



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

INDUSTRIAL REVOLUTION

TASK 1: What do we understand under the term the Industrial Revolution? Is the usage of the word **revolution** appropriate? Read the following text and decide what the most revolutionary changes were.

“This is the century when wood gave way to iron and steel, and when muscle power was replaced by steam power. These were the years when the manufacture of all kinds of goods moved from simple hand machines in people’s homes to huge, powered machines in gigantic factories. These were the years when great industrial cities sprang up in the midlands and north of England and Scotland; in which horse-drawn wagons lumbering along muddy roads at 5 km/h gave way to express trains rushing along a network of railways at 95km/h, and in which the population rose from a mere 10 millions to 37 millions.

These were the years of science, discovery and invention; of slums and disease. This was the age of the struggle of the working people for education, freedom and a decent standard of living. These were the years that made Britain the richest, most powerful and most advanced country in the world, importing food and raw materials from every corner of the globe and more than paying for them by exporting vast quantities of every type of manufactured product from drawing pins to sea-going liners.”

MOSS, Peter: History Alive 3 1789-1914, Hart-Davis Educational, 1976, p. 5

TASK 2: What were some of the main changes in the way people lived and worked? Complete the chart with the changes.

BEFORE	AFTER
most people lived in the countryside	
most people worked in their homes	
most transport was by animal	
most power was by animal or human	
Governments didn’t do much about living conditions (education, health, working hours etc)	

England – ‘the Workshop of the World’

TASK 2: Why did it all start in England? Study the list of possible reasons below and cross out **THREE** false reasons.

- | | |
|---|---|
| <ul style="list-style-type: none"> a. The population was increasing. (1801 10.5 mil, 1821 21 mil, 1901 37 mil) b. Improved farming – enough food for the people living in the cities. c. New inventions, especially cotton industry. d. No wars in England since mid-seventeenth century. e. Lot of money coming from the slave trade. f. Lot of colonies – raw materials, cheap labour, wide market. | <ul style="list-style-type: none"> g. Nowhere in Britain it is more than 120km from the sea. h. Absolute power of the king. i. High inner taxation. j. Government regulates the economy and protects good working conditions. k. lot of coal and iron l. invention of the steam engine (Thomas Newcomen 1705) |
|---|---|

No matter how suitable the conditions for the beginning of the Industrial Revolution in England were, no one was able to foretell its far-reaching consequences. Among the biggest challenges it brought we may count:

- need for education
- opportunities for wealth
- rise of trade unions
- city slums and disease
- need for new laws
- grim living and working conditions
- improving living standard and new pastimes
- rise of socialism

Textile industry first

TASK 3: *Why did the Industrial Revolution start in the textile industry?*

New inventions in the Cotton Industry:

1733 John Kay – flying shuttle – 1 weaver able to produce 4 times more cloth

1768 James Hargreave – Spinning Jenny – 1 spinner able to produce 28 times more yarn

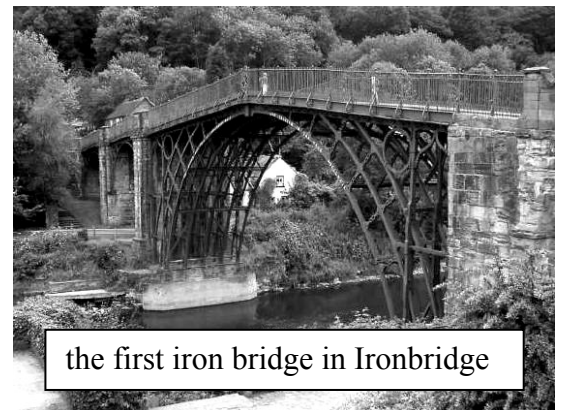
1773 Richard Arkwright – water frame (water powered spinning machine)

1779 Samuel Crompton – Spinning mule

1785 Edmund Cartwright – power loom – one spinner using a mule and one weaver using a power loom able to produce 54 times more than in 1700

The success of the cotton industry in the Manchester area was followed by a logical sequence of events:

- to produce the new machinery the **machinery industry** was on the rise
- machinery industry demanded iron, so **iron industry** flourished, **Abraham Darby** (1750 – 30,000 tons, 1830 – 1 mil tons, 1870 – 6 mil tons)
- to produce iron **mining** had to supply more coal (1750 16,000 miners 5 mil tons, 1930 230 mil tons 1 mil miners)
- to get the iron and coal to the new factories **transport** needed to improve
- and many more branches of industry followed...



Transport

TASK 4: *What did transport look like in 1700? What were the main problems?*

a. *the roads*

b. *the river transport*

Suggest some possible ways of improving transport.

Canals: James Brindley (1764-1830)

Slow but enabling to transport a lot more, and useful for transporting fragile goods – esp. glass, pottery, china

Compare the following statistics:

- One man with one pack horse able to transport about 180 kg.
- One man with one horse pulling a cart able to transport about 1-2 tones, but only in good weather.
- One man with one horse pulling a barge able to transport from 50 to 100 tones.

No wonder so many canals were built.

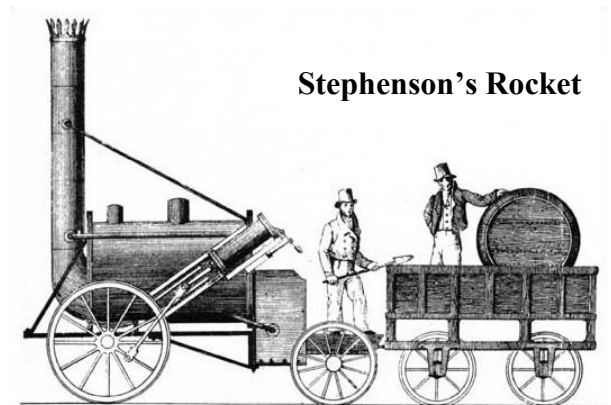
Roads:

- **Turnpikes** (“toll roads”), John **Metcalf** (blind) – better roads, new ways of road construction Faster transport: London – York 1750 = 5 days, 1860 = 1 day, 10km/h
- **Telford** and **Macadam roads** – improved road construction – faster transport 17km/h

TASK 5: *What was the advantage of the Macadam road over Telford road? Research for the diagrams showing their construction and compare it with the construction of the Ancient Roman roads.*

Roads vs Railways:

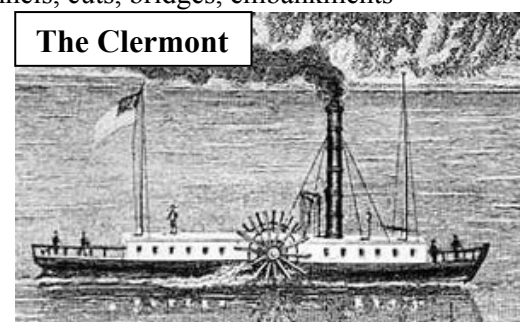
- rails first used in coal mines – width of track 143cm = width of the coal mine
- “tramways” lines of parallel tracks on which horses pulled carts
- First steam engines used to pull the wagons in the coal mines
- **George Stephenson** (1781-1848)
- **1814 first locomotive “the Rocket”**
- 1825 Stockton – Darlington first freight trains
- 1830 Liverpool – Manchester, first passenger trains
- 1835-1870 “Train Mania”
 - 1842 18 mil passengers a year
 - 1862 180 mil passengers a year
 - 1882 682 mil passengers a year
- Railway, fast, heavy cargoes but very expensive – need of investors
- Workers building railways – “Navvies” – professionals building tunnels, cuts, bridges, embankments



Steamships

Paddle Steamers

- Robert Fulton – 1807 steamship Clermont (The Clermont's side paddle wheels were 4 feet (1.2 meters) wide and 15 feet (4.6 meters) in diameter.)
- 1818 Savannah - first cross Atlantic Journey



Propeller Steamers

- 1827 Josef Ressel, first effective screw propeller, improved by Swedish John Ericsson
- 1839 first cross Atlantic journey by a propeller driven steamer
- 1848 British Navy – a race between a paddle steamer and a propeller steamer – victory of the propeller

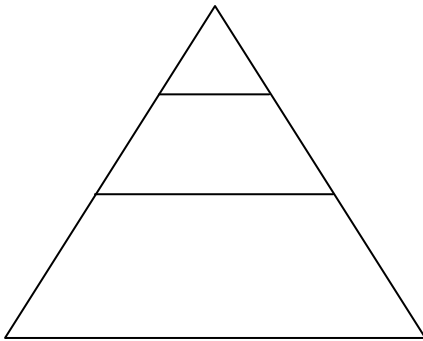
Peopple at Work

TASK 6: *What way did the Industrial Revolution influence the lifestyle of people?*

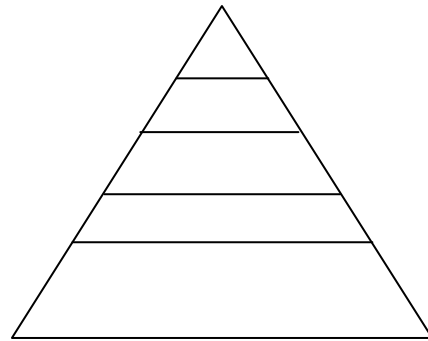
The Industrial Revolution completely changed everyday life, interests and the lifestyle of people. Then the social division into modern classes really begins. The social pyramid consisting of Wealthy Class, Middle Class and Working Class is formed due to different priorities and interests of its members.

TASK 7: *The Social Pyramid. Try to label the Social Pyramids representing the division of society into social classes during the Middle Ages and the Industrial Revolution. Add examples of typical professions.*

The Middle Ages



The Industrial Revolution



Can you give a list of reasons why the divisions are not so obvious today?

The most striking change was the growth and change of towns, bringing employment but also pollution, diseases and extreme poverty.

Working Class

TASK 8: *What were the effects of the new machinery on working conditions of the employees?*

Luddites – workers breaking machinery, blaming it for their loss of jobs 1811/1812 in the Nottingham area. 1813 a trial – many hanged or transported to Australia.

The factory owner usually owned the factory houses, where the workers lived on high rents and terrible conditions, and shops where they had to buy their food and other necessities. The owners often paid the workers in tokens which could be spent only at the owner's shop. Goods from the shop were of poorer quality and cost more.

People at work: Source based questions

TASK 9: Study the following extracts or diagrams and answer the questions below

'If you could visit a factory as it was in the first forty years of the nineteenth century your first impression would be that you had arrived at a prison. Its walls would be tall and grim and its windows small and often barred with iron. Once inside, however, you would realize that it was not a gaol, for many convicts received better treatment than the factory workers.

Perhaps the first thing that you would notice would be the dreadful conditions in which the people worked. To help stop the cotton threads from snapping, the inside of the textile factories was kept very hot and very moist, the temperature usually being between 26 and 29° C. This noisy, steamy atmosphere was thick with dust and fluff from the cotton fibres, and over all hung the unpleasant smell from the open lavatory buckets at one end of the room. It is not surprising that the death rate from tuberculosis and lung diseases among the people who had to work for up to eighteen hours a day in such conditions was horrifying.

Although the working day was so long, no one, not even small children, was allowed to sit down except during the lunch interval. Even during the short breakfast and tea breaks many factories kept their engines running so that the workers had to eat with one hand and operate their looms or jennies with the other. These long hours spent hunched over the machines added stomach complaints, varicose veins and ulcers to the long list of diseases from which the workers suffered. Perhaps even worse, small children, who often had to bend their bodies into unnatural positions to do their jobs properly, frequently grew up with twisted spines, crooked thighs and knock-knees.

Finally, as if natural diseases did not do enough in the way of killing and maiming, there were always the machines themselves waiting to mangle workers who became caught in them. There were no laws to compel factory owners to cover belts, wheels and moving parts, so that these were left completely unguarded. At the end of a twelve or fourteen hour day it was all too easy for a weary adult, let alone a child, to make a mistake and get caught in the machinery. In 1833 of every five accident cases received at Manchester Infirmary, two were the result of factory machines.'

MOSS, Peter: History Alive 3, 1789-1914, Hart-Davis Educational, London, 1976, p 51

Report of William Cobbett

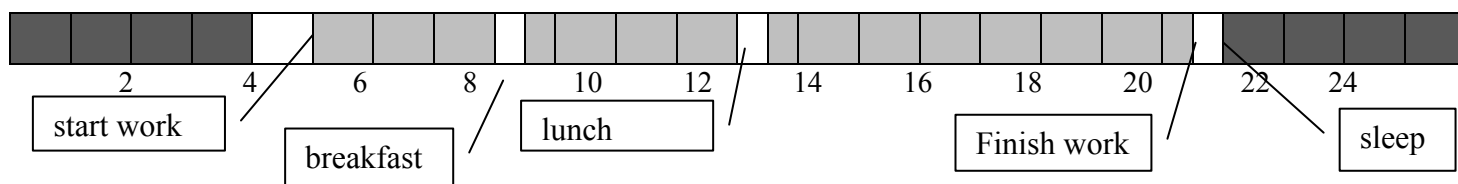
Some of these lords of the loom have in their employ thousands of miserable creatures. In the cotton spinning work these creatures are kept fourteen hours in each day, locked up, summer and winter, in a heat of 80 to 84 degrees. The rules which they are subjected to are such as no negro slaves were ever subjected to.

Observe, too, that these poor creatures have no cool room to retreat to, not a moment to wipe off the sweat, and not a breath of air to come between them and infection. The door of the place wherein they work is locked, except half an hour at tea time; the workpeople are not allowed to send for water or drink. If any be found with his window open, he is to pay a fine of a shilling.

Not only is there not a breath of sweet air in these truly infernal scenes but, for a large part of the time, there is the abominable stink of the gas, mixed with the steam. There are the dust and what is called the cotton flyings, which the unfortunate creatures have to inhale: and the fact is, the notorious fact is, that well constituted men are rendered old and past labour at forty years of age, and that children are rendered decrepit and deformed, and thousands of them are slaughtered by consumption before they arrive at the age of sixteen.

COBBETT, William: Political register Volume 152, November 20th 1824

A working day 1820's



Rules to obey

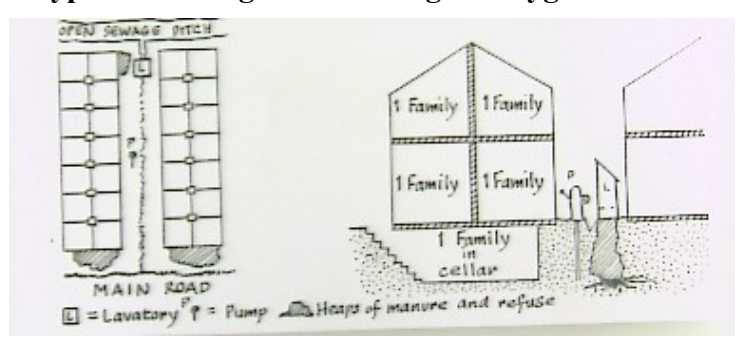
1. Doors will be closed 10 minutes after the engine starts and no weaver will be admitted until breakfast time. Any weaver absent will be fined 3d for each loom. (As a weaver normally was in charge of two looms this meant a fine of 6d, or a half a day's pay for a woman)
2. weavers leaving the room without consent of the overseer while the engine is working, fine 3d. (this included going to lavatory or getting a drink)
3. Weavers not providing themselves with nippers or shears will be fined 1d a day.
4. All shuttles, wheels, brushes, oilcans, windows etc. found broken will be paid for by the weaver.
5. If any hand in the mill be seen talking to another, whistling or singing, he will be fined 6d.
6. Any hand opening the window will be fined 1d.

Average life expectancy during the Industrial Revolution					
Wealthy class		Middle class		Working class	
rural area	Manchester	rural area	Manchester	rural area	Manchester
52	38	41	20	39	17

One Lancashire mill fined workers 1d (5 pence) if they came to the factory dirty and another 1d if they went to wash. In another any worker who was ill and failed to find someone else to do his job was fined 6d (30 pence): at today's rates this would be over £6.

Some unscrupulous employers went even further. They actually advanced the factory clocks by 15 minutes in the morning so that all of the workers were late and were fined. By evening the clock would somehow lose half an hour so that it was 15 minutes slow – and the owner would get a quarter of an hour's work from his men without payment. In other factories there were two clocks, one a normal one and the other driven by steam engine. If the engine was running slowly, then the clock ran slowly so that the employees might have to work an extra hour or more. If the engine was running quickly, then the factory closed down at the time by the ordinary clock.

A typical working class housing and hygiene



Although they were a very small minority, there were some employers who genuinely tried to do what they thought best for their work-people. But even these 'good' factory owners did not seem to realise two of the worst cruelties of the system – the incredibly long hours and the employment of children. Twelve to fourteen hours a day from Monday to Saturday with a 'short' day of four hours to clean the machinery on Sunday was quite usual, even for small children. The factory worker of 1820 put in as many hours a week as his modern counterpart does in a fortnight – and the nineteenth century man had no holidays except Good Friday and Christmas Day.

MOSS, Peter: History Alive 3, 1789-1914, Hart-Davis Educational, London, 1976, p 54

- 1) Why were the working conditions of the employees worse than in prison or than the position of a slave on plantations?
- 2) What was the effect of long working hours on the younger generation?
- 3) What tricks the employers used to exploit their workers?
- 4) How would you explain the extremely low life expectancy not only of the workers?
- 5) Was there any hope for improvement of the working and living conditions?

Reforms

TASK 10: *Some people were so horrified by the living and working conditions of the workers that they considered the possibility of returning to the pre-industrial stage. This was not practicable. What were the worst features of industrialization? What way would you suggest to eliminate the worst examples of poverty and exploitation?*

• Utopian Thinkers

Robert Owen (1771-1858), self-made man, factory owner **New Lanark**, Scotland – provided good housing, better working conditions for his workers and education for their children



"The working classes may be injuriously degraded and oppressed in three ways:

1st - When they are neglected in infancy

2nd - When they are overworked by their employer, and are thus rendered incompetent from ignorance to make a good use of high wages when they can procure them.

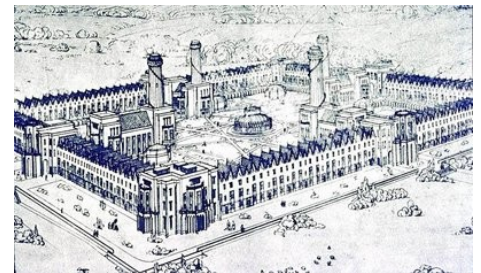
3rd - When they are paid low wages for their labour".

(On the employment of children in manufactories, 1818)

1825-1828 experimented with a community **New Harmony**, Indiana, USA, where all property was shared, money abolished – failed due to different interests of members of community.

Charles Fourier (1772-1837) Wanted to establish communities of workers, working together, sharing the results of their work, no money, everyone should get what he needed.

Claude Henry Saint Simon (1760-1825) Governments should consist of scientists, owners and workers, working together on common wealth.



• Trade Unions

1811-1812 **Luddites** breaking machinery

1800-1824 **Combination Acts** – illegal to meet and discuss working conditions

Small illegal trade unions existed

1819 **Petloo Massacre** – a demonstration demanding reform broken by army – 11 killed, about 500 wounded

1824 Combination Acts revoked

1824-1834 many small ineffective trade unions, many strikes

1834 **Grand National Consolidated Trade Union of Great Britain and Northern Ireland** – threatened general strike, but different interests of various groups involved made the union ineffective

+ **Tolpuddle Martyrs** six farm workers deported to Tasmania for making an oath of secrecy while joining the union

1839-1848 **Chartist Movement – The People's Charter** = a petition with six demands circulated, 2 million workers signed it, 1839-1842 mass manifestations, strikes to support the charter

1. There should be a parliament every year.
2. All adult men should be allowed to vote. (UK 1832)
3. Members of Parliament should be paid. (UK 1832)
4. Each constituency should have the same number of voters. (UK 1832)
5. Voting should be secret by a ballot box. (UK 1832)
6. Anyone should be allowed to become an MP, not only those who owned property. (1832)



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

- 1850s New Model Unions for skilled workers, members contribute to their own funds, have a professional paid secretary, able to support unemployed from their funds + needed by employers – managed to improve conditions for its members
- 1880s similar trade unions for unskilled workers – demonstrations
 - Workers realized the need of a political party
- 1900 Labour Representative Committee
- 1906 **Labour Party**

- **Government Action helping Women and Children**

- 1819 children under 16 maximum 12-hour working day x no inspectors to check it
- 1832 children under 9 not allowed to work
 - 9-13 9 hours work + 2 hours school
 - Inspectors to enforce it
- 1836 Births and deaths registered
- 1842 Women and children under 10 not allowed to work underground
- 1844 children under 8 not allowed to work
 - 8-13 max 6.5 hours a day
 - Women max 12 hours a day
- 1847 women max 10 hours a day

- **Education**

- No state system of education existed
- Sunday schools – since 1770
- Church Schools – since 1833, paid by the government x not enough of them
- 1870 **Education Act** – to build more schools with governmental support
- 1880 compulsory schooling for 5-10 years old children
- 1891 free education

Industrial Revolution – Middle Class Worldview

Middle Class became prosperous thanks to the revolution. Its members wanted to demonstrate their success and respectable position, to ensure the same standard of living for future generations.

- Sons and other relatives inherited positions in firms
- Family houses – representing the position of owners, huge, decorated
- Family vacations – rise of hotels
- Hierarchy – supremacy of men, daily routines, clubs
- Wives seen as helpmates of their husbands, responsible for household
 - X “better half of men” - not affected by the rat race outside



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

What was the attitude of the middle class to the working class?

Should the prosperous Middle Class feel guilty for the horrifying living and working conditions of the poor workers?

Middle Class thinkers were trying to get rid of the possible guilt

Thomas Malthus (1766-1834) '*Essay on population*' 1798

Poverty, pain and misery are inescapable. If wealth was distributed equally, the poor would have larger families and soon their state would be equally as bad as before. = Middle Class not guilty for their poverty, on the contrary the dole, benefits spoil the poor – charity only private

David Ricardo (1772-1823)

If wages rose above the subsistence level, men and women would marry earlier, have more children, population would increase, more unemployed, lower wages, bigger poverty = it is good to keep wages low.

Nassau Senior (1790-1864)

Reduction of working hours would mean lower profits, some factories would go bankrupt, workers would starve = long working hours are good.

Career Opportunities:

The Poor:

- 0-5 playing in streets
- 5-10 school (after 1871)
- 10-12 half day school, half day work
- 12+ full-time employment

Middle Class:

- 0-5 nurse, maid and mother
- 5-12 governess or small public school, ordinary school
- 12-16 (or 18) minor public or private school, grammar school
- 16+ university, college, apprenticeship, office, shop

Wealthy Class:

- 0-5 under nurse
- 5-12 governess at home
- 12-18 public school
- 18-21 university
- 21+ social life, army officer, church, politics