

Human Progress in the Light Bulb #1

Human _____ has been developing _____ and _____. _____
_____ centuries, _____ living _____
dramatically, and the _____ of progress has also been increasing. These
developments are the _____ progress in science and technology.
_____ science and technology _____ last
century or two? _____ many technologies and scientific
discoveries, _____ let's _____ one _____; the light bulb. _____
_____ in the 1870s. _____, the light bulb _____
_____, and _____. _____ we are
going to _____ the light bulb. It is
going to be a _____ of how human society has _____.

Human society has been developing faster and faster. In the last couple of centuries,
our living standards have improved dramatically, and the pace of progress has also
been increasing. These developments are the result of progress in science and
technology. Then how have science and technology advanced in the last century or
two? There are many technologies and scientific discoveries, but let's focus on
one thing; the light bulb. It was invented in the 1870s. Since its invention, the light bulb
has been improving, and made our lives better. Here we are going to look through
some figures about the light bulb. It is going to be a good example of how human
society has progressed.

society	まだ、今なお、それでも	increase	増える
develop	発展する	result	結果
fast	速く	advance	前進する
couple of ~	2,3の、いくつかの	discovery	発見、発明
living standard	生活水準	focus	集中する、絞る
improve	向上する	light bulb	電球
dramatically	劇的に	invent	発明する
progress	進歩する	figure	数字、数値

Human Progress in the Light Bulb #2

_____ the invention of the light bulb, _____ candles to _____
 _____. They turned _____ 0.01 percent of the _____ energy of
 wax into light energy. Light bulbs _____ ten times _____
 candles. In the 19th Century, _____ turn 10 percent of
 chemical energy in _____ into electric energy. Light bulbs turned 1 percent of
 _____ energy into light energy, so the _____ was about 0.1
 percent. _____, _____ the _____ and the _____
 light _____ efficiency. Today, the best _____
 _____ 60 percent of the chemical energy _____ into
 electricity, and LEDs have efficiency of 15 percent. So, the _____
 _____ 9 percent. _____
 conversion efficiency, _____ technology is 900 times _____
 _____ candles.

Before the invention of the light bulb, humans used candles to light a room. They turned just 0.01 percent of the chemical energy of wax into light energy. Light bulbs were ten times as efficient as candles. In the 19th Century, power plants could turn 10 percent of chemical energy in coal into electric energy. Light bulbs turned 1 percent of electric energy into light energy, so the total efficiency was about 0.1 percent. Since then, both the thermal power and the electric light have improved in efficiency. Today, the best thermal power plants can convert 60 percent of the chemical energy of oil into electricity, and LEDs have efficiency of 15 percent. So, the overall conversion rate is about 9 percent. In terms of conversion efficiency, our technology is 900 times better than the age of candles.

light	照らす	efficiency	効率
chemical	化学の	thermal power plant	火力発電所
efficient	効率的な	convert	変換する
power plant	発電所	electricity	電気
coal	石炭	overall	全体の
electric	電気の	conversion	変換
total	全体の		

Human Progress in the Light Bulb #3

What is prosperity? _____ one way to understand prosperity _____
 _____ how much time we need to _____ get the same
 _____. If we want to get an hour of light, how many hours do we have to
 _____? In 1800, _____ you wanted to buy a
 candle _____ light your room for one hour, you _____
 _____ for 6 hours. Ordinary people working _____ the
 _____ income couldn't _____ light for the evening. _____
 the invention of the light bulb, _____ 15 minutes to get the
 _____ light. In 1950, people _____ of light
 by working _____ 8 _____. Today, _____ a
 second to _____ for an hour. In _____,
 today we _____ times more prosperity _____.

What is prosperity? Probably one way to understand prosperity is to compare how much
 time we need to spend in order to get the same service. If we want to get an hour of light,
 how many hours do we have to work at the average wage? In 1800, if you wanted to buy
 a candle that could light your room for one hour, you would have had to work for 6
 hours. Ordinary people working with the average income couldn't even get a light for the
 evening. With the invention of the light bulb, it reduced to 15 minutes to get the same
amount of light. In 1950, people got an hour of light by working for 8 seconds. Today, it
only costs us half a second to light your room for an hour. In simple calculation, today
 we enjoy 43,200 times more prosperity than in 1800.

in terms of ~	～の観点で	wage	賃金
prosperity	繁栄、成功	ordinary	普通の、一般的な
compare	比較する	income	収入
spend	費やす	reduce	減少する
in order to V	Vするために	calculation	計算
average	平均の、平均的な		