

# Red Bead Game

## Why Use This Game

- To teach that variation is to be expected any time you measure something.
- To teach that there are different causes of this variation.
- To show how different management and improvement strategies are needed, depending on the cause of the variation you are seeing.
- To help colleagues understand that the structure of a system determines how individuals perform within that system.

## Key Concepts

- Even with identical methods and tools, there will be variation in results. These variations in results may have little or nothing to do with any one worker's skill or willingness to work hard.
- Any process has a built-in capability that is determined by the way it is set up, not by a particular worker's actions.
- Real improvements to a process come from addressing the underlying way the process is set up.
- Management's job is to work "on" the process, to change the process design so the process works better.

## Source, History and Resources for More Information

The "Parable of the Red Beads" was developed by W. Edwards Deming, a pivotal figure in the field of QI. He used it as a teaching tool in hundreds of seminars he gave throughout the world until his death in 1993. Mary Walton's book, "The Deming Management Method" (Putnam, 1986) contains a lively description of Dr. Deming's conducting the game. A useful web site for additional information about Dr. Deming is <http://deming.eng.clemson.edu/pub/den/files/>

## Materials

For this game, you will need:

- A score sheet and a graph format on which to plot the results (see below for examples). These should either be projected (with a transparency or from a computer) or written large enough so everyone in the room can read them
- A "red bead kit." This is a box with a mixture of red beads and beads of one other color (usually 1000 red beads and 4000 alternate color beads) and a paddle with 50 holes to pull beads out of the box
  - Red bead kits can be purchased at [www.redbead.com](http://www.redbead.com)
  - A simple variation on the kit can be made with glass marbles of two colors (keeping the 1:4 ratio) and a paddle from the game Boggle. While the small number of holes in this paddle may make the results less statistically sound, the key learning points still are clearly communicated

## Preparation

To prepare for this session:

- Familiarize yourself with the session's structure and content:
  - Read through the game instructions and key teaching points in their entirety.
  - Practice the game itself.
  - Practice presenting the key teaching points.
- Prepare the room:
  - Arrange chairs in a semi-circle or rows (depending on how many will be in your audience).
  - Set up a table in the front of the room.
  - Set up the equipment (e.g., flip chart, overhead projector, or LCD projector) you will use to project the chart of game results. Test the equipment to make sure it works.

## Playing the Red Bead Game

Welcome and Introductions

To begin the game, welcome participants and thank them for their participation. If necessary, ask individuals to introduce themselves to the group.

Learning Objectives

Tell participants that by the end of the session they will:

- Understand that variation is to be expected any time you measure something and that there are different causes of this variation.

- Recognize that different management and improvement strategies are needed, depending on the cause of the variation you are seeing.
- Appreciate that the structure of a system determines how individuals perform within the system.
- Begin to see how to apply these concepts to their program.

#### Agenda

Provide a brief description of the session's primary components:

1. Background to the Red Bead Game.
2. The game itself.
3. Debrief and discussion on what the game shows, and how its lessons can be applied to medical care.
4. Feedback and close.

## Background to the Game

### Facilitator's note

In the Red Bead Game, workers produce beads in a flawed process that results in many defects: red beads. The manager – played by you – tries several “good” management interventions designed to improve individual’s performance. By doing this she/he assumes that the defects result from individual actions rather than a logical consequence of the way the process is designed. Through their frustration with the manager, the game participants and audience come to understand the importance of addressing the “common causes” of variation – the design of the system.

Key points to explain to your audience:

- Many organizations working in quality have long discussions about exactly which quality indicators they will use, what they will measure. As quality expert Paul Plsek says, however, “while deciding what to measure and how to measure it are important challenges, an equally important challenge lies in determining the appropriate reaction to the measurement once we have it.”

The Red Bead Game illustrates why this challenge is so critical to quality improvement.

- All measurements show variation (if you see no variation, someone is probably “cooking” the data!). The time of your commute to work will vary every day, for example. Sometimes, this variation may be a result of an unusual, or “special” cause: a bad accident, perhaps, or an ice storm. Most of the time, however, the variation results from “common” causes that are built into the process: the number of people on the road, the way the traffic lights are timed, whether you get out the door a few minutes earlier or later than usual. You will have more impact on improving the performance of a process if you work on reducing the common cause variation.

- The Red Bead Game is a way of explaining why it is important to understand this difference.

## The Game Itself

(These instructions are based on background material for the Red Bead Game prepared by the Institute for Healthcare Improvement.)

### 1. Organize the company.

- **Recruit your work force from the audience.**
- 4-6 workers.
- 1-2 quality inspectors.
- A quality data analyst, who records the results.
- **Write each worker's name on the data results chart that is on the flip chart or projected in the front of the room.**

### 2. Hold your first staff training session.

- **Welcome your workers.**
- **Explain that the purpose of the company is to make white (or blue, or whatever your dominant color is) beads. You have done research; that is what the customer wants.**

• Demonstrate the production process yourself. Make it complicated, and stress that it must be followed exactly.

One possibility:

- Stir the beads in the box with your right hand three times, clockwise, while holding the paddle in your left hand.
- Transfer the paddle to your right hand. Insert it into the far side of the box, long side down. Move the paddle towards you while shaking it so a bead falls into each hole. Smooth off the excess beads with your left hand.
- Present the paddle to the inspector.

• Explain that the inspector now counts the red beads, because they are defects. The inspector reports the count of red beads to the quality data analyst, who records the number of defects on the data results chart.

• Encourage your employees to work hard, do a good job, and not make red beads! You are relying on them not to make mistakes! This company has been your life-long dream, and you are counting on their hard work to make it a success!

3. Begin the production process.

- Each worker “makes” one paddle’s worth of beads and their defects are counted by the inspector and recorded by the quality data analyst.
- Praise workers who make few red beads. Be creative: use every positive-reinforcement management technique you know (for example, offer to make them employee of the month).
- Criticize workers who make many red beads. Begin by being sympathetic (“everything OK at home?”) and move to criticism and threats to demote or fire them as “days” of work go on.
- After two days, inform your workers that the company may go out of business if they don’t stop producing so many defective (red) beads.
- Continue working for a total of four days, keeping up your management interventions. At the end of four days inform the workers that the company has folded, thank them and send them home.

## Debrief and Discussion

- Begin by asking the participants how it felt to work for the Bead Company. Ask whether your management interventions were helpful, whether they were surprised at the results, and what they would have done to improve the Bead Company’s production process.
- Most of the time, participants answer that they felt frustrated and stupid. They are not surprised by the results because of the set number of red beads in the box, and to improve the results they would have removed the red beads at the start.
- Point to the data results chart. Note the variation in performance. Ask why it is occurring.
- Remind your audience of your presentation on special cause and common cause variation. Ask them what they see in the Red Bead Game results (answer: common cause variation).

Ask your audience if they can recognize “red bead” situations in their own programs. If they need prompting, ask about responses to their quality data. What happens if a number – the number of visits, for example goes up or down in a given month. Do they react just to that number (treating it as if it is the result of a special cause) or look at the pattern over several months?

Then probe further:

- Are they workers or managers in these situations?
- What is the result of reacting to data in this way?
- What changes would they like to make to how data are used in their program?
- How can they make these changes? What suggestions do others have to help?

## Feedback and Close

- Ask your audience for feedback on whether this session met its objectives. Take notes of their response on a flip chart, and keep it for your use in the future.
- Schedule an informal follow-up session with any audience member who wants clarification or more information on the game or the concepts you discussed.
- Thank your audience, especially those who participated in the game.

### Red Bead Game- Data Results Chart (5 workers)

NAME	DAY 1	DAY 2	DAY 3	DAY 4	TOTAL PER WORKER
TOTAL PER DAY					
AVERAGE PER DAY					