```latex
\documentclass{article}

% Language setting
% Replace `english' with e.g. `spanish' to change the document language
\usepackage[english]{babel}

% Set page size and margins
% Replace `letterpaper' with `a4paper' for UK/EU standard size
\usepackage[letterpaper,top=2cm,bottom=2cm,left=3cm,right=3cm,marginparwidth=1.75cm]{geometry}

% Useful packages
\usepackage{amsmath}
\usepackage{graphicx}
\usepackage{float} %%This will place the image wherever
\usepackage[colorlinks=true, allcolors=blue]{hyperref}

\title{A couple cool facts about Statistical Mechanics}
\author{Michael Laemmle}

\begin{document}
\maketitle

\begin{abstract}
This document covers a few examples of the power of \LaTeX and will hopefully be a touch informative.
\end{abstract}

\section{Introduction}

Ludwig Boltzman, who spent much of his life studying statistical mechanics, died in 1906, by his own hand. Paul Ehrenfest, carrying on the work, died similarly in 1933. Now it is our turn to study statistical mechanics. Perhaps it will be wise to approach the subject cautiously. \href{http://libgen.is/book/index.php?md5=BF75328DD40141448E93EF75BE466F2A}{(Opening lines of "States of Matter", by D.L. Goodstein)}.

\section{Images, data, and charts, oh my!}

\subsection{Images}

Entropy says that the universe tends towards chaos - i.e., energy is always lost as heat, which cannot be controlled or directed without expending a larger amount of energy.

\begin{figure}[H] %% put this below gas discharges
\centering
\includegraphics[width=0.7\textwidth]{Temp.JPG}
\caption{\label{fig:Paschens curve} Chaos visualized \cite{greenwade93}.}
\end{figure}

\subsection{Cool tables}

In our system, we have neutrons and protons freely moving about a box. They form what is known as an \textbf{ensemble} - a collection of particles, each acting with individual motion. Sometimes, the neutrons and protons will collide, producing Deuterium. We begin with 10 neutrons and 10 protons. We observe that, for time measured in seconds, we have

\begin{table}[H]
\centering
\begin{tabular}{l|r}
Time(in s) & Deuterium (in atoms) \\\hline
1 & 0 \\
2 & 4 \\
3 & 7 \\
4 & 8 \\
5 & 9
\end{tabular}
\caption{\label{tab:widgets}An example table.}
\end{table}

\section{Methodology}

\subsection{Mathematical Methods}
```

```latex

We can describe the energies of the states with the following equation

\[E = \sum_{k} e^\frac{E_k}{(k_bT)}  \]

We can now use the discrete energies given by the previous equation to find the energy of the system.

Let $X_1, X_2, \ldots, X_n$ be individual particles in our ensemble, with $\text{E}[X_i] = \mu$ and $\text{Var}[X_i] = \sigma^2 < \infty$, and let
\[S_n = \frac{X_1 + X_2 + \cdots + X_n}{n}
      = \frac{1}{n}\sum_{i}^{n} X_i\]
denote their mean. We can easily find the total energy by multiplying by that mean. However, in most systems, you don't know exactly how many atoms you will have, so you want to allow for what is known as \textbf{variance}, which is \textit{the range of uncertainty of a given ensemble}

Then as $n$ approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

\subsection{How to add Lists}

We have now "covered" \dots

\begin{enumerate}
\item The nature of entropy
\item and a basic ensemble
\end{enumerate}
\dots as well as \dots
\begin{itemize}
\item Mathematical methods
\item and not much else
\end{itemize}

\subsection{Good luck!}

I hope you've found this lesson educational, if not somewhat misleading, considering I haven't studied stat mech in over two years. Anyway if you want to know more about overleaf, click \href{https://www.overleaf.com/learn}{this link}. Please also let us know if you have any questions or feedback about this. I hope it was both educational and enjoyable.

\bibliographystyle{alpha}
\bibliography{sample}

\end{document}
```