

Stamping Press

Name(s): _____

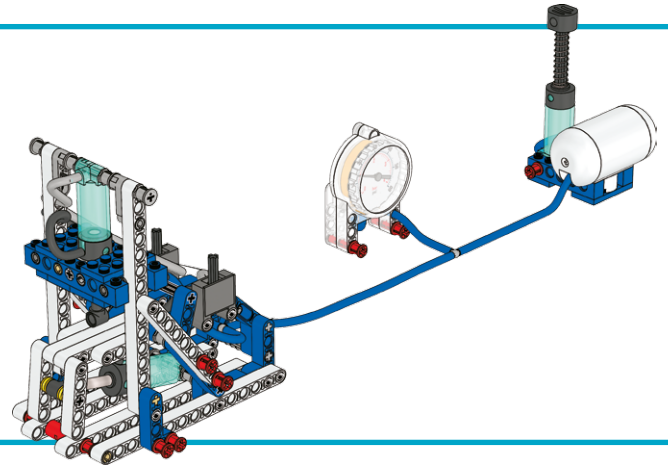
Build the stamping press and investigate how energy efficient it is.



Build the Stamping Press

(All of book 3A and book 3B to page 14, step 12)

- Pump air into the system and use the manometer to detect whether there is an air leak.
- Try all valve settings and test if the stamping press can do all four possible strokes: press down, press up, ejector down, and ejector up. Make sure all moving parts move freely.
- Then, move the press up, the ejector forward, and empty the air tank.



How energy efficient is your press?

One complete work cycle is four 'strokes' in sequence: press down, press up, ejector down, and ejector up. Find out how repeated work cycles affect loss of pressure.

First, predict how repeated work cycles affect the loss of pressure when working with empty stamping press A.

Then, test how stamping press A's repeated work cycles actually affect the loss of pressure. Start with 36 PSI (or 2.5 bars of pressure). Test several times to make sure your results are consistent.

Next, follow the same procedure for stamping presses B and C.

Test each model several times to make sure your results are consistent.

Record your results on graph paper.

| | A | B | C |
|----|---|---|---|
| 1 | | | |
| 3 | | | |
| 5 | | | |
| 7 | | | |
| 9 | | | |
| 11 | | | |
| 13 | | | |
| 15 | | | |
| 17 | | | |

Explain your findings:

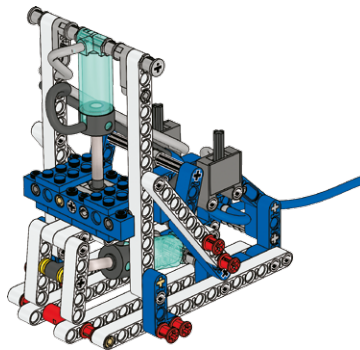
How good are you at operating the stamping press?

The faster you can operate the empty stamping press, the more cost efficient it will be. Find out how many complete work cycles you can finish within 30 seconds.

First, predict how many complete work cycles you can finish within 30 seconds when using an empty stamping press. *Record your predictions on the worksheet.*

Then, test how many complete work cycles you actually finished. *Record your findings on the worksheet.*

Next, try pressing different objects of your own choice and compare the number of complete work cycles you are able to finish.



| | My Prediction | My Findings |
|--------|---------------|-------------|
| Test 1 | | |
| Test 2 | | |
| Test 3 | | |

Optional: My Amazing Pneumatic !

Invent a new and useful machine that uses the same mechanisms as the stamping press but does a different job. Sketch it and explain the three most important features.





Optional: Further Research

Describe some of the industries and jobs for which the stamping press could be used and what some of its limitations may be.

Stamping Press

Name(s): _____

Date: _____

| NGSS GOALS |  BRONZE |  SILVER |  GOLD |  PLATINUM |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Student work related to this Crosscutting Concept: In this project, we used a graph to track the loss of pressure in our stamping press after repeated work cycles. | | | | |
| Energy and matter - Flows, cycles, and conservation: Tracking energy in and out of a system helps understand the system's possibilities and limitations. | <ul style="list-style-type: none"> We created a graph of our results on graph paper from the stamping machine experiment on page one of our student worksheet. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Bronze. We labeled our graph's axes with pressure and strokes. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Silver. We labeled the lines for each experiment (A,B, and C) on our graph with different colors or line styles. We used our graph to help us explain our findings in the experiments. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Gold. We used our graph to help us propose a new experiment for our stamping machine. <input type="checkbox"/> |
| 2. Student work related to this Practice: In this project, we investigated the loss of pressure in our stamping press after repeated work cycles. | | | | |
| Planning and carrying out investigations: Collect data to test design solutions under a range of conditions. | <ul style="list-style-type: none"> We completed the experiment for stamping press A. We recorded our pressure measurements for the odd number strokes indicated on our data table (page one of the student worksheet). <input type="checkbox"/> | <ul style="list-style-type: none"> We met Bronze. We completed and recorded the measurements for our experiment on stamping press B. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Silver. We completed and recorded the measurements for our experiment on stamping press C. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Gold. We proposed a new model for 'My Amazing Pneumatic'. <input type="checkbox"/> |
| 3. Student work related to this Practice: In this project, we used data to help us find similarities and differences in the pressure loss of three different stamping machine scenarios (A,B, and C). We used these data as evidence when we explained our findings. | | | | |
| Analyzing and interpreting data: Analyze and interpret data to determine similarities and differences in findings. | <ul style="list-style-type: none"> We reviewed our data tables and graphs. We wrote an explanation for our findings. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Bronze. We identified at least one similarity and/or difference between the data in our three experiments. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Silver. We identified at least two similarities and/or difference between the data in our three experiments. <input type="checkbox"/> | <ul style="list-style-type: none"> We met Gold. We compared our data analysis with our classmates. We revised our work and made it more clear for our classmates to understand. <input type="checkbox"/> |
| Notes: | | | | |