**Reach for the Stars, Division B** **Answer Key**

**1999 Regional Exam** **The Sun: Distance vs. Size**

Materials required: Metric ruler plus photos obtained from the Yohkoh Spacecraft web site: <http://solar.physics.montana.edu/YPOP> To locate the photos, follow these links: 1. The Solar Classroom, 2. The Earth's Orbit, 3. Pictures of the Sun. Opening the TIF images from their current location works well. [If you prefer, you may use the hard copy photos included in this lesson.]

This activity has been adapted from the YPOP lesson – "The Solar Classroom" Additional activities suitable for preparing Science Olympiad participants are available at this site.

*Note: The instructor may print the photos and duplicate them. Be sure to check for possible distortion of the photos that may occur during this process.*

Background information: The solar photos were taken by the Yohkoh Spacecraft at four different times during the year. From these photos, the effect of distance from the Sun upon Earth's seasonal temperatures and the shape of its orbit can be inferred.

| Date Photo was Taken | Season Photo was Taken | Photo Diameter in mm |
|---|---|---|
| **01/23/92** | **Winter** | *Note: Photo sizes will vary* |
| **04/22/92** | **Spring** | *according to the size of the* |
| **07/21/92** | **Summer** | *computer monitor used. The* |
| **10/19/92** | **Fall** | *results will be the same.* |

2. **If you chose to provide the hard copy photo page provided, the measurements, from top to bottom, are 135 mm, 132 mm, 131 mm, and 133 mm.**
3. **Distance – the farther the Sun is to Earth, the smaller it appears; the closer the Sun is to Earth, the larger it appears.**
4. **It's elliptical [or similar response]. If the Earth were to appear to be the same size throughout the year, its distance from the Sun would not change.**
5. **Winter**
6. **Earth's revolution about the Sun**
7. **Due to the Sun's rapid rotation and gaseous nature, there is a bulge around its equator. The Sun's shape is not a perfect sphere.**

This lesson is one of many "Reach for the Stars" exams included in the "Reach for the Stars: Science Olympiad Preparatory Packet for B-Division Participants". For details, visit http://www.otherworlds-edu.com