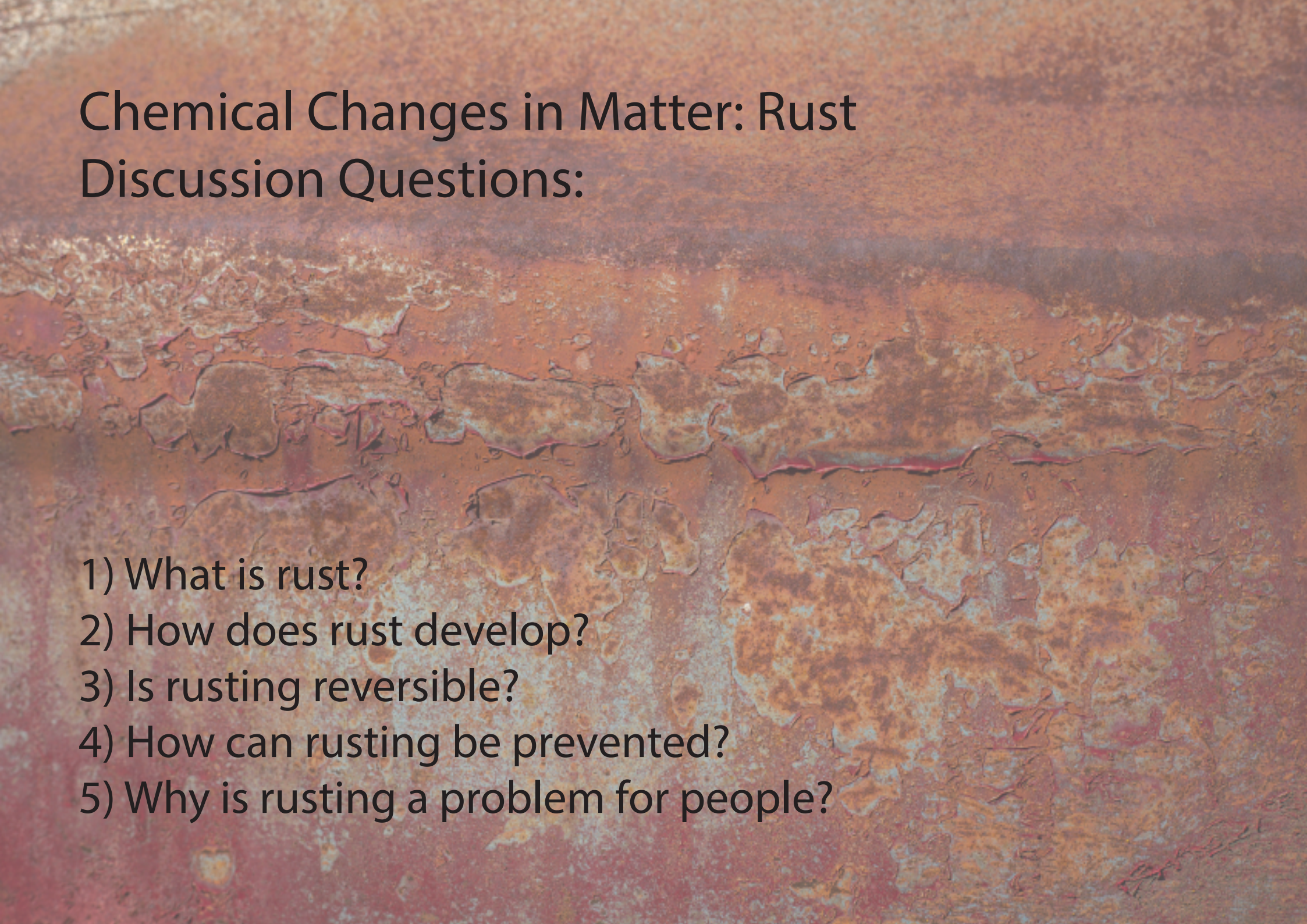

Chemical Changes in Matter: Rust
Discussion Questions:

1) What is rust?
2) How does rust develop?
3) Is rusting reversible?
4) How can rusting be prevented?
5) Why is rusting a problem for people?

A rusty old car, abandoned in the desert.

The rusted hull of a shipwreck sits on a beach on Fraser Island, in Queensland, Australia.

What kinds of material rust?

Rust

Rust is the result of a chemical reaction between iron and the oxygen contained in water. This process is called oxidation.

If objects made of metal containing iron are left in the rain, you might notice a reddish brown dusting of colour developing on their surface. Eventually the iron will become brittle and crumble. Thin iron tends to rust through more quickly than thick iron.

Metal objects can be painted to provide a protective coating but they need to be repainted regularly to prevent rusting.

Painting the metal surface often protects it from the rain, preventing the oxygen from making contact with the iron. But if this layer becomes damaged rusting will occur at this point and spread underneath the paint.

Some metals have a protective coating added to them to make them rust resistant. Galvanising is a process where steel is dipped into molten zinc. The zinc layer stops oxygen and water from reaching the iron contained in the steel underneath.

Do all metals rust?

Some metals such as gold and platinum are not affected by rust at all. Other metals such as aluminium, will corrode slightly and produce a protective grey powdery coating, but will not rust. Likewise, copper will produce a green coating but will not rust.

Some metals such as stainless steel have additives to prevent rusting. Nickel and chromium are added to iron in the steel manufacturing process.

The nickel and chromium molecules bind to the iron atoms and prevent them from oxidising. Stainless steel is a popular metal that is used in a wide variety of products because it doesn't rust.

The chef wouldn’t want this stainless steel kitchen to rust!