Precision teachers and standard celeration charters will quickly point out that kindergartners (Bates & Bates, 1971) senior citizens (Kubina, Haertel, & Cooper, 1994) and everyone in between can successful understand and use the standard celeration chart.

This guide does not focus on explaining why persons should use precision teaching or standard celeration charting, Rather, this guide will show interested readers how to chart and by doing so, Many readers will grasp precision teaching standard celeration charting without reading books or articles by virtue of measuring charting behavior. For those, however interested in reading more about precision teaching and standard celeration charting please consult the following sources: (Binder, 1996; Lindsley, 1992, 1993; Maloney, 1998; McGreevy, 1983; Pennypacker, Koenig, & Lindsley, 1972; Potts, Eshleman, & Cooper, 1993; White, 1986; White & Haring, 1980).

WHAT DO ALL THOSE LINES MEAN?

To begin to understand the chart one must first figure out what the horizontal and vertical lines mean. I will cover some figures on the standard celeration chart (SCC) that will help you understand what the lines mean. Then I will cover what we put on the chart.

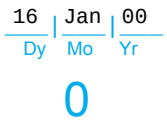
VERTICAL LINES (DAY LINES)

We call the vertical lines "day lines." Why? Each one represents a day (I bet you saw that one coming!) At the bottom of the chart you see the following figure:

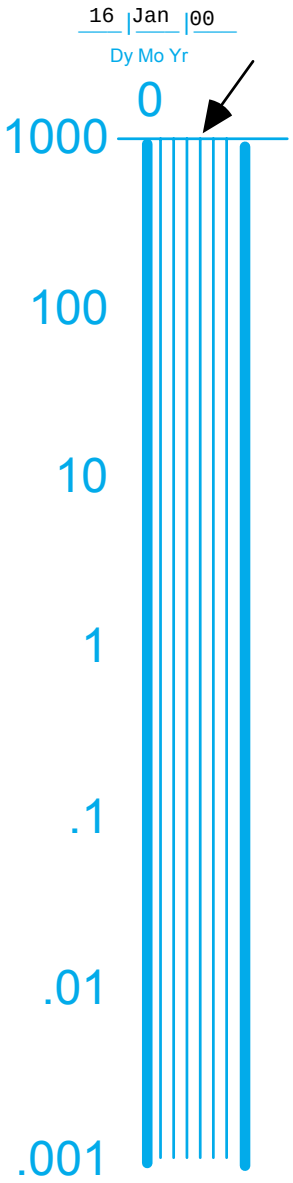
This figure helps you quickly orient to the days. You see 0, 14, 28 and so on up until 140. The 140 means 140 days appear on the chart. (Factoid: The 140 days, which comes out to 20 weeks, came about to accommodate a public school semester). Now that you know the function of day lines, to actually make the days meaningful for you or a learner we must assign the day lines a staring point. Note on the top of the chart you see the following

For personal use the easiest way to set up the times for chart follows: the Sunday (the actual date) before you started charting goes in the first Day/MO/YR category. For instance, let's say I started to chart my keyboarding skills on January 20

in 2000. It so happens that January 20 in the year 2000 falls on a Thursday. So to find that Thursday I must set up my chart by writing in the preceding Sunday (I do this because the chart Starts at Sunday and has 140 days that follow it). Now I must find the date of the Sunday before January 20. That date, January 16, will now go in the first Day/MO/YR category. We use the following convention to for the Day/MO/YR category. We represent Day by a number (in our case a 16 for the 16th of January). For MO, or month we use the 3-letter abbreviation (we would then represent January as Jan). Last we show the year by a two symbol number (we would show 2000 as 00). So I would write this in the first Day/MO/YR category to show the preceding Sunday to our charting:



Now we can easily find the first day we charted, Thursday January 20. The figure below shows how we move over from the first day, Sunday January 16, 2000 to Thursday January 20, 2000 (the arrow points to Thursday, the 20 of January 2000).


16 Jan 00
Dy Mo Yr
0
1000
100
10
1
.1
.01
.001

When I made the preceding figure I made the dark, Sunday lines thick so you can readily distinguish them from the other days. If you look on a typical daily Standard Celeration Chart you will see the Sunday lines do appear thicker than the other lines (not as thick I made them!). This will help you quickly get your bearing on the chart.

Time for a quiz (you will need a calendar for this)! We just set up our chart to show the first as 16 January 2000. Question 1: What do we write in the next Day/MO/YR? Question 2: What does the 4 under the Day/MO/YR category mean?

I like working with you because of quickly you pick these things up! Yes, I bet you answered both questions correctly. The first answer, we must write in the date for the next 28 days after 16 Jan 00. We write the date February 6, 2000 the same way we write the date for all other Day/MO/YR (two digit day, 3 letter month abbreviation, and two digit year). The following figure shows how to write in the Day/MO/YR category following the first Day/MO/YR:

As you correctly deduced the second question, that 4 stands for 4 weeks (or 28 days). So I suppose if I asked you what the 8, 12, 16, and 20 stood for you could easily reply "the number of weeks passed by since the first week." I knew you could

get this stuff! Good job! Now you can find any day on the chart just by figuring out where that day lies in relation to the first Sunday before we began charting

Technical note: Looking at the bottom of the chart I supplied you will recall the bottom figure goes 0, 14, 28, 42, 56, 70, 84, 98, 112, 126, 140. That number tells you how many days have passed from the first Sunday. Therefore 28 means 28 days have passed and 70 means 70 days have passed. If you have tried to follow along this guide with an old Standard Celeration Chart you will notice a discrepancy here. The older version, called DC-9EN, will have numbers at the bottom of the chart as follows 0, 10, 20, 30, and so on up to 140. These numbers do match up with the Day/MO/YR numbers (the charts I sent you) at the top in the newest version of the SCC (Dpmin-11EC): 0, 14, 28 etc. up to 140.

Now that you understand vertical lines we will move onto the horizontal line or frequency lines. We use the term frequency lines because the horizontal lines display frequency. Oh wait, I neglected to explain frequency! (Often times in my excitement I sometimes forget to explain the details so please bear with me).

Frequency represents a unit of measurement. You probably know of many frequencies. For example, when you drive your car the speed at which you travel depicts a frequency: miles per hour. If you traveled 60 miles per hour (or kilometers per hour for our good friends beyond the States) you find 2 elements that make up a frequency. (1.) Measurements of a physical event, in this case the distance of 60 miles and (2) a time frame. Our time frame encompasses one hour. So the frequency looks like this:

60 miles
hour

If you want to figure out the frequency of any behavior or skill you can use the following formula:

Number of events
Time frame

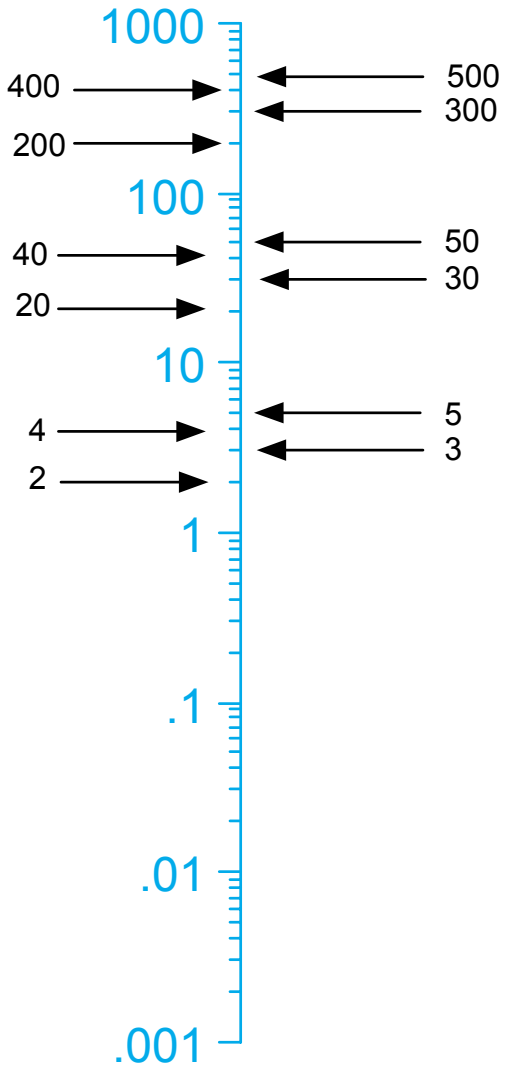
Let's say I want to know how many words I can orally (see the text and say the words – see/say) read in one-minute. I could easily figure out my see/say reading frequency by doing the following steps. I get a countdown timer (that means a timer you can set for one-minute which will count down to zero- also it helps that the countdown timer beeps when it reaches zero) and set it for one-minute. Then I get a book. I start the timer and then start to see/say words. Once the count down timer beeps I count up how many words I read correctly in the one-minute timing period. Viola! I now have a frequency! I read 223 words correctly in one-minute.

Taking frequency measurements set precision teaching apart from most other educational measurement practices. The most common way **to** measure how well someone does something typically occurs with percentage. You remember percentage, 90 to 100% equals a an "A," 80 to 89% equals a "B" and so on. One problem with using percentage readily appears when you try to distinguish competence. For instance I just shared with you the frequency of my see/say reading performance. Let's pretend I gave the same passage I read to another person who could see/say (or orally read) 110 words in one-minute. If we converted my frequency, and my imaginary friend's frequency, to percentage correct we both would get 100%! Wait a

minute! My imaginary friend read less than half of what I did in one-minute therefore our competency must differ! Percentage masks how ell people perform tasks and report proficiency on a very broad level. The good news; if you use percentage you can quickly figure out a frequency simply by recording the time it takes a person to do something in. So if we did a spelling test and previously reported the results in percentage correct (e.g., 90%, 76% etc.) we need to record the time it took the person to spell the words. Then we have a frequency. For instance a young man got a 90% (9 correct out of 10 words) on his spelling test. When we record the time it took to spell the words we now have a frequency: 9 words spelled correctly in 5 minutes (we also have a frequency for incorrectly spelled words, 1 words spelled incorrectly for 5 minutes). The frequency measure gives us an enormous amount of information compared to percentage (moral of the story: use frequency whenever you can).

HORIZONTAL LINES (FREQUENCY LINES)

On the left of the chart you see the following figure:

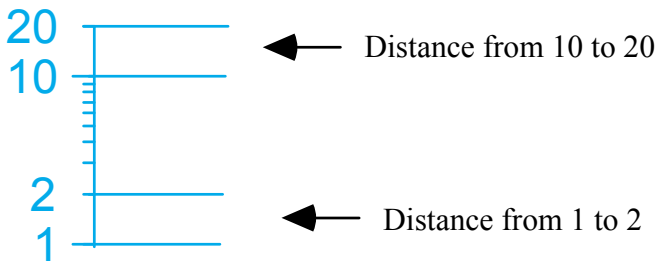


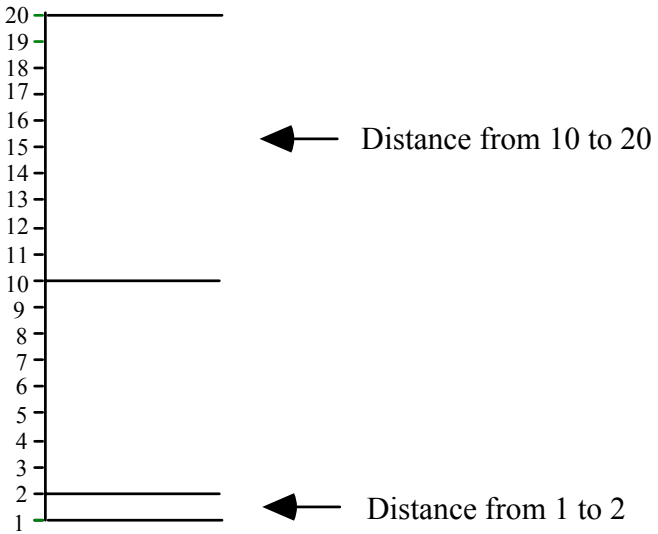
This figure, and each corresponding line tells the frequency in terms of how many in one minute (Before we go further I do want to say that this does not mean we can only display behaviors that occur in one-minute. In fact we can display behaviors that occur as little as one per day or as many times as 1000 per minute!). Back to the explanation of the figure. The 1 means

one per minute. The next line up shows 2, and it proceeds up to 10. Now something happens which does follow normal conventions for those of you used to charting behavior on convention equal interval (or add/subtract) graphs. The next line up from 10 changes into 20 (not 11 as typical in equal interval charts).

You will find from the 20 line goes to 30, 40 and so on up until 100. You probably saw this coming as well, the line after the 100 doesn't show 101 but 200. The multiply divide scale shows behavior change proportionally. In other words the distance from 1 to 2 covers the same distance as 10 to 20. Notice the difference in the horizontal axes in the figures.

Equal-interval, or add-subtract, line graphs draw their name from their axes. The progression on both the vertical and horizontal axes change in equal intervals (when you move forward to the next interval the number grows by arithmetical progression +1 or +5 or +10, whatever the graph maker decides). The following graphic show a typical equal interval chart.





When using equal/interval charts the data can give a false impression of either rapid or minimal growth. However recharting the same data on a standard celeration chart and an opposite picture may emerge. This happens because equal/interval charts show change in an arithmetical and absolute fashion. The standard celeration chart shows change in a multiplicative and proportional manner. Therefore making judgments on equal/interval charts, which by the way almost always appear NON-standard, charters set themselves up for navigating behavioral waters without the best compass. A very good source for understanding some of the problems of using an equal interval chart appears in an article by Kubina, Eshleman, and Morgenstern. (If you want a copy of this article please send me an email request and I will snail-mail you one).

Now that you understand day lines and frequency lines, the time has come to tell you what goes on those lines that make the wildly effective standard celeration chart. Knowing three symbols will allow you to begin charting any behavior you desire. The three symbols follow:

•

X

-

What does these three symbols mean?

Very briefly:

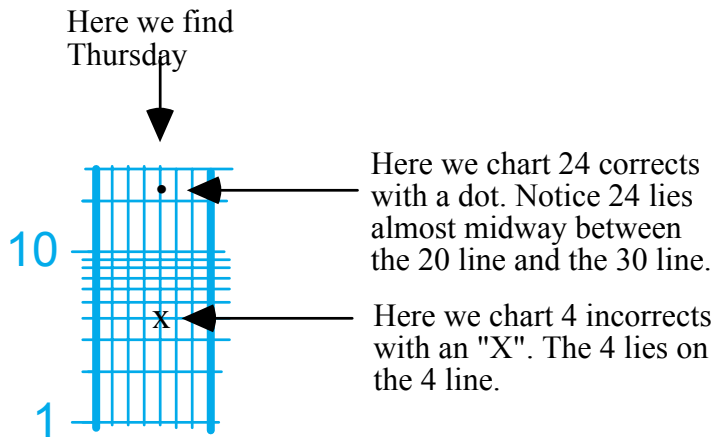
• = acceleration data (behavior you want to occur more frequently)

X = deceleration data (behavior you want to occur less frequently)

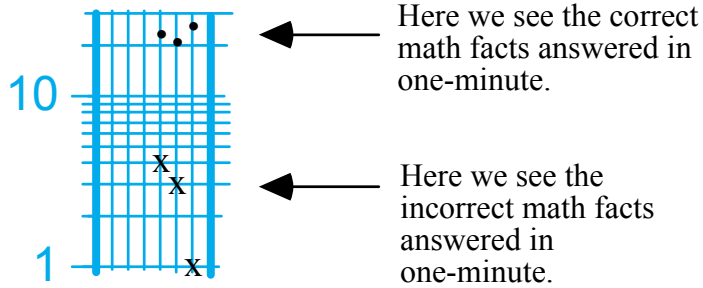
- = counting time

You use the dot (•) when you want to represent a behavior targeted for acceleration (or stated differently, something you want to happen more). For example, let's say I want my class of second graders to learn their addition facts to fluent levels. On the chart I will use dots (•) to show correctly answered addition facts. The beauty of using standard conventions? You can look at anyone's chart in the world and if they have followed the precision teaching conventions you will know those dots (•) represent something the person doing the chart wants to accelerate.

I bet you fully understand what the X's mean. Right, behaviors we want decelerated. In the addition fact example we just used, the X's would represent the number of addition facts the student answered in correctly. Let's waste no time and learn how to put these two pieces of information on the chart. This example will help. Today we gave a practice sheet of addition problems (single digit problems with sum's of 0 to 18 with no carrying) to our young student Rick. We gave Rick one-minute to answer as many problems as he could. When Rick finished our bright young man answered 23 correct and 4 incorrect (or had four "learning opportunities" as we like to call them in precision teaching). We need to do two things to graph corrects and incorrect on the chart. We must find what day this happened and then chart the corrects and incorrect on the appropriate day. Now I will illustrate how to do this just by using a cross section of the chart. Remember that dark lines show Sundays. So if we say Rick got his 23 correct and 4 incorrect answers (on the addition practice sheet) on Thursday we need to: (1) locate Thursday; (2) find where 23 corrects lays on the charts and plot that; and (3) find where 4 incorrect lies and plot that. Please look below to see how I did this with a cross section of the standard celeration chart.



Let's keep going with this example. On Friday Rick got 21 correct and 3 incorrect. Saturday saw Rick getting 28 correct with only 1 incorrect. Look below and see how we find each day and chart each data point.



You must remember something else when finding the day. Where does your chart begin. Remember the "synch-date?" Whether you use synch-dates or just start the Sunday beforehand (personal usage) you must set up your chart accordingly to figure out where the day (more specifically the date of the day) goes so you can put the dots and X's in the correct place.

Later we will talk about how to measure the correct and incorrect responses over time to come up with a "celeration." We will see that we can put a number on weekly learning (like x 2 or x 3.4 - said "times 2 or time 3.4"). Imagine that, we can actually numerically determine how much learning our teaching produces! You will not find celeration or such sensitive measures of skilled performances in any other measurement system. we might call precision teaching the sine qua non of tools for producing masterful learning (you can tell how much I love this stuff!).

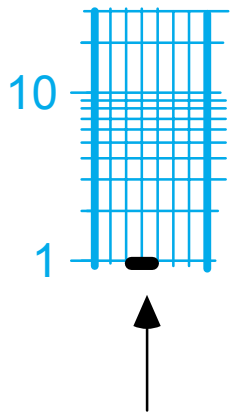
Back to charting. I did mention that you must know three symbols to chart. Recall we use dots (•) for behaviors we want accelerate and X's for behaviors we want to decelerate. The other symbol, a dash (-) stands for the counting time. A "record floor?" What the heck does that mean? Good question. A record floor represents the time period you observed, or measured a behavior. If you think about the term "record floor" you can almost figure out what it means.

Before we discuss the convention for using counting times please allow me to explain how to find where the counting time goes. The standard celeration chart has the ability to show behaviors that occur as little as once a day (24 hour counting time) or a thousand times per minute (one-minute counting time). If you have a copy of the daily standard celeration chart (Dpmin-11EC) you will notice on the right hand side a key that says "COUNTING TIMES." Then below that you see how

the seconds and minutes, and hours appear on the chart. The following figure shows how to find the counting times (or what will become the place for our counting times).

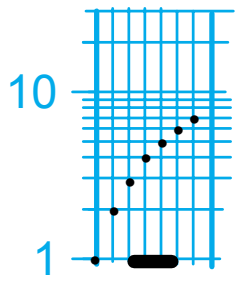
NOTE: A link to Calendar Charts is provided on the referring web page to this document.

I would like to direct your attention to the arrow that points to one minute. You will notice this line appears at the center of the chart. If all you did involved conducting one-minute timings you could use the counting time, and chart, relatively easily. Let's go back to our previous example to illustrate. Recall we had Rick doing addition facts in one-minute. Thus our counting time for that period equaled one-minute. We know how to write the corrects and incorrects convention (dots and X's). Now I will share with you the special convention for showing counting time: we draw a dashed line from Tuesday to Thursday in the middle of the week. Please look below for the convention.



The chart convention for showing the counting time. Draw a line from Tuesday to Thursday

When we use this convention for one-minute showing the frequency becomes easy. Every frequency line (horizontal line) equals the frequency shown to the left. To illustrate this I plot 1 through 7 below (I will use dots for this example).



Notice we put the 1 on the one line with the counting time. When we put data on the chart, and have a one-minute record floor, each value on the frequency line legend equals the frequency we show for the one-minute.

For any other record floor you would follow the same convention and place a line from the Tuesday to 8:27 AM Thursday for the specific time. Note on the chart with the arrows I have written in the time to the right and the frequency line to the right. To display a number simply multiply the number to the right by the corrects or incorrects and then place the corresponding number on the chart. For example look at the figure below.

Conclusion

This supplement forms but the beginning to standard celeration charting and precision teaching. Nevertheless with this supplement your beginnings should provide you with the skills to find you way around the chart and to begin to measure/display data and make decisions. As the old precision teaching slogan goes "Care enough to chart!"

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