# NFL Model Improvement Formulas & Methodology

***1. Opponent-Adjusted Efficiencies (SRS Adjustment)***

AdjMetric_team = RawMetric_team – Avg(OpponentMetric_of_opponents) + League_Avg

***2. Yards-to-Points Translation***

ExpPoints = Drives * (ExplosiveRate * 4.7 + SustainedRate * 2.4)

***3. Turnovers as Poisson Events***

Turnovers_team ~ Poisson(λ), where λ = (Own_Giveaways + Opponent_Takeaways)/2
Expected_Points_Lost = 3.2 * (Turnovers_team – League_Avg_TO) * 0.6

***4. Weather Adjustment***

PassYds_Adjust = Base_PassYds * [1 – 0.004*(TempRef–Temp) – 0.015*Wind(10–20) – 0.03*Wind(20+) – 0.06*Rain]
FG%_Adjust = FG% – (1–6%) based on wind/rain severity

***5. Home Field Advantage***

HFA = 2.0 + 0.5*Altitude + 0.3*CrossTZ + 0.2*ShortWeek

***6. Market Blend (Optional Calibration)***

FinalScore = 0.6 * Model_Pred + 0.4 * Vegas_Implied

***7. Turnover Differential Adjustment***

AdjPoints = BasePoints + 3.2 * (Takeaways – Giveaways)

***8. Recent Form Weighting***

Weighted_Metric = 0.6*(Last3Avg) + 0.4*(SeasonAvg)

***9. Special Teams EPA Adjustment***

ST_EPA = 0.04*(NetPuntDiff) + 0.02*(FG%Diff)

***10. Confidence Intervals (Monte Carlo Simulation)***

Simulate 10,000 games drawing drives, success rates, turnovers (Poisson), RZ outcomes (Binomial)
Return: Median, 25–75%, 10–90% prediction intervals

***11. Drive-Based Simulation (Advanced)***

Drives = pace blend of both teams
Each drive outcome ~ Logistic(success metrics, TO risk, field pos, RZ%)

***12. Regression Calibration***

PointDiff = β0 + β1*(AdjOffEPA) + β2*(AdjDefEPA) + β3*(Pace) + β4*(TO_diff) + β5*(Weather) + β6*(ST)
Model via Ridge/ElasticNet; retrain weekly

**Calibration Targets:**
• Winner accuracy ≥ 70%
• Mean Absolute Error (points) ≤ 6.0
• Spread MAE ≤ 5.0
• Total MAE ≤ 7.5

**Implementation Notes:**
- Opponent adjustments yield major accuracy boosts.
- Poisson turnovers and Monte Carlo add realism.
- Blend with market data for mid-season stability.

# NFL Matchup Prompt Template & Logic Guide

## ■ Prompt Template

Compare [Team A] vs [Team B] using the uploaded NFL unified dataset.
The game will be played in [City, State], with weather conditions starting at [Start Temp]°F and ending at [End Temp]°F, including [wind conditions and precipitation if any].
Assume standard field conditions unless otherwise stated.

**Return:**
1. Projected final score for both teams (with expected score range)
2. Projected passing yards for each team (adjusted for weather and opponent defense)
3. Projected rushing yards for each team
4. Projected interceptions for each team
5. Win probability for each team
6. Narrative summary covering:
• Offensive vs. defensive efficiency
• Turnover tendencies
• Special teams edge
• Weather and home-field impact
• Overall expected game flow

## ■■ Behind-the-Scenes Logic

**Base Calculations:**
• Expected Points = (Off_PPG + Opp_Def_PAG) / 2 + TO + ST + Home + Weather
• Passing Yards = (Team Off PYDS/G + Opponent DEF PYDS/G) / 2
• Rushing Yards = (Team Off RYDS/G + Opponent DEF RYDS/G) / 2
• Interceptions = 0.7 × ((Opponent Takeaways/G + Team Giveaways/G) / 2)
• Win Probability = Logistic curve based on expected point differential

**■■ Weather Modifiers:**
ConditionPassing YardageKicking EfficiencyTurnoversNotes Light wind (5–10 mph)–2%–1%—Negligible effect Moderate wind (10–20 mph)–5%–3%+0.1 TOMild passing disruption Strong wind (20–30 mph)–10%–6%+0.2 TOMajor passing/kicking impact Heavy rain / snow–8%–5%+0.3 TOEmphasis shifts to run game Cold (< 35 °F)–3%–2%+0.1 TOSlight downgrade to ball handling Hot (> 85 °F)–2%——Fatigue risk late game Calm, clear 50–70 °F———No adjustment

## ■ Example Prompt

Compare Pittsburgh Steelers vs Cincinnati Bengals using the uploaded NFL unified dataset.
The game will be played in Cincinnati, Ohio, with weather starting at 60°F and ending at 50°F, under light wind (6 mph) and no precipitation.
Assume standard field conditions.

Return projected score, passing yards, rushing yards, interceptions, win probability, and a written summary explaining offensive/defensive balance, turnovers, special teams, and weather effects.