

**Title:** Blind Mapping

**Subject:** Science

**Grade Levels:** 7<sup>th</sup> – 9th

**Rational or Purpose:** This activity requires students to use their sense of touch to locate the desks in a classroom. Students will experience how senses, other than seeing, can help them to create a rough map. This exercise relates to how sea turtles utilize the sense of the magnetic field direction and intensity.

**Materials:**

- Blindfold
- Desks in classroom

**Lesson Duration:** 35 – 45 minutes

**TEKS Objectives:**

6.1(C), 6.2(A), 6.2(B), 6.2(C), 6.2(D), 6.2(E), 6.4(A), 6.4(B), 6.6(B), 6.10(A), 6.10(C), 6.12(A)

7.1(A), 7.2(A), 7.2(B), 7.2(C), 7.2(D), 7.2(E), 7.4(A), 7.11(B)

8.2(A), 8.2(B), 8.2(C), 8.2(D), 8.2(E), 8.4(A), 8.11(A)

**CONNECTIONS TO AP**

AP Biology:

III. Organisms and Populations: B. Structure and Function of Plants and Animals  
1. Reproduction, growth, and development 2. Structural, physiological, and behavioral adaptations 3. Response to the environment

AP Environmental Science:

I Scientific Analysis, II ; II Interdependence of Earth's Systems: Fundamental Principles and Concepts, D. The Biosphere

**Background Information:** We often use our sense of seeing and smelling to find a path to certain location. However, sea turtles use Earth's magnetic field to navigate during migration. They have an ability to generate a rough map that helps them move across an ocean. Therefore, they can always nest their eggs at the same location after their migration (if we need to travel across an ocean without any directional aid, we would probably get lost very soon!). The actual mechanism of magnetic field detection is not completely known yet. For more information about the magnetic field detection, see the scientific publications by Lohmann<sup>1</sup>, Hays<sup>2</sup>, and Diebel<sup>3</sup>.

**Activity:** In activity 1, students will try their best to use their sense of touch to locate the desks in a classroom. Then, they will draw the “map” and compare it to the actual setup. In activity 2, students will experience how the “map” in their mind would help them walk faster in the returning trip.

**Procedure:** See handout for details.

**Sources:**

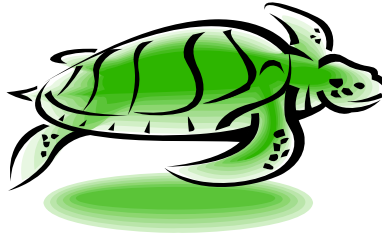
1. Lohmann K.J., *et al.* “Animal behaviour: Geomagnetic map used in sea-turtle navigation.” *Nature*. **428** (2004) 909
2. Hays G.C., *et al.* “Island-finding ability of marine turtles2003.” *Proceedings: Biological Sciences*. **270** (2003) 1471
3. Diebel, C.E. *et al.* “Magnetite defines a vertebrate magnetoreceptor.” **406** (2000) 299

# Turtle Mapping

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class Section: \_\_\_\_\_



## Activity 1

### Directions:

For each group of 4 students, one student will blindfold his/her eyes. The other 3 students will arrange the desks (*max. 6*) in a way that the blindfolded student will try to map them later.

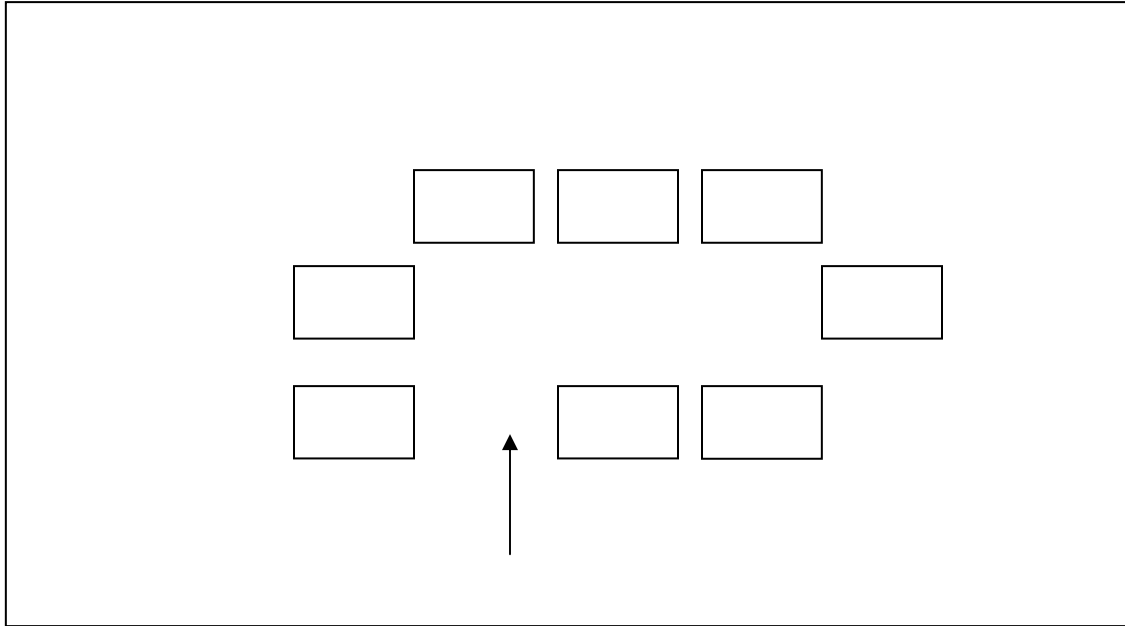
The blindfolded student needs to sit quietly until all the desk arrangement is finished. After the desks are set in the desired arrangement, the students (*except the blindfolded student*) will draw their floor plan in the following box. You will use this to compare the map produced by the blindfolded student (when the blindfolded student finishes touching the desktops, restore the desk arrangement before he/she removes the blindfold. This makes sure he/she cannot cheat).

For the blindfolded student: When your group members finish desk arrangement, you will walk very slowly and use your hand to touch the desks. You need to remember the relative location of the desks. After you finish detecting the desks, your group member will restore the desk arrangement. Then, you will remove your blindfold and draw the locations of desks in the following box.

# Turtle Mapping

## Activity 2

Choose another student to wear the blindfold. Try to setup the desks to the following arrangement.



The blindfolded student will start the detection from the arrow indicated above. This time, the student cannot use his/her hands to touch the desks. He/She can only use his/her body to feel the location of the desk. After the student finishes detecting the desks, ask the student to turn 180° and walk back to the starting point. Observe carefully on how he/she walks back to the starting point.

When the student arrive the starting point, he/she can remove the blindfold. Put the desks back into the original locations.

Discuss on the following questions:

1. For activity 1
  - a. Is it difficult to map the desks?
  - b. Does the map produced by the blindfolded student resemble the actual setup?
  - c. What senses does the student use for mapping? How is it different from visual detection?
  
2. For activity 2
  - a. What did you (blindfolded student) think when you start walking?
  - b. Would the blindfolded student walk faster if they walk the path again? Why?