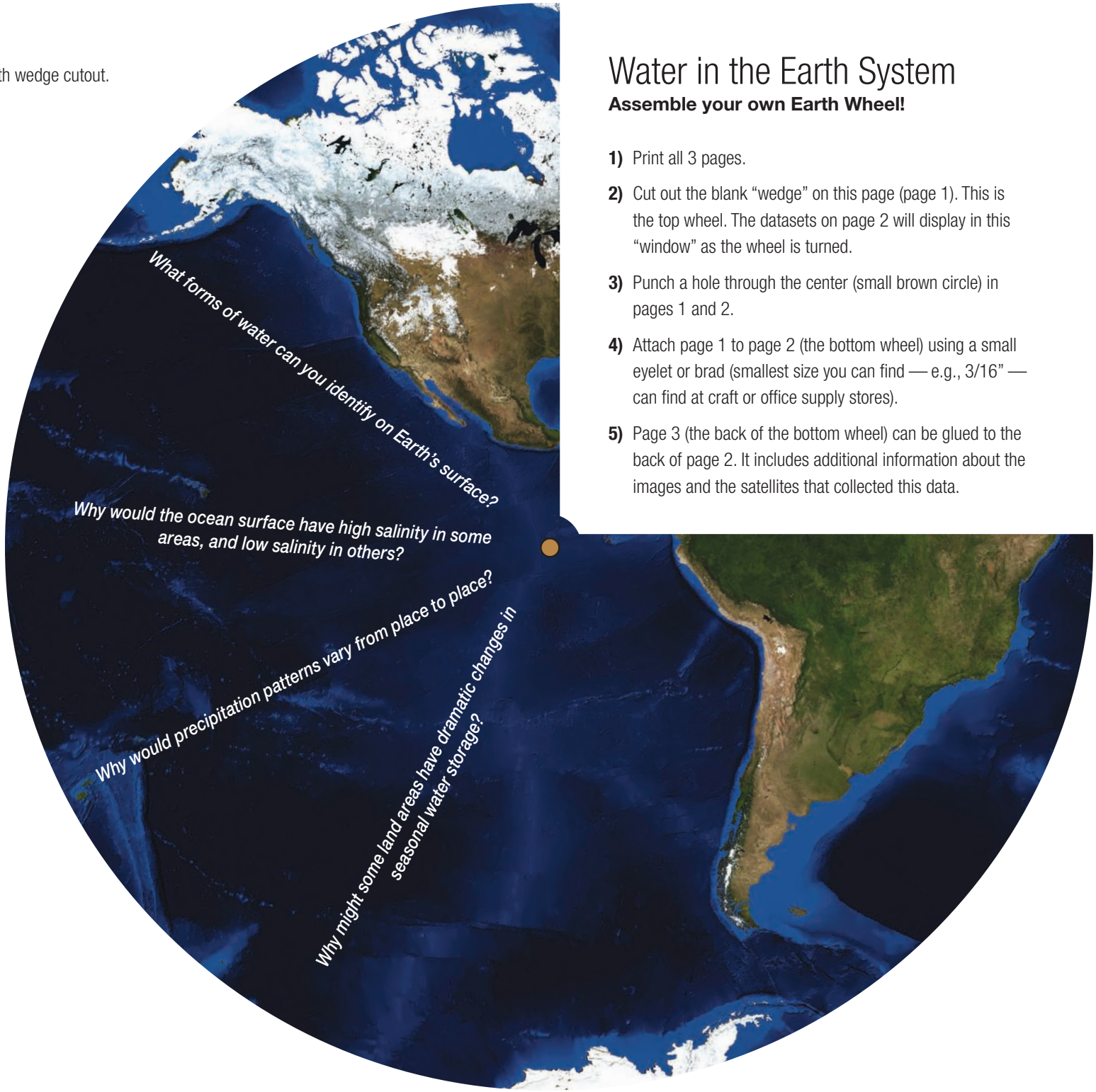
EARTH WHEEL

Page 1: Top wheel with wedge cutout.



Water in the Earth System

Assemble your own Earth Wheel!

1) Print all 3 pages.

2) Cut out the blank "wedge" on this page (page 1). This is the top wheel. The datasets on page 2 will display in this "window" as the wheel is turned.

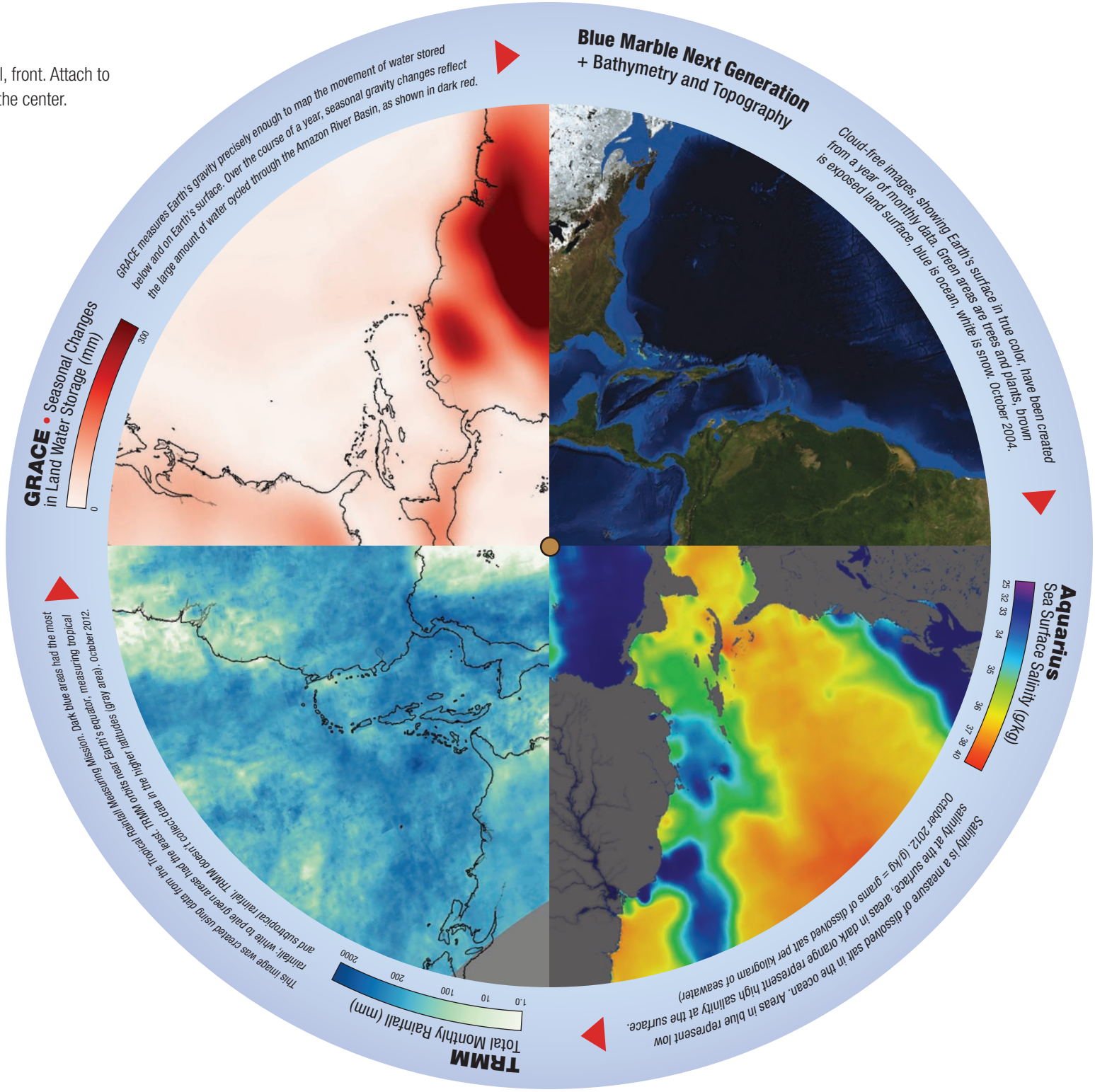
3) Punch a hole through the center (small brown circle) in pages 1 and 2.

4) Attach page 1 to page 2 (the bottom wheel) using a small eyelet or brad (smallest size you can find — e.g., 3/16" — can find at craft or office supply stores).

5) Page 3 (the back of the bottom wheel) can be glued to the back of page 2. It includes additional information about the images and the satellites that collected this data.

EARTH WHEEL

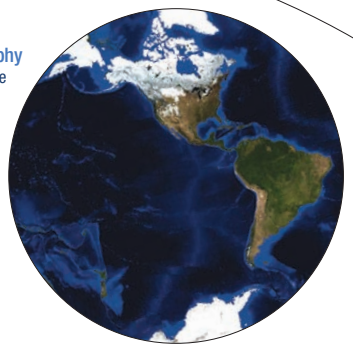
Page 2: Bottom wheel, front. Attach to top wheel in the center.

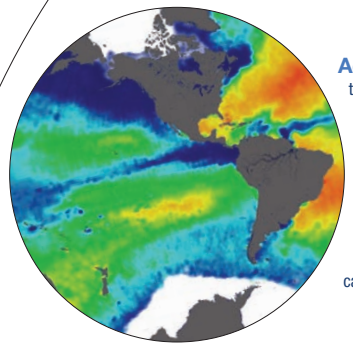


EARTH WHEEL

Page 3: Bottom wheel, back. Can be glued to the back of page 2.

Blue Marble Next Generation + Topography and Bathymetry • This image shows how the Earth's surface would look from space if our world had no clouds and no atmosphere. It's part of a set of images taken from NASA's Terra satellite, with one "blue marble" composite image created for each month in 2004. Clouds were removed from the satellite image to show the maximum land surface. Bathymetry (ocean depth) and topography data were added to the satellite image, and are not observations from space. *Image Credit: NASA's Earth Observatory.*



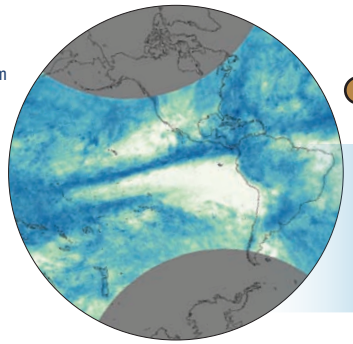


Aquarius/SAC-D • This joint US-Argentina mission measures the amount of salinity (dissolved salt) in the ocean surface. Salinity is key to studying the water cycle and ocean circulation, both of which are related to climate. Over decades, the amount of salt in ocean basins has been fairly stable. The water cycle operates on much faster time scales, however, causing changes in salinity patterns. Salinity decreases when freshwater enters the ocean from rivers, melting ice, rain, and snow. Processes that cause freshwater to exit the ocean—such as evaporation and formation of sea ice—raise salinity. Differences in dissolved salt content also play a major role in moving seawater, and the heat it carries, around the globe. *Image Credit: NASA/Goddard Space Flight Center.*

Explore Water in Our Earth System

Water moves continuously between our atmosphere, ocean and land. Flip to the other side and turn the wheel to explore some of the ways NASA scientists study water in our global Earth system. What connections can you find? See below for suggested answers to the questions on the front. Did you find others?

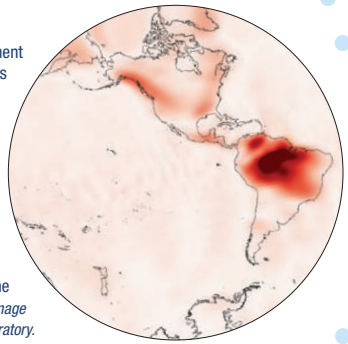
TRMM • This image was created using data from the US-Japanese Tropical Rainfall Monitoring Mission (TRMM). It shows how much rain fell in the world's tropical regions during October 2012. Dark blue areas show where a lot of rain has fallen. Areas that are white to pale green had the lowest amounts of rain. In 2014, NASA and the Japanese Space Agency launched the Global Precipitation Measurement (GPM) satellite mission. GPM will provide the next-generation observations of rain and snow worldwide every three hours. *Image Credit: NASA/Goddard Space Flight Center.*



DISCOVER Earth's Connected Systems through NASA images, data, activities and resources:
http://bit.ly/NASAEarthSystem

***KNOW YOUR EARTH:** Test your knowledge of the water cycle!*
http://bit.ly/WaterCycleQuiz

GRACE • The Gravity Recovery and Climate Experiment (GRACE) is a joint U.S.-German mission. GRACE consists of two spacecraft flying in formation around the planet to measure tiny differences in Earth's gravity field over time. From this data, scientists can map seasonal gravity changes associated with changes in the amount of water stored on and below the ground. The largest variations over the course of a year occur in northern South America. Each year, between September and April, seasonal rains deliver large amounts of water to this region, followed by a drier period during which the amount of water decreases again. *Image Credit: NASA/Jet Propulsion Laboratory.*



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ANSWER KEY

Blue Marble •
Earth truly is the water planet, with over 70% of Earth's surface covered by blue ocean. You can also see white bands of snow near the poles. **Aquarius Salinity** • A band of low salinity (blue) is seen along the equator. In the Pacific Ocean, low salinity is tied to tropical rainfall. The plume off the east coast of South America shows fresh water from the Amazon River flowing into the Atlantic. To the northeast, the large area of high salinity (orange) shows where evaporation leaves behind large amounts of dissolved salt. **TRMM Precipitation** • The tropics generally have more precipitation than other regions, shown in blue. This is because equatorial latitudes receive much more direct solar energy than higher latitudes, producing more evaporation. The warm, moist air rises, condenses into clouds, and falls back to Earth as rain. **GRACE Seasonal Land Water Storage** • This image shows how water stored below and on Earth's surface changes over time. The dark red area in South America represents the large amount of water cycled through the Amazon River Basin, for example, between rainy and dry seasons. During certain times, much of this fresh water flows into the Atlantic Ocean and lowers salinity.