

Name:..... Date:.....

## Fireworks

### MAKING BLACKPOWDER

*Gunpowder was made at the Royal Gunpowder Mills north of London for many years. Here is a description of part of the process by a girl working at the factory in 1859. It is written in the style of English used at the time, which is different from how we speak today.*

'My name is Alice and I am 13 years old. I work in the Powder Factory. My brothers John and Ernie are 12 and 11 and they works here too. It is a horrible and dangerous business. Our wages are a few shillings each week and all go to Mam for food and rent. We all walks to work, about 2 mile each way.

I starts work at 6 am and works till 6 at night. But when there's a war on we keep on to 8. I gets home and eats and falls into bed, just to get up again. I have worked at the Factory many a long year now so can tell about making blackpowder.

We makes charcoal from the alder and willow trees. For a time John was put on cutting sticks. It hurt his hands rotten. Sticks about 3 foot long are burnt in the cylinder house. But you don't want ash, just black sticks, which is charcoal. So we puts the sticks in a slip and slide the slips into round holes in the wall. There are lots of slips in a line. The slips get heated up from a huge furnace. The wood don't burn, but gets hot and gas shoots out the end of the slip into the furnace. We leave the slips in about half a day. They get red hot. You has to take care not to get burned. But when you takes out the wood it is all black and that's charcoal. Then we grinds it in big mill to a fine powder. They says that willow and alder makes the best charcoal and that's why the factory was put here on this forest.

Sulfur is the worst. It stinks bad. Ernie worked in the sulfur house and got a real bad cough. He stayed home for days and near lost his job. We have a big pot for heating sulfur. It comes in big rock shapes we can't use. Brimstone, we calls it. When it's heated the sulfur goes first to yellow powder, called 'flowers' and then melts brown and runs into a mould. If you heats it too much it burns and you choke on the gas. Then it goes hard again and we grinds it to a powder for mixing.

I also have made nitre from 'grough'. Grough comes off the boats on the canal. They says it comes all the way from India. It ain't 'clean' nitre, so we has to take away what's not wanted, like salt. The grough goes in a big pot and is boiled up with water. Then it runs into copper coolers. When it cools we stir all the time. You get a beating if you falls asleep and stops stirring, I knows well enough. You gets small crystals by stirring, big if you don't. The small crystals is the best, they say, because they don't need no grinding, just washing, careful with water. We calls them 'flour'.

I am now in the mixing house. We puts 30 pound nitre, 4 pound sulfur and 6pound charcoal in the box, set the turner and they are mixed. We use big scales for weighing. The mix needs to be right or the charge won't go off. The turner is a big stick that goes through the box and has metal teeth on which help the mixing. We can turn on our own, but it is nicer to have two, it is heavy work. Then we hangs a bag under, pulls out the slide and the powder is in the bag. One bag is about 40 pounds and this is called a 'charge'. The master says I am quick, so I can make 20 or 22 charges a day. I am covered in black from when I start to when I finish.

*continued on next page*



# Fireworks

*continued from previous page*

There's a lot more goes on in other houses to make the charges into powder. I can also tell we get fined a lot if we breaks rules. We has to wear clothes only for working and leave home clothes at the door, and leather shoes and no metal. You can't go between houses. You can't have a fag all day. John lost a day's pay for having a metal button once. I got fined a shilling for trying to see my dad in the press house. The masters try to stop the powder going off, but last year we had a bang in the press house. The roof blew off and the men inside died. My dad was one.'

## Questions

1. Find four pieces of information about making charcoal.

.....  
.....  
.....

2. What is the main chemical element in charcoal?

.....

3. Why is it important not to completely burn the wood when making charcoal?

.....

4. How long in hours did it take to make charcoal?

.....

5. Name one gas which may escape from a slip when making charcoal. (Extension: write an equation to show how this gas forms.)

.....  
.....  
.....

6. Why must the sulfur be melted down?

.....

7. What gas might have caused Ernie's cough? Explain how it formed. (Extension: write an equation to show the reaction that produces this gas.)

.....  
.....  
.....  
.....

8. Use the words 'dissolve', 'solution', 'evaporate', 'crystallises', 'insoluble', 'soluble' and 'impurities' to explain the process of making pure potassium nitrate (nitre) from grough.

.....  
.....  
.....  
.....

*continued on next page*



# Fireworks

*continued from previous page*

9. What are the percentages of the ingredients in the blackpowder?

.....

10. Why is it important to get the mix right?

.....

11. Why does the turner have teeth on it?

.....

12. How long does it take Alice to make a charge?

.....

13. Work out the mass in kilogrammes of one charge of gunpowder.

.....

14. Describe three safety precautions used in the factory. How effective do you think they were? What else could have been done to protect the workers?

.....

.....

.....

.....

.....

15. Find six pieces of evidence which describe Alice's working conditions. What do you think about these?

.....

.....

.....

.....

.....

