



## Try Some Math Down Under!



The story on pages 22-23 shows that the difference in water temperatures in deeper lakes creates layers during the summer. Here are some math puzzles you can dive into.

**Puzzler #1:** The water temperature at the lake's surface in July is 80 degrees. The water temperature drops to approximately 64 degrees at 20 feet.

### Primary

1. Is the water colder at the lake's surface or at 20 feet below the surface?

Using a thermometer, measure the temperature of your cold tap water.

2. Is the tap water colder or warmer than the water at the lake's surface?

### Intermediate

3. How many degrees did the temperature drop in 20 feet?

4. Referring back to the graph on page 22, at what depth did the water temperature become pretty constant?

### Middle School

5. What is the percentage drop in temperature in the first 20 feet of water?

6. What is the average drop in temperature per foot of water?

**Puzzler #2-** The graph on page 23 shows the temperature difference at different water depths between summer and winter.

### Primary

The water temperature at the surface in July is 80 degrees. The temperature at the surface in January is 38 degrees.

7. Which temperature is warmer: 38 degrees or 80 degrees?

### Intermediate

8. What is the approximate difference in water temperature at 20 feet below the surface between January and July?

9. What is the approximate difference in water temperature at 60 feet between January and July?

Answers: (1) 20 feet below the surface, (2) you tell us, (3) 16 degrees, (4) 46 feet, (5)  $16/80=20$  percent, (6)  $16/80=n/20$  (binomial equation)  $n=4$  feet, (7) 80 degrees, (8) 26 degrees, (9) 7 degrees

## NATURE NOTES

## Mystery of Migration

On just a short walk through autumn woods, brushy fields, roadside thickets or even urban areas, you will notice birds on the move. Flocks of robins and thrushes are flitting about berry-laden trees and shrubs. Numerous bluejays are bustling in the tree-tops. Out of thickets float flurries of the shrill chirps of sparrows. Fall migration is ready to begin.

Not all songbirds migrate. Mingled with the migrant birds in woods and thickets are cardinals, chickadees, nuthatches and woodpeckers -- all stay-at-homes. But what causes birds to make their long trip south? How do they find their way over such great distances? The changing day length, particularly the shorter days of late summer and fall, stimulates the production of a hormone that induces migratory behavior and the deposition of body fat needed



*Canada geese heading southward.*

Tim McCabe/USDA-NRCS Photo

for the long trip. Following this, an environmental signal such as a drop in temperature or the arrival of a cold front tells birds it is time to head southward.

How birds find their way south is another matter. Actually they use a variety of mechanisms. Daytime migrants use the sun as a compass by determining their directions and position by the arc of the sun.

Nighttime migrants travel by the configuration of the stars, using the position of the sunset for the initial selection of direction.

Other birds use the magnetic fields of the earth or geographic land forms to find their way southward. But science will probably never isolate the exact mechanism of migration or the hold that it has on the human spirit.