### The Second Industrial Revolution

- There were actually two Industrial Revolutions. The first one involved the textile industry, the second one occurred about 50 years later. It focused on three new industries — **coal mines**, **steel mills**, and new transportation in the form of the **railroad**.
- The textile revolution had a profound social and economic impact, but the second revolution’s impact was even more extensive.

### Black Gold

- The mining of coal became an essential industry in Britain for several reasons.
- **First**: The development of the steam engine. Steam engines were powered by coal, and were used to power everything else — factory machines, water pumps, and transportation devices.
- **Second**: Coal could be heated to high temperatures — high enough to melt iron ore and create steel. As steel became a more and more important commodity, coal increased in importance as well.
- **Third**: Coal was plentiful in England (a geographic gift!), and that made it pretty cheap. It was not just used for the above reasons, but also for heating homes and apartment buildings.

### Mine and Forge

- Coal mining was extremely dangerous. Flooding in mines was common, as were explosions (from ignited natural gas) and cave ins (or shaft collapse).
- Children (as young as 5!) and women were often employed in the mines to carry baskets of coal to the surface.
- The demand for coal skyrocketed in the mid-1800s with the development of the **Bessemer process** of making steel. The Bessemer process created high quality steel in about 30 minutes. It was 85% cheaper!
- England also had large naturally occurring deposits of iron ore. This iron ore was also mined and then heated (using coal) to high enough temperatures to melt it. The Bessemer process removed the impurities, and steel was poured into molds.
- Production of steel created a secondary revolution in building and transportation. Steel was stronger and more flexible than iron. It was used for train rails and for girders, allowing buildings and bridges to soar to new heights, and rails to cross the nation.

### Transportation

- The steam engine coupled with cheap steel created a revolution in transportation.
- **George Stephenson** built **The Rocket** in 1829 — an early locomotive using a steam engine that reached speeds of 29 mph! These steam engines were powered by coal which also added to the demands placed on mines.
- It was cheap steel, however, that allowed train tracks to criss-cross the continent. As tracks were laid, transportation times were cut by 75%, and costs plummeted.
- Most importantly, the cost of transporting raw materials and finished products declined. Factories no longer needed to be located close to canals or rivers for purposes of transportation, railways ran everywhere.