



Scales of Measurement at a Glance

A practical field guide for choosing Nominal, Ordinal, Interval, and Ratio scales before selecting charts, averages, or statistical tests.

Master Black Belt field note

In real manufacturing, quality, and business analysis, the biggest mistake is not usually the formula—it is treating the wrong kind of data as if it were precise measurement data. This sheet helps you classify the variable first, then choose the method.

1. Quick Comparison Table

Scale	What it tells you	Order?	Equal gap?	True zero?	Common examples
Nominal	Names or categories only	No	No	No	Defect type, machine ID, supplier, department
Ordinal	Categories with a meaningful rank	Yes	No	No	Risk level, satisfaction rating, audit maturity
Interval	Numeric values with consistent spacing	Yes	Yes	No	Temperature in °C/°F, calendar year, time of day
Ratio	True measurement with absolute zero	Yes	Yes	Yes	Weight, cycle time, cost, distance, count, revenue



Scales of Measurement at a Glance

2. 30-Second Decision Tree



3. What You Can Safely Do With Each Scale

Scale	Best summaries	Useful charts	Typical analysis direction	Avoid this mistake
Nominal	Count, %, mode	Bar chart, Pareto, pie chart	Compare category frequencies	Do not average labels or codes
Ordinal	Median, percentile, rank, mode	Ordered bar, stacked bar	Compare ranked responses or maturity levels	Do not assume equal gaps without justification
Interval	Mean, range, standard deviation	Line chart, histogram, box plot	Compare differences and trends	Do not say twice as much without true zero
Ratio	Mean, standard deviation, CV, rate	Histogram, box plot, scatter, control chart	Compare magnitude, ratios, rates, capability	Do not ignore units or measurement system quality

Scales of Measurement at a Glance

4. Practitioner Examples by Business Scenario

Shopfloor / Manufacturing	Quality Engineering	Customer / Service	Business Dashboard
Machine ID → Nominal	Defect type → Nominal	Complaint category → Nominal	Region → Nominal
Defect severity → Ordinal	Risk priority band → Ordinal	Satisfaction rating → Ordinal	Priority level → Ordinal
Oven temperature °C → Interval	Calibration temperature °F → Interval	Time of day → Interval	Calendar year → Interval
Cycle time minutes → Ratio	Part weight grams → Ratio	Response time hours → Ratio	Revenue, cost, units → Ratio

5. Scale Selection Checklist

Before analysis

- ☐ The variable is clearly named
- ☐ The unit of measure is visible
- ☐ Category codes are not mistaken for numbers
- ☐ Ranking data is not automatically averaged
- ☐ True zero is confirmed before ratio statements

Before publishing or sharing results

- ☐ Chart type matches the scale
- ☐ Summary statistic matches the scale
- ☐ Any limitation is explained in plain language
- ☐ Business decision is tied to correct interpretation
- ☐ Data source and date are clearly stated



Scales of Measurement at a Glance

6. Common Mistake → Better Practice

Common mistake	Why it matters	Better practice
Averaging department codes	Codes are labels, not measurements	Use counts, percentages, Pareto charts
Treating every rating scale as precise measurement	Rank does not always mean equal spacing	Use median, distribution, or justify assumptions
Calling Celsius temperature ratio data	Zero °C is not absence of temperature	Treat as interval unless using Kelvin
Ignoring measurement system reliability	Wrong data collection creates false confidence	Check definitions, units, and data collection method

How to use this cheat sheet in a project

Use it during Define and Measure phases before building dashboards, selecting control charts, summarizing survey data, or running hypothesis tests. A one-minute scale check prevents many downstream interpretation errors.

Download intent idea: Pair this cheat sheet with a data collection plan, check sheet, and chart-selection guide to create a complete “Statistics Starter Toolkit” for learners and project teams.

Reference basis

Prepared as an original Digital E-Learning practitioner cheat sheet using standard statistical definitions of nominal, ordinal, interval, and ratio measurement scales, with examples adapted for manufacturing, quality engineering, Lean Six Sigma, customer feedback, and business dashboards.