

Brushfall: Balance & Economy

Design workbook by Umut Eren Demirci. Blue cells are inputs; everything else is calculated or measured.

Sheet	What it contains	Live formulas?
Charge	Hero power after the 30 s match-3 charge for three players (weak, average, strong), and a calculator for the power rules.	Calculator
Climbs	All 24 climbs: guardian, the smallest board that can win, and each player's win rate, paint and stars, with a chart.	No
Restorations	Each quarter of the three paintings: buckets, paint by colour at the chapter's price, and what the sand is made of.	Price per chapter
Economy	Whole chapters per player: climbs played, extra climbs for paint, paint earned, spent and left.	No
Colours	Paint income by colour against what each chapter's painting needs, at the bucket prices you set.	Yes
Meta	Phase 6: the daily painting's boxes, the weekend Grand Climb's tiers by player, and skin prices against the paint each player has left over.	Skin prices
Tuning	Every tuning number, as the build uses it.	No

Source of truth: the game's code (Assets/_Project/Scripts/Brushfall/Core). Measured data comes from the balance runner (Tools/sim), which compiles those same rules outside Unity and plays them with bots at human speed: 300 charges per player, 300 climbs per player per level, and 40 whole journeys per player for the economy. Players: weak (2.4 s a move, random matches, careful but slips 10% of the time on the climb), average (1.7 s, biggest match), strong (1.1 s, plays for power and specials).

The charge

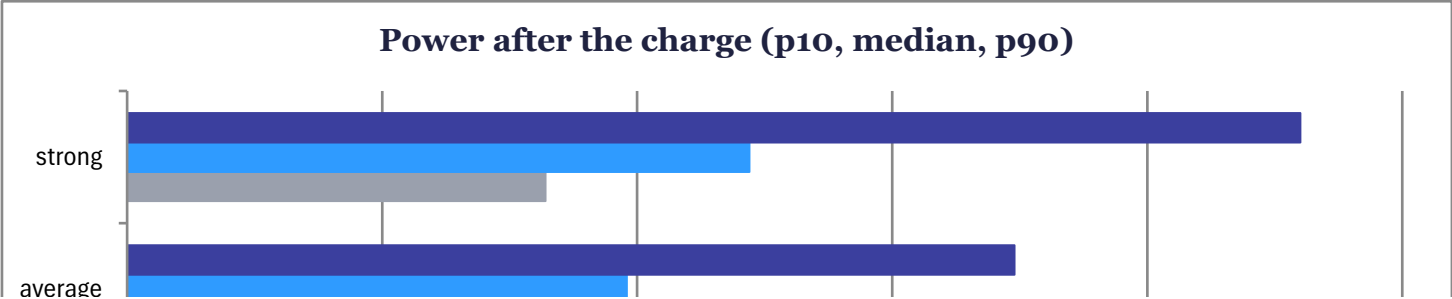
Hero power after 30 seconds of match-3. 300 charges per player.

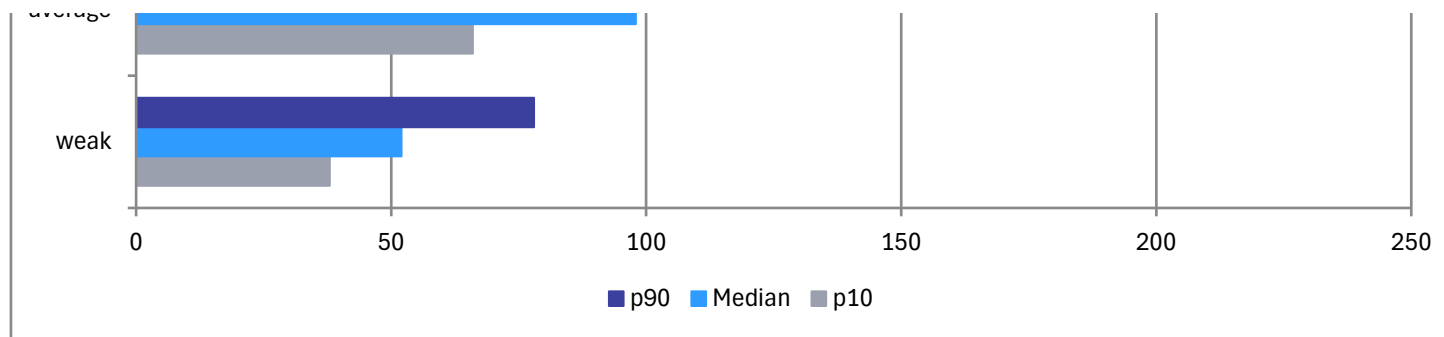
Player	Seconds a move	Power p10	Median	Mean	p90	Starts with a shield	Starts with a magnet	Moves
weak	2.4 s	38	52	55	78	6%	4%	7.8
average	1.7 s	66	98	109	174	20%	7%	9.0
strong	1.1 s	82	122	142	230	44%	19%	11.2

Power calculator

Start power	10
Power per tile	1.1
Power per special made	8
Moves in the charge	8
Tiles cleared a move	5
Specials made a move	0.4
Estimated power	80

Phase 5 started with a fast bot charging ~200 power against levels built for 50-140, and shields in 88-100% of runs. At human speed with these rules the medians are about 50 / 100 / 125: the gap between a weak and a strong player is real but each can play every level. Shields now come only from Star specials, so a shield is earned. Combos multiply the whole charge by 1.4, the big moment a strong player chases.





The climbs

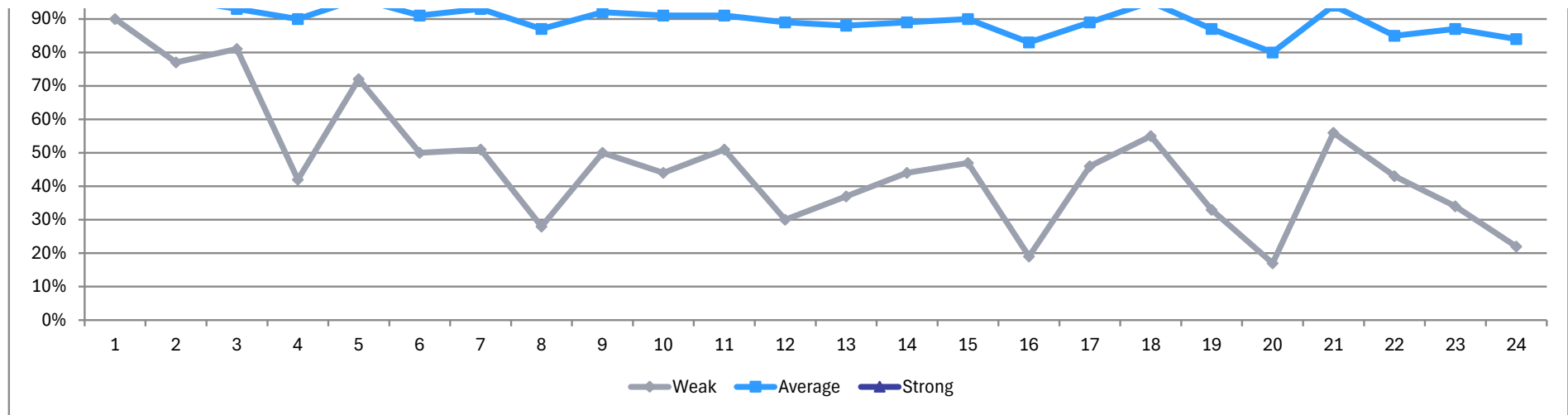
300 climbs per player per level, each starting from one of that player's charges. Paint is per win.

#	Level	Chapter	Hard?	Guardian	Smallest winning board	Weak win	Weak paint	Weak stars	Average win	Average paint	Average stars	Strong win	Strong paint	Strong stars
1	First Steps	1		200	34	90%	62	1.0	97%	103	2.3	100%	127	2.8
2	Two Paths	1		230	33	77%	70	1.0	96%	131	2.3	99%	160	2.8
3	Mind the Gap	1		220	33	81%	70	1.0	93%	132	2.2	98%	152	2.5
4	The Shielded Way	1	Hard	360	52	42%	83	1.0	90%	160	2.2	98%	184	2.5
5	Gate Garden	1		410	37	72%	88	1.0	96%	159	2.3	100%	188	2.8
6	Crowded Lane	1		290	39	50%	80	1.0	91%	166	2.0	98%	206	2.4
7	Long Way Round	1		500	41	51%	97	1.0	93%	184	2.3	100%	216	2.7
8	The Narrow Climb	1	Hard	440	55	28%	100	1.0	87%	208	2.0	98%	252	2.4
9	Storm Front	2		640	43	50%	116	1.0	92%	222	2.3	99%	261	2.8
10	The Gallery Gate	2		800	45	44%	124	1.0	91%	232	2.0	99%	280	2.4
11	Cypress Row	2		510	45	51%	119	1.0	91%	210	2.3	99%	248	2.8
12	Golden Rise	2	Hard	770	54	30%	125	1.0	89%	266	2.4	99%	309	2.8
13	Swirling Sky	2		830	45	37%	138	1.0	88%	256	2.3	99%	291	2.7
14	The Reapers' Path	2		980	45	44%	139	1.0	89%	243	2.0	98%	287	2.4
15	Hay Bales	2		720	45	47%	124	1.0	90%	256	1.9	98%	320	2.4
16	Windbreak	2	Hard	1600	60	19%	173	1.1	83%	292	2.1	98%	332	2.4
17	Kitchen Steps	3		460	45	46%	110	1.0	89%	236	2.0	98%	293	2.4
18	The Bread Basket	3		830	45	55%	138	1.0	95%	264	2.4	98%	312	2.8
19	Blue Apron	3		890	45	33%	145	1.0	87%	306	2.4	98%	348	2.7
20	Window Light	3	Hard	1500	64	17%	171	1.1	80%	289	2.1	97%	335	2.4
21	Pouring Milk	3		540	45	56%	131	1.0	94%	279	2.3	98%	343	2.7
22	The Foot Warmer	3		1000	45	43%	164	1.0	85%	389	2.6	97%	422	2.8
23	Old Delft	3		1650	45	34%	186	1.0	87%	327	2.0	96%	386	2.4
24	The Masterpiece	3	Hard	1800	54	22%	203	1.0	84%	444	2.5	97%	498	2.8

Guardians are set from how a careful weak player actually walks the level, not the perfect route (which can reach a far x2 gate no careful player takes). Every chapter's 4th and 8th climb is a hard level sized for an average board: a weak player wins it 17-42% of the time and replays it, an average player 80-90%. Stars: 2 for 85% of the paint a 90 board can bank, 3 for 90% of what a 140 board can; an average player averages about 2.2, a weak one about 1.0. A meal adds the enemy's power but at most 30% of the hero's own: with the full power a strong hero met the guardian with ~22 times its power, now ~6. Paint per enemy is round(sqrt(power)) of the enemy's full power, so the rich lane still pays more.

Win rate by level





The restorations

The bot restores each quarter with plenty of paint. Change a chapter's bucket price (blue) and the paint updates.

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1	The Great Wave (Hokusai)	6
2	Wheat Field with Cypresses (Van Gogh)	10
3	The Milkmaid (Vermeer)	15

Per quarter

Painting	Quarter	Chapter	Buckets placed	Buckets paid (net of refunds)	Paint	Red	Yellow	Blue	Green	Purple	Sand: red	Yellow	Blue	Green	Purple	Dust
great-wave	1	1	20	17	104	0	69	35	0	0	0%	56%	28%	1%	0%	15%
great-wave	2	1	22	16	97	21	65	0	11	0	30%	56%	0%	11%	0%	2%
great-wave	3	1	22	17	103	0	19	73	11	0	0%	19%	52%	5%	0%	23%
great-wave	4	1	30	17	102	6	34	29	33	0	8%	29%	24%	21%	0%	18%
wheat-field	1	2	18	16	161	0	59	102	0	0	0%	35%	60%	0%	0%	6%
wheat-field	2	2	25	17	172	0	43	93	21	15	0%	22%	48%	14%	11%	6%
wheat-field	3	2	34	17	173	35	82	21	35	0	24%	42%	12%	17%	0%	5%
wheat-field	4	2	31	18	179	37	29	75	38	0	11%	19%	37%	28%	0%	5%
milkmaid	1	3	21	17	249	41	48	0	160	0	22%	15%	0%	60%	0%	3%
milkmaid	2	3	20	16	241	52	174	0	15	0	17%	74%	0%	7%	0%	3%
milkmaid	3	3	20	17	257	116	15	122	0	4	46%	4%	36%	0%	3%	12%
milkmaid	4	3	29	17	252	83	61	86	22	0	28%	31%	29%	11%	0%	1%

A quarter is 40 x 54 grains, sorted into its own main colours (up to four paints); only paper-white highlights and black lines are dust, which pours into any bucket. 80% drained and the brush sweeps the rest. A bucket holds 120 grains; one sent away early refunds its unfilled share (rounded to the nearest paint, so an unused bucket is free), so 'buckets paid' is below 'buckets placed'. The sand is smoothed into patches (none under 120 grains) and a bucket catches its paint from the bottom four rows of its funnel, so each bucket fills to about 74 grains on average (a playtest found the earlier speckled sand jammed buckets after about 14). The price per bucket rises by chapter (6 / 10 / 15) because the climbs pay more as the monsters grow.

The economy

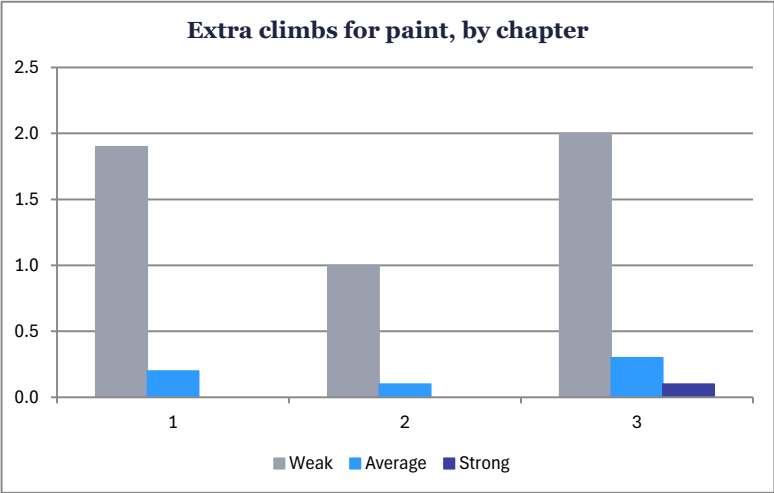
40 whole journeys per player: each chapter's 8 climbs (a lost climb is replayed), then its 4 restorations; short of paint, the player replays the last climb and carries on.

Player	Chapter	Climbs played	Extra climbs for paint	Restoration visits	Paint earned	Paint spent	Paint left
weak	1	17.4	1.9	5.9	792	409	383
weak	2	26.4	1.0	5.0	1,185	686	499
weak	3	28.5	2.0	6.0	1,533	1,017	516
average	1	8.6	0.2	4.2	1,241	405	836
average	2	8.8	0.1	4.1	2,043	686	1,357
average	3	9.3	0.3	4.3	2,580	1,010	1,569
strong	1	8.1	0.0	4.0	1,500	405	1,095
strong	2	8.1	0.0	4.0	2,339	685	1,654
strong	3	8.3	0.1	4.1	2,967	1,000	1,967

Targets

Player	Max extra climbs a chapter	Worst chapter	On target?
weak	2.5	2.0	Yes
average	0.5	0.3	Yes
strong	0.5	0.1	Yes

Before phase 5 a bucket cost 5 in every chapter and the climbs paid 5-10 times what the restorations needed, while a weak player was still 9 climbs short in chapter 2: the paint came in the wrong colours. Three changes fixed it: each chapter's climbs now drop the colours its painting needs (Colours sheet), the bucket price rises by chapter, and a restoration that runs out of paint keeps the sand already drained, so the player climbs once more and carries on instead of paying twice. The paint left over (wrong colours, mostly) carries into the next chapter and is the stock for the boosters and shop of phase 6.



Paint by colour

What a chapter's 8 climbs pay in each colour, against what its painting needs at the bucket prices on the Restorations sheet.

Chapter 1: The Great Wave (Hokusai)

	Red	Yellow	Blue	Green	Purple
Painting needs	27	187	137	55	0
weak climbs pay	89	186	133	142	97
weak coverage	3.3x	1.0x	1.0x	2.6x	
average climbs pay	173	402	225	304	110
average coverage	6.4x	2.1x	1.6x	5.5x	

Chapter 2: Wheat Field with Cypresses (Van Gogh)

	Red	Yellow	Blue	Green	Purple
Painting needs	72	213	291	94	15
weak climbs pay	158	279	338	180	107
weak coverage	2.2x	1.3x	1.2x	1.9x	7.1x
average climbs pay	264	626	620	352	157
average coverage	3.7x	2.9x	2.1x	3.7x	10.5x

Chapter 3: The Milkmaid (Vermeer)

	Red	Yellow	Blue	Green	Purple
Painting needs	292	298	208	197	4
weak climbs pay	240	370	244	281	126
weak coverage	0.8x	1.2x	1.2x	1.4x	31.5x
average climbs pay	639	785	461	448	159
average coverage	2.2x	2.6x	2.2x	2.3x	39.8x

Coverage under 1.0x (red) means the base climbs alone don't pay for that colour; the player makes it up with an extra climb or by mixing (green = yellow + blue, purple = red + blue, at 4/5 of a bucket of each). Each chapter's colour cycle leans on its painting: the Great Wave is blue then yellow, the Wheat Field an even yellow, blue and green, the Milkmaid mostly yellow with red and blue. Over a whole chapter even a weak player is covered; the one or two extra climbs on the Economy sheet come from timing. A restoration arrives after every two climbs, and a quarter that is nearly all one colour (the Great Wave's third, all blue) can ask for more of it than the last two climbs paid. The saved sand makes that a short detour rather than a wall.

The meta

The daily painting, the weekend Grand Climb and the skins shop (phase 6).

Daily painting: the box of buckets per quarter (the bot's need x1.3, plus one spare of every paint used)

Painting	Quarter	Red	Yellow	Blue	Green	Purple	Buckets	Bot result	Buckets left
great-wave	1	0	16	9	0	0	25	Restored	7
great-wave	2	6	16	0	4	0	26	Restored	9
great-wave	3	0	6	17	4	0	27	Restored	9
great-wave	4	3	9	8	9	0	29	Restored	11
wheat-field	1	0	9	15	0	0	24	Restored	7
wheat-field	2	0	7	14	4	3	28	Restored	10
wheat-field	3	6	12	4	6	0	28	Restored	10
wheat-field	4	6	5	11	6	0	28	Restored	10
milkmaid	1	5	6	0	15	0	26	Restored	9
milkmaid	2	6	17	0	3	0	26	Restored	10
milkmaid	3	12	3	12	0	2	29	Restored	11
milkmaid	4	9	7	9	3	0	28	Restored	11

Grand Climb: best tier of three tries, over twelve generated weekends

Player	No tier	Bronze	Silver	Gold
weak	13%	87%	1%	0%
average	0%	8%	57%	35%
strong	0%	1%	30%	70%

Weekend	Bronze line	Silver line	Gold line	Weak bronze+	Average silver+	Strong gold
17/10/2026	860	3,600	10,800	95%	99%	84%
24/10/2026	860	3,600	10,700	86%	90%	57%
31/10/2026	830	3,450	10,300	80%	92%	90%
07/11/2026	1,000	4,200	12,500	88%	99%	59%
14/11/2026	790	3,300	9,850	91%	97%	78%
21/11/2026	860	3,550	10,700	92%	80%	30%

28/11/2026	970	4,050	12,100	79%	94%	76%
05/12/2026	840	3,500	10,500	75%	95%	66%
12/12/2026	910	3,800	11,300	96%	96%	66%
19/12/2026	780	3,250	9,800	89%	86%	77%
26/12/2026	710	2,950	8,900	96%	93%	100%
02/01/2027	820	3,400	10,200	79%	88%	61%

Skins: the paint sink (prices are inputs; leftover paint per chapter from the Economy sheet)

Average player's paint left a ch 1,254

Weak player's paint left a chap 466

Skin	Price	Unlock	Running total	Chapters (average)	Chapters (weak)
Whiskers (Cat)	0	Default	0	0.0	0.0
Biscuit (Dog)	300	Paint	300	0.2	0.6
Clucky (Chicken)	600	Paint	900	0.7	1.9
Coo (Pigeon)	900	Paint	1,800	1.4	3.9
Sunny (Birb)	1,300	Paint	3,100	2.5	6.7
Merlin (Wizard)	1,800	Paint	4,900	3.9	10.5
Shadow (Ninja)	2,500	Paint, or the start	7,400	5.9	15.9
Zib (Alien)	0	Grand Climb gold	7,400	5.9	15.9

The daily box leaves the bot about a third of its buckets, room for a person's slower play. The Grand Climb is drawn so that every row can be survived from every lane by a careful hero (a safe middle, or safe edges); feasts beside the safe cells are what a bigger board eats, so the board decides how high you go. The lines are 0.6x, 2.5x and 7.5x the power a careful 100-power hero reaches. Skins are paid from the biggest piles first, so they soak up the colours the paintings don't need: over the three chapters an average player's leftover paint buys all but the last two skins (the daily and Grand Climb rewards cover the rest), and a weak player's buys two.

Tuning

Every tuning number, as the build uses it (*ChargeRules*, *ClimbRules*, *RestorationRules*).

Area	Field	Value	What it does
Charge	Seconds	30	Length of the match-3 charge
Charge	StartPower	10	Hero power before the first move
Charge	PowerPerTile	1.1	Power per tile cleared
Charge	PowerPerCascade	0	Bonus per cascade after the first
Charge	PowerPerSpecial	8	Bonus per special tile made
Charge	ComboMultiplier	1.4	Power multiplier when two specials are swapped together
Charge	MaxShields	2	Shields carried into the climb (from Star specials)
Climb	PaintFor(power)	$\text{round}(\sqrt{\text{power}})$	Paint dropped by an enemy of that power
Climb	MealCap	0.3	A meal adds the enemy's power, but at most this share of the hero's own
Climb	MagnetRatio	0.5	Paint pulled from a neighbouring lane with the magnet
Climb	GuardianJackpot	2	Paint multiplier for beating the guardian
Climb	Stars	0.85 / 0.90	Shares of the solver's best paint (boards 90 / 140) for 2 / 3 stars
Restoration	Width x Height	40 x 54	Grains in a quarter of a painting
Restoration	Funnels	4	Funnels under the painting
Restoration	BucketCapacity	120	Grains a bucket holds
Restoration	ChapterBucketCost	6 / 10 / 15	Paint per bucket in chapters 1 / 2 / 3
Restoration	MixCostEach	4/5 of a bucket	Paint of each parent colour to mix a green or purple
Restoration	WinShare	0.8	Share of the sand drained before the brush sweeps the rest
Restoration	Refund	unused share	A bucket sent away early refunds its unfilled share of the price
Restoration	Saved sand	kept	Running out of paint keeps the drained sand for the next visit
Daily	Box	$\text{bot} \times 1.3 + 1$	Buckets in the daily's box: what the bot spends, plus a margin and a spare of each paint
Daily	Reward	(2 + streak) buckets	Paint for the first win of the day, at the current chapter's bucket price; the streak counts up to 7
Daily	UnlockStep	3	The daily and the Grand Climb open after the first restoration
Grand	Rows	20	Rows in a weekend's Grand Climb
Grand	Lines	0.6 / 2.5 / 7.5	Bronze / silver / gold, as multiples of a careful 100-power hero's power at the top
Grand	Tries	3 + 2	Free tries a weekend, plus tries for rewarded ads
Grand	Rewards	150 / 300 / 600	Paint per tier, once a weekend each; first gold ever gives the Zib skin
Ads	RewardedPerDay	12	Cap on rewarded ads a day
Ads	Interstitials	from level 8, every 3 climb	At least 180 s apart, 90 s after a rewarded ad; never with the starter pack or ad removal

Ads	RefillBuckets	3	Buckets a restoration or daily refill gives
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