

Sky Heroes: An Activity Reinventing the Constellation

Activity F6

Grade Level: 3–12



Source: This activity has been part of astronomy education in different versions for many years. This version, with an emphasis on getting students to think about their own heroes, was written by Andrew Fraknoi for the Family ASTRO program at the Astronomical Society of the Pacific and revised for classrooms. This write-up is © copyright 2010 by the Astronomical Society of the Pacific. www.astrosociety.org/education.html

What's This Activity About?

The constellation patterns that we currently use are based on (mainly) Greek and Roman myths, many of which have little resonance for our students. Ancient people all over the world put their most important heroes and monsters into the sky, so they could pass on stories about them to future generations. What if we redid the constellation figures today? Whom would students put into the sky as their heroes?

What Will Students Do?

Student, in small groups, discuss who their heroes are and then select a hero (a real person) who is deserving of giving his or her name to a constellation. They then find a way to symbolize their hero with a pattern in the real sky. At the end, groups share their hero and new constellation with the whole class.

Tips and Suggestions

- While this activity may begin with an astronomical concept, it can be continued in discussions of social studies and writing. Some classes use this activity as a way of leading into a library research period as well.
- Younger students take the constellation picture issue very literally, and try to draw the face of their hero as a connect-the-dots picture among the stars. So it can be important to remind them that (and give examples of how) the star patterns can symbolize a hero, rather than be a portrait.
- If students are not familiar with the present-day constellations, it's best to start with some examples of constellation pictures and stories. Resources are given in the activity.

What Will Students Learn?

Concepts

- Constellations
- Star maps

Inquiry Skills

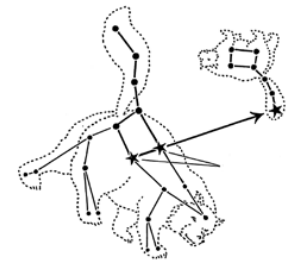
- Ordering
- Visualizing
- Communicating

Big Ideas

- Models and simulations
- Diversity

Sky Heroes: An Activity Reinventing the Constellations

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Ancient cultures named the patterns of bright stars in the sky after their mythological heroes and monsters. Different countries and ethnic groups had completely different stories to tell about the same groups of stars. For example, the seven stars we call the Big Dipper were seen as a plow in England, as a stretcher with a sick patient by the Skidi Pawnee tribe of North America, and as seven Watchmen guarding the pole of the sky in Siberia. What if we could start over and rename the constellations (the star patterns) today? Who are the heroes we would now put in the sky?

This is an activity that serves several purposes:

- it teaches students (or audiences) that the constellation patterns and stories we now use are the products of particular cultures and times;
- it gets students thinking about how arbitrary these patterns and stories are;
- it helps students think through their own values about heroes;
- it allows students to talk with one another in small groups about a topic (whom they admire) they may not usually discuss;
- it helps students develop story telling and writing skills.

Procedure

1. First do a lesson on the constellations, or hand out the background sheet at the end of this activity.
2. Divide students into groups of 3–5.
3. Tell them that they are astronomers assigned to help with a very important decision. The world of astronomers has decided that the old star patterns are no longer relevant and we have to start over again, naming the constellations. We want to name at least some of them after the greatest heroes of modern times. The

group's job is to come up with one hero on whom all the group members can agree.

4. Here are the ground rules: The hero they select must be a real person, not a fictional character. The person can be either someone alive today, or someone from history. It can, for example, be a political leader, someone from the arts, a sports figure, a scientist, a doctor, or a visionary. The group must be able to explain why the person is their hero.
5. Once the group's hero has been selected, the next step is to find a way to put him or her in the sky. Hand out one of the blank star maps that accompany this activity and ask them to make a connect-the-dots star pattern that goes with their hero. Emphasize that the pattern doesn't have to *look like* the person. It could just be a symbol. So if they select a baseball player, the constellation could look like a bat and a ball. If they pick Beethoven, the constellation could resemble a piano or a set of notes. They should be prepared to share their pattern with the class and explain their reasoning.
6. Once the groups have reached their decisions, ask them to report briefly to the whole class. In most classes, it's rare that two groups pick the same hero, which helps explain why we don't redo the constellations. How could we ever get everyone on Earth to agree?

Extension Activities

1. You can assign each student or group to research one of the actual 88 constellations and write a report on the legends associated with their star pattern. For a more advanced class, ask them to list some interesting astronomical objects in their constellation.
2. You can ask each student or group to write a report with more information on the hero they have se-

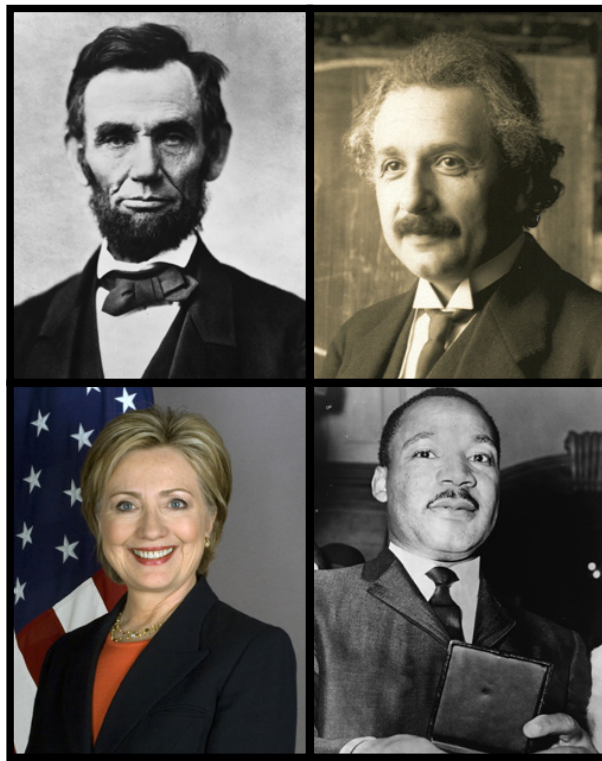
lected and then present their findings to the class.

3. You can do a variant on the activity where groups now get to nominate a favorite hero from fiction (you need to decide if the hero has to be from a novel only, or if you will allow comic books, movies, or television shows to be part of the hero pool.)
4. Another possibility is to let students (especially younger ones) invent their own hero and to create a story to go with him or her. The story can be realistic or can be fantastic, like some of the ancient sky tales. Then they need to invent a nice star pattern that fits with the hero.
5. Encourage students to do this activity at home with their families (or perhaps at large family gatherings.) A nice variant is to ask whom in the history of their family they would nominate to be the family hero and then allow older members of the family to tell the story (or stories) of those family heroes.

The thing to notice in all these activities is that it's often hard to agree. Once people come up with their favorite hero, they don't want to give it up for someone else's. The same was true for the constellation stories of the world's cultures. It was sometimes hard to give up the sky stories people grew up with and accept one uniform set of constellations for the whole world.

Resources for Further Exploration:

1. Some favorite books for learning more about the sky stories of many different cultures include:
 - Ed Krupp's *Beyond the Blue Horizon: Myths and Legends of the Sun, Moon, Stars, and Planets*. 1991, Harper Collins.
 - Lloyd Motz and Carol Nathanson's *The Constellations*. 1988, Doubleday.
 - Julius Staal's *The New Patterns in the Sky: Myths and Legends of the Stars*. 1988, McDonald and Woodward.
 - Ray Williamson and Jean Monroe's *They Dance the Sky: Native American Star Myths*. 1987, Houghton Mifflin.
 - Milton Heifetz and Wil Tirion's *A Walk through the Heavens: A Guide to Stars and Constellations and their Legends*, 3rd ed. 2004, Cambridge University Press.



See the resource guides *Observing the Night Sky* (5.11) and *The Astronomy of Many Cultures* (5.5) in *The Universe at Your Fingertips*.

2. Some web sites for exploring constellation stories further are:

- Windows to the Universe Mythology Page:
www.windows2universe.org/mythology/stars.html
- The Constellations Web Site:
<http://www.dibonsmith.com/constel.htm>

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The Constellations

Background Information

On a completely clear night, if you could see the entire sky (with no trees, hills, or buildings in the way), you could see about 3000 stars. Even if you only see half as many, that's way too many dots of light to memorize. To cope with this great throng, human civilizations have long tried to identify groups of bright stars that made interesting connect-the-dots patterns.

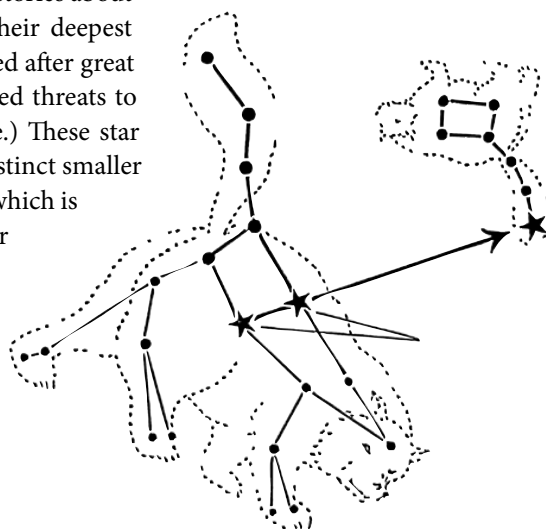
Each civilization placed its own patterns in the sky, telling stories about the figures they had constructed — stories that reflected their deepest hopes and fears. Many of the ancient star patterns were named after great heroes of legend or history, or after monsters that symbolized threats to human society (such as wild animals, storms, floods, or ice.) These star patterns were called *constellations*. Sometimes, there was a distinct smaller pattern within a constellation figure, such as the Big Dipper, which is part of the ancient constellation of the Big Bear. These smaller star groupings are now called *asterisms*.

Dimmer stars that were not part of the constellation patterns were sometimes called “scattered” or “outside the image” stars. And which bright stars belonged to a constellation and which did not depended on whose constellations you adopted. The patterns and stories differed from continent to continent and culture to culture. And astronomers in the 18th and 19th century began making suggestions for additional constellations, many of which contradicted each other.

As long as astronomy was mostly a local pursuit, astronomers only needed to know the local system of identifying and naming the constellations. But by the beginning of the 20th century, as astronomy became more international, some system was needed to allow astronomers and astronomy enthusiasts around the world to understand each other's references to the sky. Astronomers from many countries formed the International Astronomical Union (IAU) to promote cooperation among the world's astronomers. In a series of discussions and resolutions between 1922 and 1930, the IAU defined a new standard system for mapping the sky.

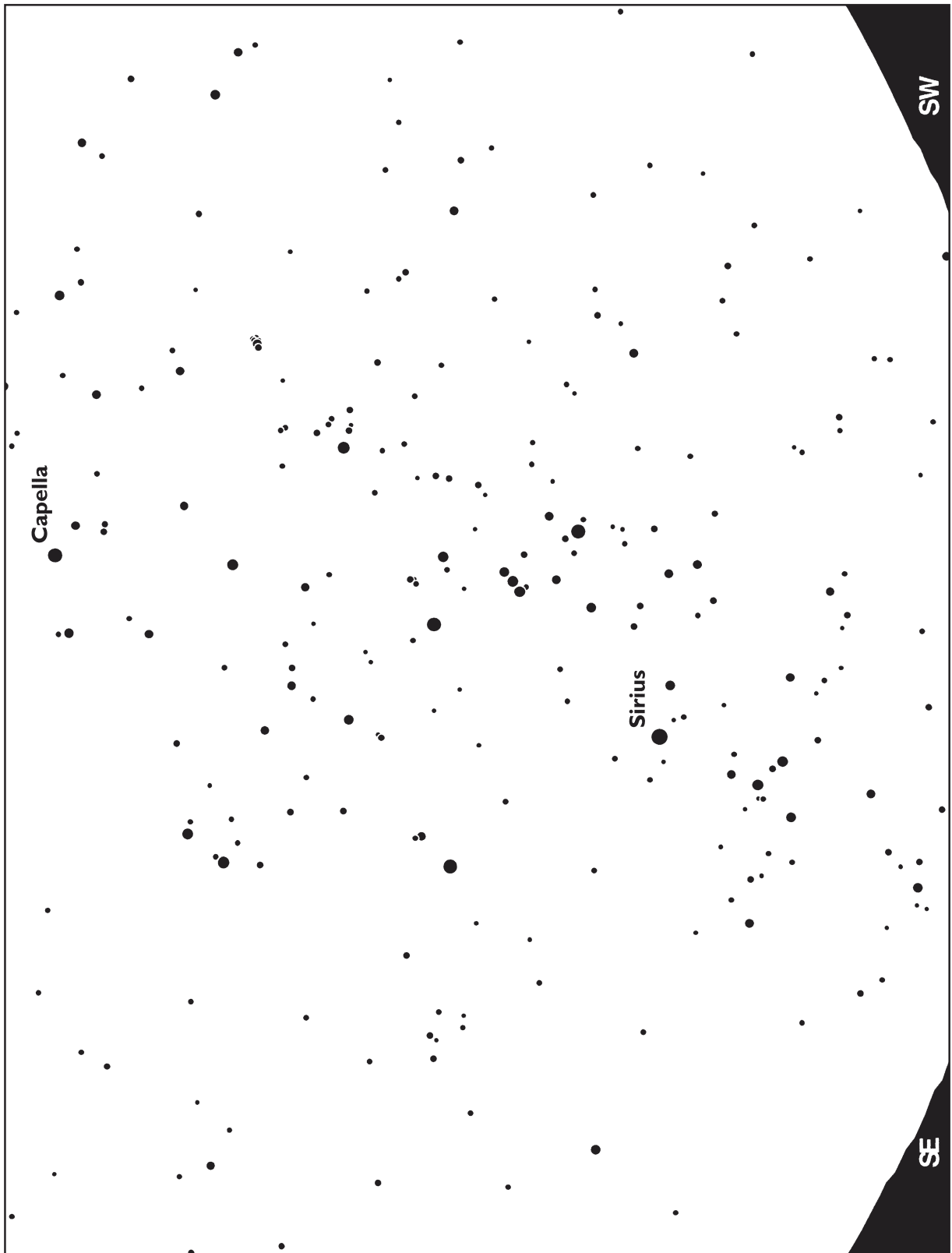
The IAU divided the sky into 88 boxes or sectors (much as the continental United States has been divided into 48 sectors called states) and called these boxes the constellations. Many of the sectors were named after a prominent ancient star pattern inside them. So the whole box with Orion the Hunter in it was now the constellation of Orion. It included not just the bright stars of the hunter's pattern, but all the stars in that box. For boxes that did not include a well-known ancient pattern, more recent suggestions were used, such as the constellations of Telescopium and Microscopium, in the Southern Hemisphere. (For more on the constellation names and how to pronounce them, see: http://www.skyandtelescope.com/howto/Constellation_Names.html)

Note that even some of the most famous star patterns don't resemble the people or creatures after whom they are named. But the state of Washington doesn't look like George Washington either! Constellations can just *symbolize* a hero or monster as long as we agree on the symbol.

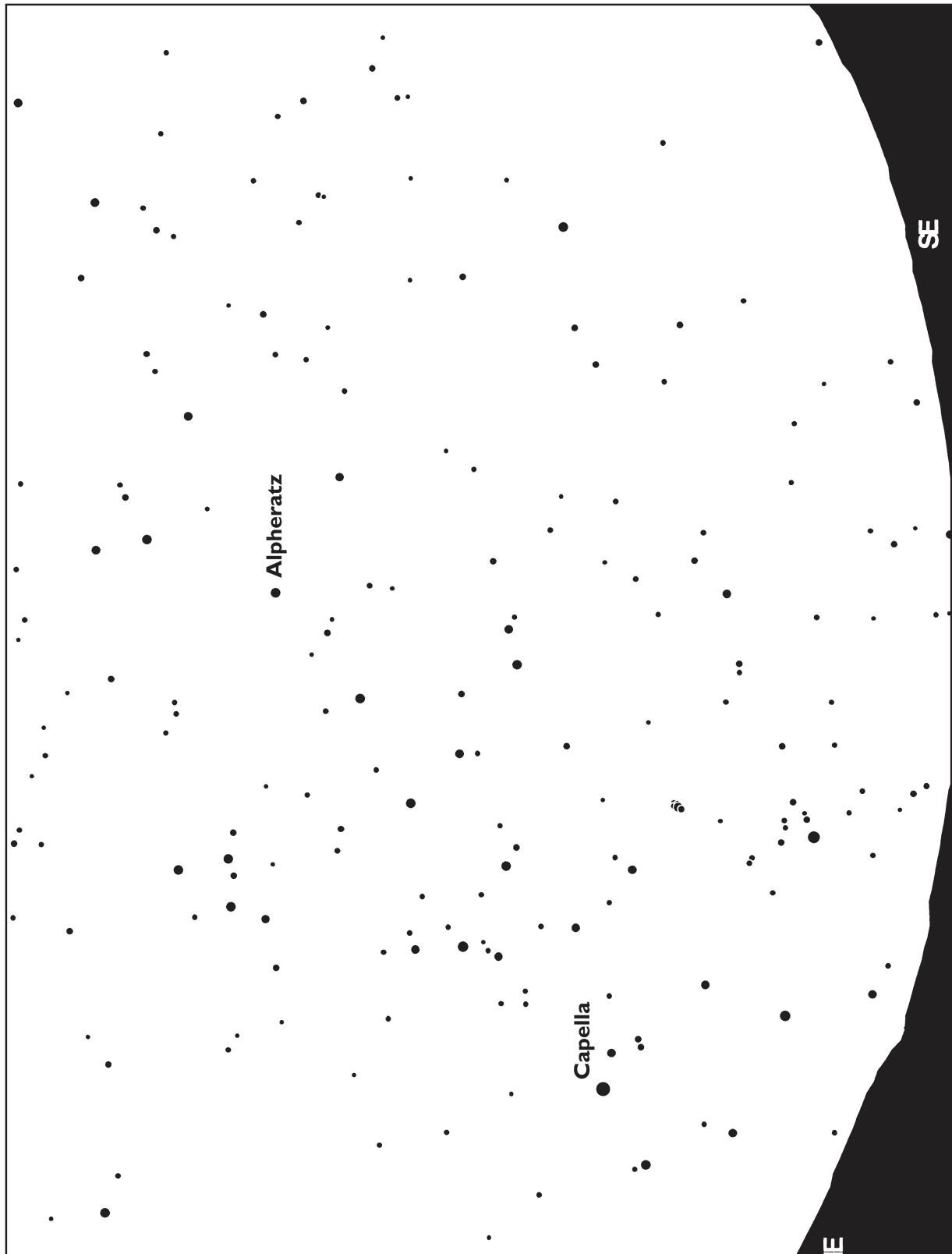


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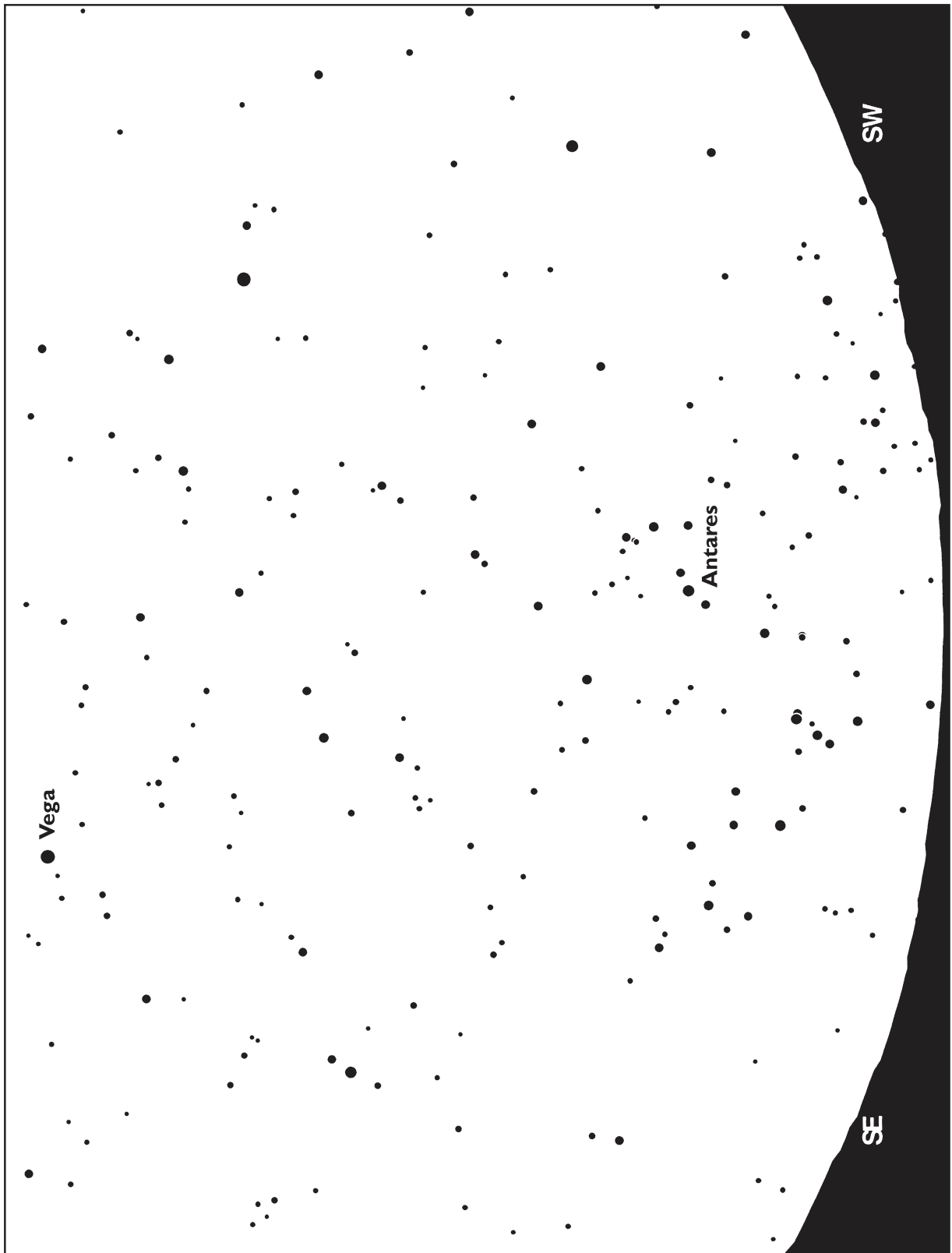
WINTER SKY HEROES STAR CHART



AUTUMN SKY HEROES STAR CHART



SUMMER SKY HEROES STAR CHART



SPRING SKY HEROES STAR CHART

