

USGS Data Exploration Unit: Presentation 2 (KEY)

Opening Questions

Fill in the Blank for Questions 1-3:

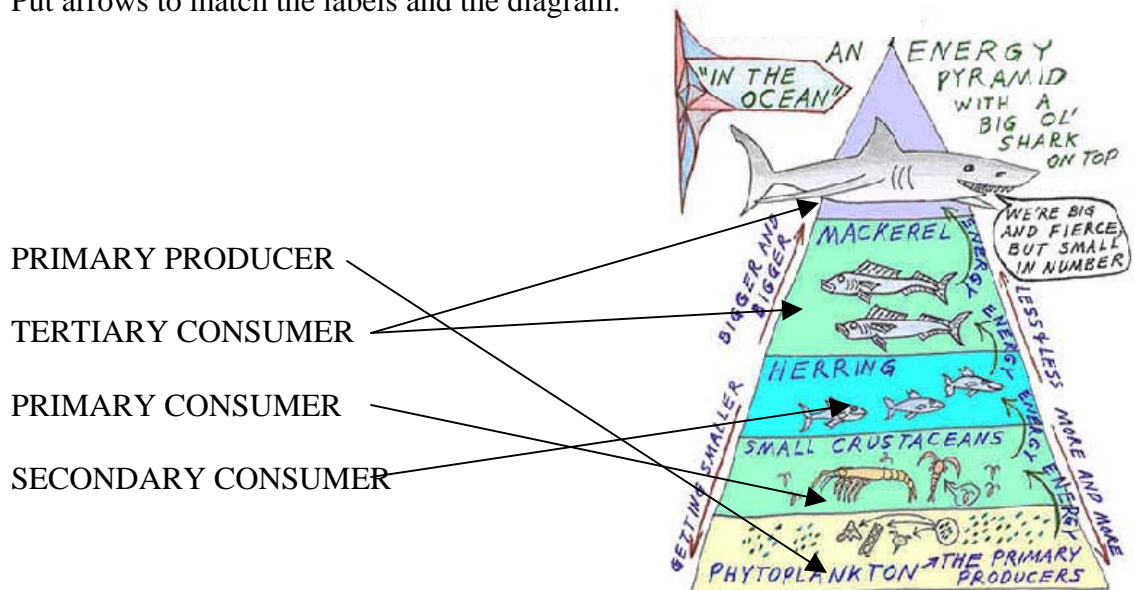
1. Name two kinds of bias: 1) sampling bias 2) measurement bias
2. Name three sources of bias:
 - 1) Not taking a random or representative sample
 - 2) Taking too small a sample
 - 3) Not using measurement equipment correctly
3. What are some important aspects of DDT?

*DDT is a pesticide that was widely used in the United States following WWII. DDT has had detrimental effects on bald eagles and other birds of prey. In 1962 Rachel Carson published the book *Silent Spring* that drew public attention to the harmful environmental impacts of DDT and the public's concern resulted in the eventual banning of DDT in 1972.*

Presentation Questions

Based on information in the presentation, answer the questions and fill-in the blanks.

1. Name three health hazards of DDT:
 - 1) *Reproductive failure in birds (eggshell thinning)*
 - 2) *Thyroid problems*
 - 3) *Nervous system damage*
2. Define Food Web: The summary of the feeding relationships within an ecological community
3. Put arrows to match the labels and the diagram:



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4. Define bioaccumulation: *The build up of poison in an organism's body*
5. Define biomagnification: *Increase in concentration of toxin as it passes through successive levels of the food web*
6. Fill in the Osprey Food Chain and the DDE Concentrations:

Animals in the Food Chain	DDE Concentration
<u><i>Osprey</i></u>	<u><i>3-76 $\mu\text{g/g}$</i></u>
<u><i>Large Mouth Bass</i></u>	<u><i>1-2 $\mu\text{g/g}$</i></u>
<u><i>Crayfish</i></u>	<u><i>0.2 – 1.2 $\mu\text{g/g}$</i></u>
<u><i>Plants/Algae</i></u>	<u><i>0.04 $\mu\text{g/g}$</i></u>

7. What is a microgram?

a microgram (μg) is one millionth of a gram

8. What is a $\mu\text{g/g}$?

$\mu\text{g/g}$ = number of micrograms per gram

9. Define wet weight

wet weight refers to the weight of animal tissue or other substance including its contained water

10. Define dry weight

refers to the weight of animal tissue after it has been dried in an oven at 65 °C until a constant weight is achieved

11. At what DDE concentration did bald eagles and osprey suffer from total reproductive failure?

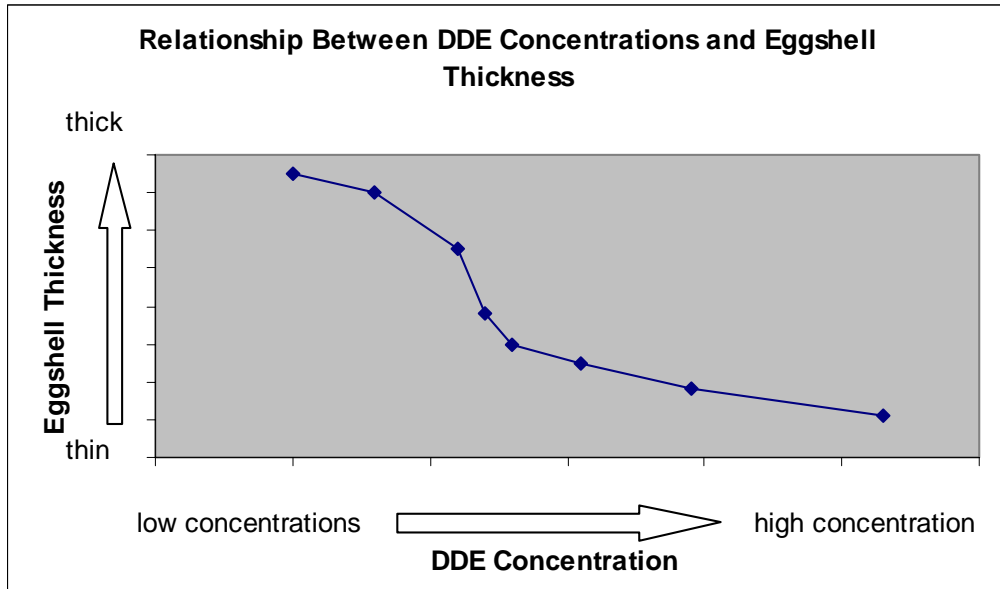
Bald Eagles: *$\geq 16 \mu\text{g/g}$* Osprey: *$\geq 17.6 \mu\text{g/g}$*

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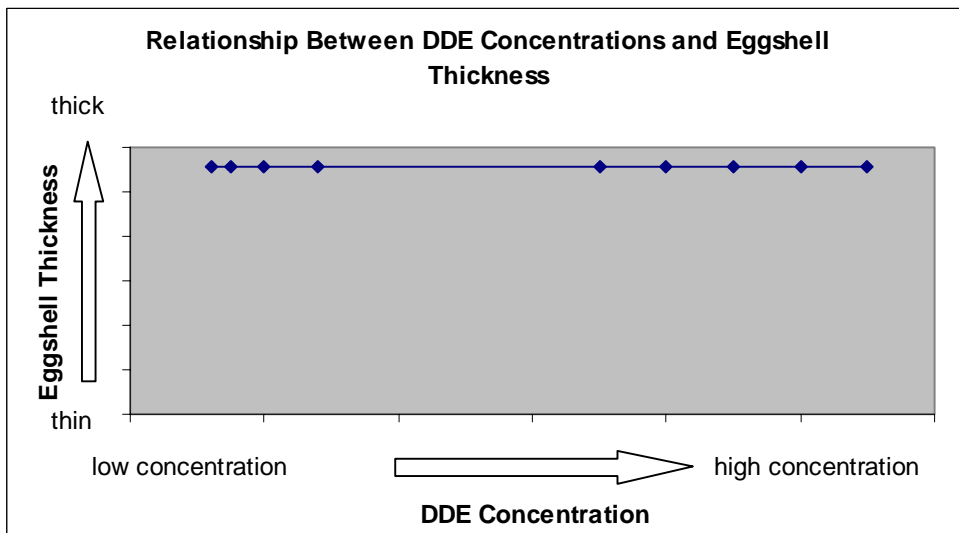
12. Fill in the blank:

- a) High concentrations of DDE in the egg-laying female osprey cause the female to lay eggs with thin eggshells.
- b) What is the importance of thin eggshells? *When eggshells are thin the eggs usually break before the chick has a chance to develop and be born.*

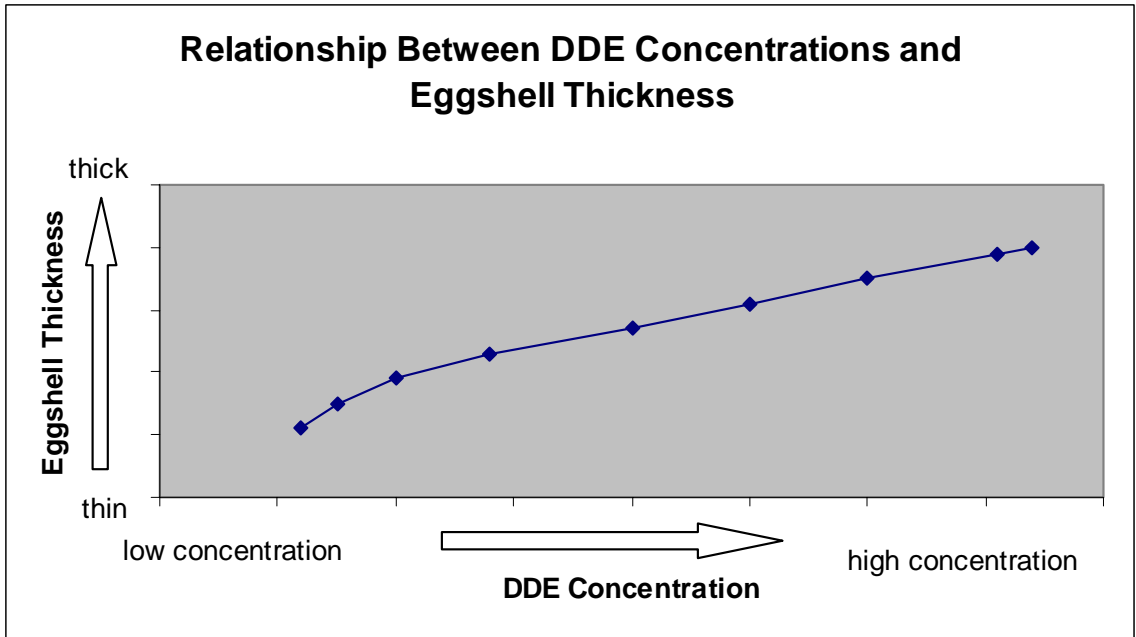
13. If DDE causes eggshell thinning, how would you draw a graph showing the relationship between eggshell thinning and the concentration of DDE?



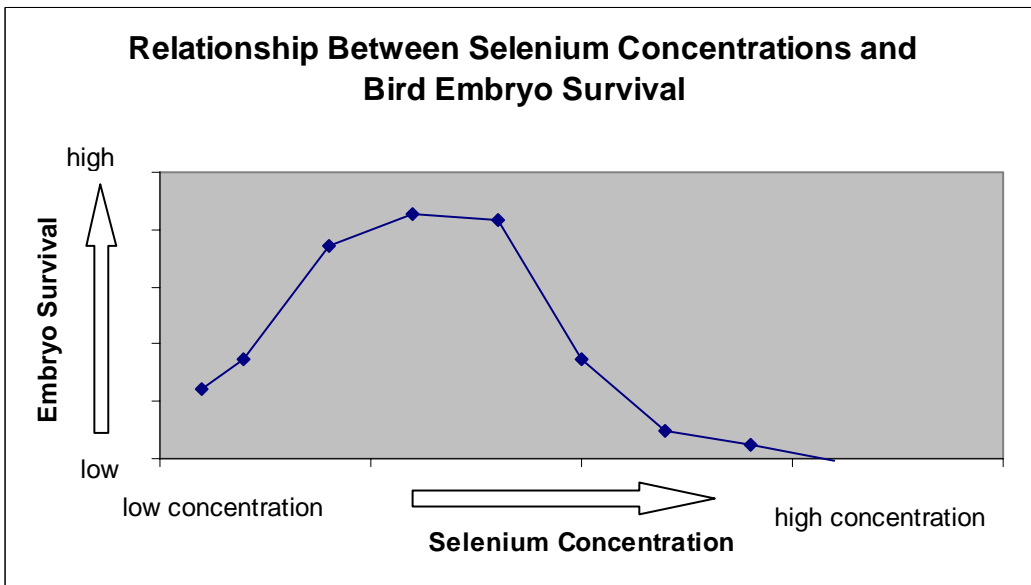
14. If DDE has no impact on eggshell thickness, what relationship would you expect to see between DDE concentrations and eggshell thickness?



15. If increased concentrations of DDE are associated with increased eggshell thickness, how would you make a graph showing the association between eggshell thickness and DDE concentration?



16. If bird embryos have too little selenium it decreases their rate of survival. If bird embryos have too much selenium, it bioaccumulates and is toxic to the birds. How would you make a graph showing the relationship between selenium and bird embryo survival?



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17. DDE reduces reproductive rates at low concentrations. At moderate and high concentrations it causes total reproductive failure. How would you make a graph showing the relationship between DDE and reproductive success?

