EROSION LIVING RULES SMG27 (Sept 2009)

Make molehills out of mountains. A geological game of mountainous growth and destruction, that plays in 30 minutes with 2 to 5 players. Comes with 96 color cards, instructions, and a box.

This is the way mountains crumble. Players uplift their mountains, while eroding those of their opponents. In the advanced game, players control the climate through the emission and sequestering of greenhouse gases. A surprisingly engaging and educational game.

Introduction

In ***Erosion***, uplift your mountain while weathering and eroding those of other players. You earn points for the value of the rock in your mountain and delta.

The basic rules introduce the four player actions: Weathering, Hillslope, Fluvial, and Draw Cards. The advanced rules add details: atmospheric change, ice ages, glaciers, flood volcanism, rock avalanches, etc.

Designed by John Douglass Ph.D.,
Development: Phil Eklund, Rick Heli.
Thanks to Wulf Corbett, Clint Bell, Lourdes Tallet, Meggin Kirk, Matt Eklund, & Darrell Hayhurst.

Components

96 Cards: 38 Weathering (WX), 32 Hillslope (H), 20 Fluvial (F) and 6 Atmosphere cards

Set Up

Separate the cards

Sort the cards into 4 decks: Atmosphere (”1 Draw” in the corner), Weathering (WX), Hillslope (H), and Fluvial (F). (“Fluvial” is geo-speak for “riverine”.)

Create the three Process Decks

Set three overlapping pairs of Atmosphere Cards on the table, as shown in the “Set Up” example. Then shuffle each of the WX, H, and F card decks and place each face down, on the corresponding Atmosphere Card pair, as shown.

Note: These decks may not be examined or counted during the game.

Create your starting mountain

Each player randomly draws 3 WX, 2 H, and 1 F card. These six cards are shuffled and arranged vertically face up on the table, with the *rock type* visible, as shown in the “Set Up Example” in the rules. The uppermost rock in each starting mountain is set a bit to the left, to show that it is *weathered*.

Create your starting hand

Each player draws 3 WX, 2 H, and 1 F card to form his ***hand***, kept concealed from the others.

Game Start

Randomly choose the starting player and begin the game.

Definitions

Delta and Discard Locations
To the right of your mountain are two empty locations: the upper one "**Delta**" to store cards that have eroded into your river delta, and the lower one "**Discards**" to store process cards you have played. Delta cards are played face down, whereas discards go face up.

River Location
The River is a common-use location, where cards are stored upon being eroded off a mountain by H processes. Cards in the River are stored side by side face up, so that all are visible. The River starts empty.

Mountain Height
Each card in a mountain is a 500 meter rock layer; players start with mountains 3000 meters (10,000 ft) high. In the example in the rules, the weathered layer is schist for Player 1, and shale for Player 2.

Player Actions

On your turn, choose <u>one</u> of the following four actions, or else ***pass***. Then go to the next player in clockwise order.

*Note: Process cards are divided in two. Play the lower "**process**" portion by discarding it. Play the upper "**rock**" portion usually by putting it into the base of your mountain. Ignore text in the rock portion unless playing with Advanced rules (Montane Architecture).*

*Important: If your play empties your hand, draw 6 new cards, observing **draw limits**. This ends your turn. If one or more decks run out, see End of Game.*

1. Weathering (WX)
To play a WX card from your hand, place it in your discards face up. Then ***weather*** rocks, up to the number specified, in any one mountain (including yours). To show that a rock is weathered, shift its card slightly to the left, as shown in the rules. (To show an entire mountain is weathered, slant it 45 degrees.)

*Shielding: Weathering occurs from the top rock of a mountain down. If a rock cannot be weathered, all rocks beneath it are **shielded** from weathering!*

Note: If a WX card lists <u>types</u> of rocks, it weathers all unshielded rocks of those types on the mountain. Each rock may only be weathered once.

Remember: WX (shorthand for weathering) is a process that weakens rock, but does not transport it. Weathered rock counts toward the height of a mountain, but does not count toward victory.

Bonus: See "uplift" (next page).

Elevation Limits: Cards with a hill icon may only be played on mountains that <u>begin</u> your turn less than 4000 meters. Conversely, cards with a mountain icon are used if starting at 4000 meters or more.

2. Hillslope (H)
To play an H card from your hand, place it in your discards face up. Then ***hillslope*** weathered rocks by moving them to the River, up to the number specified. The mountain hillsloped can be yours or an opponent's.

Bonus: See "uplift" (next paragraph).

Uplift: For each card that you weather or hillslope, draw a card into your hand, respecting draw limits. If you then have more cards than 6, reduce your hand to 6 by choosing cards to play as ***uplifted*** rocks. These rocks are added into your mountain from the bottom up, as shown in the rules. They can be of any type.

Note: Uplift occurs only with the play of WX or H cards, not by architecture WX or H effects.

3. Fluvial (F)
To play an F card from your hand, place it in your discards face up. Then transport from the River to your delta exactly the number of rocks specified on the F card. For each rock transported, you must discard the same rock type from your hand.

In the example shown in the rules, one "Straight" F card is played, and one shale discarded, to move a shale from the River to your delta.

Fluvial Hint: The decks are distinguished by rock classes: WX deck = sedimentary, H deck = igneous, F deck = metamorphic. This will help you to draw cards that match those in the river.

4. Draw Cards
Draw a number of cards from any of the 3 process decks to replenish your hand back up to a full 6 cards. Alternatively, you may discard all of your cards, and draw a new hand. You must draw all your cards before looking at them.

Draw Limit*: Each Atmosphere card lists a* ***draw limit*** *at each end. One end is covered by the decks, the other is visible. You may not draw more cards from a deck than the sum of its two visible draw limits. See example in the rules.*

End of Game

Ending the Era
Scoring occurs at the end of each ***era***. The era ends if all players *pass* in a row. The era also ends if the same person passes the second time after the last card has been drawn from any deck.

Game Length
The two or three-player game lasts one **era**; and the four- or five-player game lasts two eras.

Scoring
Points are scored at the end of each era. You gain one point for each unweathered rock in your mountain, two points for each rock in your delta, and three points for each weathered rock in your mountain that contains one of the fossil icons shown in the rules.

Starting a new era
After each player has recorded his score, all cards except the Atmospheres and mountains (i.e., River, hands, discards, etc.) are separated into 3 process decks and shuffled/arranged as in "Set Up". The lowest-scoring player starts the new era by taking his turn.

Advanced Rules

Montane Architecture
The "rock" portion of certain cards lists special rules for mountains that contain them. Rules that say "upon uplift" apply only when the card is first uplifted. Other architectures (in red) apply as long as the rock remains unweathered.

Atmospheric Triggers
If an architecture specifies one or more Atmospheres to be ***triggered***, rotate the cards by 180 degrees, exposing or hiding their "Hypoxic Age", "Ice Age" or "Arid Age" legend. This immediately changes its *draw limit*. You may trigger each Atmosphere card no more than once in your turn.

Example: The H process deck shown in the rules is in an Ice Age and may not be drawn from, since the sum of its two draw limits is zero.

Remember: Mountains grow from below, but erode from above. Your maximum hand size is 6, but your draw per process deck is limited by its draw limit. You may not play a WX, H, or F card unless it processes at least one rock.

*For a **tie-breaker**, have the competing players draw a card at random from their own hands, and then guess the **Mohs hardness** of the rock type. The scale is talc = 1, and diamond = 10. The player guessing the closest chooses the tie. The correct answers are: shale & limestone = 3, granite & conglomerate = 6, schist, sandstone, & quartzite = 7, basalt & welded tuff = 8.*

Wulf's Hints

Mountains and deltas are about equal in importance. To see which mountain is the hardest to weather, look at the size of the rock image: the larger, the stronger the layer. Vary the layers to prevent runaway weathering. In the endgame, fossils in your mountain will make opponents think twice about WX you. Fossils are found in the sedimentary deck. A tall, heavily-weathered mountain is a game-winning debris flow waiting to happen.

Designer's Notes

*Mountains are far more dynamic than the limitations of human lifetimes would suggest. Their birth and death involve cycles that keep the planet habitable. The machinery of these cycles is called **erosion**: the weathering of rock and its transport to the sea. Once there, it is subducted into the mantle, where volcanos return the silicates, sulfates, water, carbon dioxide, and oxygen to the surface.*

*Almost every step of the erosion process is catalyzed by water. For instance, in your turn you may weather rock using "**crystallization**" (busting rock by growing evaporated salt crystals), then transport the remains to the River using "creep" (movement propelled by wet/dry and freeze/thaw cycles). Once plunked in the River, the eroded material is moved as sediment to the sea. Braided rivers carry the maximum sediment load, but they are the trickiest to play.*

The role of erosion in atmosphere control is widely overlooked. Every mountain is a titanic terraformer and greenhouse gas scrubber. Weathering removes 100 billion tons of oxygen and 800 billion tons of carbon dioxide from the air each year. Although the biological functions of respiration and decay contribute more to the atmosphere than erosion, during many past episodes it was the other way around. Left unchecked, a major ***orogenic*** *(mountain-building) event removes so much CO_2 that the oceans would freeze over in less than an* ***Erosion*** *game turn (6 million years, the same scale as for the game* ***American Megafauna****). On the other hand, a major* ***flood basalt*** *such as the Deccan Traps has poured hundreds of trillions of tons of CO_2 back into the air, dwarfing the outputs of all human industry combined.*

John Douglass & Phil Eklund, 2009
www.sierramadregames.com

Montane Legend Variant (John Douglass)

Components:
You will need to print out the montane legend and montane challenge cards posted in the files section at http://games.groups.yahoo.com/group/ErosionGame/files/

Set Up:
Place all four montane legend cards face up near the Process Decks. Each player is dealt one montane challenge card.

Legend Claim:
You can claim a legend card at any time after you meet the conditions (height and capstone rock type) stated on it.

Advanced Legend Claim:
To claim a legend card, you need both listed rock types on your mountaintop, instead of just one, in any order.

Scoring:
If you meet your challenge card condition during each scoring, you earn the bonus points listed. You also earn the points listed for each legend card you have claimed.