



GLOBE AT NIGHT

Teacher Activity Packet: Observation Guide

www.globeatnight.org

2012 Campaign Dates that use Orion: January 14-23, February 12-21 & March 13-22

Encourage your students to participate in a worldwide citizen science campaign to observe and record the magnitude of visible stars as a means of measuring light pollution in a given location. Because the data collection occurs in the evening, this is an excellent opportunity to get parents involved in a learning activity with their child. Participants will learn how to locate the constellation Orion. They will learn stars have different magnitudes of brightness in the night sky and that this information is of interest to scientists studying light pollution. Using the information provided your students will collect data and report their findings to the GLOBE at Night online database. The data will then be analyzed and mapped for participants to see the results of this global campaign.

鼓励你的学生参加一个世界公民科学活动，以观测并记录可见星星的大小来估测当地的光污染。因为在晚上进行数据的收集，这还是一个很好的让父母陪他们的孩子一起参加的机会。参加者会学习如何找到猎户座。他们还会学习有着不同亮度的星星，这些信息是研究光污染的科学家所关心的。用我们提供的信息，你的学生将会收集资料并像 GLOBE at Night 网上数据库汇报他们的发现。这些数据将会被分析并且制图让参加者们看到结果

You may choose to have GLOBE at Night be a part of your planned curricula or a completely independent extracurricular activity. Note that an activity packet has been designed for parents and families to help them successfully participate with their child.

你可以将 GLOBE at Night 做为你课程的一部分，或者做为一个完全独立的课外活动。注意一个已经设计好的活动指南可以帮助家长和家庭同孩子们参与活动。

Learning Objectives - Students will be able to:

- Use latitude and longitude coordinates to report the location of their observation
- Locate the constellation Orion using stellar maps
- Determine the magnitude of the faintest visible stars in their location
- Analyze the spatial data collected
- Draw conclusions from studying the mapped observations

用精度和纬度来汇报他们的观测地点

用星图来定位猎户座

决定当地最微弱的可见星的星等

分析空间数据

Materials Needed:

- GLOBE at Night Teacher or Family Activity Packet
- Something to write on (clipboard or cardboard)
- Something to write with (pencil or pen)
- Red light to preserve night vision (A red light can be made by covering a flashlight with a brown paper bag or a red balloon with the neck cut off.)
- Optional: smart mobile device, GPS unit, or a topographic map to determine your latitude and longitude

需要的材料

- GLOBE at Night 教师活动指南

剪贴板或纸

笔

红光手电筒（用红色气球或者棕色纸包包住的闪光灯或手电筒）

可选的：智能手机，GPS 以及其他能决定你经度纬度的仪器。

GLOBE AT NIGHT

Five Easy Star-Hunting Steps:

(www.globeatnight.org/observe.html)

1) Find your latitude and longitude using any of the following:

- Use the interactive tool in the web application at www.globeatnight.org/webapp/. With a smart cell phone or tablet, the latitude and longitude are automatically determined as you report the observation. If you are reporting it later on your computer, input the address of the observation. Or input your city; zoom in/out and pan around until you find it. The latitude and longitude will be displayed.
- Visit eo.ucar.edu/geocode online for a similar tool.
- Use a GPS unit where you take a measurement. Report as many decimal places as the unit provides.
- Use a topographic map of your area.

用以下方法找到你的经度和纬度

- 用一个互动的网上工具，www.globeatnight.org/webapp/ 和一个智能手机。它能在你做观测的时候自动找到经度和纬度。如果你之后在电脑上汇报，可以输入你观测的地址，或者放大地图来找到观测地点。
- 去eo.ucar.edu/geocode网站上找一个类似的工具
- 用GPS
- 用你所在地区的地形图

2) Find Orion by going outside at least an hour after sunset approximately between 8-10 pm local time. (Note for higher latitudes (>45 degrees North or South), you will need to do your observation closer to 9:00 pm rather than 8:00 pm.)

- Determine the darkest area by moving to where the most stars are visible in the sky toward Orion. If you have outside lights, be sure they are all off.
- Wait outside for at least 10 minutes for your eyes to adapt to the darkness. This is called becoming "dark-adapted."
- Locate Orion in the sky. For help use the appropriate Orion Finder Chart for your latitude. See www.globeatnight.org/observe_finder.html

2. 在太阳落山至少1小时候找到猎户座，大概是当地时间 8-10点，（注意那些高纬度地区（大于北纬或南纬

- 通过观察猎户座可见星星最多的数量，找到最黑暗的地区，如果你有外置灯光，请关掉它
- 在外面等待至少10分钟让你的眼睛适应黑暗环境
- 找到猎户座，可以通过用合适你纬度的猎户座查找图表

3) Match your nighttime sky to one of our magnitude charts (pp. 3-4 or www.globeatnight.org/observe_magnitude.html).

- Select the chart that most closely resembles what you are seeing.
 - Estimate the cloud cover in the sky.
 - Fill out the Observation Sheet (page 5).
- 在下列星等图表中找到你的晚上填空
- 选择最代表你看到星空的图表
 - 估计天空中的云
 - 填写观测表格

4) Report your observation online (if not done already by smart mobile device) at: www.globeatnight.org/report.html.

- There are 3 sets of campaign dates in 2012 that use Orion: January 14-23, February 12-21 and March 13-22. During those dates, take observations from different locations!
- Your observations can be reported online any time up to the last day of the campaign month (e.g., January 31, February 29 and March 31, respectively).

4. 网上汇报你的观测（如果你没有用智能手机汇报）在 www.globeatnight.org/report.html。

- 2012年的活动有3个部分，1月14-23日，2月12-21日，3月13-22日。在这些日子里，请在不同的地点做观测。
- 你的观测可以在活动当月的最后一天之前任意时间上报（1月31日，2月29日，3月31日）

5) Compare your observation to thousands around the world at: www.globeatnight.org/analyze.html

5. 与世界各地的上千份观测比较

45度）你需要再9点以后做你的观测



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U.S. Education Standards:

This activity meets the following U.S. educational standards:

National Science Education Standards

Earth and Space Science Standards-

- K-4: Objects in the sky
- Science in Personal and Social Perspectives-
- K-4: Changes in environments
 - 5-8: Populations, resources, and environments, Science and technology in society
 - 9-12: Environmental quality, Science and technology in local, national, and global challenges

Mathematics Standards

Numbers and Operations: Understand numbers, ways of representing numbers, relationships among numbers, and number systems

- Pre-K-2: Count with understanding and recognize “how many” in sets of objects; Understand and represent commonly used fractions, such as $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{2}$
- 3-5: Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers
- 6-8: Work flexibly with fractions, decimals, and percents to solve problems

Geometry: Use visualization, spatial reasoning, and geometric modeling to solve problems

- Pre-K-2: Recognize geometric shapes and structures in the environment and specify their location
- 3-5: Recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life
- 6-8: Recognize and apply geometric ideas and relationships in areas outside of the mathematics classroom, such as art, science, and everyday life

Geography for Life: The National Geography Standards
Essential Element 1: The World in Spatial Terms

- How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information.
 - How to analyze the spatial organization of people, places, and environments on Earth’s surface.
- Essential Element 5: Environment and Society
- How human actions modify the physical environment.

Remember Safety First!

Please remind students of the following safety guidelines:

- Be sure you ask for permission from your parent(s) or guardian to go outside after dark to do this activity. This is designed to be a family activity, invite all your family members to do the activity with you.
- Depending on your location, be sure to wear suitable clothing for the weather and for being outside at night (light colored and/or with reflective colors).
- Remember safety first! When choosing the darkest area in your location, be sure the location is not close to traffic, the edge of a balcony, or near any other type of danger.

Multiple Observations:

You can enter more than one observation by moving to a new location at least 1 km away from your original location. Don’t forget to get new latitude and longitude coordinates. This can be done on the same night or on another night any time during the dates of the campaign.

Note for higher latitudes (>45 N or S): astronomical twilight will occur later and Orion will be low on the horizon; so you may need to do your observation closer to 9:00 pm rather than 8:00 pm.

Charts in this document were prepared by Jan Hollan, CzechGlobe (<http://amper.ped.muni.cz/jenik/astro/maps/GaNight>).

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Please orient this page with the arrows up according to your location (e.g., in the Northern Hemisphere, near the equator or in the Southern Hemisphere).

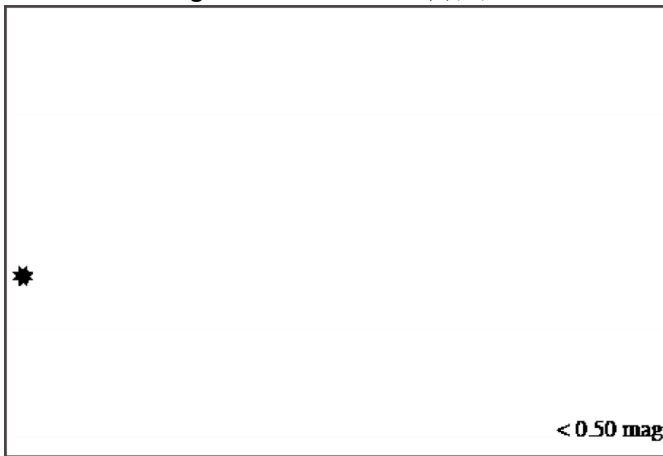
请按照你所在地区以箭头标识旋转此页



Northern Hemisphere View 北半球



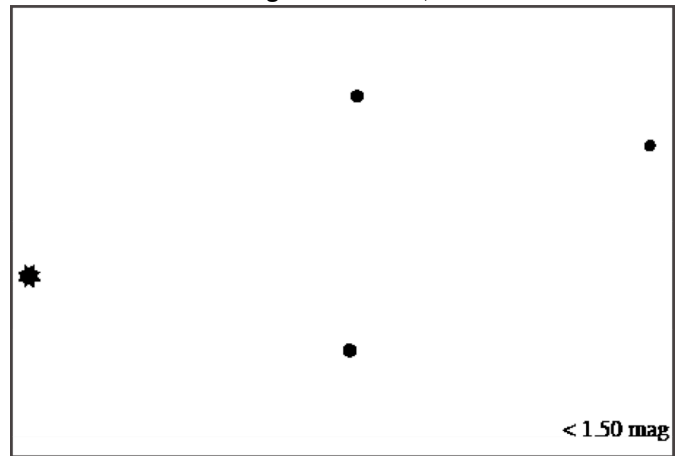
Magnitude Below 1 星等低于1



Hint: You can't see stars in Orion because the sky is too bright. The star you see is Sirius in the constellation, Canis Major

提示：你不能看到猎户座因为天空太亮了，你看到的那颗星星是天狼星

Magnitude 1 星等1



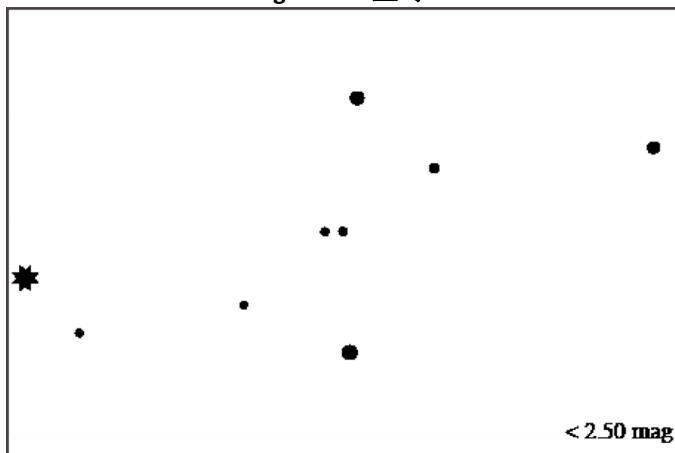
Hint: You can only see a couple of the brightest stars in Orion
你可以看到几个最亮的猎户座的星星



Near Equator View 赤道附近

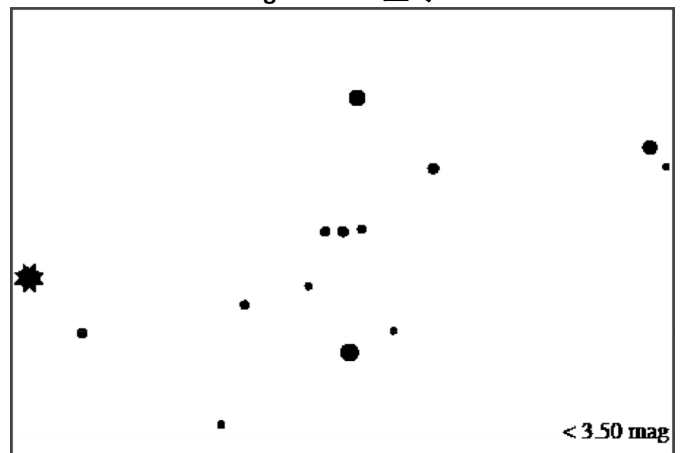


Magnitude 2 星等2



Hint: You can see two stars in Orion's belt.
你可以看到2颗星星在猎户座的腰带处

Magnitude 3 星等3



Hint: You can see three stars in Orion's belt
你可以在猎户座腰带处看到三颗星星



Southern Hemisphere View 南半球



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Please orient this page with the arrows up according to your location (e.g., in the Northern Hemisphere, near the equator or in the Southern Hemisphere).

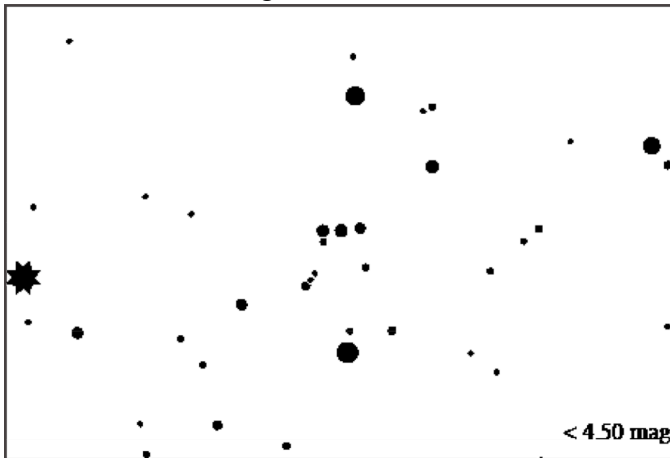
请按照你所在地区以箭头标识旋转此页



Northern Hemisphere View 北半球

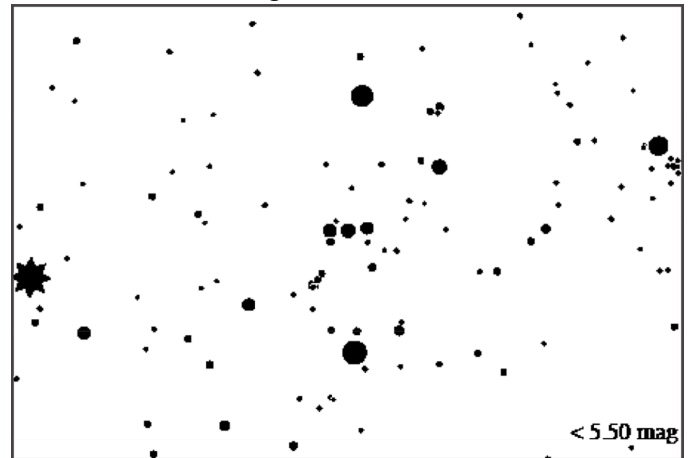


Magnitude 4 星等4



Hint: You can see four stars in Orion's belt
提示: 你可以在腰带处看到4颗星星

Magnitude 5 星等5



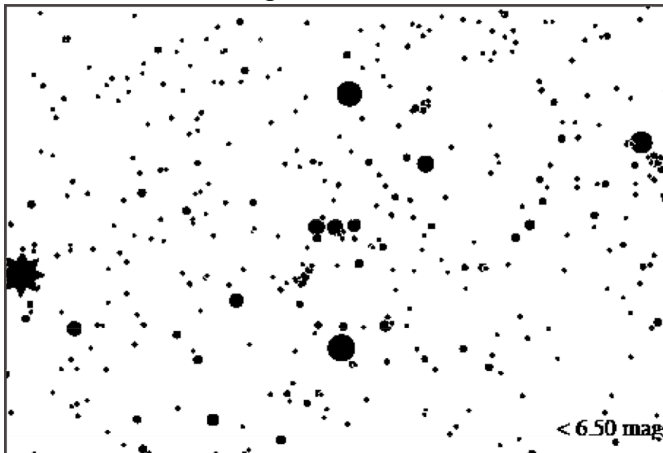
Hint: You can see six stars in Orion's belt,
and also you can easily find his sword
你可以看到6颗星星在腰带处, 并且轻松找到剑



Near Equator View 赤道附近

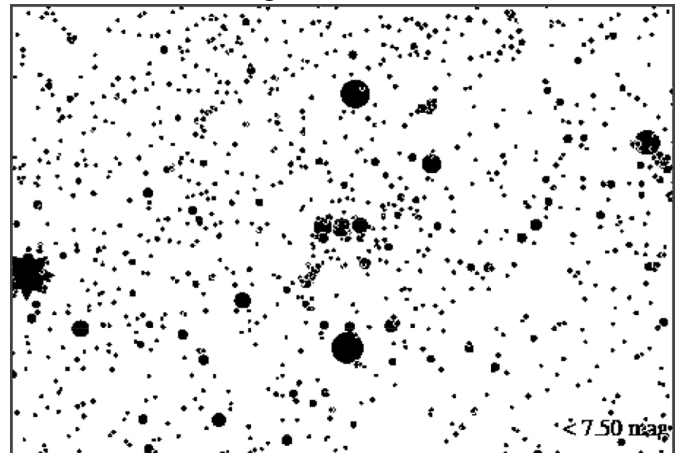


Magnitude 6 星等6



Hint: You can see many stars in Orion's belt,
and his sword is clearly visible
你可以在腰带处看到很多星星, 剑非常清楚

Magnitude 7 星等7



Hint: You can't count that many stars!
你数不清有多少星星



Southern Hemisphere View 南半球



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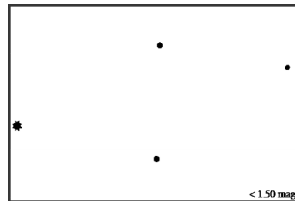
Only fields marked by * are required.

*Date: March / April (circle month) _____, 2011
*Observation Time: ____:____ PM local time (HH:MM) *Country: _____
*Latitude (in deg/min/sec ____ deg ____ min ____ sec (North / South) circle direction
or decimal degrees): _____ decimal degrees
*Longitude (in deg/min/sec ____ deg ____ min ____ sec (East / West) circle direction
or decimal degrees): _____ decimal degrees
Comments on location: (e.g. There is one street light within 50 m that is shielded from my view.)

*Match your nighttime sky to one of our magnitude charts :



Stars in Orion not visible



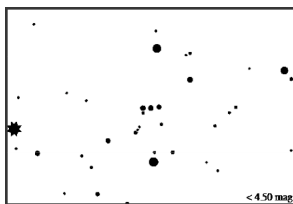
Magnitude 1 Chart



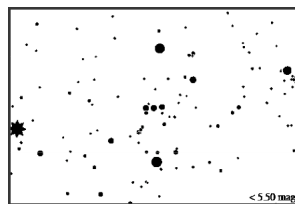
Magnitude 2 Chart



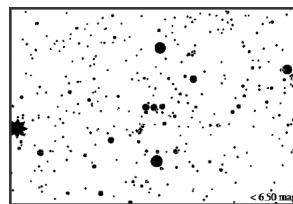
Magnitude 3 Chart



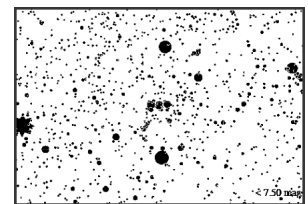
Magnitude 4 Chart



Magnitude 5 Chart



Magnitude 6 Chart



Magnitude 7 Chart

Reading from the Unihedron Sky Quality Meter (if applicable): _____

Serial number from the Unihedron Sky Quality Meter (if applicable): _____

*Estimate the cloud cover in the sky:

Clear Clouds cover ¼ of sky Clouds cover ½ of sky Clouds cover > ½ of sky

Comments on sky conditions: (e.g. a little haze to the north)

Report online at www.globeatnight.org/report.html