

## Astronomy Discovery Sheet #1

# The Earth

### Creating a globe with great circles

With a small Styrofoam sphere (about the size of a baseball), do the following:

- **The Axis.** Carefully push a (brass) rod through the sphere. This represents the axis of the earth.
- **The Equator.** Place a orange rubber band around the sphere that represents the equator.
- **Your Location.** I will tell you what angle above the equator to place a thumbtack. This represents where you are on the earth.
- **The (astronomer's) Horizon.** From your location on the sphere, place a purple rubber band to represent the horizon (from the perspective of being far above your location).
- **The Zenith Circle.** Place a green rubber band that represents the zenith circle.
- **The Meridian Circle.** Place another rubber band that represents the meridian circle.

#### Questions:

1. What is the angle between the axis and the horizon?
2. What is the angle between the axis and the equator?
3. What is the angle between the horizon and the zenith circle?
4. What is the angle between the horizon and the meridian circle?
5. What is the angle between the meridian and zenith circles?
6. What is the angle between the horizon and the equator?
7. What is the angle between the zenith circle and the equator?
8. What is the angle between your location and the equator?
9. What properties have you noticed about these angles?
10. Spin the globe on its axis. Describe carefully what happens to the (a) equator; (b) your location; (c) the horizon; (d) the zenith circle; (e) the meridian circle.


11. Now go outside. Look at the celestial sphere. As with your Styrofoam globe, imagine the equator, the horizon, the meridian, and the zenith circle relative to your location on the earth. Now, in your imagination, extend these four circles from the earth onto the celestial sphere.

- a. Describe where the axis of the earth is (assuming that it is an infinitely long line) relative to your position.
- b. Describe where the zenith circle (on the celestial sphere) is relative to your position on the earth.
- c. Describe where the meridian circle (on the celestial sphere) is relative to your position on the earth.
- d. Describe where the celestial equator is relative to your position on the earth.
- e. As the earth spins on its axis (i.e., as the day progresses) how do the four circles move according to your perspective on earth?
- f. What does move according to your perspective on earth?

12. Given what you have learned on this sheet, how would it be possible to look up into sky and determine your latitude?

# Discovery Problems In Earth Science

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## **Discovery Problems In Earth Science:**

*Discovery Problems in Earth Science* Donald B. Stone, 1966      **Discovery Problems in Earth Science** Donald B. Stone, 1966      **Discovery Problems in Earth Science** Donald S. Stone, 1966      **The Changing Role of Geological Surveys** P.R. Hill, D. Lebel, M. Hitzman, M. Smelror, H. Thorleifson, 2020-12-07 Senior managers and Heads of Geological Survey Organizations GSOs from around the world have contributed a collection of papers to provide a benchmark on how GSOs are responding to national and international needs in a rapidly changing world GSOs continue to provide key scientific information about Earth systems natural hazards and climate change As countries adopt sustainable development principles and the public increasingly turns to social media to find information about resource and environmental issues the generation and communication of Earth science knowledge become increasingly important This volume provides a snapshot of how GSOs are adapting their activities to this changing world The different national perspectives presented converge around several common themes related to resources environment and big data Climate change and the UN's Sustainable Development Goals provide an increased incentive for GSOs of the world to work in harmony to generate knowledge of Earth systems and to provide solutions for sustainable management of the planet      **Database and Expert Systems Applications** Pablo García Bringas, Abdelkader Hameurlain, Gerald Quirchmayr, 2010-08-13 st We welcome you to the proceedings of the 21 International Conference on Database and Expert Systems Applications held in Bilbao With information and database systems being a central topic of computer science it was to be expected that the integration of knowledge information and data is today contributing to the again rapidly increasing attractiveness of this field for researchers and practitioners Since its foundation in 1990 DEXA has been an annual international conference located in Europe which showcases state of the art research activities in these areas DEXA 2010 continued this tradition and provided a forum for presenting and discussing research results in the area of database and intelligent systems and advanced search topics applications and practically relevant issues related to these areas It offered attendees the opportunity to extensively discuss requirements problems and solutions in the field in the pleasant atmosphere of the city of Bilbao which is known for its driving industriousness its top cultural venues and its rich and inspiring heritage and lifestyle The University of Deusto with its great educational and research traditions and the hospitality which the university and the city are so famous for set the stage for this year's DEXA conference This volume contains the papers selected for presentation at the DEXA conference

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fatality hangs over one who has consecrated his days to science If he would contribute to the advancement of science he must prepare himself first of all by a patient study of the thousands of details which constitute its technique he must learn the results obtained by numberless laborers whose researches tend toward the same aim He must master their conceptions and subject them to a new criticism This work so engrosses the attention of the investigator that he has little time left for casting a glance over the branches of science which are developing beside him Yet this necessity also weighs upon his soul If on the one hand he ought to study special problems on the other he cannot exempt himself from considering the ends set before special research by rising to a general outlook which shall command the view of a broader scientific basis This double necessity causes a conflict of tendencies and this conflict in our system of production results in a loss of time and of work from which the intellectual world suffers Most investigators if they are not rightly directed shut themselves up in a narrow circle and fall into a blind empiricism Others lose themselves in the region of confused generalities while a few finer spirits find the way for themselves and often must win again by fresh efforts that which they should have a right to expect as the outcome of the completed work of their companions in labor But the age of heroes that of Descartes or Leibniz whose genius opened all the doors of science seems closed forever The conquests of the past weigh upon the present and upon the future And if it is permissible to hope that a happier use of our intellectual power

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