an eligible square neutral	Commit

What Removes What

Attacker / process	Can remove
Reduction Attack	Opponent pebbles
Pebble War	Opponent pebble units
Stone Creation	Your own neighboring pebbles, by compressing them into a stone
Cast Stone	Stones, by converting two non-neutral stones into one boulder
Boulder attack	Opponent pebbles, stones, or boulders, if pressure wins
Boulder Chain	Your own pebbles, consumed as prepared road
Resignation	Does not remove pieces if the game continues; pieces become neutral
Resign Piece	Does not remove the acting player's selected pieces; they become neutral
Sealed-region collapse	Ordinary pieces in the sunken region; neutral pieces remain visible but

inert

Pebbles can be taken by pebbles or boulders.

Stones can be turned into boulders or taken by boulders.

Boulders can be taken by boulders.

Common Tactical Ideas

Extend is economy

[Extend Supply Chain](#) creates material in Stage 1. Any other Stage 1 action means you are giving up that chance to create a pebble this turn.

This makes Stage 1 a real choice: grow, reposition, retreat, teleport, cast, or move a boulder.

Pressure fields matter more than raw pieces

Because pressure uses terrain multipliers and a target-centered 3×3 area, the same piece can be weak on one tile and decisive on another.

Use [Pressure Values](#) to read pressure before committing to [Pebble War](#) or [Boulder attack](#).

Boulders are anchors until fed

A boulder normally moves only one square. It can hold a front line, but it can also become stranded.

[Boulder Chain](#) lets you build pebble runways and consume them for emergency boulder movement. This is powerful, but expensive: the runway is gone afterward.

Supply lines are strength and vulnerability

[Supply Chain](#) lets you reorganize pebbles and extend into new space. But a thin line can also

become a weakness if an opponent breaks it with [Pebble War](#) or boulder pressure.

Pebble War can detonate a quiet position

Because [Pebble War](#) stays in Stage 2, one won pressure fight can open another. A long period of positioning can suddenly become a chain of captures if a front line has a pressure seam.

Perimeter Move changes future space

[Perimeter Move](#) is not just a tile slide. It reshapes the edge of the board and can change future [Vacuum Move](#), pressure, and movement possibilities.

Glossary

Active player

A player still in the game and not eliminated.

Adjacent

One square away horizontally, vertically, or diagonally, unless a rule specifically says orthogonal.

Barren

Non-playable space. See [Barren / void](#).

Boulder

A high-density piece worth base 9 before terrain multiplier. See [Boulders](#).

Boulder Chain

A mode inside [Boulder Move](#) where a boulder consumes adjacent own pebbles as prepared road.

Commit

The irreversible action that ends the turn after a final action. See [Undo and Commit](#).

Final Action

A Stage 3 action: [Vacuum Move](#), [Perimeter Move](#), or [Resign Piece](#).

Home pedestal

A player's associated pedestal corner. See [Home Pedestals](#).

Neutral

Pieces no longer controlled by an active player. They remain as obstacles and can form collapse walls. See [Neutral Pieces](#).

Pebble

The basic stackable piece, worth base 1 before terrain multiplier. See [Pebbles](#).

Pressure

Target-centered value used by [Pebble War](#), [Boulder attack](#), and [Diagnostics](#). See [Pressure Value](#).

Source

The starting square selected for an action.

Stage

A part of the turn structure. See [Turn Structure](#).

Stone

A compressed piece worth base 3 before terrain multiplier. See [Stones](#).

Target

The destination or affected square selected for an action.

Vacuum space

An empty playable target contained in a valid empty 3×3 area. See [Vacuum Move](#).

Rule Cross-Links

- To learn how turns advance, read [Turn Structure](#).
- To understand combat math, read [Pressure Value](#).
- To learn basic piece behavior, read [Pebbles](#), [Stones](#), and [Boulders](#).
- To learn how pebbles grow and move, read [Vacuum Move](#), [Extend Supply Chain](#), and [Supply Chain](#).
- To learn how stones and boulders are created, read [Stone Creation](#) and [Cast Stone](#).
- To learn how pieces are removed, read [What Removes What](#).
- To learn how the app interface works, read [The Three Panels](#), [Tool Tips](#), [Diagnostics](#), and [Right-Click Menu, Manual, Save, and Load](#).