



Name: _____ Date: _____

Handout 4-1: Tracking Spot**Directions:**

1. Fill in the Prediction column in the table before reading the field notes.
2. After reading the field notes, fill in the Information obtained and Evaluate columns in the table.

What is happening to the water? (cause)	Prediction: How will this affect the tiger salamander? (effect)	Information obtained: What happens to Spot in the field notes?	Evaluate: What is the effect on Spot?
The vernal pool dries up in hot summer.			

What is happening to the water? (cause)	Prediction: How will this affect the tiger salamander? (effect)	Information obtained: What happens to Spot in the field notes?	Evaluate: What is the effect on Spot?
It rains in the fall.			
It is cold in winter.			

What is happening to the water? (cause)	Prediction: How will this affect the tiger salamander? (effect)	Information obtained: What happens to Spot in the field notes?	Evaluate: What is the effect on Spot?
In spring, the snow melts and water seeps into Spot's burrow (hole/home).			

Dr. Cortez's Field Notes: Tracking Spot

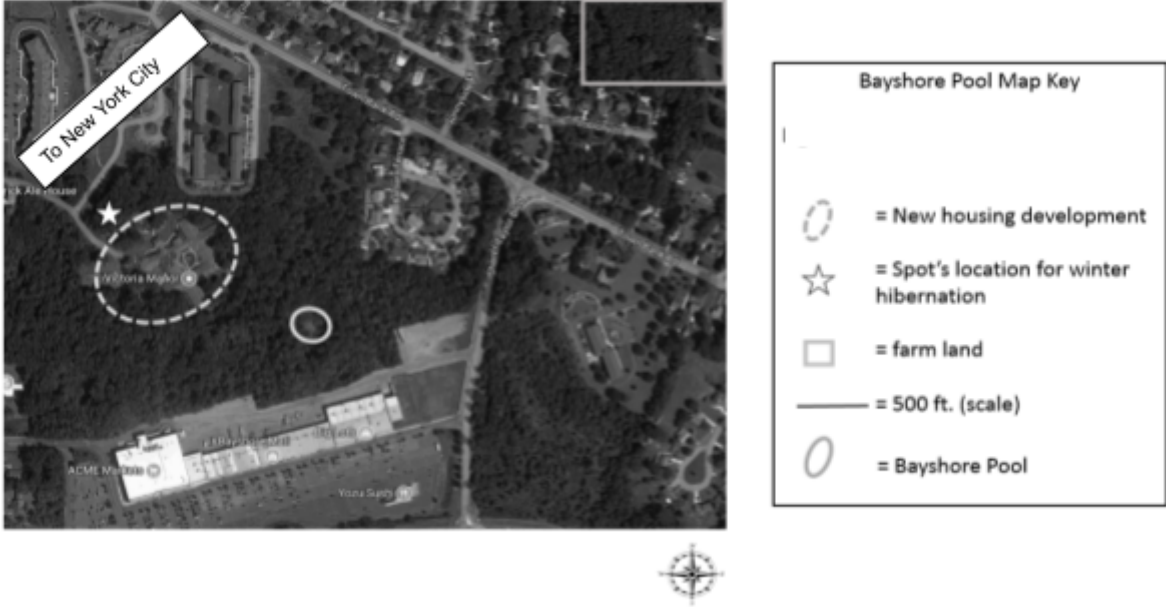
Dr. Cortez's Field Notes	
Organism: EASTERN TIGER SALAMANDER <i>Ambystoma tigrinum tigrinum</i>	
Sex: Female	
Tag Name: Spot	
Tag Date: March 31	
Tag Insert: ☐	
Field Notes: Dr. Cortez	
I tagged a tiger salamander from Bayshore Pool ecosystem to	
observe and record her movements. To tag the tiger salamander,	
I caught her and inserted a GPS tag so I can locate her at	
different times of the year. Finally, I released her back into the	
ecosystem from the same area where I caught her. I named her	
Spot.	
My team and I planned to track and observe Spot over 1 year to	
answer the question, What is the tiger salamander's location from	
one season to the next?	

	Date: April 3		
	Season: Spring Last Year		
	I observed Spot near Bayshore Pool.		
	At the same time, tiger salamander eggs were hatching in the		
	vernal pool. There was plenty of water in the vernal pool for Spot to		
	absorb through her skin for hydration. There was also plenty of		
	Fairy shrimp to eat. Bayshore Pool was a healthy ecosystem for tiger		
	salamanders since many different plants and animal lived there from		
	one year to the next.		
	Date: May 29		
	Season: Spring Last Year		
	I observed Spot again absorbing water from the vernal pool. The		
	larvae in the pool were bigger from eating fairy shrimp and		
	zooplankton. Bayshore Pool was covered in algae.		
	Date: June 21		
	Season: Summer Last Year		
	The weather was much warmer, and the vernal pool water levels had		
	decreased. Spot was spending more time in the upland, hunting		

	slugs and small frogs. I observed her crawling into a hole to stay	
	and absorb water from the water in the surrounding soil. She	
	immediately came back out of the hole because there was a garter	
	snake already in it. It looked like the garter snake bit off some of	
	Spot's tail when she escaped from the predator. A lost tail could be	
	a big problem for some animals, but not for Spot. Salamanders can	
	regrow their tails or other lost limbs.	
		
	Date: August 4	
	Season: Summer Last Year	
	Spot's tail appeared to be growing again. She looked strong and had	
	many food sources around the vernal pool. The vernal pool had	
	completely dried up, but Spot's hole had some water. Spot only	
	came out of the hole to eat anything she could fit in her mouth,	
	like frogs, worms, snails, and slugs.	
	Date: September 15	
	Season: Fall This Year	
		

	There was a lot of rain recently. The	
	vernal pool filled up with water. I observed Spot slipping into the	
	vernal pool for water. The banks of the vernal pool were muddy.	
	Later in the day, I saw Spot approach a slug on a twig. Spot quickly	
	caught the slug in her mouth and ate the slug in one bite. Winter is	
	coming. Winter means hibernation for the tiger salamanders. Spot	
	prepared for winter when she ate the slug. For the winter,	
	salamanders hibernate as they sleep in a deep hole.	
	Date: December 5	
	Season: Winter This Year	
	The weather was much colder than the last time I was at Bayshore	
	Pool. It was 7° Celsius (45° Fahrenheit) outside as I looked for Spot.	
	I didn't see any tiger salamanders around the vernal pool. The GPS	
	tag showed she was in the same exact place, less than 5 miles from	
	Bayshore Pool.	
	Spot was most likely in her hibernation	
	hole below ground. The deep hole was	
	warmer than the cold air. Spot conserved	
	energy by not moving. Tiger salamanders	

	do not hibernate in groups, so Spot was	
	on her own. It was hard to see where Spot had dug her home for	
	hibernation because of the many leaves on the ground.	
	Some of the leaves were decomposing. Their color and	
	texture did not look the same as they did earlier in the	
	year. In the spring time Spot will come out of her hole to meet the	
	other tiger salamanders around Bayshore Pool. Bayshore Pool was	
	unusually noisy because of the construction nearby.	
	Date: March 18	
	Season: Spring This Year	
	The snow was melting and water	
	was seeping into the ground	
	around the vernal pool. The melted snow water ran into the vernal	
	pool. The GPS tag showed Spot had not moved from her	
	hibernation hole.	
	Date: April 3	
	Season: Spring This Year	
	The GPS showed that Spot had moved from her hibernation hole,	

	but now I don't have a GPS signal. On my visit to observe, I didn't	
	see Spot or any other tiger salamanders around Bayshore Pool.	
	What happened?	
	 The map shows an aerial view of a suburban area. A road in the upper left is labeled 'To New York City'. A star is placed on this road, labeled 'Spot's location for winter hibernation'. A dashed circle to the right of the star indicates a 'New housing development'. A solid circle further right indicates 'Bayshore Pool'. A scale bar at the bottom left indicates '500 ft. (scale)'. A compass rose is at the bottom center. The map key on the right lists these symbols: a dashed circle for 'New housing development', a star for 'Spot's location for winter hibernation', a square for 'farm land', a line for '500 ft. (scale)', and a solid circle for 'Bayshore Pool'.	

Name: _____ Date: _____

Las Anotaciones de la Dra. Cortez		
Organism: SALAMANDRAS TIGRE DEL ESTE <i>Ambystoma tigrinum</i>		
Sexo: Hembra		
Nombre al etiquetar: Spot		
Fecha al etiquetar: 31 de marzo		
Inserción de la etiqueta: ☐		
Anotaciones: Dra. Cortez		
Etiqueté a una salamandra tigre del ecosistema de la laguna		
temporal Bayshore para observar y registrar sus movimientos. Para		
etiquetarla, la capturé e inserté el chip GPS para poder localizarla		
en distintos momentos del año. Finalmente, la liberé en su		
ecosistema en el mismo lugar en donde la encontré. La llamé Spot.		
Mi equipo y yo planeamos rastrear y observar a Spot durante 1 año		
para responder a la siguiente pregunta: ¿Cuál es la ubicación de la		
salamandra tigre de una estación a la otra?		
Fecha: 3 de abril		
Estación: Primavera del año pasado		

	Observé a Spot cerca de la laguna temporal Bayshore. Al mismo	
	tiempo, huevos de salamandra tigre estaban por salir en la laguna	
	temporal. Había mucha agua en la laguna para que Spot absorbiera	
	a través de su piel y se hidratara. También había muchos	
	camarones hada para comer. La laguna temporal Bayshore era un	
	ecosistema saludable para salamandras tigre ya que muchas	
	Plantas y animales distintos vivieron	
	ahí de un año al otro.	
	Fecha: 29 de mayo	
	Estación: Primavera del año pasado	
	Observé a Spot absorbiendo agua de la laguna temporal de nuevo.	
	Las larvas en la laguna eran más grandes por comer camarones	
	hada y zooplancton. La laguna temporal Bayshore estaba cubierta	
	por algas.	
	Fecha: 21 de junio	
	Estación: Verano del año pasado	
	El clima era mucho más caluroso, y los niveles de la laguna	
	temporal habían bajado. Spot estaba pasando más tiempo en tierra,	
	cazando babosas y pequeñas ranas. Llovía por la mañana y se veía	

	a Spot afuera. La observé moverse a un agujero para mantenerse 	
	fresca. Inmediatamente, salió del agujero porque ya había una	
	culebra rayada adentro. Me pareció que la culebra había mordido	
	una parte de la cola de Spot cuando escapaba del depredador. Una	
	cola perdida podría ser un gran problema para algunos animales,	
	pero no para Spot. Las salamandras pueden hacer que sus colas y	
	otros miembros crezcan de nuevo.	
	Fecha: 4 de agosto	
	Estación: Verano del año pasado	
	La cola de Spot parece estar creciendo de nuevo. Spot se veía	
	fuerte y tenía muchas fuentes de comida alrededor de la laguna	
	temporal. La laguna se había secado completamente, pero el	
	came out of the hole to eat anything she could fit in her mouth,	
	like frogs, worms, snails, and slugs.	
		

	Fecha: 15 de septiembre	
	Estación: Otoño de este año	
	Llovía mucho recientemente. La	
	laguna temporal se llenó de agua. Observé a Spot metiéndose a la	
	laguna buscando agua. Los bancos de la laguna estaban	
	embarrados. Más tarde en el día, vi a Spot acercársele a una	
	babosa en una rama. Spot capturó rápidamente a la babosa en su	
	boca y se la comió de un mordisco. El invierno está viniendo.	
	Invierno significa hibernación para las salamandras tigre. Spot se	
	Preparó para el invierno cuando comió la babosa. Para el invierno,	
	las salamandras hibernan mientras duermen en un agujero	
	profundo.	
	Fecha: 5 de diciembre	
	Estación: Invierno de este año	
	El clima era mucho más frío que la última vez que estuve en la	
	laguna temporal Bayshore. Hacían 7° Celsius (45° Fahrenheit)	
	afuera mientras buscaba a Spot. No vi ninguna salamandra tigre	
	alrededor de la laguna temporal. El GPS mostraba a Spot en el	
	mismo lugar, a menos de 5 millas de la	
	laguna temporal Bayshore. Probablemente,	
	Spot estaba en su agujero de hibernación,	



	bajo tierra. El agujero profundo era más	
	cálido que el aire frío. Spot conservó	
	energía al no mover. Las salamandras tigre no	
	hibernan en grupo, así que Spot estaba sola. Era difícil ver dónde	
	Spot había cavado su agujero por todas las hojas que había en el	
	piso. Algunas de ellas se estaban descomponiendo. Su	
	color y textura eran distintos que a principio del año.	
	En primavera, Spot va a salir de su agujero para reencontrarse con	
	las otras salamandras alrededor de la laguna temporal Bayshore. La	
	laguna era especialmente ruidosa por una construcción cercana.	
		
	Fecha: 18 de marzo	
	Estación: Primavera de este año	
	La nieve se estaba derritiendo	
	y el agua empezaba a filtrarse en el suelo alrededor de la laguna	
	temporal. El agua de la nieve llegó a la laguna temporal. El GPS	
	mostraba que Spot no se había movido de su agujero de	
	hibernación.	
	Fecha: 3 de abril	

	Estación: Primavera de este año	
	El GPS mostró que Spot se había movido de su agujero de	
	hibernación, pero ahora no tengo señal de GPS. En mi visita para	
	observar, no vi a Spot ni a ninguna otra salamandra tigre alrededor	
	de la laguna temporal Bayshore. ¿Qué paso?	
 Layenda del mapa de la laguna temporal Bayshore  = Nuevo complejo de viviendas  = Ubicación de Spot para hibernar  = campo  = 500 pies (escala)  = La laguna temporal Bayshore		

Name: _____ Date: _____

Article 4-1: Bayshore Pool Water Quality

New Jersey has 15 vernal pools with tiger salamanders, and 13 of these 15 pools are in the Cape May area of New Jersey. New Jersey Division of Fish and Wildlife constructed several new vernal pools there that help tiger salamanders locate a pond within the 5-mile range.¹

There are many possible causes for the disappearance of the tiger salamander. One of the causes is substances in the water. Water is important to the tiger salamander's survival. An adult tiger salamander absorbs water to stay hydrated. Any substances in the water also enter the tiger salamander. Substances dissolved in the water could cause death when the tiger salamander interacts with the water. What happens to the pesticide in the dead tiger salamander's body when the animal decomposes?

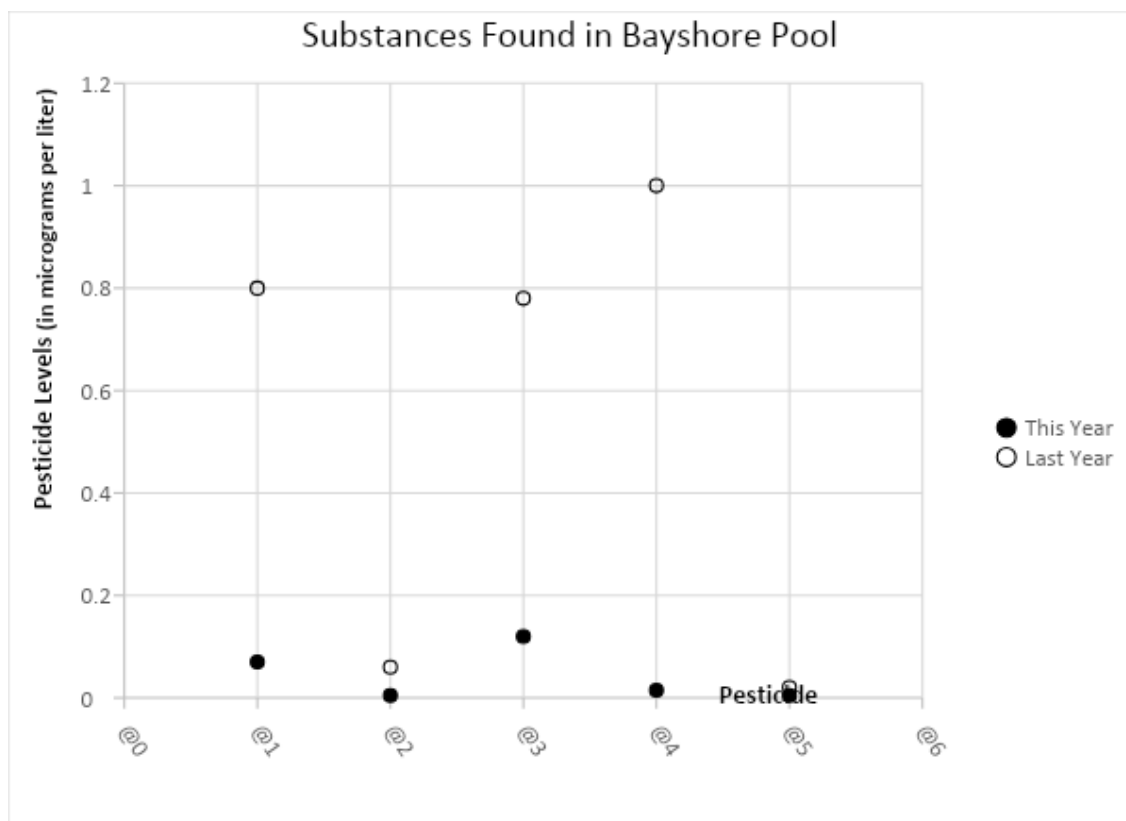
Farming releases substances like pesticides into the water system. The pesticides mix with water during storms. The water with the pesticides flows downhill into rivers and other wetlands. Sometimes the wind blows pesticides from the farmland into wetland and the pesticides mix with the water.

United States Geological Service (USGS) publishes data on substances that enter New Jersey streams. USGS takes samples from 45 sites across the state of New Jersey. The table on the next page lists Maximum Contaminant Levels (MCL) of some pesticides. If levels are above the MCL, tiger salamanders (and people) can get sick. MCL is measured in micrograms per liter.

¹ Adapted from: http://www.conservewildlifenj.org/species/spotlight/tiger_salamander/

Below is a graph of the Maximum Contaminant Levels (MCL) of some pesticides in Bayshore Pool. If levels are above the MCL, tiger salamanders (and people) can get sick. MCL is measured in micrograms per liter. Record the measurement from the **GRAPH** of the substances from Bayshore Pool This Year (black dot) and Bayshore Pool Last Year (white dot) in the **TABLE** on the next page. The first one is done for you.

GRAPH: Substances Found in Bayshore Pool



Pesticide Number on GRAPH	Pesticide Name
1	Alachlor
2	Cyanazine
3	Metolachlor
4	Prometon
5	Simazine

TABLE: Drinking Water Standards for Pesticides

Pesticides: Drinking Water Standards		Measurements from Graph	
Pesticide Name	Safe Amount of Pesticide MCL (in micrograms per liter)	Bayshore Pool LAST YEAR (in micrograms per liter)	Bayshore Pool THIS YEAR (in micrograms per liter)
1 Alachlor	2.0	0.8	0.1
2 Cyanazine	1.0		
3 Metazachlor	70.0		
4 Prometon	100.0		
5 Simazine	4.0		

Article 4-1: Questions

1. Were the pesticide levels dangerous in Bayshore Pool last year? Why?

2. Are the pesticide levels dangerous in Bayshore Pool this year? Why?

Name _____ Date _____

SEN Entry 4-1: Evidence for the Cause of the Tiger Salamanders' Disappearance

1. What are your ideas about the cause of the tier salamanders' disappearance from Bayshore Pool?

2. What are your ideas about the cause of the tier salamanders' disappearance from Bayshore Pool?
