Fields and Auroras

Name:_____

Lesson 16

Date:_____

Vocabulary

Magnetic Field - an invisible area around a magnet where magnetic fields can be observed
Aurora Borealis - when charged solar particles interact with the Earth's magnetic fields in the high latitude areas
Magnetosphere - a region around a planet where the magnetic field traps charged particles and manipulates their behavior

Activity 1

Magnetosphere Exploration

Using the Ari Compass Application, you'll create drawn magnetic fields similar to Earth's magnetic fields. With the Compass Application set to Advanced, you'll use the application to track the direction of magnetic fields.

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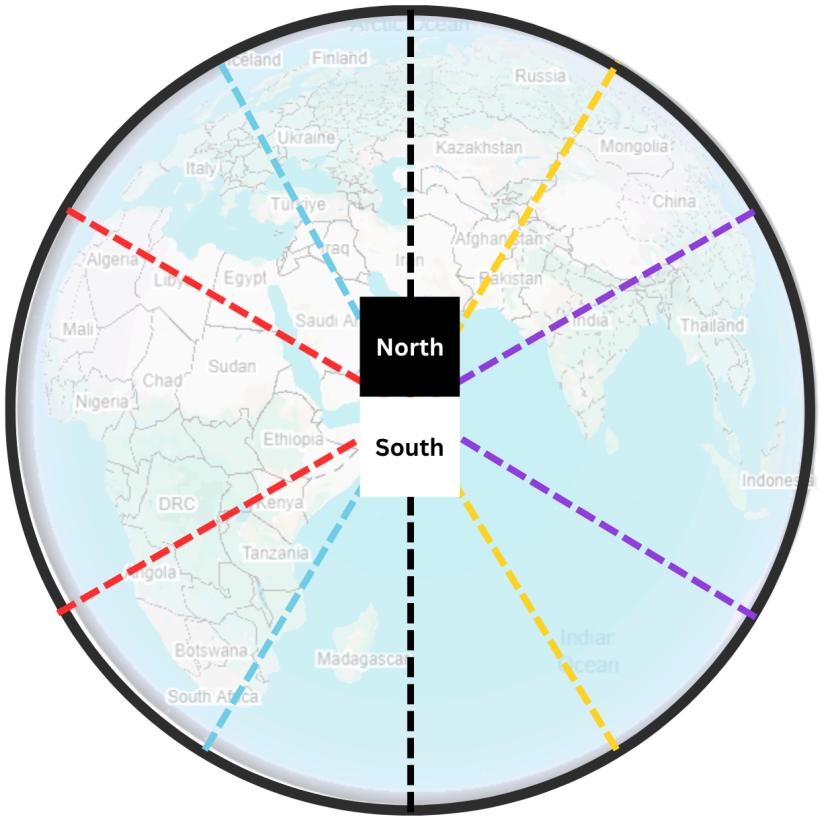
1 Using the colored lines drawn below, connect the same color lines by drawing a semicircle outside of the Earth.



2

1. Once the lines are drawn, place a bar magnet on the North & South image. Place Ari at the top of the blue line and move Ari, following the blue line. Note the direction of the red needle of the compass.

2. Draw arrows along the blue line pointing in the direction of Ari's compass needle.

3. Draw arrows along the red, yellow, and purple arrows after placing Ari on the lines and noting the direction of the red compass needle.

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3

Earth's magnetosphere is composed of a few parts. Based on the definitions provided below, place the cut-out terms on the diagram in the area that it describes.

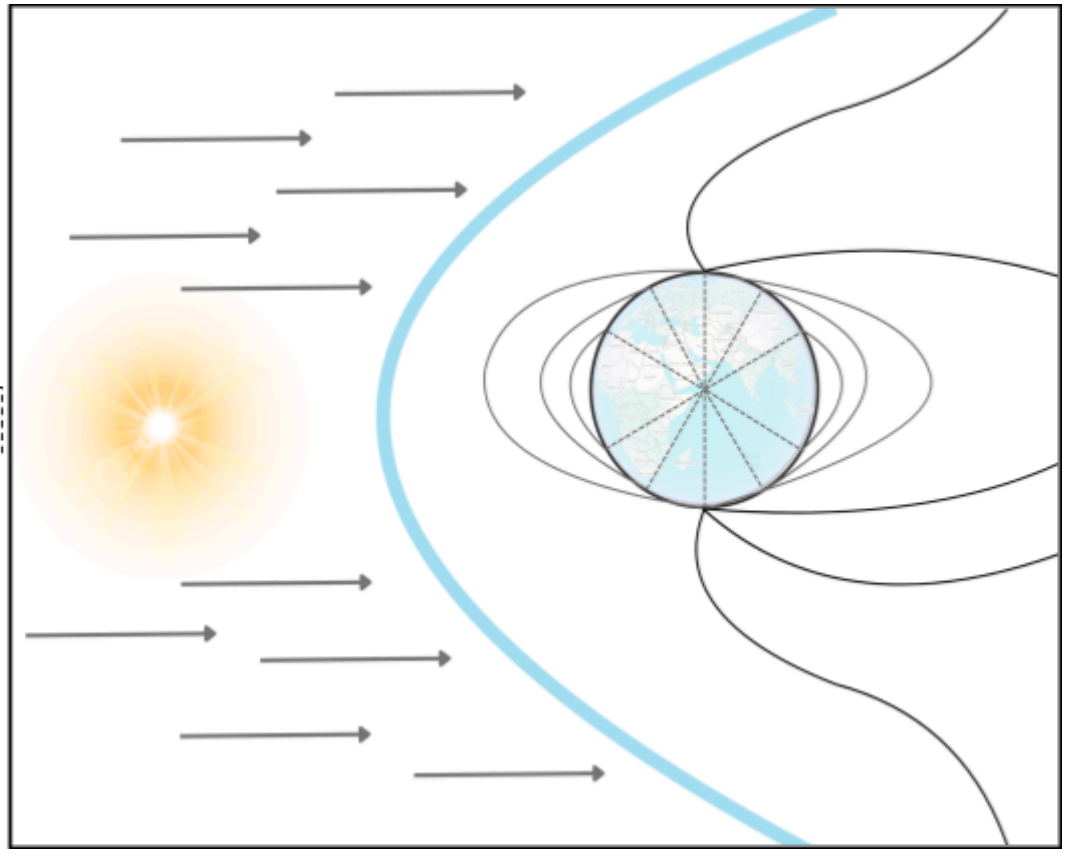
- Definition 1: a region of space where solar winds become subsonic after passing through the bow shock
- Definition 2: a stream of charged particles released from the Sun's atmosphere
- Definition 3: a region where solar winds slow from supersonic to subsonic speeds
- Definition 4: a long trailing region in the magnetosphere opposite the solar winds

Magnetotail

Solar winds

Bow shock

Magnetosheath



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Activity 2

When solar particles aren't deflected by the Earth's magnetosphere, they are caught up in the magnetic fields. As solar particles travel in Earth's magnetic fields, they eventually converge at the magnetic north pole and magnetic south pole.

The convergence of solar particles and the Earth's magnetic fields at the magnetic poles creates an electrical effect known as the *aurora borealis*—convergence at the north pole and the *aurora australis*—convergence at the south pole.

Research images of the auroras and, using your coloring supplies, color an aurora.

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Exit Ticket

Please respond to the following prompts.

Criteria for Success:

- An accurate description of how magnetic fields affect charged particles.
- An accurate description of how auroras are created, including where the charged particles are generated and what the particles may interact with.

1. How do charges move in Earth's magnetic fields relative to the north and south magnetic poles?

2. How are auroras created?