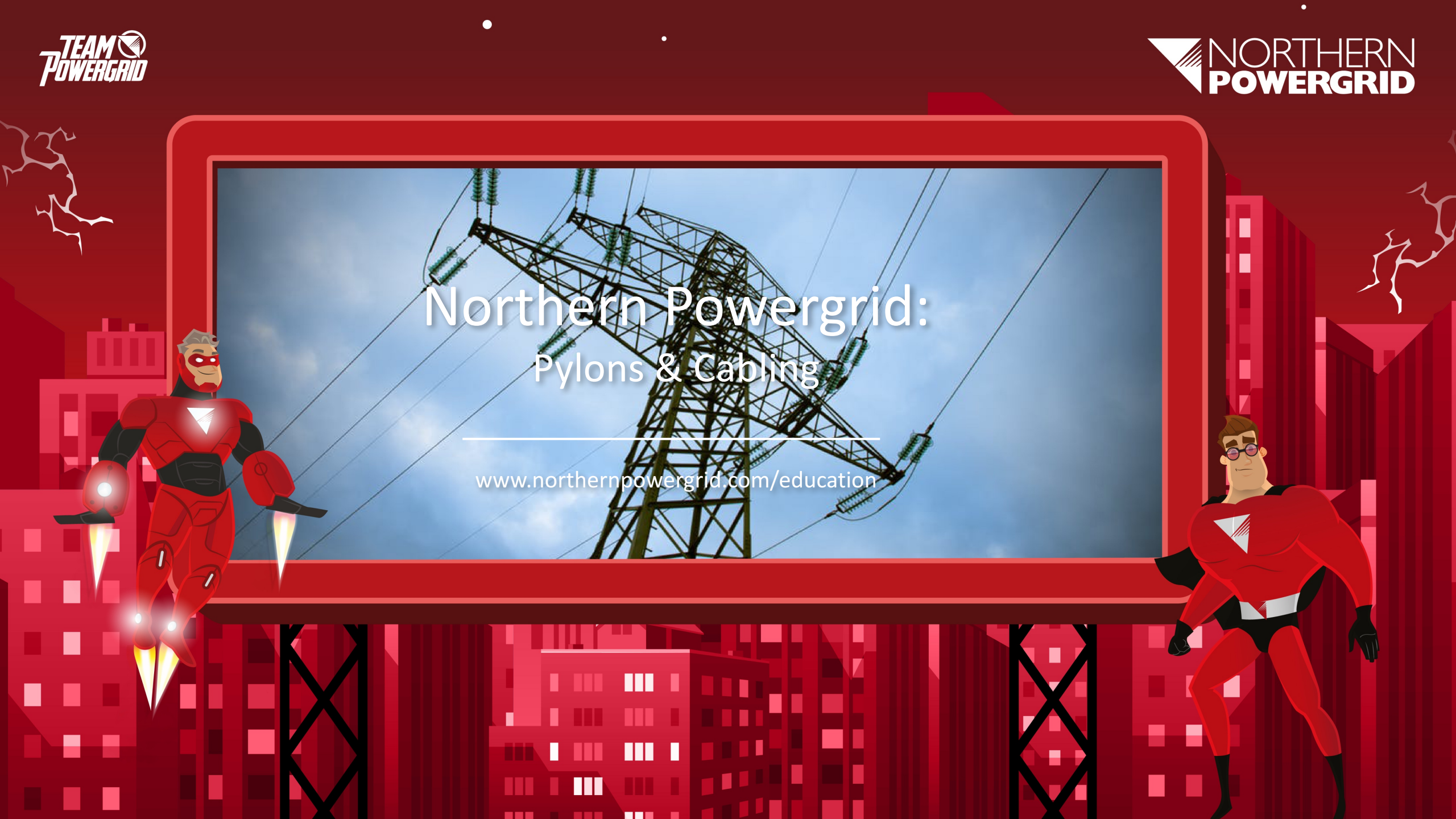
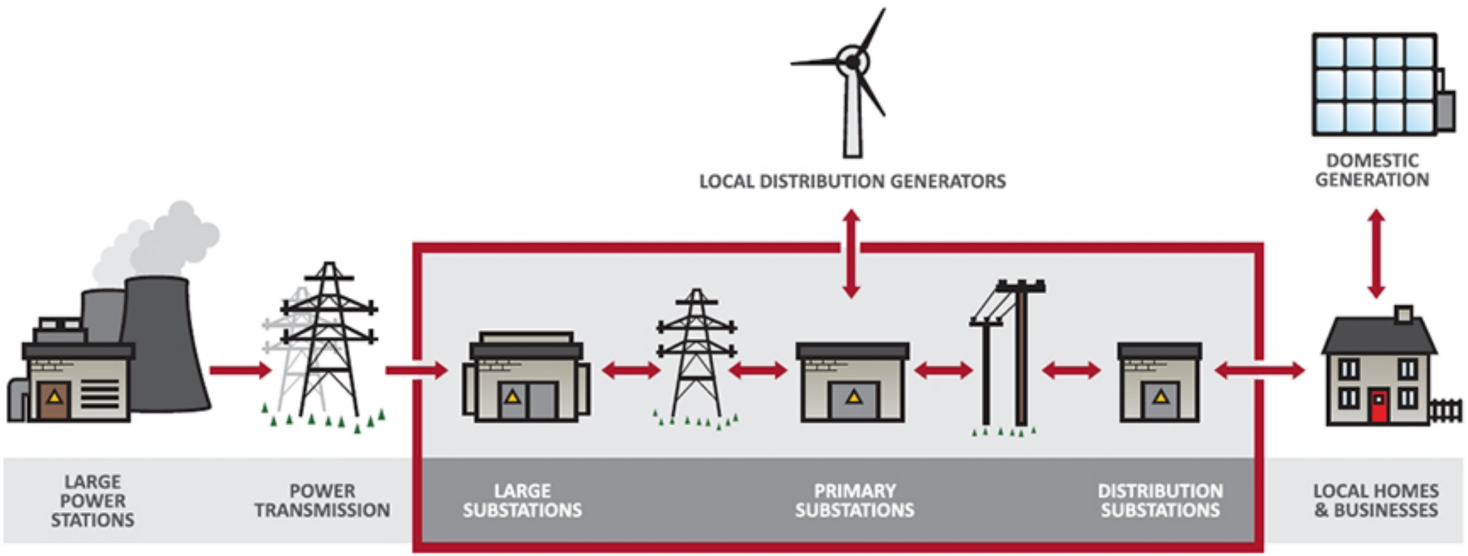

Northern Powergrid:
Pylons & Cabling
www.northernpowergrid.com/education



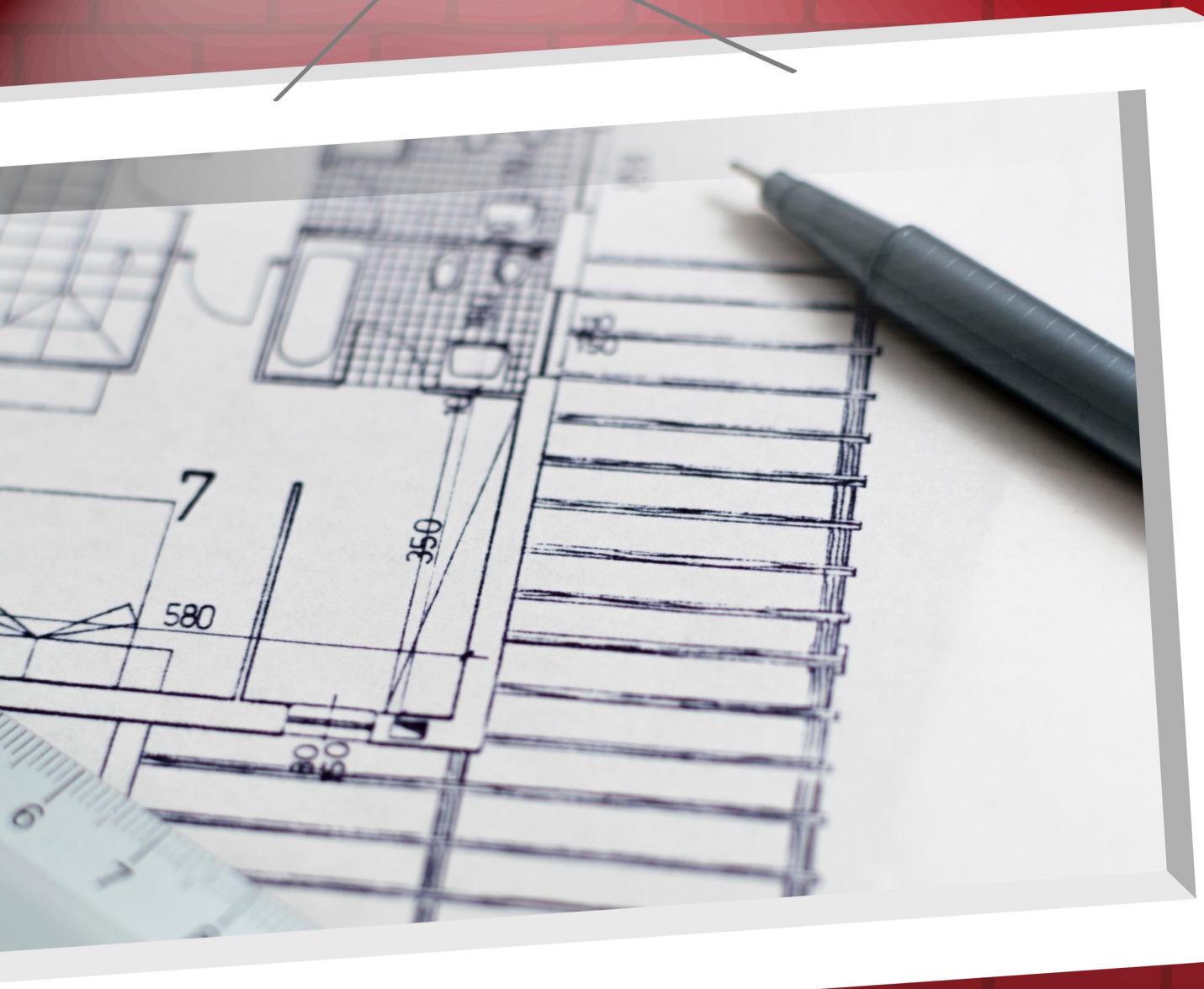
- Northern Powergrid is the Distribution Network Operator (DNO) for the North East of England, Yorkshire and northern Lincolnshire.
- We distribute electricity to 3.9 million homes and businesses.
- As a DNO we do not own the electricity we distribute We charge electricity suppliers for the use our infrastructure (e.g. substations; overhead and underground cables) that distribute electricity in to homes and businesses across our operating area. Suppliers invoice Bill payers for the energy they use. A fixed amount of the household bill is paid to the Distribution Network Operator. If you live in the North East, Yorkshire, Humberside or northern LInconshire, this will be Northern Powergrid.
- This charge to suppliers represents around 10% of customer's bills.

Starter:

What is shown in the pictures below?

What are they used for?

What shapes can you see?



Loci and constructions:

Loci and constructions are used when drawing plans to identify distances between objects and to highlight where objects can be located.

Task:

In pairs think about how Northern Powergrid might use loci and constructions in their work.

NORTHERN POWERGRID

Rod Gardner, Head of Network Operations at Northern Powergrid, explains:

The electricity network is made up of a number of assets and components, operating at various voltages. Pylons, the metal tower structures that you see, typically support overhead lines operating at 275,000 and 400,000 volts, this the transmission part of the electricity network. Overhead lines operating at distribution system voltages are usually supported on wood pole structures, however, smaller metal lattice tower structures are also Used. The type of structure used to support overhead lines is determined by a number of factors:

- the operating voltage
- electrical safety clearances to ground, dictated by the voltage the mechanical forces associated with the apparatus you want to support
- the physical strength of the structure to withstand external factors, mainly relating to weather conditions; and
- geographic conditions

Different designs/structures can be deployed to suit the profile of the land and overcome physical challenges i.e. rivers, railways etc.

TEAM POWERGRID

Placing Pylons

When Northern Powergrid plan to put pylons in an area they have a number of things that they need to consider.

Think, Pair, Share

What sort of things will Northern Powergrid need to consider?

Rules and Regulations

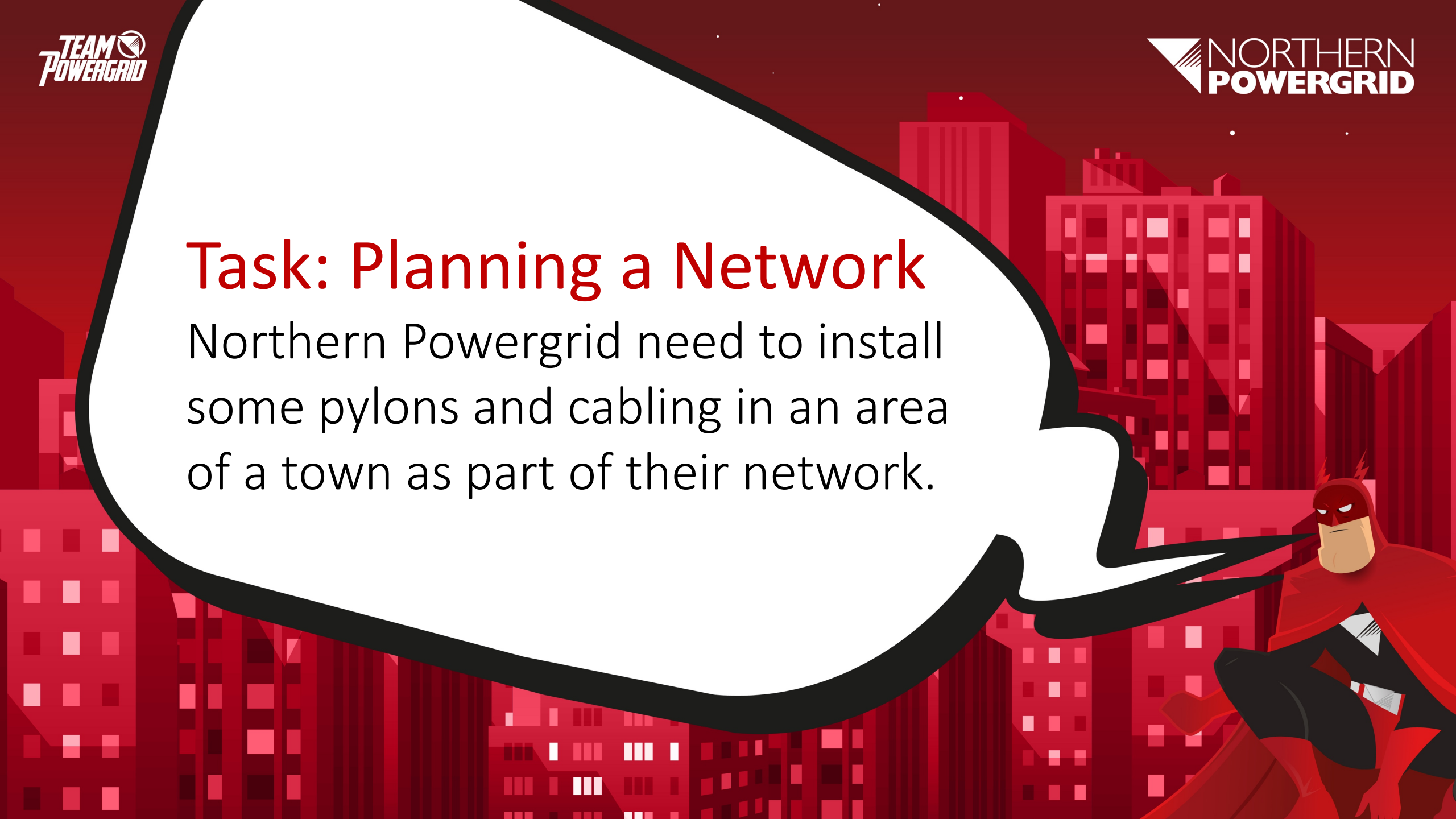
When placing pylons and overhead cables, Northern Powergrid have clear guidelines that they need to adhere to. For example, they need to consider how far pylons and cables are from objects like buildings and trees.

Rules and Regulations

Northern Powergrid will also have to consider requirements and recommendations from local authorities and interested parties.

Task: Planning a Network

Northern Powergrid need to install some pylons and cabling in an area of a town as part of their network.



Task: Planning a Network

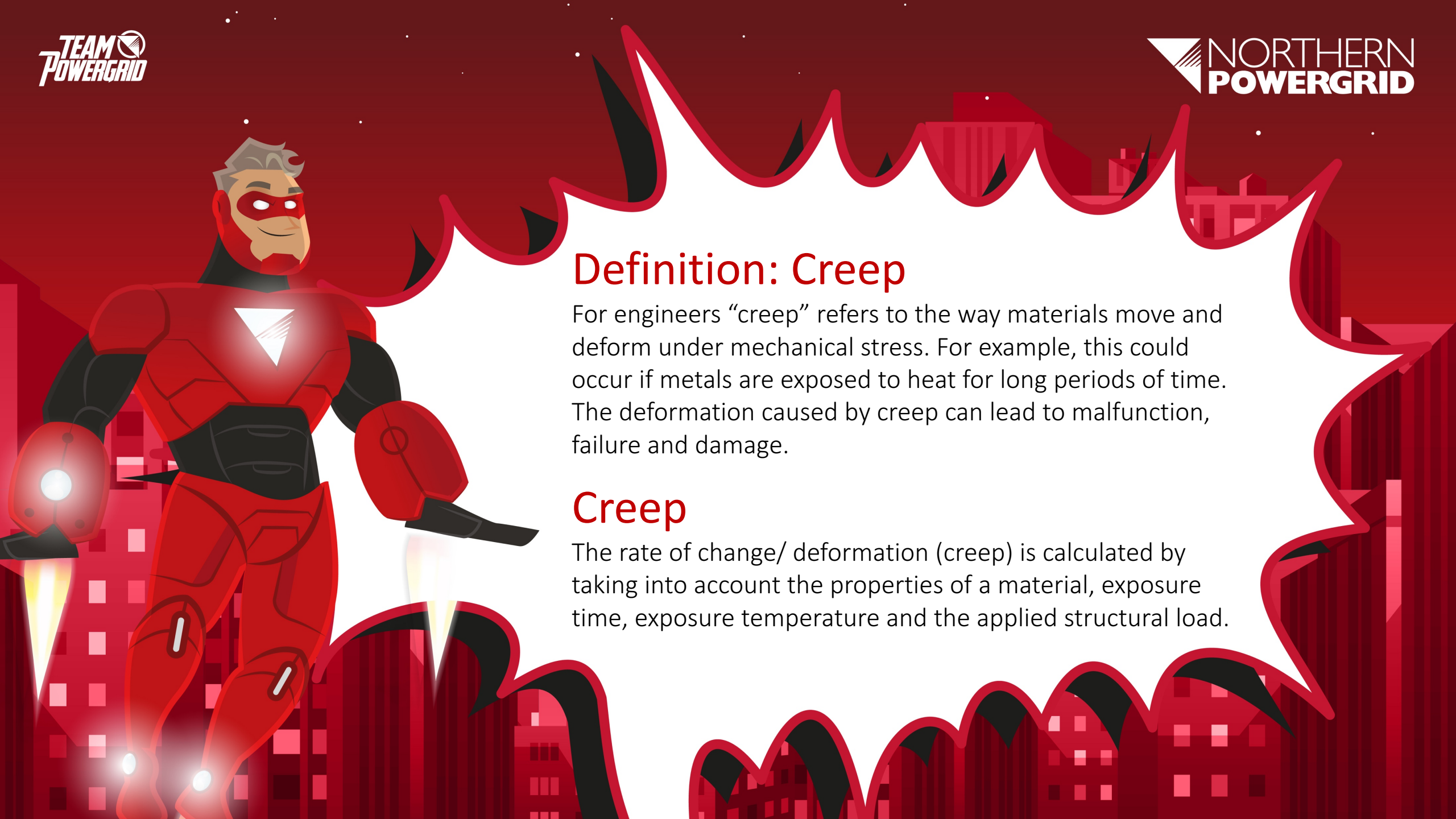
In pairs you will be given a map and information. You will need to use loci and constructions to identify where Northern Powergrid could locate their pylons and cabling.

Tip:

Take care when using scales

Challenge:

See if you can complete the extension task on the Information sheet



Definition: Creep

For engineers “creep” refers to the way materials move and deform under mechanical stress. For example, this could occur if metals are exposed to heat for long periods of time. The deformation caused by creep can lead to malfunction, failure and damage.

Creep

The rate of change/ deformation (creep) is calculated by taking into account the properties of a material, exposure time, exposure temperature and the applied structural load.

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Well done!