

FIELD-OF-VIEW (FOV) WITH AND WITHOUT SNOW GOGGLES

Materials

Per student:

- ▼ Snow goggle Pattern A or B
- ▼ Scissors

Per group of three:

- ▼ 2 meter sticks
- ▼ 2 chairs
- ▼ Scotch tape

You will make snow goggles similar to those used by ancient Inuit hunters.

- ▼ Organize into groups, three students per group.
- ▼ Gather materials.

Procedures

1. Cut out snow goggle patterns and construct them. Make sure your group has one of each pattern.
2. Put the goggles on, making sure to place them so they fit like glasses, resting on the bridge of your nose comfortably, but are not wrapped around your face. Look up and down, right and left. Write your observations below.

3. Now do a scientific experiment. One of the members in your group is the Viewer, another is the Experimenter and the third, the Controller. (You will do the experiment three times so everyone plays each role once.) First, the Viewer puts on his/her goggles, and the group does the following:

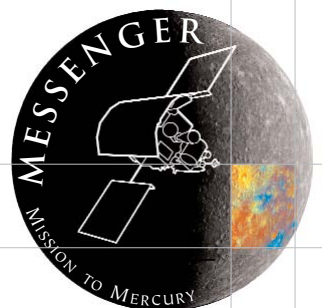
a) The Controller sits down in a chair. The Viewer sits down in the other chair 50 cm away and looks the Controller directly in the eyes. The Controller makes sure the Viewer does not move his or her eyes or head through this part of the Experiment.

b) The Experimenter stands to the side of the Viewer and holds up one hand above the Viewer's eye level and the other one below. The Experimenter moves the upper hand slowly higher and the lower hand lower, alternating between the hands. While staring the Controller straight to the eyes, the Viewer tells exactly when (s)he loses sight of the Experimenter's hands. This is the Viewer's vertical Field-of-View (FOV).

WARNING! Do *not* look directly at the Sun!

Looking for even a few seconds can cause permanent damage to the eyes!
Note that sunglasses do *not* provide an adequate safeguard against looking directly at the Sun.

So remember to *never* look directly at the Sun!



c) The Controller uses the meter stick to measure the Experimenter's armspread, and writes down his/her observation here (noting which pattern of snow goggles was used.)

Vertical FOV _____ with Pattern _____ for student _____ (your name here).

d) Repeat b) for horizontal FOV. The Experimenter stands behind the Viewer and places one hand to the right-hand side of the viewer and the other to the left-hand side. While the Experimenter slowly moves his/her hands forward from the Viewer, the Viewer tells exactly when (s)he has sight of them. This range defines the Viewer's horizontal FOV.

e) The Controller uses the meter stick to measure the Experimenter's armspread, and writes down his/her observation here (noting which pattern of snow goggles was used).

Horizontal FOV _____ with Pattern _____ for student _____ (your name here).

4. Repeat (3) but without the Viewer wearing goggles. Write the observations about the FOV here.

Vertical FOV without goggles: _____

Horizontal FOV without goggles: _____

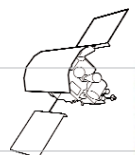
5. Repeat (3)-(4) for each student in your group, first with the goggles, then without.

6. Based on each Experimenter's notes on 3c), 3e), and 4), discuss as a group your observations and write them here.

Now answer the following questions individually:

1. How did the goggles change your vertical FOV?

2. How did they affect your side-to-side (horizontal) FOV?



3. List some advantages of the snow goggles.

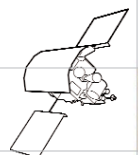
4. List some disadvantages of the snow goggles.

5. Would covering the goggles with reflective material have an effect?

6. Do you think the goggles are useful for the hunter in snow-and-ice covered arctic regions? Why or why not?

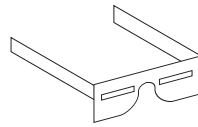
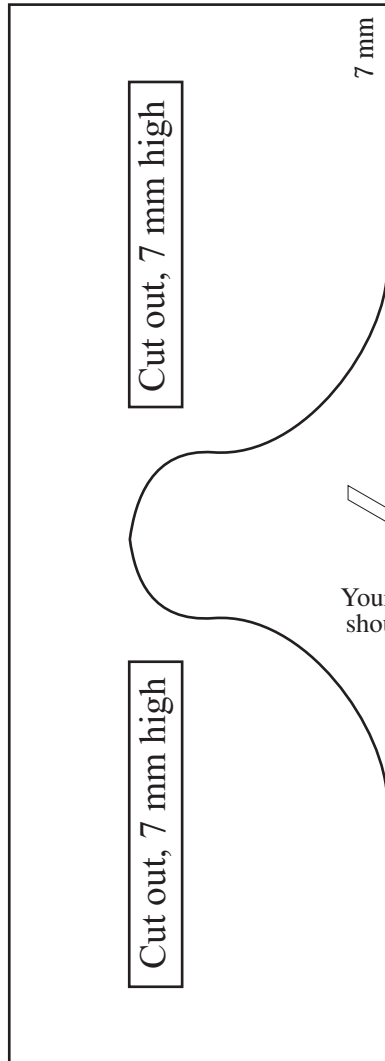
7. How would you improve the goggles? (You may want to make an improved version at home and bring them to class next time.)

8. Which pattern would you rather use if you had to hunt like the ancient Inuits in the snow? Why? (Keep in mind, the bigger your field of view, the more light will enter your eyes.)

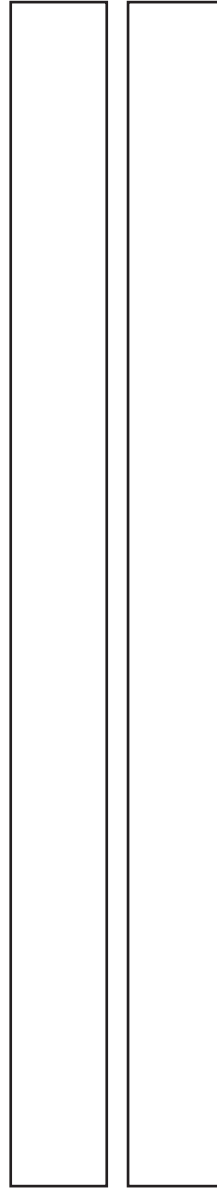


Snow Goggles: 7 mm Eye Opening

Cut out all pattern parts. Attach earpieces as illustrated below. Adjust to fit like eyeglasses.

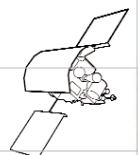


Your finished goggles should look like this.



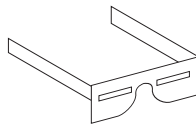
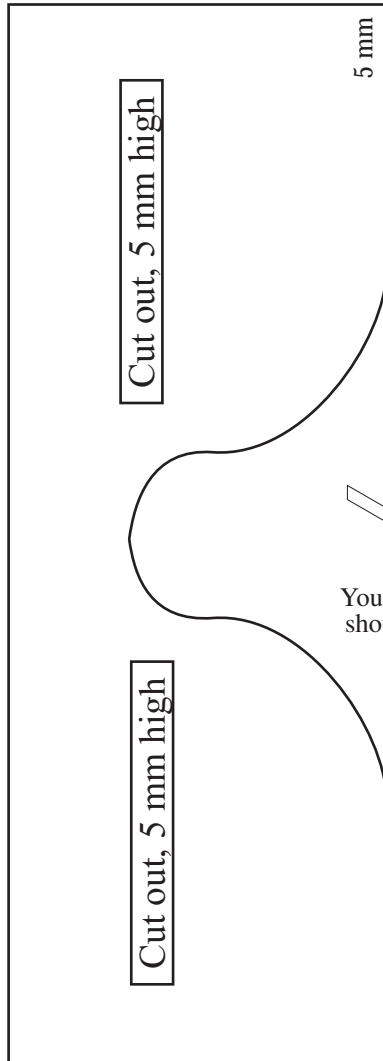
earpieces

For more information about the MESSENGER mission to Mercury, visit:
<http://messenger.jhuapl.edu/>
Students' snow goggles designed by Dr. Timothy Livengood

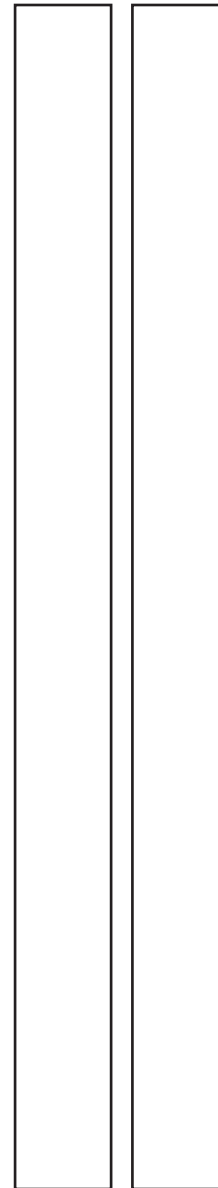


Snow Goggles: 5 mm Eye Opening

Cut out all pattern parts. Attach earpieces as illustrated below. Adjust to fit like eyeglasses.



Your finished goggles should look like this.



earpieces

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