

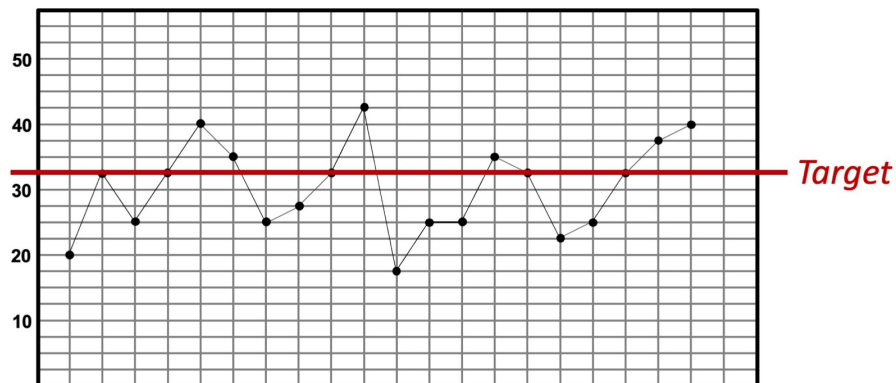
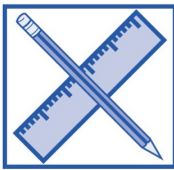


RUN CHARTS - *Plot the Dots!*

Making run charts often provides eye-opening, data-based clues that help students better understand what is actually going on, versus what they might assume is going on. But it takes a little practice to make run charts something that students will go ahead and create on their own.

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1) What is a Run Chart?



Run charts are a simple but highly useful tool for visualizing, understanding, and communicating information. A run chart is a plot of data points over time, connected with a line, that tracks data variation, trends, and patterns. A run chart gives you a deeper look at what is really happening. It tells a story.

The basic elements are a grid with dots that represent individual measurements, and a line connecting the dots:

- **The horizontal X axis along the bottom** represents time or the order of observations.
- **The vertical Y axis is the metric you're tracking.** That could be how often something happens, how long something takes, a quantity, and so on.
- **Plot the data for that metric as dots** and connect the dots with a line, to see and analyze variation. If you only have the dots, it's hard for our eyes to follow the data points and interpret their variation and trends.
- After you have started collecting and plotting data, and have gotten a sense for the current condition, **you can add a target line** that shows where you want the metric to be next. When a target line is added, the run chart helps students visualize progress toward a goal, tying into the Coaching/Reflection Questions and a growth mindset. No need to be overly ambitious with the goal. Just set a next target and see what you learn as you try to reach it.

2) How to Use Run Charts

Although run charts are a relatively simple tool, don't assume your students know how to make one. Just showing your students a completed run chart is not enough.

An important point here is that first you should walk your students through making a run chart, step-by-step, with you drawing along with them. Introduce run charts in class by creating one together from a sample data set, so everyone learns the process. (There's an example data set at the end of these instructions.) Have your students take out graph paper and pencil, and make that first run chart together. As you're doing this, go around the room to see how each student is doing, and give correcting feedback right away.

Step 2: After drawing that first run chart together in class, have the students make a run chart on their own over the course of a week, outside of class, based on having them track a daily event or activity (for example, how much TV they watch each evening, what time they have dinner, how much water they drink, etc.). Each day, invite a few students to share their ongoing charts in class, and give feedback in front of the group. Also ask what they're learning by making the run chart. This way, everyone can benefit from the corrections and insights.

Any time students have tracked and plotted data for a while, consider having them add a 'target' line to their run chart. At that point the target line becomes the goal and you can start using the Coaching/Reflection Questions in conjunction with those run charts.

You might develop a habit of saying to students, *"Run chart, or it didn't happen!"* which means *please show me your data in a run chart*. Encourage students to start by simply using pencil and graph paper, not a computer. Making run charts by hand helps you better understand both the data and the tool. Later, the students can use Excel or other software but internalize the basics first by hand.

In general, students can track two kinds of metrics: **outcome metrics** and **process metrics**.

- **Outcome metrics** measure results — things we can't directly control, like test scores or project grades.
- **Process metrics** measure the actions or behaviors that might *influence* those results — things we can control, such as study time, number of practice problems completed, or participation in discussions.

By tracking process metrics, students can look beneath the surface and identify what they can actually adjust. The idea is that if we work on these process actions, they'll lead to a predicted outcome. This is where experimenting takes place, with a hypothesis that, *"If we take this step, we predict it will influence the outcome in this way."*

Here are some examples of outcome and process metrics:

Example: Classroom Clean-Up

- An Outcome Metric: How many minutes it takes to clean the classroom.
- A Process Metric: Number of students cleaning up.

Example: Math Quizzes

- An Outcome Metric: Score on a weekly math quiz.
- A Process Metric: Number of practice problems completed each day.

Example: Spelling Tests

- An Outcome Metric: Percent score on the weekly spelling test.
- A Process Metric: Number of times you practiced spelling the words.

Avoid calculating and drawing an average/mean line for the data points, because that obscures the more detailed information you are trying to get. There's a reason for variation. See if you can find it, rather than being happy with an average number.

Tracking an outcome often leads to ideas about factors that might be influencing the outcome. Students may learn that the metrics they thought were going to drive the outcomes are not the important ones. Sometimes we learn things are different than expected, realizing that a hypothesis we had about a connection between the process and outcome metrics is not necessarily there. That's science, where you learn more as you go.

3) Why Practice Making Run Charts?

Regularly making run charts is one of the most useful process analysis practices.

Learning to use run charts isn't just about plotting data; it's about learning to pause before jumping to conclusions. Our first impressions often feel convincing, but they can be misleading. Run charts help us slow down, test our assumptions, and get a better sense for what's really happening.

Collecting the data and drawing a run chart forces you to observe and study something in more detail. This takes a little patience, but it provides better information than a first impression. By making run charts you're working more like a scientist.

By practicing run charts, students learn to withhold judgment, ask better questions, and base their conclusions on evidence rather than assumptions. It's a way of training the mind to slow down, look closer, and think more scientifically.

"Plotting measurements over time turns out, in my view, to be one of the most powerful devices we have for systemic learning." - Donald M. Berwick MD, 1995, Institute for Healthcare Improvement

"The greatest value of a picture is when it forces us to notice what we never expected to see." - John Tukey, 1977, American mathematician and statistician

Data Set for Practicing Making Run Charts

"Three weeks of measurements of the time taken to make my bed in the morning, in seconds:"

41 seconds

43

46

45

39

44

79

43

45

44

55

44

65

43

56

50

49

51

70

47

44



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