MECHANICS PAPER - SEASON 1 (v1.0)

BattleDoge (Season 1 Mechanics)

Player-facing document. Some values are governance parameters; always check the latest on-chain params.

https://BattleDoge.co

BattleDoge (Season 1 Mechanics)

This paper explains the Season 1 ("v1.0") rules so players can predict outcomes, plan risk, and avoid ambiguity. Later seasons may revise numbers and rules; a new paper will be published for each season.

Season 1 brings forward a deterministic, on-chain PvP game built around:

- Unbanked vs Banked balances (risk vs protection)
- Attack Turns (AT) (your pacing / stamina)
- Clear combat math (so you can calculate outcomes)
- Anti-abuse limits (how system stays fair and prevents exploits and collusion)

Season 1 note: Banked funds generate no yield. Banking is protection, not interest-bearing staking.

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1) Getting started (first-time player checklist)

1. Connect your Ethereum wallet to https://BattleDoge.co. We recommend using Metamask and mevblocker.io to prevent front-running/mempool attacks.
2. Acquire BDOGE in your wallet/eth address.
3. Deposit BDOGE in the game to create/activate your Hero (see Chapter 2.1).
4. Ensure your Unbanked is at least MIN_PLAY_STAKE (see Chapter 4).
5. Buy at least one weapon and one armor (Tier 1 is enough) (see Chapter 6.2).
6. Use previewAttack to check outcomes before spending AT (see Chapter 13).
7. Attack targets within ±5 levels (see Chapter 6.1).

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2) The Hero (identity, attributes, progression)

2.1 Hero existence (important)

Each wallet can have exactly one Hero in Season 1.

Your Hero is recognized on-chain after your first Deposit. Before that, you effectively "don't exist" in the game state.

2.2 Hero stats (what you control)

Your Hero has:

- Level, XP, and a daily XP counter
- Attributes: Might and Grit (plus Unspent points)
- Item stats: ItemAtk (weapon total) and ItemDef (armor total)
- Attack Turns (AT) (spent to initiate battles)

2.3 Might and Grit (what they do)

- Might amplifies your weapon contribution to Attack Rating
- Grit amplifies your armor contribution to Defense Rating

They behave like multiplier-style scaling on item totals (not flat additions). Combat rating math also uses an effective cap concept so scaling can't run away infinitely.

2.4 Attribute point budget (exact)

At level L, your total attribute-point budget is:

$$\text{TotalPointsBudget}(L) = 20 + 4 \times (L - 1)$$

You distribute this budget across:

- Might
- Grit
- Unspent points (not allocated yet)

(You can change allocation later via Respec.)

2.5 Leveling curve (exact)

To advance from level L to L+1:

$$\text{XP\_required}(L) = 250 + 150 \cdot L + 50 \cdot L^2$$

Season 1 level cap: LEVEL_MAX (launch cap is 100).

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3) The two-balance economy (the core gameplay loop)

Your BDOGE is split into two pools:

- Unbanked (at risk):
  - Used for play eligibility
  - Used to pay for game actions (shop, respec, guild ops, etc.)
  - The only balance that can move due to combat (loot/steal)
- Banked (protected):
  - Not affected by combat outcomes
  - Not used for purchases
  - Does not count toward risk factor (risk uses Unbanked only)
  - No on-chain yield in Season 1

3.1 Deflationary design

Season 1 is deflationary: BDOGE spent on in-game fees/purchases is burned (permanently removed from supply).

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4) Play eligibility (minimum stake)

To initiate attacks, your Unbanked must be ≥ MIN_PLAY_STAKE.

If your Unbanked falls below MIN_PLAY_STAKE, you become Play-Disabled:

- You cannot initiate attacks until you top up.
- You can still be attacked, but the risk system and XP gates make "broke targets" generally unattractive (see Chapter 9).

MIN_PLAY_STAKE is a Season 1 parameter adjustable by governance. Always check the latest on-chain params.

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5) Attack Turns (AT): your stamina system

5.1 AT basics

- AT is spent only by the attacker (defenders do not spend AT).
- You may spend 1, 2, or 3 AT per attack.
- AT regenerates over time, up to a cap.

5.2 Season 1 defaults (player-relevant)

- AT cap: 3
- AT starts at: 3
- Regen period: `attackTurnsPeriod` seconds per 1 AT (published on-chain)

5.3 Exact regeneration behavior (saturating)

Let:

- `period = attackTurnsPeriod`
- `lastATTime = your stored AT timestamp`

Rules:

- If you're at cap, you stay at cap.
- AT does not "overfill": time spent waiting while already at cap does not store bonus AT. Regen effectively resumes after you spend AT.
- Otherwise, you regain: gained = floor((now - lastATTime) / period) (rounded down)
- Fractional remainder is ignored.
- Your `lastATTime` advances by `gained × period` (so regen doesn't "double count" time).

5.4 AT multipliers (exact)

Spending fewer AT reduces the "decisiveness" of your battle (affects outcome metric and loot math).

- Spend 1 AT: 0.5773502691896257 28 (≈ 0.58)
- Spend 2 AT: 0.8164965809277260 80 (≈ 0.82)
- Spend 3 AT: 1.0

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6) Who you can attack (anti-abuse limits)

6.1 Level band (exact)

You may only attack targets within ±5 levels of you (inclusive).

6.2 Equipment requirement (attacker-only, exact)

To initiate an attack in Season 1, the attacker must have:

- a weapon (ItemAtk > 0)
- armor (ItemDef > 0)

(Defenders may have zero equipment; the restriction is on initiating attacks.)

6.3 Per-target cap (exact; counts all outcomes)

You may resolve at most 3 attacker-initiated battles against the same defender in a rolling 24-hour window, regardless of outcome (win/loss/stalemate all count).

Only resolved (completed) battles count toward this limit. reverted/failed transactions do not count (and do not spend AT).

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7) Combat math (deterministic outcomes)

7.1 Ratings (shape)

Combat uses two main ratings:

- Attack Rating (attacker)
- Defense Rating Effective (defender)

They are computed from:

- attacker ItemAtk + Might scaling
- defender ItemDef + Grit scaling
- plus the effective-cap behavior in the rating math

7.2 Outcome metric (exact structure)

Compute:

1. outcomeRatio = AttackRating / DefenseRatingEffective
2. Apply AT multiplier:

```
outcomeMetric = outcomeRatio × AT_multiplier
```

7.3 Outcome bands (exact thresholds)

- If outcomeMetric ≥ 1.0 → ATTACKER_WIN
- Else if outcomeMetric ≥ 0.95 → STALEMATE
- Else → DEFENDER_WIN

7.4 Rounding note

All on-chain math is integer-based; divisions effectively round down. This matters at tiny balances: "a small % of a tiny balance" may round to 0.

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8) Value transfer (Loot & Steal)

Important: Only Unbanked moves due to combat. Banked never moves due to battle outcomes.

8.1 Attacker win → Loot (exact shape; capped)

If attacker wins, attacker may loot a portion of defender's Unbanked.

Loot percentage:

- Base 5%
- Plus up to +45% based on advantage and AT spent
- Then scaled by the attacker's risk factor
- Final cap: 50%

Player-readable formula:

- `ratioAdv = clamp01(outcomeRatio - 1)`
- `lootPctRaw = 0.05 + 0.45 × ratioAdv × AT_multiplier`
- `lootPct = min(0.50, lootPctRaw × attackerRiskFactor)`
- `lootAmount = floor(defenderUnbankedPre × lootPct)`

If defenderUnbankedPre is 0, loot is 0.

8.2 Defender win → Steal (exact shape; max 20%)

If defender wins, defender may steal a portion of attacker's Unbanked.

Steal percentage:

- Base 5%
- Plus up to +15% based on how strongly defender won
- Then scaled by defender risk factor
- Maximum possible steal percent is 20% (before/after risk scaling, the top is still 20% because the base+bonus tops out at 20%)

Player-readable formula:

- `marginFactor = clamp01((0.95 - outcomeMetric) / 0.95)`
- `baseStealPct = 0.05 + 0.15 × marginFactor`
- `stealPct = baseStealPct × defenderRiskFactor`
- `stealAmount = floor(attackerUnbankedPre × stealPct)`

If attackerUnbankedPre == 0 or defenderUnbankedPre == 0, steal is 0.

8.3 Stalemate

- No BDOGE moves (no loot, no steal)

9) Risk system (why "dust farming" doesn't work)

9.1 Key strategic rule (one sentence)

You only earn meaningful progress when you accept meaningful exposure: keeping too little Unbanked (or attacking targets with too little Unbanked) sharply reduces rewards - especially XP - and frequent attacking forces you to plan around locks that limit how fast you can move funds out.

Treat Unbanked as your "battle bankroll." Don't expect to farm progress from dust balances.

9.2 RISK_DENOM_FLOOR (exact)

A derived floor is used in the risk system:

RISK_DENOM_FLOOR = max(MIN_PLAY_STAKE / 2, 100) (in BDOGE units)

9.3 Risk factors (concept)

Both value transfer and XP are scaled by a risk factor that rewards "skin in the game."

- AttackerRiskFactor scales attacker loot and attacker XP
- DefenderRiskFactor scales defender steal and defender XP

Full risk credit is reached once you bring meaningful Unbanked exposure relative to your target (and a system minimum floor).
If you bring too little Unbanked (or fight targets with too little Unbanked), your rewards - especially XP - are sharply reduced.
Additional Unbanked beyond the full-credit point doesn't increase rewards further; it just gives you buffer.

9.4 Attacker XP hard-gate (critical)

Some defenders are effectively loot-only targets: even if you win, you may receive 0 attacker XP.

If defenderUnbankedPre < RISK_DENOM_FLOOR, then attacker XP candidate is forced to 0 (loot may still occur).

Practical note: targets with 0 Unbanked yield no loot and no attacker XP, so they are not meaningful progress targets.

10) XP awards, difficulty, and daily cap

10.1 Base XP per outcome (exact)

Per resolved battle (for each side):

- Winner: 100 XP
- Stalemate: 40 XP
- Loser: 20 XP

10.2 Difficulty factor (exact behavior)

XP is multiplied by a factor based on level difference:

- Each level the opponent is above you: +10%
- Each level you are above opponent: -10%
- Clamped to [0.5, 1.5]

10.3 XP candidate (player-readable)

For each side:

```
xpCandidate = floor(baseXp × difficultyFactor × thatSideRiskFactor)
```

Additional rules:

- Attacker also applies the hard-gate in Chapter 9.4.
- Defender does not have that hard-gate (defenders can still earn reduced XP on low-stake defenses if they risk >0).

10.4 Daily XP cap (exact behavior)

Each Hero has a per-day XP cap xpCapDaily, using a UTC day index:

- `dayIndex = floor(timestamp / 86400)`
- XP is tracked per hero per day.
- Once you hit the cap, further XP that day becomes 0 (but battles can still transfer Unbanked).

Season 1 launch default: 5,000 XP per UTC day (attacker + defender combined).

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11) Items & the shop (stacked model)

11.1 Stacked items (key rule)

Season 1 uses a stacked model:

- Every weapon purchase increases ItemAtk by that tier's stat.
- Every armor purchase increases ItemDef by that tier's stat.
- There is no equip/unequip; totals accumulate permanently.

11.2 Tiers, unlocks, and visibility

Weapon/armor tiers have:

- price
- stat value
- unlock level

The current schedule is published on-chain and shown in the official UI.

11.3 Calculating an upgrade

Upgrades affect combat immediately through the rating formulas (Chapter 7), with Might/Grit scaling item totals.

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12) Respec (reallocating attributes)

Respec lets you reallocate your attribute points at your current level by paying a fee from Unbanked BDOGE.

Respec fee behavior (player-readable):

- Fee increases with your Respec count.
- Season 1 allows a maximum of 26 Respecs per Hero. After you reach this cap, Respec becomes unavailable for the season.
- The fee growth is capped (so it does not increase forever).

Respec is blocked by the attacker-side combat spend-lock (see Chapter 14.2).

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13) Previewing fights (recommended)

Before attacking, use:

previewAttack(attacker, defender, t)

This mirrors the same guards and combat math as a real attack without changing state, returning (among other values):

- outcome band (win / stalemate / lose)
- ratings + outcome metric
- loot/steal % (when applicable)
- XP candidates (pre daily-cap enforcement)

If preview shows attacker XP candidate = 0, check defender's Unbanked vs RISK_DENOM_FLOOR.

In plain terms: the defender is a low-stake / loot-only target (you may still loot on a win, but you won't gain attacker XP).

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14) Locks, cooldowns, and safety rules

This section is explicit so you can plan liquidity.

14.1 Banking cooldown (exact)

Bank / Unbank / Withdraw are subject to a 7-day cooldown, and also a combat-time lock.

The game exposes:

nextBankUnbankWithdrawAvailableAt(owner)

This returns the earliest timestamp you can Bank/Unbank/Withdraw again:

max(cooldownEnd, combatEnd)

14.2 Combat spend-lock (attacker-only)

After you initiate an attack, you enter a combat lock window (COMBAT_LOCK_SECONDS).

During this window (as the attacker), you are prevented from certain spend/burn actions (such as shop purchases, respec, and various guild fee operations) and from banking operations per Chapter 14.1.

Being attacked does not place you under this attacker spend-lock.

14.3 Deposits during locks

- Deposit is not subject to the 7-day cooldown.
- By default in Season 1, Deposit is intended to be "always allowed in," even during combat lock.
- Governance can enable a stricter rule that blocks Deposit during combat lock (COMBAT_DEPOSIT_LOCK_ENABLED).

14.4 Mempool reality (practical)

Because everything is on-chain, the state used for combat is whatever is true when the transaction executes. If you broadcast an attack publicly, others may react before it confirms. Use the safety guidance in Chapter 16.

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15) Guilds (Season 1 social layer)

Guilds provide coordination and identity (Season 1 has no guild combat mechanics).

- Create guild: costs BDOGE (burned). Creator becomes owner.
- Capacity: starts at 20 members; owner may buy up to three upgrades (+10 each) for a max of 50.
- Ownership controls: owner can remove members and transfer ownership; dissolution requires the guild to be empty.
- Joining a guild: free in Season 1 (join fee is 0).
- Renaming / upgrades: cost BDOGE (burned).

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16) MEV / transaction safety (strong recommendation)

We strongly recommend (especially when attacking) to use MEV Blocker (or other private transaction routing) to reduce harmful transaction ordering effects.

Official RPC: https://mevblocker.io

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17) Glossary (quick definitions)

- AT (Attack Turns): Regenerating resource spent to initiate attacks (1-3 per battle). Spending more increases the AT multiplier.
- Unbanked: Exposed balance used for combat transfers and all purchases; used for play eligibility.
- Banked: Protected balance (not affected by combat transfers). No on-chain yield in Season 1.
- Play-Disabled: State where Unbanked < MIN_PLAY_STAKE; you cannot initiate attacks.
- ATTACKER_WIN: Attacker loots defender Unbanked (subject to risk factor).
- STALEMATE: No value transfer; XP still awarded.
- DEFENDER_WIN: Defender steals attacker Unbanked (subject to risk factor).
- Risk factors: Scaling terms rewarding real exposure; suppress dust farming; also used in XP.

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18) Season 1 quick reference (defaults & fixed rules)

- Level band: ±5 (inclusive)
- Per-target cap: 3 resolved attacks per attacker→defender per rolling 24h (all outcomes count; reverted/failed tx don't count)
- AT cap: 3; spend 1-3 AT per attack
- Outcome thresholds: ≥1.0 win, ≥0.95 stalemate, else defender win
- Loot: base 5% + up to 45%, scaled by risk factor, capped at 50%
- Steal: base 5% + up to 15%, scaled by risk factor, max 20%
- Base XP: 100 / 40 / 20 (win / stalemate / loss)
- Difficulty factor: ±10% per level, clamped [0.5, 1.5]
- Daily XP cap (launch default): 5,000 XP per UTC day per hero
- Banking cooldown: 7 days for Bank/Unbank/Withdraw
- No yield on Banked in Season 1
- Might cap: 150, Grit cap: 150
- Level cap (Season 1): 100
- Joining a guild: free
