

Leading a Team to Analyze and Display Data Using Quality Tools



Georgia Leadership Institute
for School Improvement

**A Performance-based Learning Module
for Georgia's Educational Leaders**

Related Modules

Related GLISI Modules

Other modules related to this topic include:

- *Leading a Team to Analyze Performance Factors*
 - *Leading a Team to Analyze Root Causes Using Quality Tools*
 - *Leading a Team to Implement Graphic Organizers*
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Performance Objective(s)

Given This...	Do This...	To Meet These Criteria...
<ul style="list-style-type: none"> • A challenge, issue, or opportunity related to student achievement or organizational effectiveness • A need to collect, organize, and display data related to the issue, and to make decisions about next steps • A team of educators willing and able to contribute to the analysis session • Data related to the challenge, issue or opportunity (or, an opportunity to collect such data) • Basic office supplies for creating charts, etc. 	<p>Based on the nature of the issue, Lead a team to select an appropriate quality tool from the list below and use it to collect, organize, and display data related to the issue:</p> <ul style="list-style-type: none"> • The Process Flow Chart • The Check Sheet • The Pareto Chart 	<ul style="list-style-type: none"> • The detailed task performance criteria listed in the Performance Checklists in the Topic Practice(s), Final Practice, and Final Assessment • GLISI's criteria for how to work effectively as a team leader/facilitator, listed in the Performance Feedback Form(s) located in the Final Practice and Final Assessment

Module Introduction

Using Quality Tools to Analyze and Display Data

Every educational leader needs to have a working knowledge of Quality Tools in their “bag of tricks.” In this module, you will explore three tools that can help you and your team analyze data and display information effectively:

- The Process Flow Chart
- The Check Sheet
- The Pareto Chart

The module, *Leading a Team to Analyze Root Causes Using Quality Tools* examines how to use The Five Whys, The Cause and Effect Diagram and The Relationship Diagram. You may find it helpful to complete that module prior to starting this one.

Although this module is part of the Data Analysis Leader series, the skills taught herein are important to your development as a leader across all roles. This module is, therefore, relevant to, and may be taught with, several different series in the Educational Leader and Rising Stars program.

Why is Using Quality Tools Important?

In today’s environment of high accountability, knowing how to analyze and display data – and how to lead others through these processes – is essential. Using quality tools helps to make complex issues simple and easy to understand for stakeholders. Using simple, clear visuals to display data will help inform team decision-making for school improvement.

What’s in it for Me (WIIFM)?

In today’s environment of high accountability, knowing how to analyze and display data – and how to lead others through these processes – is essential. Using quality tools helps to make complex issues simple and easy to understand for stakeholders. Using simple, clear visuals to display data will help inform team decision-making for school improvement.

When to Use Quality Tools (Cues)

An old adage says that “if the only tool you have is a hammer, then everything looks like a nail.” Knowing when to use which display tool is important.

There are several cues that suggest the time is right to use Quality Tools to analyze and/or display data – and, that suggest which tool is best suited to the task at hand. Use the chart below to determine when to use a Quality Tool, and which tool is appropriate for the task:

If this is occurring...	...Use this Quality Tool
Stakeholder feedback indicates general dissatisfaction with a process, and your team needs to pinpoint the problem within the process to be addressed	Process Flow Chart
Opinions about a problem flow freely. Your team needs to separate fact from opinion to determine how often a problem is occurring or what type of problem is happening	Check Sheet
There are competing issues to be solved, and you want to help your team to focus efforts on high leverage issues that will yield the greatest gain in terms of improvement	Pareto Chart

TIP(s)

Model a continuous improvement approach. Seek and apply feedback from your coach to develop skill in using the tools described in this module. You can continue to refine your performance as you use the tools with groups and receive feedback from them as well.

What Resources are Used with Quality Tools?

Before beginning to use quality tools, the following resources should be at hand:

- Flip charts or whiteboard, and markers
 - Self-stick notes
 - Specific data related to the problem at hand, gleaned from multiple data sources as appropriate
-

What Is the Leader's Role?

- Be prepared with the necessary materials and supplies
 - Schedule and communicate meeting times and locations to participants
 - Thank the participants, acknowledging everyone's worthwhile contribution to the group and commitment to future actions
-

Begin With The End in Mind

Research about effective assessment of performance tells us that the learner always performs better when they understand what they should know and be able to do. For this reason, you are encouraged to **review the Final Assessment in its entirety** in order to:

- Understand the knowledge, skills, and behaviors that are being taught and tested in this module
 - Understand the standards (performance criteria) by which your performance will be assessed
 - Gauge your current level of performance against what will be expected of you by the end of the module
 - Prioritize which areas to concentrate on as you work through the module
-

Topic 1: Process Flow Chart

What is a Process Flow Chart?

A Process Flow Chart is a diagram that show the various steps, decisions, inputs and outputs involved in a particular organizational process. The graphic or map shows all of the steps and loops in the process to describe how work currently gets done.

Why Use a Process Flow Chart?

Process Flow Charts are used primarily to map existing processes in order to see the steps involved, and, ultimately, to improve the process. This tool provides a visual of the process that teams then examine to determine gaps, redundancies or omissions in the process. By analyzing the Process Flow Chart, teams can pinpoint areas for improvement in the process and to determine how the work can be completed more effectively and/or more efficiently.

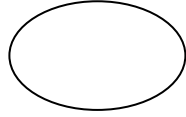
You can also create a Process Flow Chart to plan for a future process, test it for efficiency and effectiveness, and share it to get input from stakeholders. Once the new process is finalized, you will find that having it documented in flow chart format makes it easy to announce and communicate, provide training, and have a resource to refer to when questions arise.

When To Use a Process Flow Chart

Draw a Process Flow Chart when planning and analyzing a function, an activity, or other work that impacts school improvement. Use the Process Flow Chart when you and your team need to identify the tasks or steps in a process, or are trying to determine areas for improvement, for designing a new process, or for standardizing an existing process.

Elements of a Flow Chart

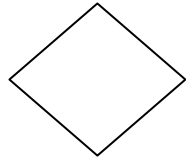
It is common practice to use standard symbols in a flow chart, which include but are not limited to the following:



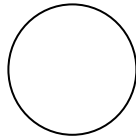
Represents the starting and ending points of a process – the “cues” that let you know to start the process, and let you know when you are finished.



Represents one step or task in the process (may include a brief description, if desired).



Represents a point in the process at which a decision must be made in order to determine which step to perform next. The diamond contains a question that can be answered “yes” or “no.”



“Connectors” used in flow charts that are longer than one page, to indicate how to follow the flow chart between one page and the next.



Indicates, by pointing in the appropriate direction, the next step in the process to which to proceed.

How Do I Do It?

- Read through the steps in the step-action table (starting on page 13)
 - Study any accompanying examples
 - Complete the practice exercise
 - Share the results with your Performance Coach
-

Figure 1.1 Process Flow Chart – Hiring a New Teacher (page 1 of 2)

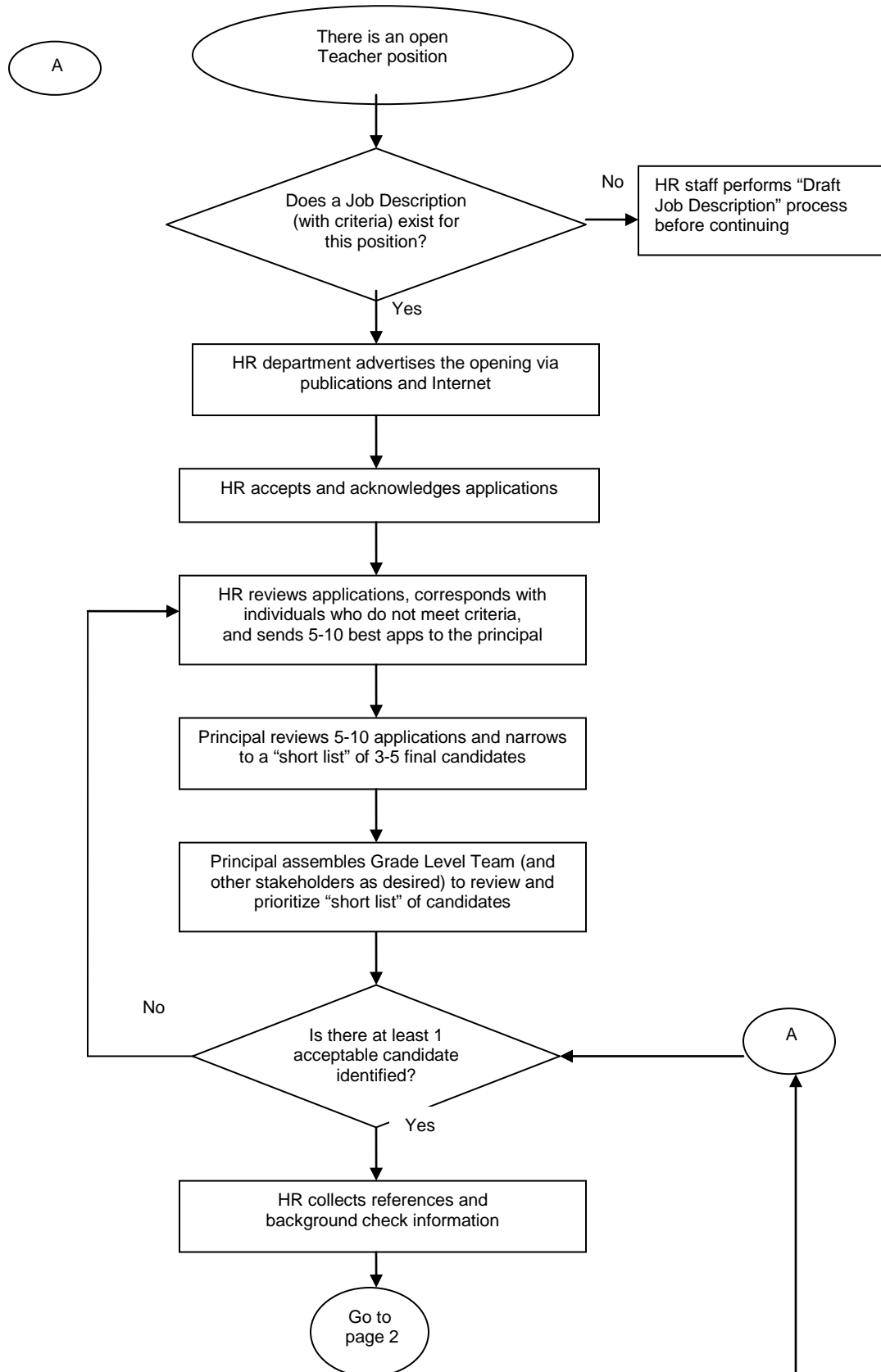
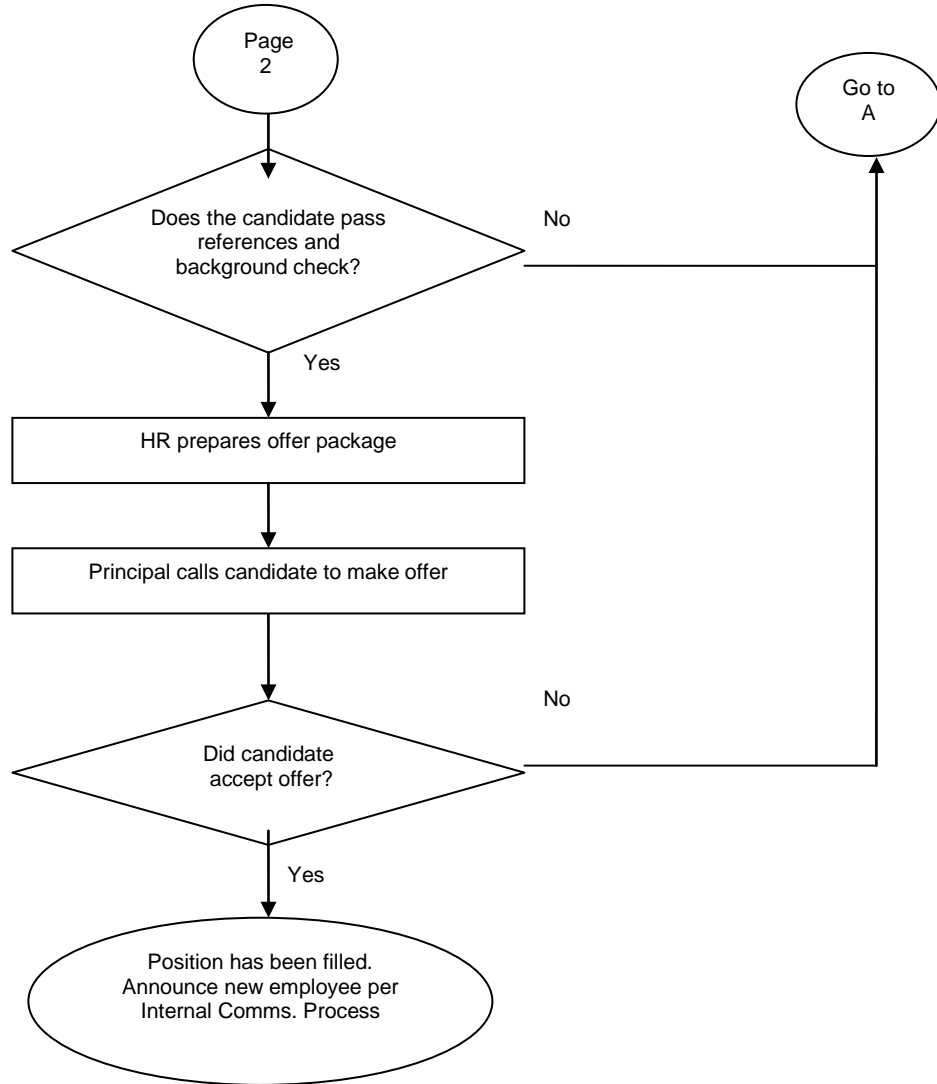


Figure 1.1 Process Flow Chart – Hiring a New Teacher (page 2 of 2)



Step-Action Table

Step	Action
1. Plan for the session	<p>Based on data, select a process within your organization for study and flow charting. This may be an existing process in which a problem or improvement opportunity exists. Or, it may be a proposed or new process that the team wants to draft together.</p> <p>Determine when you need to have the process flow chart completed (begin with the end in mind) and also decide on the time limit for each session. In general, mapping a process may take two sessions.</p> <p>Select the participants to engage in the activity, schedule the event, and communicate the date and time of the session(s).</p> <p>Identify who will serve as recorder (or plan to serve as the recorder yourself). The recorder’s job is to draw the graphic representing the steps in the process as identified by team members. Select someone who has some experience with the Process Flow Chart tool.</p> <p>Premeditate what you will say to:</p> <ul style="list-style-type: none"> • Begin the meeting • Establish the purpose of the meeting • Set the outcomes and describe the deliverables of the meeting • Introduce the Process Flow Chart tool, explain the symbols, etc.
2. Assemble the materials	<p>Create a “legend” (handout, poster, etc.) that explains each symbol that will be used by the team.</p> <p>Ensure that needed materials are available, e.g., flip chart, markers, Post-It notes.</p>
3. Review the purpose	<p>Open the session using your premeditated plan.</p> <p>Explain that creating a Process Flow Chart will help your team understand the process in question and identify areas for improvement.</p>
4. Explain the Process Flow Chart procedure	<p>Review and explain the symbols that will be used, directing participants’ attention to the legend you have created.</p> <p>Facilitate any other team discussions that need to occur in order for the process to go smoothly, such as norms, operating procedures, scope, etc.</p>

Step	Action
5. Draft the Process Flow Chart	<p>The recorder creates the graphic as the team works through the steps. It is a good idea to create the flow chart using self-stick notes (with large, legible writing), so that the elements can be easily rearranged as the team thinks through the process.</p> <ul style="list-style-type: none"> • Write the name of the process on the flipchart • Have the team identify/agree on the starting cue, and write it in an oval shape at the top of the flow chart • Also identify the ending cue, write it on a self-stick note, and set it aside for the end of the flow chart <p>(OPTIONAL) It may be helpful to invite team members to make their own individual process flow chart of the process as they see it as a beginning step. This helps people order their thinking about a process, which can make the group discussion move more quickly and easily.</p> <ul style="list-style-type: none"> • Ask questions to help the entire team think through the tasks involved in the process as it currently exists – such as: <ul style="list-style-type: none"> ○ What happens after the first step/task? ○ Are any decisions made prior to the next step/task? ○ Are any approvals needed before moving to the next step/task? • Honor contributions • Invite others to interject steps or suggest a different order of steps <p>Facilitate the discussion until the team reaches agreement that the Process Flow Chart accurately represents the steps in the process under discussion.</p> <p>Make sure that the recorder finalizes the graphic (by arranging the self-stick notes, and/or by re-drawing the final flow chart onto paper) once the team has come to consensus about the process.</p>
6. Examine and analyze the Process Flow Chart	<p>Conduct a process analysis by asking questions appropriate to process improvement, such as:</p> <ul style="list-style-type: none"> • What results are we getting using the current process? • Is the current process efficient? Effective? • Where are there problems? What are the potential areas for improvement? • How can we reduce cycle time? • What steps can be added or eliminated to prevent rework? • Where are there redundant tasks? Are these value-added? • What steps should be eliminated? • Do all of the steps remaining add value to the process?

Step	Action
7. Determine next steps	<p>TIP: You may choose to have your “next steps” discussion at the end of the first meeting. Or, as an alternative, you may decide to allow some time to elapse and schedule a second meeting for this discussion, so that team members consider the process analysis before action is taken.</p> <p>Ask team members to reflect upon the process analysis from the previous meeting. Have the recorder post comments.</p> <p>Ask team members to suggest, discuss, and decide upon next steps- which may include, but are not limited to:</p> <ul style="list-style-type: none"> • Continue researching the existing process and updating the chart • Provide additional training/practice on flow charting and process improvement • Distribute the Process Flow Chart for others’ reactions • List ideas or decisions on how to improve the process • Create new measurements to determine how well the improved process works • Pilot the improved process and collect data on its effectiveness • Decide the changes required do not justify the effort involved

Practice Exercise

Instructions

- Follow the steps in the Step-Action Table for this topic
 - Complete the Practice Worksheet and/or forms, listing results that are realistic based on the information in the practice scenario below
 - Check your work
 - Meet with your Performance Coach to review the results and decide what to do next
-

Practice Scenario

Think about the Student Support Team (SST) process in your school – get a “picture” in your mind about how that process works. Now, imagine the following scenario is occurring in your school: A long list of students waiting to be served exists. Parents are anxious about getting help for their students. Administrators can’t schedule SSTs fast enough. Students continue to get further and further behind. In response to these issues, the principal has asked the leadership team to think through the SST process and make some suggestions for next steps.

- Create a flow chart that depicts the “as-is” SST process in your school
 - Review the process, identify areas for improvement (including solutions to the listed problems) and make a list of possible next steps
-

Practice Worksheet

Directions: Answer the questions on this page to guide your flow charting process. Draw your completed flow chart on the next page.

What is the name of the process? (What is it called?)

What symbols will be used to map the process? Draw and explain them below. This becomes the "legend" you will use to explain these symbols to others.

What is the cue that starts the process?

What is the cue that the process is done?

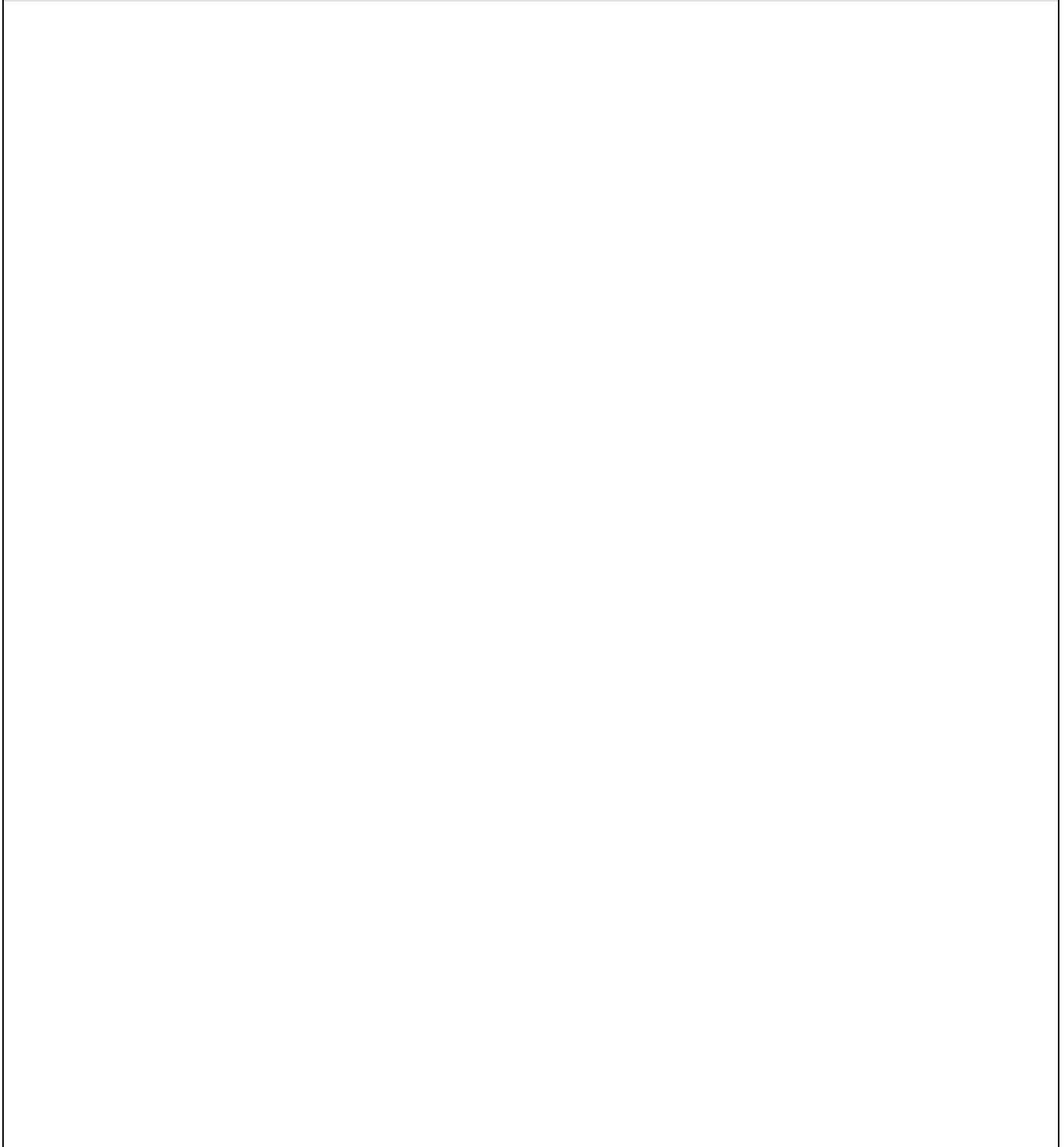
Does your finished flow chart accurately reflect the process being studied? Explain.

What reflections do you have about the process you have flow charted? (e.g. efficiency, redundancy, problems, areas for improvement, solutions to the scenario's problems, etc.)

What suggestions do you have for next steps?

Practice Worksheet

Draw your completed flow chart in this space (use additional pages if necessary).

A large, empty rectangular box with a thin black border, intended for drawing a flow chart. The box occupies most of the page below the instruction text.

Topic Practice Performance Checklist

Select one: Performer’s self-assessment Performance Coach’s observations

Performer’s Name: _____

Performance Coach’s Name: _____

Date of Performance: _____

*Check off each criterion that is observed. If the performance meets criteria with satisfactory quality, mark Yes. If not, mark No and provide feedback (use the back of the page for more space). Enter this performance into your portfolio when **all** items are marked Yes.*

Evidence	Criteria	Proficient? Give Feedback.
1. The process has been mapped in a Process Flow Chart	<input type="checkbox"/> All tasks in the process are mapped	<input type="checkbox"/> Yes
	<input type="checkbox"/> The process flow chart is clear	<input type="checkbox"/> No
	<input type="checkbox"/> The process flow chart is accurate	
2. Process Flow Chart protocol is followed	<input type="checkbox"/> A legend indicates what symbols mean	<input type="checkbox"/> Yes
	<input type="checkbox"/> Agree-upon symbols are used	<input type="checkbox"/> No
	<input type="checkbox"/> Start and end cues are included, and represented by the correct symbol	
	<input type="checkbox"/> Decision points are clearly indicated by the correct symbol	
	<input type="checkbox"/> The chart includes a title that clearly represents the process being studied	
3. Next steps for further study are indicated	<input type="checkbox"/> A logical list of next actions is generated from the Process Flow Chart analysis (such as those listed in the Step-Action Table)	<input type="checkbox"/> Yes <input type="checkbox"/> No

Topic 2: Check Sheet

Why and When to Use a Check Sheet?

Check Sheets are used when you want to know how often, and/or where, key events are happening. They can also be used to collect more information about the kind of problem(s) that are occurring. They are often used to help teams distinguish facts from opinions. Check Sheets are easy to create, use and read.

How Do I Do It?

- Read through the steps in the step-action table (see next page)
- Study any accompanying examples
- Complete the practice exercise
- Share the results with your Performance Coach

Figure 2.1 Completed check sheet tracking number and location of incidents

<i>Where and When are Physical Discipline Problems Occurring?</i>						
Start Date:	<i>Monday April 12, 2011</i>			End Date:	<i>Friday April 16, 2011</i>	
	Before Lunch		After Lunch		Total	
	Classroom	Schoolyard	Classroom	Schoolyard	Classroom	Schoolyard
Hitting	/	//		///	1	5
Tripping		/	/	//	1	3
Pushing		//	/	///	1	5
Totals	1	5	2	8	3	13

Step-Action Table

Step	Action
1. Plan for the session	<p>Make sure that the perceived problem to be analyzed lends itself to the use of a Check Sheet (tallying) – such as “Too many students are asking for and receiving Hall Passes.”</p> <ul style="list-style-type: none"> • The following resources are useful for creating Check Sheets: • Flip Chart or Whiteboard, and markers to draft the Check Sheet • Word processing or spreadsheet software to create the Check Sheet • Photocopier to duplicate the Check Sheet <p>Select the participants, and schedule the event.</p>
2. Agree on the problem	<p>State the perceived problem clearly. Be sure the team agrees with the stated problem.</p>
3. Decide what you want to measure	<p>Gain agreement from all participants as to what is to be observed.</p>
4. Determine the focus of your measurement	<p>Decide as a team which elements are important to your measurement:</p> <ul style="list-style-type: none"> • Number of occurrences (how many incidents occur per hour/day/week/month/etc.) • Place of occurrence (i.e., how many incidents occur in the classroom versus the schoolyard) • Or both? <p>This will determine how you will set up your Check Sheet, and how you will plan for data collection.</p>
5. Set the time frame for data collection	<p>Set a start date and an end date for your data collection period.</p>

Step	Action
6. Create the Check Sheet form	<p>You may wish to draft your form on the whiteboard as a team first, then assign a participant to create the final form on the computer and forward it to the rest of the team.</p> <ul style="list-style-type: none"> • Give the Check Sheet a title that clearly communicates what observers are looking for. Example: If your team will measure the number of parent complaints, title the form "Parent Complaints." • Below the title, indicate the start and end dates of the collection period. • Down the left edge of the form, list the item(s) you intend to measure. Be specific. • Across the top of the form, write the time periods (class periods, dates, days of the week, months, etc.) and/or places (classroom, hallway, bathrooms, etc.) in which the measuring should occur. Label each row clearly. • At the right edge of the form, create a column for totaling each row. • Along the bottom of the form, create a row for totaling each column. • Compare your draft to the sample Check Sheet (provided on a previous page). • Gain agreement from the team that the draft is complete and ready to use.
7. Collect the data	<p>Instruct the team members to observe for data during the collection period, and to record their observations on the Check Sheet. Stress the following:</p> <p>The importance of accuracy in collecting data.</p> <p>Record only those items listed in the left-hand row of the table, and only during those times listed across the top.</p> <p>Calculate the totals for each row and column in the spaces provided.</p>
8. Tally the data	<p>Reconvene the group to compare results and calculate the "grand total" from all of the Check Sheets.</p>

Step	Action
9. Determine next steps	<p>In this step, the team now has facts (data) versus opinion from which to work. Facilitate a conversation around the data. Help the team make suggestions based on the data, and to agree on next steps – which may include, but are not limited to, the following:</p> <ul style="list-style-type: none"> • Continue collecting data to see if conclusions hold true • (using more Check Sheets, or another quality tool) • Decide to use the Check Sheet data to populate another quality tool for further analysis • Share the results with a larger group of teachers/leaders/etc. • Convene a focus group to get more information <ul style="list-style-type: none"> ○ In this case, for example, you might hear from students who have faced disciplinary action • Implement steps to solve the problem(s) <ul style="list-style-type: none"> ○ In this case, for example, you might assign more adults (teachers, staff or parents) to monitor the schoolyard

Practice Exercise

Instructions

- Follow the steps in the Step-Action Table for this topic
 - Complete the Practice Worksheet and/or forms, listing results that are realistic based on the information in the practice scenario below
 - Check your work
 - Meet with your Performance Coach to review the results and decide what to do next
-

Practice Scenario

Teachers at Middleton High School expressed concern about the number of 9th grade tardies. However, the teachers could not agree as to whether the issue of tardiness was a consistent problem, or whether it occurred only briefly during the weeks after Spring Break. They were also unclear as to whether the tardies were affecting each period, or just first-period Homeroom. The principal suggested that the 9th Grade Team collect some data about the issue. She suggested using a Check Sheet as a tool to help teachers collect the data, and asked that they share their observations and suggestions with her once they completed the assignment.

Practice Worksheet

Answer the questions on this page to guide the creation of your Check Sheet. Draw your completed Check Sheet on the back of this page.

State the problem clearly:

--

On what date will you start collecting data?

On what date will you stop collecting data?

--	--

List one or more elements you wish to measure in each category - number, place, or both:

Type of occurrences per time period

Place(s) of occurrences

Type of occurrences per time period	Place(s) of occurrences
<ul style="list-style-type: none">•••	<ul style="list-style-type: none">•••

Enter some sample data into your completed Check Sheet, and total it. What do these data tell you about the facts related to this problem?

--

What next steps might you recommend based on the results of your sample data?
Is additional data collection required?

--

Practice Worksheet

Draw your completed check sheet in this space (use additional pages if necessary).

Topic Practice Performance Checklist

Select one: Performer's self-assessment Performance Coach's observations

Performer's Name: _____

Performance Coach's Name: _____

Date of Performance: _____

*Check off each criterion that is observed. If the performance meets criteria with satisfactory quality, mark Yes. If not, mark No and provide feedback (use the back of the page for more space). Enter this performance into your portfolio when **all** items are marked Yes.*

Evidence	Criteria	Proficient? Give Feedback.
1. A problem has been identified and agreed upon	<input type="checkbox"/> The problem is clearly stated	<input type="checkbox"/> Yes
	<input type="checkbox"/> All team members agree on the problem	<input type="checkbox"/> No
	<input type="checkbox"/> The problem lends itself to a Check Sheet for data collection	
2. Measures that inform the problem are identified	<input type="checkbox"/> There is agreement on what will be observed	<input type="checkbox"/> Yes
	<input type="checkbox"/> A decision has been reached to focus on number, place, or both	<input type="checkbox"/> No
	<input type="checkbox"/> A start date and end date for the data collection period have been established	
3. A Check Sheet form has been created, that meets the standard protocol	<input type="checkbox"/> The title clearly indicates what data will be collected	<input type="checkbox"/> Yes
	<input type="checkbox"/> The start and end date are listed	<input type="checkbox"/> No
	<input type="checkbox"/> Items to be observed are listed down the far-left column	
	<input type="checkbox"/> Columns across the top of the page indicate when and/or where to observe for occurrences	
	<input type="checkbox"/> Space is provided at the end of each row, and the bottom of each column, for totals	

Evidence	Criteria	Proficient? Give Feedback.
4. The Check Sheet has been used to collect all the desired data	<input type="checkbox"/> Tally marks in each cell indicate that data was collected on the day/in the place desired <input type="checkbox"/> Totals are entered into each space provided to indicate that the observation/collection of data is complete	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Next steps have been determined	<input type="checkbox"/> Logical next steps have been recorded (such as those listed in the Step-Action Table).	<input type="checkbox"/> Yes <input type="checkbox"/> No

Topic 3: Pareto Chart

Pareto Chart

The Pareto Chart is a type of vertical bar graph that helps you decide which problems to tackle, and in what order. It helps you display data in a way that summarizes and compares the difference between, and relative importance of, different categories within your data.

The Pareto Chart is a helpful tool to use after you have gathered data from Check Sheets (or other data analysis tools) and are ready to focus your team's efforts on what is really important.

Why use a Pareto Chart?

Use of a Pareto Chart will help you and your team prioritize problems into rank order by their importance, thus pin-pointing the few, most important problems to solve first.

The Pareto Chart helps you and your team prioritize actions according to the 80-20 rule, which states that by focusing on the most important 20% of your problems, you stand to gain 80% improvement. These top priority items are called "high leverage" because efforts in this category seem to leverage or multiply into a greater effect than might normally be expected.

When to use a Pareto Chart

Use the Pareto Chart when you want to:

- Prioritize/rank-order the frequency or importance of various problems
 - Identify one (or a few) "high-leverage" problems that are likely to result in the most-needed improvement
-

What Resources are Required?

Populate the Pareto Chart using data that has already been collected – historical data, current data from Check Sheets or other quality tools, or (as a last resort) brainstorming.

Tip(s)

In general, you will find that high-leverage points are represented by the tallest bar on the Pareto Chart.

This is not always the case, however. For example, when examining discipline referrals, "carrying weapons" may be a low incidence item (represented by a lower bar) – but, of course, the issue demands immediate and careful examination.

Sample

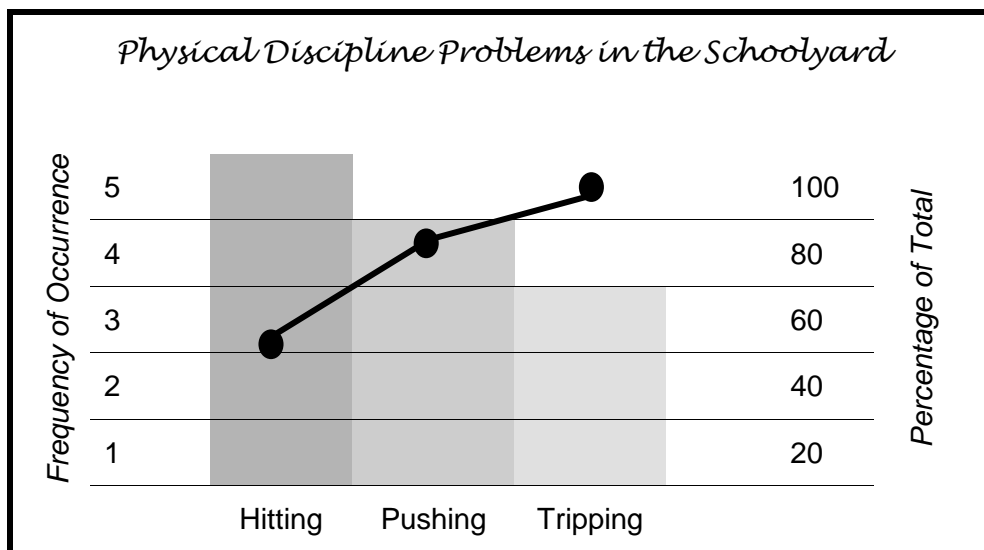
The sample Pareto Chart below (figure 3.1) was created based on the sample Check Sheet in the previous topic. The shaded boxes indicate the frequency of the incidents in each category. The dotted line indicates the percentage of the total that each category accounts for. Read the dotted line as follows:

- There were 12 total incidents ($5 + 4 + 3 = 12$)
- Hitting accounts for about 50% of all incidents (5 out of 12)
- Pushing accounts for 30% of all incidents (4 out of 12) – so now we know that hitting and pushing together account for 80% of incidents ($50\% + 30\% = 80\%$)
- Tripping accounts for the last 20% percent of incidents (3 out of 12) which brings us up to the total of 100% ($50\% + 30\% + 20\% = 100\%$)
- Conclusion: If you concentrate your efforts on hitting and pushing – the “high leverage” items in this scenario – you stand to resolve 80% of the physical discipline problems in the school yard

How Do I Do It?

- Read through the steps in the step-action table (see next page)
- Study any accompanying examples
- Complete the practice exercise
- Share the results with your Performance Coach

Figure 3.1 Pareto Chart showing physical discipline problems



Step-Action Table

Step	Action
1. Determine what data to use	<p>Teams frequently use data recently collected via Check Sheets and other quality tools.</p> <p>However, your team may also choose to use historical data. If so, be sure that previous measurements were categorized as they are today – that is, be sure you are comparing “apples to apples” and not “apples to oranges.”</p> <p>Lastly, you may also use information gathered from simple brainstorming – but, do so only if no other pertinent data exists.</p>
2. Identify data groups	<p>Identify the “buckets” of data that you will represent in the bar chart portion of the Pareto graphic. These are usually the problems or symptoms about which you gathered data. (In our sample, the categories are “Hitting,” “Pushing” and “Tripping.”)</p>
3. Draft the format of the chart	<p>Draw a 3-column table, with the middle column wide enough to accommodate as many vertical bars as you have categories of data.</p> <p>Label the left-hand column “Frequency” and make tick-marks that will work with the numbers associated with each of your data categories. (In our sample, we made 5 tick marks.)</p> <p>In the middle column, create one vertical bar for each category of data, making the bar tall enough to meet the tick-mark on “Frequency” that matches its tally number. (In our sample, total number of “Hitting” was 5, so we drew the vertical bar all the way up to the 5 mark.)</p> <p>NOTE: Arrange the bars so that the tallest one is next to the left axis, and they go in descending order from left to right.</p> <p>TIP: If you have several categories with very low numbers, you can combine them into one category called “other.” Be sure to add up all of the numbers of the included category, and size the bar accordingly. If this is the smallest category, place it nearest to the right axis.</p> <p>Label the right-hand column “Percentage of Total” and make tick-marks that break down a total of 100% - a simple way to do it is to mark off 80, 60, 40, 20.</p>
4. Calculate and plot a percentage for the largest category	<p>Count the total number of occurrences by adding the number from each category. (In our sample, we added $5 + 4 + 3 = 12$).</p> <p>Divide the total number by the number of the first, largest category (closest to the left axis) to calculate this category’s percentage of the total. (In our sample, we calculated for the “Hitting” category $12 / 5 = 53\%$).</p> <p>Mark a dot within (or above) this category’s vertical bar, at the height that corresponds to its percentage value. (In our sample, we placed the dot across from the 50% spot on the right axis.)</p>

Step	Action
5. Calculate and plot percentages for the other categories	<p>The calculation is the same as the first one: Divide the total number by the next category's number. (In our sample, for the "Pushing" category, we calculated $12 / 4 = 30\%$.)</p> <p>The plotting is slightly different from the first category. Starting from the first dot, add the new percentage number to it. (In our sample, 50% in the "Hitting" category + 30% in the "Pushing" category = 80. Your second dot will, therefore, be made within (or above) the second vertical bar, across from the appropriate tick-mark on the right axis.</p> <p>Repeat for the remaining categories.</p>
6. Plot the cumulative line	<p>When you connect the dots, you should have a line that moves upward from left to right, ending at 100% near the far-right axis.</p>
7. Analyze the data	<p>Review the sample Pareto Chart on page 50 as a reminder of how to read the data represented by the bars and the plotted line.</p> <p>Ask questions such as:</p> <ul style="list-style-type: none"> • What is the highest leverage point? That is, which issue(s), if tackled, stand to earn the greatest results? (Usually the one or two nearest the left axis.) • Which issue should be tackled first? Second? • What will make the biggest difference to students? • What will have to happen to correct the selected problem(s)? • What will it cost to correct the selected problem(s)?
8. Determine next steps	<p>Remember that your next steps should be designed to satisfy or benefit the "customer" (usually students). Next steps might include any or all of the following, or others that your team decides upon:</p> <ul style="list-style-type: none"> • Collecting more data • "Slicing" the data into different categories, and drafting a new Pareto Chart to analyze the new view • Sharing the Pareto Chart(s) with others who have concerns about the problem(s) or ideas about next steps • Deciding whether or not it makes sense to continue studying or solving the problem (estimating return on investment)

Practice Exercise

Instructions

- Follow the steps in the Step-Action Table for this topic
 - Complete the Practice Worksheet and/or forms, listing results that are realistic based on the information in the practice scenario below
 - Check your work
 - Meet with your Performance Coach to review the results and decide what to do next
-

Practice Scenario

Because teachers at Middleton High School expressed concern about the number of 9th grade tardies, their principal had them use the Check Sheet method to gather data about the issue.

Use the data from the results of your Topic 2 practice: The Check Sheet to create a Pareto Chart, then analyze it to create a rank order of the problem(s) it reflects.

Practice Worksheet

What is the title of your Pareto Chart?

Draft your Pareto Chart using the outline provided below as a guide, making sure to add all the missing elements. Or, if you need more space, recreate it on the next page.

Categories		Percent of Total
Frequency of Occurrence		100
		80
		60
		40
		20

What percent of the total do the first 2 categories account for?

Which problem(s) will you address, and why? List all problems in priority order.

Practice Worksheet

Based on this data, what next steps would you recommend?

Draw your completed Pareto Chart in this space (use additional pages if necessary).

Topic Practice Performance Checklist

Select one: Performer’s self-assessment Performance Coach’s observations

Performer’s Name: _____

Performance Coach’s Name: _____

Date of Performance: _____

*Check off each criterion that is observed. If the performance meets criteria with satisfactory quality, mark Yes. If not, mark No and provide feedback (use the back of the page for more space). Enter this performance into your portfolio when **all** items are marked Yes.*

Evidence	Criteria	Proficient? Give Feedback.
1. Uses data from the Check Sheet practice activity	<input type="checkbox"/> Selects appropriate data from the Check Sheet to populate the Pareto Chart	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Check Sheet data is placed into the proper column of the Pareto Chart	
2. Pareto Chart is formatted correctly	<input type="checkbox"/> Chart has a title that clearly indicates the nature of the data	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Includes 3 columns labeled, from left to right, “Category,” Frequency” and “Percent of total	
	<input type="checkbox"/> Axes are drawn correctly, and are clearly labeled	
	<input type="checkbox"/> Left axis has tick-marks to indicate frequency of occurrences	
	<input type="checkbox"/> Right axis has tick-marks to indicate 0% - 100%	
	<input type="checkbox"/> Includes a series of vertical, rectangular bars in descending order and clearly labeled	
	<input type="checkbox"/> Dots are plotted for each bar, and the correct cumulative line drawn	

Evidence	Criteria	Proficient? Give Feedback.
3. Next steps are identified	<input type="checkbox"/> Based on the data, the highest-leverage issues are selected for attention. <input type="checkbox"/> Problems are prioritized <input type="checkbox"/> Next steps are in written format	<input type="checkbox"/> Yes <input type="checkbox"/> No

Final Practice

Instructions

- Perform this practice, referring to the topic step-action tables as needed.
 - Use the worksheet from Topic 1, 2 or 3 as needed to complete the practice.
 - Meet with your Performance Coach to review the results and decide what to do next.
 - Completing this Final Practice requires meetings with a team of 2 - 4 peers. Prepare for these meetings by:
 - Communicating the time and location of the meeting to the participants in advance
 - Preparing and providing copies of a meeting agenda
 - Being prepared with all the necessary materials and resources
-

Practice Scenario

Work with your Performance Coach to identify an issue affecting your organization that is a good candidate for analysis.

Based on the nature of the issue, Lead the team to select an appropriate quality tool from the list below and use it to collect, organize, and display data related to the issue:

- The Process Flow Chart
- The Check Sheet
- The Pareto Chart*

***NOTE:** You must first create a check sheet from which you will apply the data to your Pareto chart.

Final Practice Performance Checklist

Select one: Performer's self-assessment Performance Coach's observations

Performer's Name: _____

Performance Coach's Name: _____

Date of Performance: _____

*Check off each criterion that is observed. If the performance meets criteria with satisfactory quality, mark Yes. If not, mark No and provide feedback (use the back of the page for more space). Enter this performance into your portfolio when **all** items are marked Yes and **all** Feedback Form (next form) items are marked 3 or 4 (or Not Applicable).*

Use this checklist for the Process Flow Chart.

Evidence	Criteria	Proficient? Give Feedback.
1. The process has been mapped in a Process Flow Chart	<input type="checkbox"/> All tasks in the process are mapped	<input type="checkbox"/> Yes
	<input type="checkbox"/> The process flow chart is clear	<input type="checkbox"/> No
	<input type="checkbox"/> The process flow chart is accurate	
2. Process Flow Chart protocol is followed	<input type="checkbox"/> A legend indicates what symbols mean	<input type="checkbox"/> Yes
	<input type="checkbox"/> Agree-upon symbols are used	<input type="checkbox"/> No
	<input type="checkbox"/> Start and end cues are included, and represented by the correct symbol	
	<input type="checkbox"/> Decision points are clearly indicated by the correct symbol	
	<input type="checkbox"/> The chart includes a title that clearly represents the process being studied	
3. Next steps for further study are indicated	<input type="checkbox"/> A logical list of next actions is generated from the Process Flow Chart analysis (such as those listed in the Step-Action Table)	<input type="checkbox"/> Yes <input type="checkbox"/> No

Use this checklist for the Check Sheet.

Evidence	Criteria	Proficient? Give Feedback.
1. A problem has been identified and agreed upon	<input type="checkbox"/> The problem is clearly stated	<input type="checkbox"/> Yes
	<input type="checkbox"/> All team members agree on the problem	<input type="checkbox"/> No
	<input type="checkbox"/> The problem lends itself to a Check Sheet for data collection	
2. Measures that inform the problem are identified	<input type="checkbox"/> There is agreement on what will be observed	<input type="checkbox"/> Yes
	<input type="checkbox"/> A decision has been reached to focus on number, place, or both	<input type="checkbox"/> No
	<input type="checkbox"/> A start date and end date for the data collection period have been established	
3. A Check Sheet form has been created, that meets the standard protocol	<input type="checkbox"/> The title clearly indicates what data will be collected	<input type="checkbox"/> Yes
	<input type="checkbox"/> The start and end date are listed	<input type="checkbox"/> No
	<input type="checkbox"/> Items to be observed are listed down the far-left column	
	<input type="checkbox"/> Columns across the top of the page indicate when and/or where to observe for occurrences	
	<input type="checkbox"/> Space is provided at the end of each row, and the bottom of each column, for totals	
4. The Check Sheet has been used to collect all the desired data	<input type="checkbox"/> Tally marks in each cell indicate that data was collected on the day/in the place desired	<input type="checkbox"/> Yes
	<input type="checkbox"/> Totals are entered into each space provided to indicate that the observation/collection of data is complete	<input type="checkbox"/> No
5. Next steps have been determined	<input type="checkbox"/> Logical next steps have been recorded (such as those listed in the Step-Action Table).	<input type="checkbox"/> Yes <input type="checkbox"/> No

Use this checklist for the Pareto Chart.

Evidence	Criteria	Proficient? Give Feedback.
1. Uses data from the Check Sheet	<input type="checkbox"/> Selects appropriate data from the Check Sheet to populate the Pareto Chart	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Check Sheet data is placed into the proper column of the Pareto Chart	
2. Pareto Chart is formatted correctly	<input type="checkbox"/> Chart has a title that clearly indicates the nature of the data	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Includes 3 columns labeled, from left to right, "Category," Frequency" and "Percent of total"	
	<input type="checkbox"/> Axes are drawn correctly, and are clearly labeled	
	<input type="checkbox"/> Left axis has tick-marks to indicate frequency of occurrences	
	<input type="checkbox"/> Right axis has tick-marks to indicate 0% - 100%	
	<input type="checkbox"/> Includes a series of vertical, rectangular bars in descending order and clearly labeled	
	<input type="checkbox"/> Dots are plotted for each bar, and the correct cumulative line drawn	
3. Next steps are identified	<input type="checkbox"/> Based on the data, the highest-leverage issues are selected for attention.	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Problems are prioritized	
	<input type="checkbox"/> Next steps are in written format	

Final Practice Feedback Form (page 1 of 2)

Performer's Name: _____

Performance Coach's Name: _____

Date of Performance: _____

*Use the rubric below to rate **only** the cross-cutting leadership skills on this page (including write-ins). Enter this performance into your portfolio when **all** Performance Checklist (previous form) items are marked Yes and **all** Feedback Form (this form) items are marked 3 or 4 (or Not Applicable).*

Performance Levels			
1	2	3	4
Emerging Needs Study and Practice <i>Few/none of desired behaviors were adequately displayed.</i>	Developing Needs Practice <i>Some but not all of the desired behaviors were adequately displayed.</i>	Proficient Meets Criteria and Expectations <i>All desired behaviors were displayed and performed correctly.</i>	Distinguished Could be Used as a Model to Teach Others

Eligible for Portfolio

How effective was the performer in these Cross-Cutting Skills?		Rating				
1.	Facilitating group interaction and managing participation	1	2	3	4	n/a
2.	Assisting the group to meet task criteria	1	2	3	4	n/a
3.	Modeling appropriate leadership behaviors	1	2	3	4	n/a
4.	Teaching others how to perform the tasks	1	2	3	4	n/a
5.	Presenting information clearly and concisely	1	2	3	4	n/a
6.	Leveraging technology to increase effectiveness	1	2	3	4	n/a
7.	Motivating others to achieve success	1	2	3	4	n/a
8.	Using group processes to achieve desired results	1	2	3	4	n/a
9.	Other:	1	2	3	4	n/a

Turn the page to provide additional written feedback (required).

Final Practice Feedback Form (page 1 of 2)

Performer's Name: _____

Performance Coach's Name: _____

Date of Performance: _____

If any element was rated less than 3, what needs to be done to score a 3? To score a 4?

What greatest strengths did the leader exhibit through this performance?

What could be done to improve this leader's performance? Include any criteria on the Performance Checklist that were missed. Be specific.

Were there any significant issues that must be rectified (by additional practice and assessment) before entering this evidence into the Portfolio?

Final Assessment

When Can I Take the Final Assessment?

Complete the Final Assessment when you are able to sufficiently execute the module’s performance objective(s) according to the:

- Task-related criteria on the Final Assessment Performance Checklist
- Cross-cutting leadership skills on the Performance Feedback Form

When you take the Final Assessment — either as someone who takes it to “test out” of the module or as someone who has worked through the topics and Final Practice — the underlying assumption is that you are a competent, experienced, performer. This means that the Final Assessment does not include any “helps,” such as step-action tables or worksheets.

When Can I Add the Final Assessment to My Portfolio?

Has your Final Assessment performance met all the criteria on the Final Assessment Performance Checklist and earned at least a 3 on all of the cross-cutting skills on the Final Assessment Feedback Form?

Yes	No
<p>Add these items to your Portfolio and talk to your Performance Coach about next steps:</p> <ul style="list-style-type: none"> • Final Assessment Performance Checklist • Final Assessment Feedback Form • Module Progress Tracker page • Additional artifacts such as documents, slides, video tapes, participant feedback forms, etc. 	<p>Do the following as needed before attempting the Final Assessment again when you are ready:</p> <ul style="list-style-type: none"> • Obtain performance feedback from your Performance Coach • Review relevant topics in the module • Repeat Topic Practices and/or the Final Practice • Pursue additional learning, training and experience

**Final Assessment
Instructions**

1. Gain permission from your supervisor, sponsor, or Performance Coach to complete the Final Assessment in a school setting.
 2. Schedule the date, time and location of your session — one that works for you, your Performance Coach, and other participants.
 3. Invite a group of 2 - 4 volunteers to assist you. Ideally, you should invite your real work team. (If you are an aspiring leader, this may be a team that you would lead once you enter the leadership role. For an incumbent leader, it should reflect the team or type of team that you are currently leading.)
 4. Review the following with your Performance Coach:
 - Task-related criteria on the Final Assessment Performance Checklist
 - Cross-cutting leadership skills on the Performance Feedback Form
 - Final Assessment Scenario (on the next page)
 5. Prepare any other materials or information that you and your participants need to have with you on the day of the activity.
 6. Perform the Final Assessment as follows:
 - In a real school or district setting
 - With a team of teachers, staff, or other leaders as appropriate
 - Observed by your Performance Coach
 7. Retain artifacts from your performance (documents, slides, etc.)
 8. Obtain feedback from your Performance Coach about your performance, and discuss next steps.
-

**Final Assessment
Scenario**

Work with your Performance Coach to identify an issue affecting your organization that is a good candidate for analysis.

Based on the nature of the issue, Lead the team to select an appropriate quality tool from the list below and use it to collect, organize, and display data related to the issue:

- The Process Flow Chart
 - The Check Sheet
 - The Pareto Chart
-

Final Assessment Performance Checklist

Select one: Performer’s self-assessment Performance Coach’s observations

Performer’s Name: _____

Performance Coach’s Name: _____

Date of Performance: _____

*Check off each criterion that is observed. If the performance meets criteria with satisfactory quality, mark Yes. If not, mark No and provide feedback (use the back of the page for more space). Enter this performance into your portfolio when **all** items are marked Yes and **all** Feedback Form (next form) items are marked 3 or 4 (or Not Applicable).*

Use this checklist for the Process Flow Chart.

Evidence	Criteria	Proficient? Give Feedback.
1. The process has been mapped in a Process Flow Chart	<input type="checkbox"/> All tasks in the process are mapped	<input type="checkbox"/> Yes
	<input type="checkbox"/> The process flow chart is clear	<input type="checkbox"/> No
	<input type="checkbox"/> The process flow chart is accurate	
2. Process Flow Chart protocol is followed	<input type="checkbox"/> A legend indicates what symbols mean	<input type="checkbox"/> Yes
	<input type="checkbox"/> Agree-upon symbols are used	<input type="checkbox"/> No
	<input type="checkbox"/> Start and end cues are included, and represented by the correct symbol	
	<input type="checkbox"/> Decision points are clearly indicated by the correct symbol	
	<input type="checkbox"/> The chart includes a title that clearly represents the process being studied	
3. Next steps for further study are indicated	<input type="checkbox"/> A logical list of next actions is generated from the Process Flow Chart analysis (such as those listed in the Step-Action Table)	<input type="checkbox"/> Yes <input type="checkbox"/> No

Use this checklist for the Check Sheet.

Evidence	Criteria	Proficient? Give Feedback.
1. A problem has been identified and agreed upon	<input type="checkbox"/> The problem is clearly stated	<input type="checkbox"/> Yes
	<input type="checkbox"/> All team members agree on the problem	<input type="checkbox"/> No
	<input type="checkbox"/> The problem lends itself to a Check Sheet for data collection	
2. Measures that inform the problem are identified	<input type="checkbox"/> There is agreement on what will be observed	<input type="checkbox"/> Yes
	<input type="checkbox"/> A decision has been reached to focus on number, place, or both	<input type="checkbox"/> No
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	<input type="checkbox"/> Totals are entered into each space provided to indicate that the observation/collection of data is complete	<input type="checkbox"/> No
5. Next steps have been determined	<input type="checkbox"/> Logical next steps have been recorded (such as those listed in the Step-Action Table).	<input type="checkbox"/> Yes <input type="checkbox"/> No

Use this checklist for the Pareto Chart.

Evidence	Criteria	Proficient? Give Feedback.
1. Uses data from the Check Sheet	<input type="checkbox"/> Selects appropriate data from the Check Sheet to populate the Pareto Chart	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Check Sheet data is placed into the proper column of the Pareto Chart	
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	<input type="checkbox"/> Axes are drawn correctly, and are clearly labeled	
	<input type="checkbox"/> Left axis has tick-marks to indicate frequency of occurrences	
	<input type="checkbox"/> Right axis has tick-marks to indicate 0% - 100%	
	<input type="checkbox"/> Includes a series of vertical, rectangular bars in descending order and clearly labeled	
	<input type="checkbox"/> Dots are plotted for each bar, and the correct cumulative line drawn	
3. Next steps are identified	<input type="checkbox"/> Based on the data, the highest-leverage issues are selected for attention.	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Problems are prioritized	
	<input type="checkbox"/> Next steps are in written format	

Final Assessment Feedback Form (page 1 of 2)

Performer's Name: _____

Performance Coach's Name: _____

Date of Performance: _____

*Use the rubric below to rate **only** the cross-cutting leadership skills on this page (including write-ins). Enter this performance into your portfolio when **all** Performance Checklist (previous form) items are marked Yes and **all** Feedback Form (this form) items are marked 3 or 4 (or Not Applicable).*

Performance Levels			
1	2	3	4
Emerging Needs Study and Practice <i>Few/none of desired behaviors were adequately displayed.</i>	Developing Needs Practice <i>Some but not all of the desired behaviors were adequately displayed.</i>	Proficient Meets Criteria and Expectations <i>All desired behaviors were displayed and performed correctly.</i>	Distinguished Could be Used as a Model to Teach Others

Eligible for Portfolio

How effective was the performer in these Cross-Cutting Skills?		Rating				
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2.	Assisting the group to meet task criteria	1	2	3	4	n/a
3.	Modeling appropriate leadership behaviors	1	2	3	4	n/a
4.	Teaching others how to perform the tasks	1	2	3	4	n/a
5.	Presenting information clearly and concisely	1	2	3	4	n/a
6.	Leveraging technology to increase effectiveness	1	2	3	4	n/a
7.	Motivating others to achieve success	1	2	3	4	n/a
8.	Using group processes to achieve desired results	1	2	3	4	n/a
9.	Other:	1	2	3	4	n/a

Turn the page to provide additional written feedback (required).

Final Assessment Feedback Form (page 1 of 2)

Performer's Name: _____

Performance Coach's Name: _____

Date of Performance: _____

If any element was rated less than 3, what needs to be done to score a 3? To score a 4?

What greatest strengths did the leader exhibit through this performance?

What could be done to improve this leader's performance? Include any criteria on the Performance Checklist that were missed. Be specific.

Were there any significant issues that must be rectified (by additional practice and assessment) before entering this evidence into the Portfolio?

Recommended Reading and Resources

(2005). *Analyzing Causes to Improve Student Achievement and Organizational Effectiveness (A Performance-Based Learning Module)*. Atlanta, GA: Georgia's Leadership Institute for School Improvement.

Chang, R.Y. and Dalziel, D.D. (1993). *Continuous Improvement Tools In Education, Volume I – A Practical Guide to Achieving Quality Results*. Houston, TX: American Productivity & Quality Center.

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Conzemius, A. and O'Neill, J. (2002). *The Handbook for SMART School Teams*. Bloomington, IN: National Educational Service.

Lezotte, L. W. and McKee, K.M. (2002). *Assembly Required: A Continuous School Improvement System*. Okemos, MI: Effective Schools Products, Ltd.

(1992). *The Memory Jogger for Education: A Pocket Guide of Tools for Continuous Improvement of Schools*. Salem, NH: GOAL/QPC.

Michalski, W. J. (1998). *40 Tools For Cross-Functional Teams: Building Synergy Breakthrough Creativity*. Portland, OR: Productivity Press.

Scholtes, P. R., et. al. (1994). *The Team Handbook for Educators: How To Use Teams to Improve Quality*. Madison, WI: Joiner Associates, Inc.

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