Name_____**Class period**____

Magnetic Polarity Evidence for Continental Drift

The Wegener hypothesis has been so stimulating and has such fundamental implications in geology..."

"...as to merit respectful and sympathetic interest from every geologist. Some striking arguments in his favor have been advanced, and it would be foolhardy indeed to reject any concept that offers a possible key to the solution of profound problems in the Earth's history." - Chester R. Longwell, "Some Thoughts on the Evidence for Continental Drift," 1944

Wegener and his supporters did all they could do to find evidence to support continental drift. But without a mechanism the idea would not be accepted. What was needed was the development of technologies that would allow scientists to find more evidence for the idea and help them describe a mechanism. But first, they would find still more evidence that the continents had moved.

Magnetic Polarity Evidence

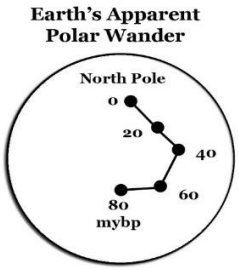
The next breakthrough in the development of the theory of plate tectonics came two decades after Wegener's death. **Magnetite** crystals are shaped like a tiny bar magnet. As basalt lava cools, the magnetite crystals line up in the magnetic field like tiny magnets. When the lava is completely cooled, the crystals point in the direction of magnetic north pole at the time they form. How do you expect this would help scientists see whether continents had moved or not?

As a Wegener supporter, you have just learned of a new tool that may help you. A **magnetometer** is a device capable of measuring the magnetic field intensity. This allows you to look at the magnetic properties of rocks in many locations. First, you're going to look at rocks on land. Which rocks should you seek out for study?

Geologists noted important things about the magnetic polarity of different aged rocks on the same continent:

- Magnetite crystals in fresh volcanic rocks point to the current magnetic north pole (**Figure** below) no matter what continent or where on the continent the rocks are located.
- Older rocks that are the same age and are located on the same continent point to the same location, but that location is not the current north magnetic pole.
- Older rocks that are of different ages do not point to the same locations or to the current magnetic north pole.

In other words, although the magnetite crystals were pointing to the magnetic north pole, the location of the pole seemed to wander. Scientists were amazed to find that the north magnetic pole changed location over time (**Figure** below).



The location of the North Pole 80 million years ago, 60, 40, 20 and present.

If the continents had remained fixed while the north magnetic pole moved, there must have been two separate north poles. Since there is only one north pole today, what is the best explanation? The only reasonable explanation is that the magnetic north pole has remained fixed but that the continents have moved.

Wegener Was Right!

How does this help you to provide evidence for continental drift? To test the idea that the pole remained fixed but the continents moved, geologists fitted the continents together as Wegener had done. It worked! There has only been one magnetic north pole and the continents have drifted They named the phenomenon of the magnetic pole that seemed to move but actually did not **apparent polar wander**..

This evidence for continental drift gave geologists renewed interest in understanding how continents could move about on the planet's surface.

TRUE OR FALSE.

_____ 1. The location of the magnetic North Pole has never changed.

_____ 2. Wegener could not find any evidence of continental drift.

_____ 3. In the past, Earth most likely had two North Poles.

_____ 4. Magnetite crystals are contained within basaltic rock.

_____ 5. Scientists found no new evidence that proved continental drift occurred after improvements in technology.

_____ 6. Wegener was proved correct about continental drift long after his death.