

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

Due: \_\_\_\_\_

## BIOMAGNIFICATION IN AQUATIC ECOSYSTEMS

### PURPOSE:

To determine how a pesticide like DDT builds up in the bodies of top predators such as the Marsh Hawk.

### MATERIALS:

None

### METHODS:

Imagine a marsh near a farmer's field which is infected by a harmful insect pest. The farmer sprays the field with the pesticide DDT. Due to runoff from the field after a rainstorm the DDT makes its way into the marsh. As a result the marsh plants absorb very small amounts of DDT. For example, Tiny microscopy algae called Diatoms absorb one (1) unit of DDT each. After a while the Marsh hawks begin to die. This does not seem to make sense since only very small amounts of DDT were released & absorbed by the plants. DDT is a long lasting pesticide & will remain in the body of the marshawk even after it dies.

↳ 15 yrs!

Using the information in the food chain table listed below:

1. Calculate the amount of DDT ( number of units) that each organism accumulates in its body after feeding for one week.
2. Calculate the amount of DDT (number of units) that the top predator the Marshawk accumulates in its body after one year (52 weeks).
3. Place your answers in the observation table & answers the discussion questions.

PREDATION RATES IN A MARSH FOOD CHAIN	
Organism In Food Chain	Predation Rate Number Of Prey (food) Eaten Per Week
1. Mayfly larva	Eats 1000 Diatoms per week
2. Predacious beetle larva	Eats 10 mayflies per week
3. Resided Dace (minnow)	Eats 20 predacious beetle larvae per week
4. Smallmouth bass	Eats 15 red dace per week
5. Northern pike	Eats 10 smallmouth bass per week
6. Marshawk	Eats 2 northern pike per week

### OBSERVATIONS:

See observation & calculations table on next page.

**CONCLUSIONS:** (how does the DDT build up in the body of the marshawk?)

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## OBSERVATIONS DDT ACCUMULATION & CALCULATIONS TABLE

Organism In The Food Chain	Number Of Prey Eaten Per Week	Units of DDT In The Body of The Prey	Total DDT Build Up In The Body Of The Organism
1. Diatom (algae)	N/A	X	1
2. Mayfly		X	
3. Predacious Beetle		X	
4. Resided Dace		X	
5. Smallmouth Bass		X	
6. Northern Pike		X	
7. Marshhawk		X	

### DISCUSSION:

- How much has the amount of DDT increased from the body of the diatom to the body of the marshhawk?  
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- What will happen to the DDT after the hawk dies? Remember the "three feeding levels" there are more than producers & consumers.  
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- The farmer was going to use a new pesticide AST. It disappears in the environment after only seven days. How would the accumulation of AST have compared to the accumulation of DDT?  
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- The new born son ( 1month old) of a local fisherman was tested for hepatitis. The results were negative for hepatitis but the doctors were surprised to find DDT in his system. How is this possible when the infant does NOT eat fish or solid food?  
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- Why must the use of pesticides be controlled and monitored very carefully?  
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- Using the library or other resource find out what DDT stands for. Dichloro-diphenyl-trichloroethane
- On separate piece of paper prepare a sketch of a Marsh Food Web which includes the food chain described in this lab. Think of other marsh animals found in, on or around the marsh that would feed or be food for the animals in our DDT food chain.