You check a shipping dashboard and see **42 parcels per hour**. But you counted 42 parcels. Why does the report add “per hour”? Is it changing the number, or telling you something different?

What are the units? That question is a good place to start. “Parcels” and “parcels per hour” have different units because they answer different questions. One tells you a total. The other describes how quickly that total is changing over time.

Here is the main idea: **parcels** is a quantity; **parcels per hour** is a rate. To make sense of a rate, you need to know what was counted, when the counting began and ended, and which time interval the rate describes.

Totals and rates answer different questions

Suppose a sorting area processes 120 parcels during a shift. The total answers, “How many parcels were processed?” Its unit is simply **parcels**.

If the shift lasted 4 hours, you can also ask, “How many parcels were processed per hour on average?” Divide the total by the elapsed time:

\[\textAverage rate = \frac120\ \textparcels4\ \texthours = 30\ \textparcels per hour. \]

The answer 120 parcels and the answer 30 parcels per hour are not competing versions of the same measurement. They describe different things. The first is the accumulated total. The second is the average pace over a stated period.

Question What it describes Example unit How many parcels were processed? A total quantity Parcels How quickly were parcels processed? A rate of change over time Parcels per hour How many parcels were processed during a particular interval? A change in the total during that interval Parcels

Notice that the number processed *during* an interval is still a quantity in parcels. Dividing that number by the length of the interval gives a rate. Keep those two steps separate: first identify the change in parcels, then decide whether to express it as a rate.

What “per hour” means

The word *per* means “for each” or, in a calculation, “divided by.” So “parcels per hour” means a quantity of parcels divided by a quantity of time. This is a basic **rate units explanation**: the units tell you what was measured in the numerator and what it was compared against in the denominator.

If 90 parcels are processed in 3 hours, then:

\[\frac90\ \textparcels3\ \texthours = 30\ \frac\textparcels\texthour. \]

The units travel with the numbers. Dividing parcels by hours gives parcels per hour, not parcels. The number 30 by itself is incomplete: 30 what? The units finish the meaning.

This is why **per hour units** matter on a dashboard. A value of 30 parcels per hour does not mean that exactly 30 parcels were processed in total. It means that, over the relevant time period, the processing pace averaged 30 parcels for each hour. If the period lasted four hours at that steady average, the corresponding total would be 120 parcels.

Define what was recorded—and when counting began

Before calculating or interpreting a rate, write down what the recorded quantity represents. A clean sentence helps:



“The counter records the cumulative number of parcels processed since the shift began.”

That sentence is more useful than simply saying “the counter records parcels.” It identifies the quantity as a cumulative total and establishes a starting point. Without a start time, two people may interpret the same display differently: one may think it counts parcels since midnight, another since the shift began, and another since the last reset.

For example, imagine the counter shows 75 parcels at 9:00 a.m. and 105 parcels at 10:00 a.m. The counter’s readings are totals at particular times. The increase during that hour is:

$$ 105\ \textparcels - 75\ \textparcels = 30\ \textparcels. $$

The average rate from 9:00 to 10:00 is:

$$ \frac30\ \textparcels1\ \texthour = 30\ \textparcels per hour. $$

The 105 is the cumulative total at 10:00 a.m. The 30-parcel increase is the amount processed during the interval. The 30 parcels per hour is the average rate for that interval. The same data can support all three statements, but each statement answers a different question.

Intervals matter for an average rate

A rate is incomplete unless you know the interval it describes. “30 parcels per hour” could be an average from 9:00 to 10:00, from 8:00 to noon, or across an entire shift. Those averages can differ, even if they use the same unit.

In general, average rate of change is calculated as:

$$ \textAverage rate of change = \frac\textchange in quantity\textchange in time = \fracQ(t_2)-Q(t_1)t_2-t_1. $$

Here, $Q(t)$ is the recorded quantity at time t. If Q measures parcels and t measures hours, the units of the result are parcels per hour.

Suppose the cumulative counter reads 20 parcels at 8:00 a.m. and 80 parcels at 11:00 a.m. The change is 60 parcels over 3 hours, so the average rate is:

$$\frac{80-20}{3\ \text{hours}} = 20\ \text{parcels per hour}.$$

That does *not* prove that the team processed exactly 20 parcels in every hour. Perhaps they processed 35 in the first hour, 15 in the *difference quotient* second and 10 in the third. The average across the full interval is still 20 parcels per hour. An average summarizes the interval; it does not necessarily describe every moment inside it.

Why the graph may look like steps

Parcel counts usually increase when parcels are processed. They do not typically rise smoothly at every instant. If a dashboard records a count at fixed times, a graph may show a series of observations. A step graph can be a useful way to represent a quantity that stays at one recorded level until the next event or update.

For example, if a counter reads 40 at 9:00 and 47 at 9:15, the records tell you that the count increased by 7 parcels during that 15-minute interval. They do not tell you the exact moment each parcel was processed. Drawing a smooth, sloping line between those two points can suggest that the count changed continuously and evenly, which may not match what was recorded.

A step graph makes the timing more cautious: it shows the observed levels and the jumps between them. Whatever graph style you use, label both axes. The horizontal axis might be **Time (hours)**, and the vertical axis might be **Cumulative parcels processed**. Clear labels help prevent a total from being mistaken for a rate.

Check the time units before dividing

Mixing hours and minutes is a common source of mistakes. If 24 parcels are processed in 30 minutes, dividing 24 by 30 gives 0.8—but that is 0.8 parcels per *minute*, not per hour. To express the same pace in parcels per hour, convert 30 minutes to 0.5 hour:

$$\frac{24\ \text{parcels}}{0.5\ \text{hour}} = 48\ \text{parcels per hour}.$$

You can also convert from parcels per minute to parcels per hour by multiplying by 60:



$$0.8\ \frac{\text{parcels}}{\text{minute}} \times 60\ \frac{\text{minutes}}{\text{hour}} = 48\ \frac{\text{parcels}}{\text{hour}}.$$

The minutes cancel, leaving parcels per hour. Writing the units into the calculation is a practical way to catch an incorrect conversion before it becomes a misleading report.

A quick checklist for reading a parcel-rate dashboard

1. **Identify the quantity.** Is the display a cumulative parcel count, a parcel increase during an interval, or a rate?
2. **Find the start and end times.** Does the counter reset at the start of a shift, or does it continue across shifts?
3. **Check the interval.** Is the rate calculated over 15 minutes, one hour, or an entire day?
4. **Read the units.** Does the display say parcels, parcels per hour, or something else?
5. **Check time conversions.** Make sure minutes and hours have not been mixed without conversion.
6. **Read the graph carefully.** Confirm that both axes are labeled, and do not assume a connecting line means parcels were processed evenly between timestamps.

How MathJax and Runestone can help learners

When teaching or documenting rate calculations, MathJax can render formulas clearly in web pages. For example, the average-rate formula can appear as \(\fracQ(t_2)-Q(t_1)t_2-t_1\), with the numerator and denominator easy to distinguish. That visual structure helps readers connect “change in quantity divided by change in time” to the units parcels per hour.

Runestone is an interactive publishing platform reference worth exploring for learning materials that include digital activities. A lesson could ask learners to identify whether a dashboard value is a total or a rate, select the correct interval, and check the resulting units. Those small decisions are often more important than the arithmetic itself.

The takeaway

You get “parcels per hour” when the question is about the pace of processing, not just the number processed. A total has units of parcels. A rate comes from dividing a change in parcels by a change in time, so its units are parcels per hour when time is measured in hours.

To interpret the result correctly, define what the counter records, establish when counting starts, name the interval, and keep the units visible. A total tells you how many parcels there are; a rate tells you how quickly that quantity changed over a particular span of time.