Introduction to 5S

About Activity:

Learn about 5S by doing this hands-on activity!

- Pair up in teams of two (Parent/Instructor & Student)
- Perform 2 outfit relay trials
  - Trial 1: Simulates lack of 5S methodology
    - Student starts out facing the bucket of clothes
    - Parent turns their back to the student
    - Student says “Go” and the parent starts the stopwatch
    - Parent faces the student and selects first item on clothing list and hands to the student
    - Parent then turns back away from the student
    - Student says “Go” when ready for the next article of clothing
    - This process repeats until the child is fully “dressed”
    - Parent then stops the stopwatch and records the time
  - Trial 2: Simulates use of 5S methodology
    - Now the student and parent can establish a standardized layout of the clothing (Ex. Layout in order, fold, etc.)
    - Parent does NOT turn around (represents process being visual)
    - Repeat trial one process with addressed changes

Benefits of 5S: Increases efficiency, reduces waste in forms of waiting, searching, and motion. Provides clear visual identification and improves task ergonomics.

Sort: When in doubt move it out
Set in Order: A place for everything and everything in its place
Shine: Clean and inspect or inspect through cleaning
Standardize: Make up the rules, follow and enforce them
Sustain: Part of daily work and it becomes a habit
What to take away from the activity?

Now you have a better understanding of 5s. It seems simple and practical but the implementation is extremely beneficial.

- Did your time improve from Trial 1 to Trial 2? Why?

  Your time should improve from Trial 1 to 2 because there is a standard layout; you know where to find each article of clothing. This reduces time spent searching.

- How do you use 5s in your daily life right now?

  Do you fold your clothes and have a specific drawer for t-shirts and another for pants? Do you label your binders and notebooks for each class? In your locker, do you place your books in the order in which you have class? That is all 5s.

- Why is 5s important?

  With the implementation and use of 5s, you reduce waste within a process. These wastes could include all or some of the 7 forms of waste; transportation, inventory, motion, waiting, overproduction, over processing and defects. Essentially, by reducing waste you are saving money, time, and energy.

RIT Industrial & Systems Engineering

Industrial engineers figure out how to do things better. They engineer processes and systems that improve quality and productivity. They work to eliminate waste of time, money, materials, energy, and other commodities. Most important of all, ISEs save companies money.

Industrial engineers are big-picture thinkers. They are present in various industries, influencing our lives everyday; shortening rollercoaster lines, streamlining operating rooms and patient care, distributing products worldwide, manufacturing automobiles, etc.

https://www.rit.edu/kcoe/ise/
An assembly line is a manufacturing process, sometimes called a progressive assembly, in which parts are added as the semi-finished assembly moves from workstation to workstation. The parts are added in sequence until the final assembly is produced. By moving the parts to the assembly work and moving the semi-finished assembly from workstation to workstation, a finished product can be assembled faster and with less labor than by having workers carry parts to a stationary piece for assembly.

Assembly lines can be used for simple products like personal pizzas and for very complex products like cars and electronic equipment. Other examples include cameras, computers, household appliances like your refrigerator, microwave, and even your toaster. The food industry also uses the assembly line to manufacture or process the foods and then package them to be distributed and sold.

In addition to using the assembly line process, other ideas for improving the efficiency of the manufacturing process include standardizing the parts and equipment used as well as designing the product so it can use interchangeable parts. Using interchangeable parts allows for easier repair and replacement of parts in the event of a breakdown. An efficient assembly line should have a continuous flow of work throughout the line. To improve the flow, the work needs to be arranged so that as one task was finished, another began, with minimum time spent in set-up.

For more information please visit: https://www.rit.edu/kgcoe/ https://www.rit.edu/kgcoe/rem
# Assembly Line
## Vocabulary Worksheet

Match the following words with their definitions.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assembly Line</td>
<td>A. Where the time taken to perform work at each workstation is not the same (some shorter, some longer), usually resulting in a build-up at one of more workstations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bottleneck</td>
<td>B. A model that is used for the design and analysis of a manufacturing process and shows the flow of parts or products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Manufacturing</td>
<td>C. A particular “stop” on the assembly line where a specific task (work) is performed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Process Simulation</td>
<td>D. A measure of busy time - How busy a person is on the line relative to how much time they could be busy or working</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Throughput</td>
<td>E. The rate at which products come off the line (parts per second or per minute)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Unbalanced Assembly Line</td>
<td>F. The production of goods for use or sale using people, machines, and tools - Typically, materials are transformed into finished goods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Utilization</td>
<td>G. A manufacturing process in which parts are added to a product in a specific order or sequence to create a finished product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Workstation</td>
<td>H. A circumstance where the performance of an entire system is limited by one workstation, typically the slowest workstation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sustainability is defined by the Environmental Protection Agency (EPA) as “an attempt to provide the best outcomes for the human and natural environments both now and into the indefinite future.”

Sustainable Practices are about how you live your life. Do you use resources in a responsible way? What activities do you do everyday that could be made more sustainable?

- Turn off the water faucet while you brush your teeth.
- Recycle more plastic, metal, and electronics.
- Turn off lights and electronics when they’re not being used.
- Run your dishwasher only when it’s full.
- Line dry clothes outside on nice days rather than using the dryer.
- Bike, walk, or carpool to the store, park, school, and work.
- Become a member of a community garden, create a garden in the yard, or grow potted vegetables and use your compost.
- Start using natural cleaners; diluted vinegar cleans most surfaces.
- Stop unwanted mail from being delivered.

For information about sustainability at the KGCOE please visit: https://www.rit.edu/kgcoe/program/sustainable-engineering
Sustainable engineering refers to the integration of social, environmental, and economic considerations into product, process, and energy system design methods.

Additionally, sustainable engineering encourages the consideration of the complete product and process lifecycle during the design effort. The intent is to minimize environmental impacts across the entire lifecycle while simultaneously maximizing the benefits to social and economic stakeholders.
CAN YOUR TOTAL IMPACT BE SUSTAINABLE?!

STEP 1 Identify Impact Factors
- Height of your structure
- Type of paper used for construction
- Type of coins supported by your structure
- Are there more!?  

STEP 2 Calculate Impact... Total Impact is the Sum of the Individual Impact Factors

<table>
<thead>
<tr>
<th>Impact Factor</th>
<th>Trial 1</th>
<th>Trial 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Structure height in inches) x (-4)</td>
<td>_____ x - 4 = _____</td>
<td>_____ x - 4 = _____</td>
</tr>
<tr>
<td>(Number of construction papers) x (2)</td>
<td>_____ x 2 = _____</td>
<td>_____ x 2 = _____</td>
</tr>
<tr>
<td>(Number of printer paper papers) x (1)</td>
<td>_____ x 1 = _____</td>
<td>_____ x 1 = _____</td>
</tr>
<tr>
<td>(Number of tissue paper papers) x (0.5)</td>
<td>_____ x 0.5 = _____</td>
<td>_____ x 0.5 = _____</td>
</tr>
<tr>
<td>(Number of pennies supported) x (-1)</td>
<td>_____ x - 1 = _____</td>
<td>_____ x - 1 = _____</td>
</tr>
<tr>
<td>(Number of nickels supported) x (-5)</td>
<td>_____ x - 5 = _____</td>
<td>_____ x - 5 = _____</td>
</tr>
</tbody>
</table>

Total Impact = _____ + _____ + _____ + _____ + _____

STEP 3 Determine the Meaning
The total impact value is your current impact or effect on the environment. If the value is greater than zero your structure has a negative impact on the environment. Now we ask, what can be done about this? By decreasing the total impact value of the structure it becomes more sustainable.

STEP 4 Identify Improvement Opportunities
By knowing the currently identified impact factors in the impact equation you can determine changes that will help decrease the total impact.
Ask questions of your current design like...
What would changing the material of the structure do to the total impact value? How would changing the number of coins or type of coins supported by the structure change the total impact value? Should other factors be considered?
The _________(1) is of fixed size.

The _________(2) are the part that have been discovered and established as _________(3) viable for extraction.

The reserves can be expanded into more lean materials if _________(4) improves.

Increased prospecting will allow us to reach currently _________(5) ore.

Many ores in the resource base that are not in the reserves are considered _________(6) and _________(6).

Figure reconstructed from “Materials and the Environment” Second Edition by Michael F. Ashby.

Word Bank:
- reserves
- resource base
- economically
- identified
- lean
- uncertain
- ore
- already exploited
- undiscovered
- grades
- dilute
- lean/dilute/uncertain
- undiscovered
- mining technology
- economically
- reserves
- resource base
- ore
- already exploited
- undiscovered
- identified
- lean
- uncertain
- ore
- grades
- dilute
- lean/dilute/uncertain