

Fields and Auroras

Lesson 16

Name: __Answer Guide__

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.

Fields and Auroras

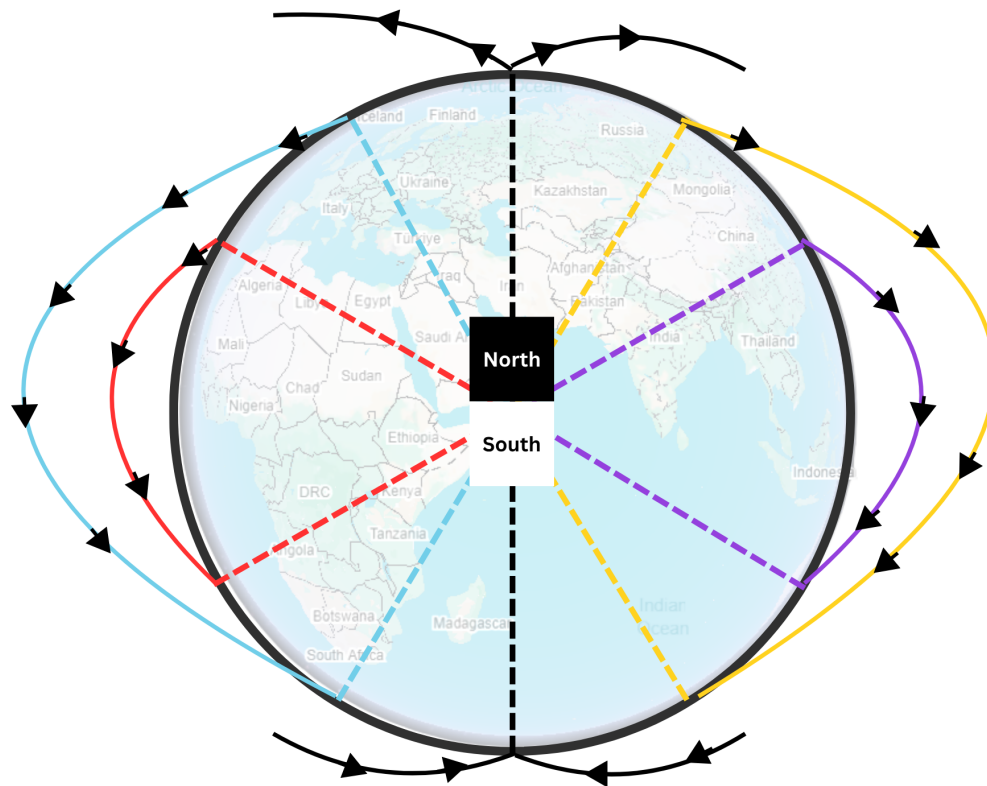
Name: Answer Guide

Lesson 16

Date: _____

1

Using the colored lines drawn below, connect the same color lines by drawing a semi-circle 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.

Fields and Auroras

Name: Answer Guide

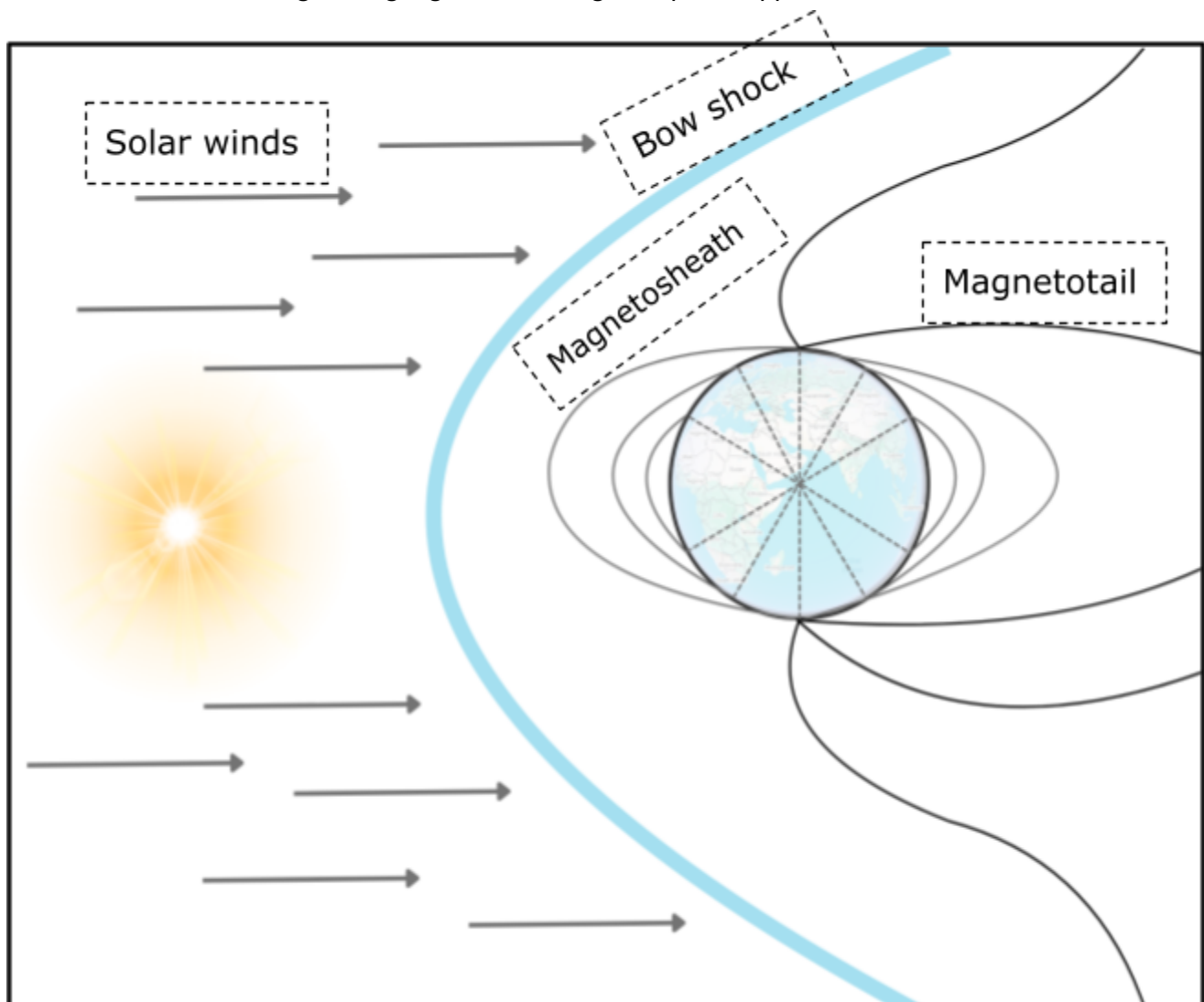
Lesson 16

Date: _____

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



Activity 2

Aurora Creation

Fields and Auroras

Name: __Answer Guide__

Lesson 16

Date: _____

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.

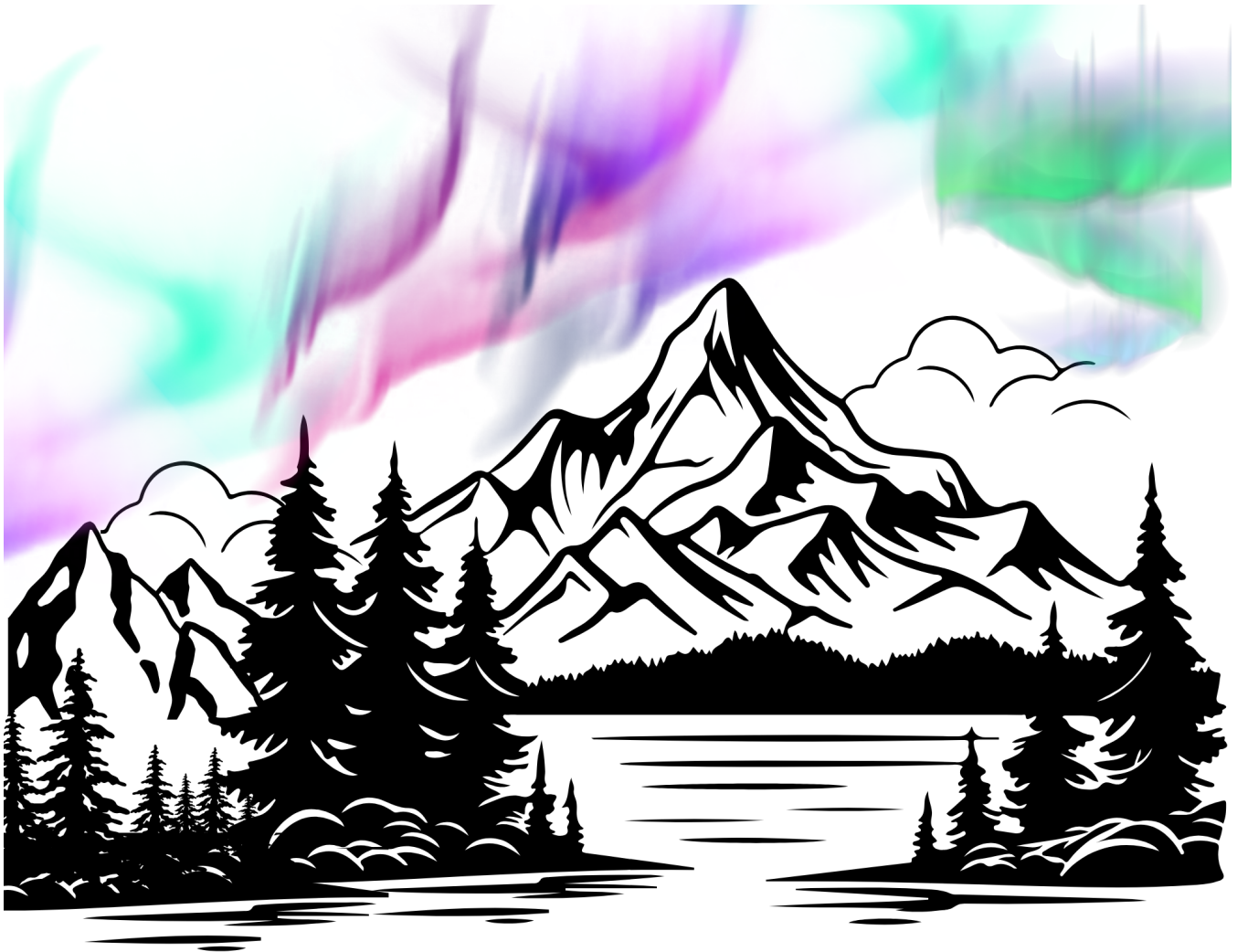
Research images of the auroras and, using your coloring supplies, color an aurora.

Fields and Auroras

Name: Answer Guide

Lesson 16

Date: _____



Exit Ticket

Please respond to the following prompts.

1. How do charges move in Earth's magnetic fields relative to the north and south magnetic poles?
Charged particles caught and moving in Earth's atmosphere follow the magnetic fields that move outward from the magnetic north pole in the direction of the magnetic south pole.
2. How are auroras created?
Auroras are created when solar particles are caught in Earth's magnetic fields and interact with Earth's atmosphere. As they interact with the atmosphere, the particles collect at the magnetic north and magnetic south poles, creating electrical light systems known as the auroras.