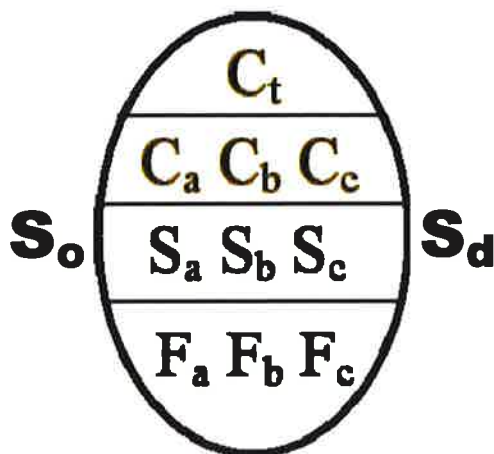




## ICE CHART SYMBOLOGY

The World Meteorology Organization (WMO) system for sea ice symbology is more frequently referred to as the "Egg Code" due to the oval shape of the symbol.



**C<sub>t</sub>** - Total concentration of ice in area, reported in tenths. May be expressed as a single number or as a range, not to exceed two tenths (3-5, 5-7 etc.)

**C<sub>a</sub> C<sub>b</sub> C<sub>c</sub>** - Partial concentration (C<sub>a</sub>, C<sub>b</sub>, C<sub>c</sub>) are reported in tenths, as a single digit. These are reported in order of decreasing thickness. C<sub>a</sub> is the concentration of the thickest ice and C<sub>c</sub> is the concentration of the thinnest ice.

**S<sub>a</sub> S<sub>b</sub> S<sub>c</sub>** - Stages of development (S<sub>a</sub>, S<sub>b</sub>, S<sub>c</sub>) are listed using the code shown in Table 1 below, in decreasing order of thickness. (NOTE: If there is a dot (.), all stages of development codes to the left of the dot (.) are assumed to carry the dot (.) These codes correspond directly with the partial concentrations above. C<sub>a</sub> is the concentration of stage S<sub>a</sub>, C<sub>b</sub> is the concentration of stage S<sub>b</sub>, and C<sub>c</sub> is the concentration of S<sub>c</sub>.

**S<sub>o</sub> S<sub>d</sub>** - Development stage (age) of remaining ice types. S<sub>o</sub> if reported is a trace of ice type thicker/older than S<sub>a</sub>. S<sub>d</sub> is a thinner ice type which is reported when there are four or more ice thickness types.

**F<sub>a</sub> F<sub>b</sub> F<sub>c</sub>** - Predominant form of ice (floe size) corresponding to S<sub>a</sub>, S<sub>b</sub> and S<sub>c</sub> respectively. Table 2 below shows the codes used to express this information.

Table 1. Egg Codes for Stages of Ice Development (S<sub>x</sub> Codes)

Stage of Development for Sea Ice	Code Figure	Stage of Development for Fresh Water Ice
New Ice-Frazil, Grease, Slush, Shuga (0-10 cm)	1	New Ice (0 - 5 cm)
Nilas, Ice Rind (0 - 10 cm)	2	
Young (10 - 30 cm)	3	
Gray (10 - 15 cm)	4	Thin Ice (5 - 15 cm)
Gray - White (15 - 30 cm)	5	Medium Ice (15 - 30 cm)
First Year (30 - 200 cm)	6	
First Year Thin (30 - 70 cm)	7	Thick Ice (30 - 70 cm)
First Year Thin - First Stage (30 - 70 cm)	8	First Stage Thick Ice (30 - 50 cm)
First Year Thin - Second Stage (30 - 70 cm)	9	Second Stage Thick Ice (50 - 70 cm)
Medium First Year (70 - 120 cm)	1.	Very Thick Ice (70 - 120 cm)
Thick First Year (>120 cm)	4.	
Old - Survived at least one season's melt (>2 m)	7.	
Second Year (>2 m)	8.	
Multi-Year (>2 m)	9.	
Ice of Land Origin		

Table 2. Egg Codes for Forms of Ice (F<sub>x</sub> Codes)

Forms of Sea Ice	Code Figure	Forms of Fresh Water Ice
	~F	Belts and Strips symbol followed by ice concentration
New Ice (0-10 cm)	X	
Pancake Ice (30 cm - 3 m)	0	
Brash Ice (< 2m)	1	
Ice Cake (3 - 20 m)	2	
Small Ice Floe (20 - 100 m)	3	
Medium Ice Floe (100 - 500 m)	4	
Big Ice Floe (500 m - 2 km)	5	
Vast Ice Floe (2 - 10 km)	6	
Giant Ice Floe (> 10 km)	7	
Fast Ice	8	Fast Ice
Ice of Land Origin	9	
Undetermined or Unknown (Iceberg, Growlers, Bergy Bits)	/	

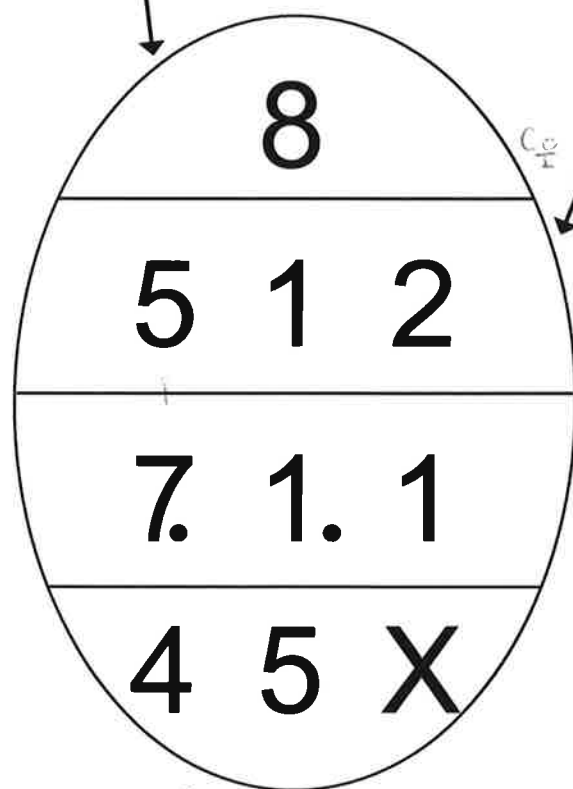
## Activity Preparation:

During this activity, students play a card game to help them understand the egg code, which is an international way of describing sea ice. Students can play the "Egg Code Game" in groups of 2 to 4. Each group will need one set of cards (2 pages), and one STUDENT INFORMATION SHEET: "Egg Code Game." Copy the STUDENT INFORMATION SHEETS to compile a game packet for each group.

## Activity Procedure:

1. Explain that scientists and sea travelers use an international code known as the "egg code" to describe ice conditions around the world. The egg code describes sea ice concentration (amount of the sea surface that is covered in ice), stage of development (thickness) and form of ice (floe size) for a given area.
2. Place the OVERHEAD: "Cracking the Egg Code" on the overhead projector. Explain that:

- The top section of the egg tells how much of the sea in this area is covered by ice. This number is expressed in tenths. *In the example, eight-tenths of the region is covered by ice.*



- The second row of the egg tells how much of the sea in a region is covered by each of up to three types of ice and is expressed in tenths. The first number in this section tells the concentration of the thickest ice in the area, the second number tells the extent of the medium thickness ice in the area, and the third number tells the extent of the thinnest ice in the area. The sum of the numbers in this row is always equal to or less than the number in the top section of the egg. *In the example, we know that eight-tenths of the surface is covered by ice. Of this, five-tenths is the thickest ice in the area, one-tenth is ice of medium thickness for this area, and two-tenths is the thinnest type of ice found in this area.*

- The third row of the egg describes the stage (age and thickness) of each concentration of ice indicated in the second row. The number and dot code in this row are keyed to the Stages of Sea Ice Development Chart. The first number in the third row describes the stage and thickness of the thickest ice. The second number in the third row describes the stage and thickness of the medium ice and so on. *In the example, 7. indicates that Old Ice more than 200 cm thick covers five-tenths of the sea surface in this region. The 1. indicates that Medium First Year Ice 70-120 cm thick covers one-tenth of the surface, and the 1 indicates that New Ice 0-10 cm thick covers two-tenths of the surface in this region.*

- The bottom section of the egg describes the form of the ice, including the floe size. A floe is a piece of floating sea ice. The numbers in this section are keyed to the Forms of Sea Ice Chart. The first number in the bottom section indicates the form of the thickest ice. The second number indicates the form of the ice of medium thickness and so on. Ask students to pay careful attention to the units in the chart. Remind them that 100 cm = 1 m and that 1000 m = 1 km. *In the example, 4 indicates that the Old Ice in the region is made up of one or more Medium Ice Floes (100 m - 500 m across). The 5 indicates that the Medium First Year Ice in the region is made up of one or more Big Ice Floes (500 m - 2 km across). The X indicates that the New Ice in the region is in small pieces 0-10 cm across.*