Scatter Plots: Two Variables, One Pair per Point

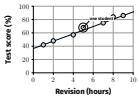
Key idea

A **bivariate** scatter plot records two numerical variables for each individual. Read both axes, variables and units before describing the pattern.

Roles

Revision time is the plausible **explanatory** variable; test score is the **response**. This names roles, not proven cause.

Each point is one student



Common mistake

Do not treat the points as a journey through time. They are paired observations.

TARS: Shape, Direction, Strength, Spread

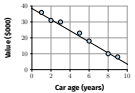
Key idea

T Trend: linear or non-linear.
A Association: positive, negative, or no clear association.
R Relationship: weak, moderate, or strong.
S Scatter: constant or non-constant (fanning).

Keep ideas separate

Direction answers “which way?” Strength answers “how tightly do points follow the pattern?”

Strong negative, linear, constant scatter



Common mistake

“Strong positive” mixes R and A correctly, but it does not say whether the trend is linear.

O and G: Exceptions and Subgroups

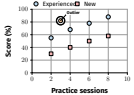
Key idea

An **outlier** sits away from the main pattern. **Groups** are distinct clusters. Identify them with coordinates, ranges, or the key.

Evidence

The point $(3, 82)$ is far above the main pattern. Circle and square markers form two bands, so one overall description may hide group differences.

Name what the graph actually shows



A Complete TARSOG Description Uses Evidence

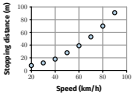
Key idea

Name both variables and connect every claim to visible evidence. Not every plot has an outlier or grouping.

Model statement

There is a **non-linear, positive, strong** relationship between speed and stopping distance: points closely follow an upward-curving pattern. Scatter increases at higher speeds; there are no clear outliers or groups.

The curve matters



Common mistake

Association does not prove causation. A third variable or study design may explain the pattern.