

Kanban interactive – user instructions

Link to interactive: <https://www.technicaleducationnetworks.org.uk/interactive/kanban>

Link to video walkthrough: <https://vimeo.com/1118131685/4406764c1a>

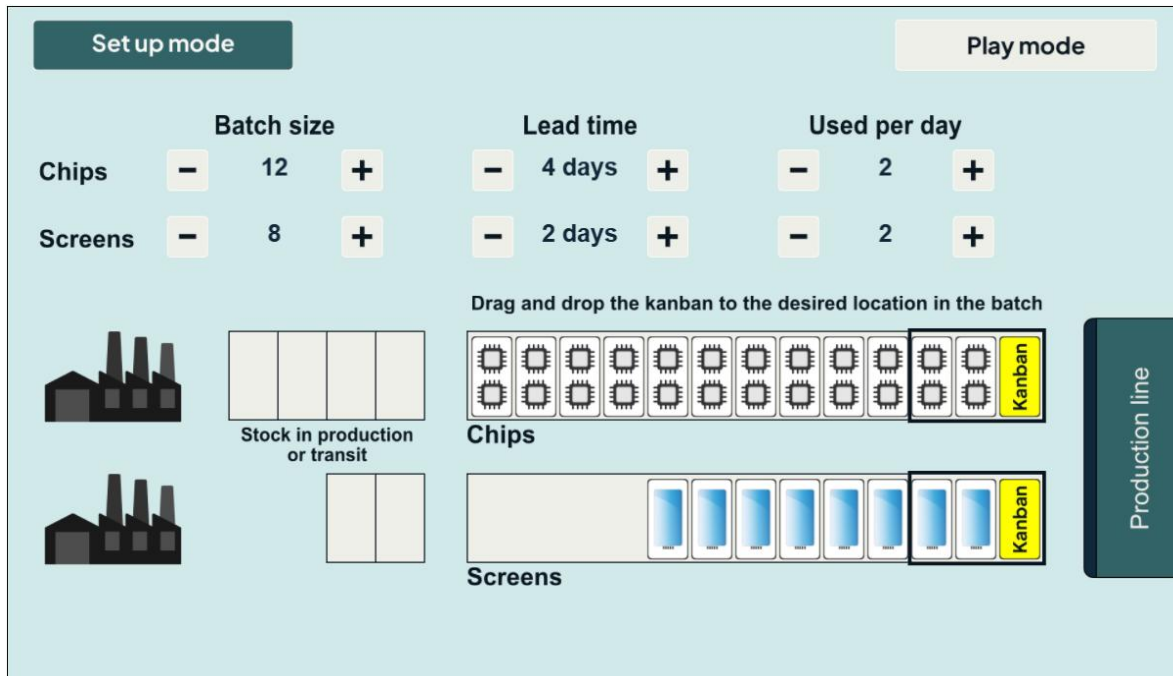
Overview

The Kanban interactive is intended to show how kanbans are used as visual markers to facilitate Just-in-Time (JIT) stock control. The purpose of the simulation is to place the kanban in the correct place in the stock so that new stock arrives just in time to continue production. If the kanban is placed too early in the stock queue, it triggers new stock to arrive too soon and the production facility becomes overstocked. This ties up cash in unnecessary stock and in the worst case, might mean there is more stock than space to store it. If the kanban is placed too late in the stock queue, the production facility runs out of stock and production stops, leading to the production facility losing income.

The interactive has two modes: set up and play. In the first mode, the scenario is set up to define the component batch size, the lead time for new batches and the number of items used per day. Once the scenario is defined, the user can place the kanban within the stock queue for each of the components.

Set up mode

This mode is the default when the interactive is launched.



The screenshot shows the 'Set up mode' interface of the Kanban interactive. It features two tabs: 'Set up mode' (active) and 'Play mode'. Below the tabs, there are three columns of controls for 'Chips' and 'Screens' components.

	Batch size			Lead time			Used per day		
Chips	-	12	+	-	4 days	+	-	2	+
Screens	-	8	+	-	2 days	+	-	2	+

Below the controls, there are two factory icons on the left. In the center, there are two rows of boxes representing 'Stock in production or transit'. The top row is for 'Chips' and the bottom row is for 'Screens'. Each row contains a series of boxes, with the last box in each row containing a yellow 'Kanban' icon. A vertical bar on the right is labeled 'Production line'. Above the stock boxes, there is a instruction: 'Drag and drop the kanban to the desired location in the batch'.

Step 1 – Set up the scenario values

Using the '+' and '-' buttons next to each item, set up scenario values for batch size, lead time and number of items used per day. A number of starting positions should be provided in the teacher guide. The batch size will be shown in the production queue area with the kanban initially placed at the head of the queue.

Step 2 – Place the kanbans

This is achieved by clicking and dragging the kanban left or right within the starting batch. It is expected that this stage will require some trial and error to get right. Note, if the scenario is changed, the kanban locations will reset.

The rectangles drawn around items at the right of the production queues show which items will be considered for action on the production run for that day.

The example used in this guide is shown below. It is noted that in this set up, two chip items will be used and a chip kanban will be dispatched on the first day of production. Note, when two items are used per day, the kanban can be placed to the right of the two items or between them and the effect will be the same. In the example below, the kanban has been placed between the two items that will be used on day 1. It would be equally valid to have it to the right of the two items. If it were moved one further place to the left, then it would be considered on the next day when the second two items were used. One screen item will be used each day and the kanban has been dragged to sit to the immediate right of the third screen item. This means it will be dispatched on day 3 when the third item is used.

Set up mode

Play mode

Batch size

Chips - 6 +

Screens - 8 +

Lead time

Chips - 3 days +

Screens - 2 days +

Used per day

Chips - 2 +

Screens - 1 +

Drag and drop the kanban to the desired location in the batch




Stock in production
or transit

Kanban

Chips



Kanban

Screens

Production line

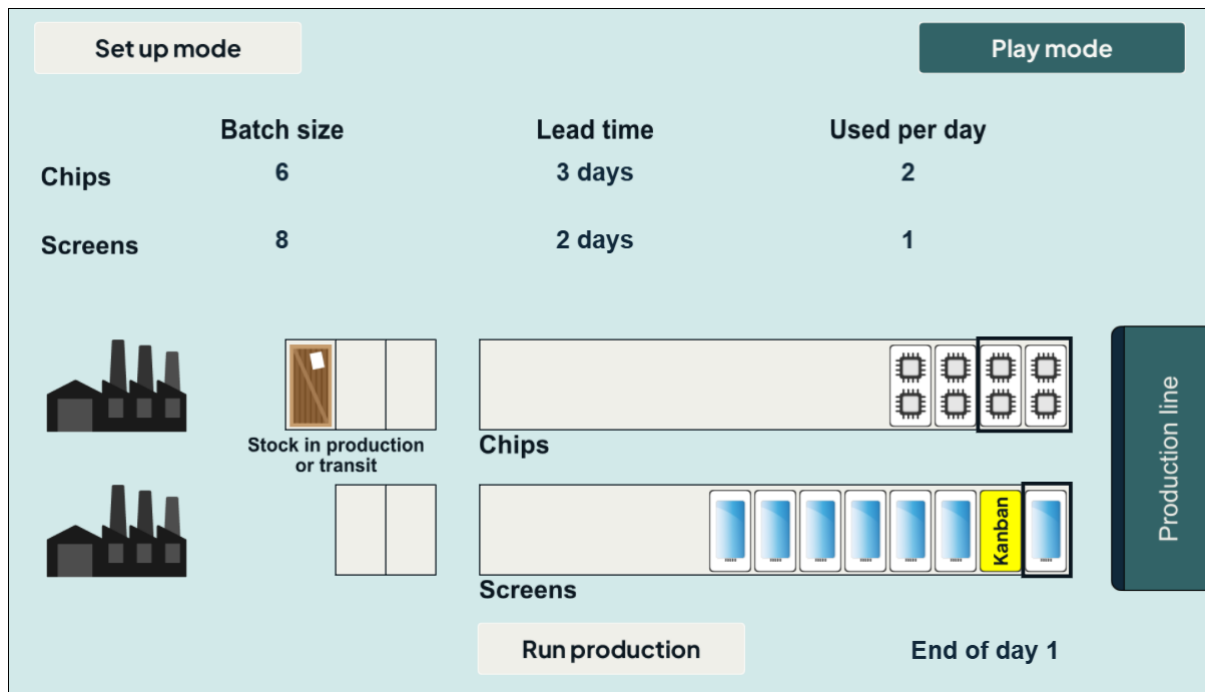
Play mode

When play mode is selected, the user can no longer change scenario values or move the kanbans. Production is stepped through on a day-by-day basis by pressing the “Run production” button. (The “Run production” button appears after Play has been pressed.)

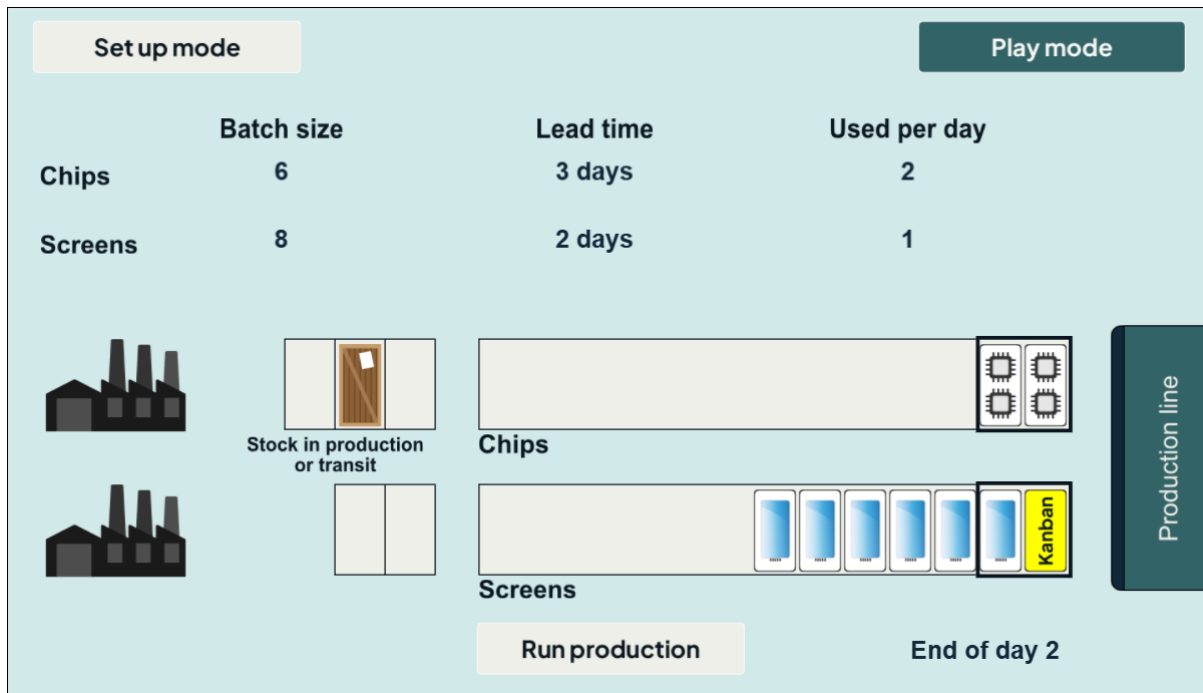
When the day’s production is run, the following happens:

- The number of items used per day is consumed by production.
- If there is a kanban in the day’s items, it will be dispatched and an order raised for external supply. The kanban will result in stock entering the first box in the production/transit area.

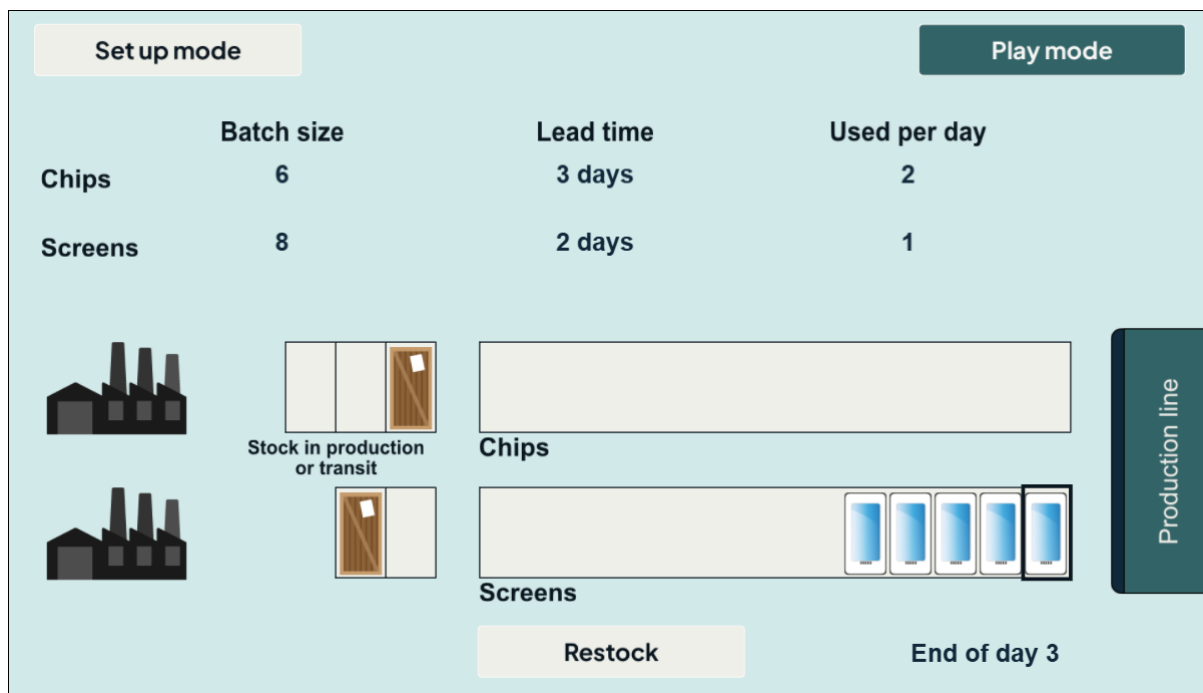
At the end of day 1, the simulation will show:



At the end of day 2, the simulation will show:



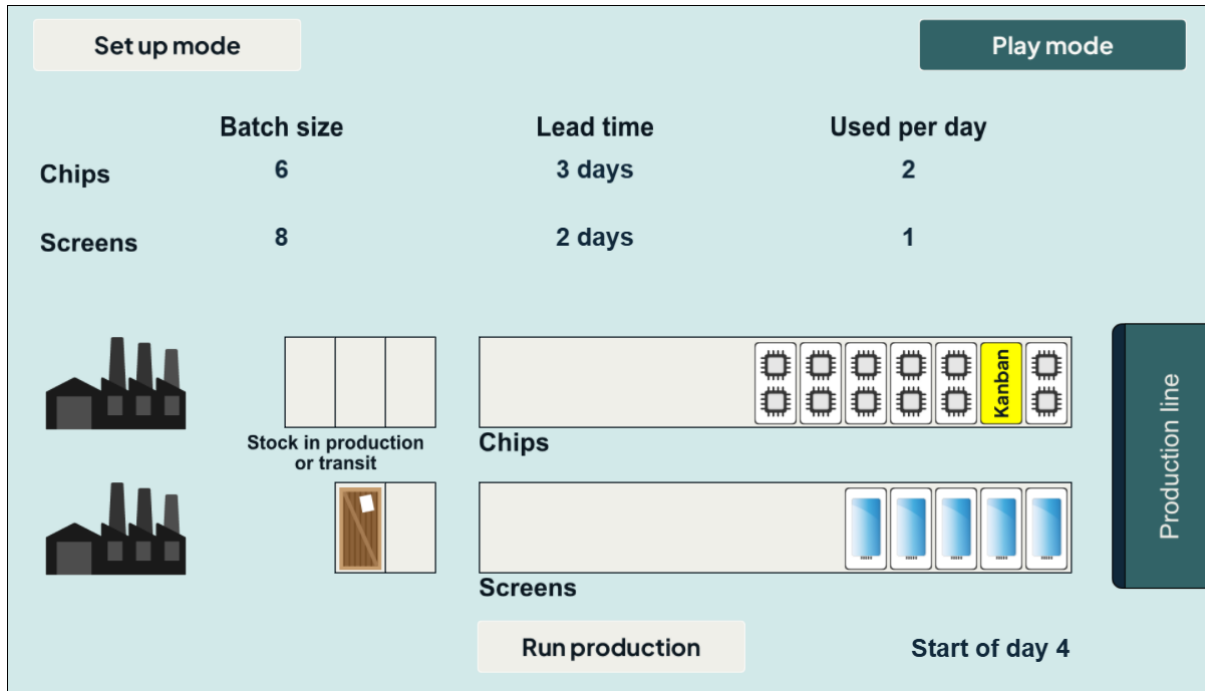
At the end of day 3, the simulation will show:



At the end of day 3, the chips stock has reached the final box and so is ready for restocking. This is an important definition of the lead time in this simulation:

If a kanban is dispatched on day x and has a lead time of L days, it will be restocked ready for use on day $x + L$. For example, the chips kanban was dispatched on day 1 with a lead time of 3 days and so will be ready for production use at the start of day 4.

Pressing the “Restock” button gives:



No problems so far! The key point to notice is that when the restocking has taken place, the chips production queue looks identical to the starting position – six chips and one kanban in the same location.

Continue the next two steps by pressing “Run production”, which gives the figure shown below. It is noted that eventually the “Run production” button does not reappear; instead, a “Restock” button appears. This indicates that new parts are available for restocking for the day’s production.

Set up mode

Play mode

	Batch size	Lead time	Used per day
Chips	6	3 days	2
Screens	8	2 days	1

Stock in production
or transit

Chips

Screens

Production line

Restock

End of day 5

Pressing the “Restock” button moves items from the packing area to the stock area. In the figure below, the restocking of the screens has resulted in a production stock of 12 screens. This is higher than the starting stock of 8 and your production director has stepped in to have a word with you!

It works this time, but you are overstocked with screens - try again.

Stock in production
or transit

Chips

Screens

Production line

Reset

Start of day 6

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6

Set up mode
Play mode

	Batch size			Lead time			Used per day		
Chips	-	6	+	-	3 days	+	-	2	+
Screens	-	8	+	-	2 days	+	-	1	+

Drag and drop the kanban to the desired location in the batch

Stock in production
or transit

Chips

Screens

Production line



You've got so much stock you've run out of space to store it - try again.




Stock in production or transit

Chips

Screens

Production line

Reset

Start of day 3

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Set up mode

Play mode

Batch size

Chips - 6 +

Screens - 8 +

Lead time

Chips - 3 days +

Screens - 2 days +

Used per day

Chips - 2 +

Screens - 1 +



Stock in production
or transit

Drag and drop the kanban to the desired location in the batch

Kanban



Chips

Kanban



Screens

Kanban

Production line

The diagram illustrates a production line simulation. At the top, a red circle with a sad face icon and the text "Production halted as there are no chips. Try again!" indicates a problem. Below this, the production line consists of several components:

- Factories:** Two factory icons on the left represent sources of raw materials.
- Stock in production or transit:** A central area with two vertical slots. The top slot contains a brown box with a white chip icon, while the bottom slot is empty.
- Chips:** A horizontal bar labeled "Chips" is currently empty.
- Screens:** A horizontal bar labeled "Screens" contains five slots. The first three are empty, the fourth is a yellow box labeled "Kanban", and the last two are blue boxes.
- Production line:** A vertical bar on the right side is labeled "Production line".
- Controls:** At the bottom, there is a "Reset" button and a "Day 4" indicator.

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Set up mode

Play mode

	Batch size			Lead time			Used per day		
Chips	-	6	+	-	3 days	+	-	2	+
Screens	-	8	+	-	2 days	+	-	1	+

Stock in production or transit

Drag and drop the kanban to the desired location in the batch

+
-

+
-

+
-

+
-

+
-

+
-

Kanban

Chips

+
-

+
-

Kanban

+
-

+
-

+
-

+
-

+
-

Kanban

Screens

Production line



Perfect - your kanbans are placed to ensure JIT production runs smoothly.

Production line



Stock in production or transit



Chips





Stock in production or transit



Screens



Reset

Start of day 11

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A number of scenarios should be constructed so that different groups can work on different problems.

Set up mode
Play mode

	Batch size			Lead time			Used per day		
Chips	-	6	+	-	4 days	+	-	2	+
Screens	-	8	+	-	2 days	+	-	1	+

Stock in production
or transit

Drag and drop the kanban to the desired location in the batch

Chips

Screens

Production line

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