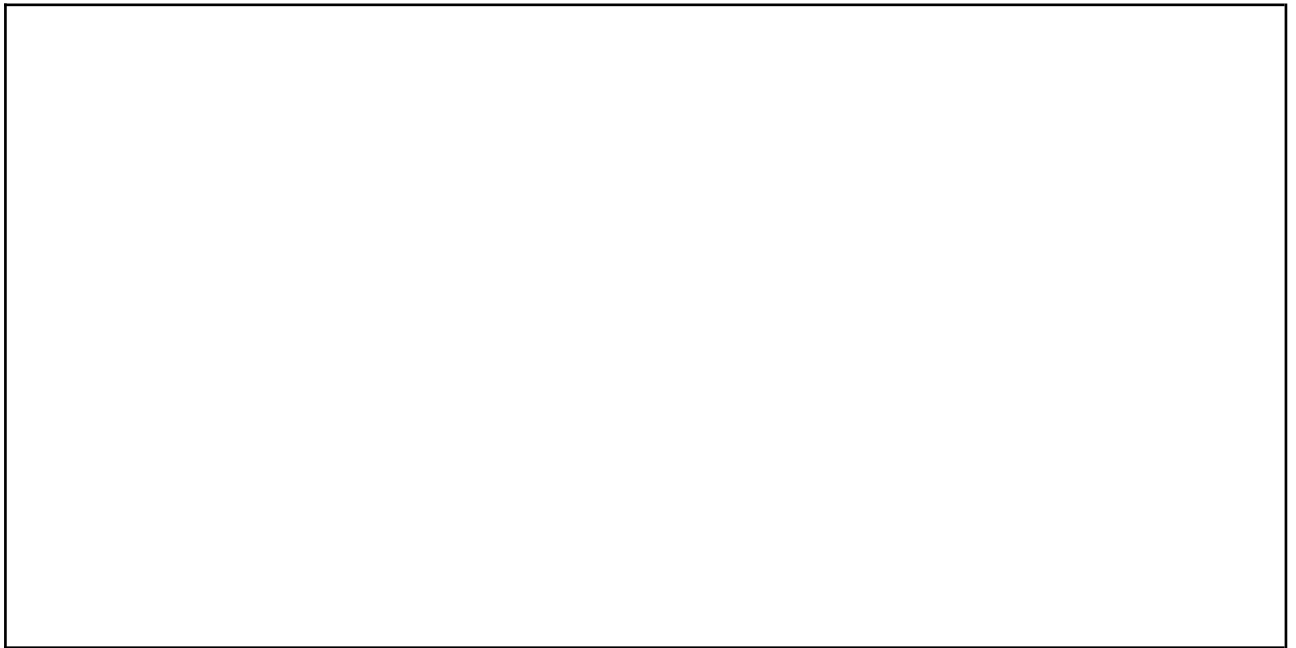
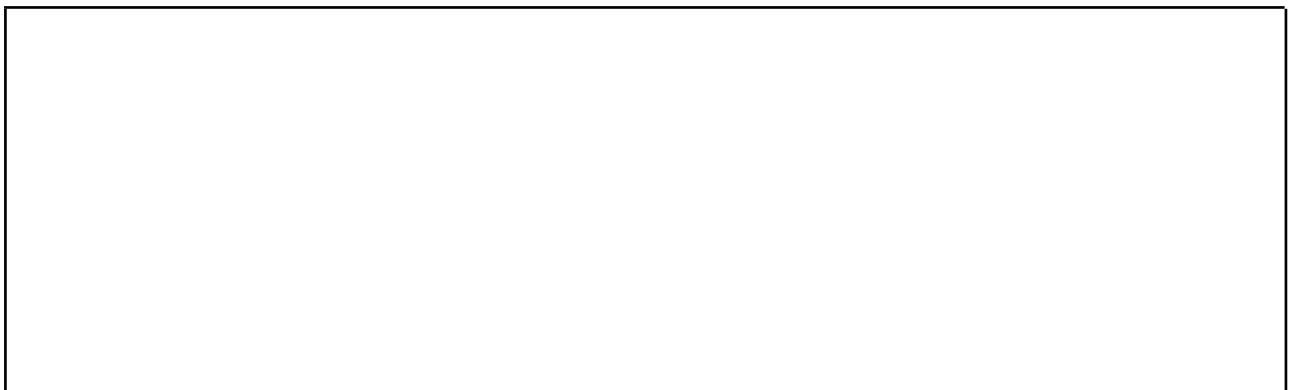


Background information: From Earth the Sun seems quite stable and unchanging but what is really happening on the surface of the Sun? Find out about solar flares [here](#).

Q1. Solar flares have massive amounts of energy and come from the Sun, however most of the energy is blocked by Earth's magnetic field. This is just one part of what we call 'Space Weather'. Earth's magnetic field is similar to any magnetic field. In the box below draw what a magnet and its magnetic field lines look like and what you think the magnetic field lines look like for Earth.



Q2. Oersted showed the connection between electricity & magnetism. (If you have not completed worksheet 1.5 watch [this video](#) to show his experiment). If solar flares are electrically charged what might happen when they come into contact with a magnetic field?



Q3. During the time of the solar flare, a scientist noticed some strange results in the data below. Resistance is  $0.5\Omega$ . Using the data below, plot the actual current against the time and mark on the graph when you think the solar flare hit Earth. Explain what you think happened to give the scientist this unexpected result.

Time (am)	Voltage	Expected Current	Actual Current
9:05	6		12
9:10	7		14
9:15	8		32
9:20	9		26
9:25	10		20
9:30	11		22
9:35	12		24

Graph:

Explanation:

Q4. Based on your ideas from Q3, connect the effects of space weather with human technology and explain how these issues are connected.

GPS Navigation
Aircraft/Spacecraft
Electricity grid
Satellites in orbit
Humans

Warmed air rises so the air is more dense and harder to travel through
Electrical equipment stops working Radiation high up in the atmosphere
Signals are changed as they pass through the atmosphere
Extra electrical currents
Electrical equipment stops working

Connection 1:

Connection 2:

Connection 3:

Connection 4:

Connection 5:

Q5. As well as having effects on our technology, space weather can also create beautiful sights like the Northern and Southern Lights (Aurora Borealis). As the Solar storm hits Earth's magnetic field some of the energy escapes to the poles and gives extra energy to the Oxygen and Nitrogen atoms in the air causing them to emit light. Imagine you are the writer of a scientific paper and the Northern Lights have been seen for the first time. Write about the myths and scientific discovery made.

Headline: \_\_\_\_\_

Author: \_\_\_\_\_

