

**Part I: Internal vs. External Fertilization**

Some animals that live in the water gather in large groups during their breeding seasons. The females release their eggs into the water. The males of the species then release their sperm over the eggs. The sperm cells fertilize the eggs in the water. This is called external fertilization because it takes place outside the body. Once fertilization occurs externally, the embryo will also develop externally. In other animals, the male releases sperm directly into the females body where fertilization takes place.

**Questions:**

1. What is the difference between internal and external fertilization?
  
2. List an animal species that utilizes each of the following strategies:
  - A. External fertilization and external development \_\_\_\_\_
  - B. Internal fertilization and external development \_\_\_\_\_
  - C. Internal fertilization and internal development \_\_\_\_\_

**Directions:**

Analyze table 1 below. Using this information and your knowledge of these animal species, complete questions 1 – 5.

Table: Reproduction in Various Animal Species

Animal	Where an animal lives	Number of Gametes Produced by Female	Number of fertilized eggs (zygotes) produced	Number of Offspring that survive for at least 1 year
Horse	land	1	1	1
Spider	land	100	100	10
Oyster	water	1,000,000	750,000	100
Jellyfish	water	2,000	1,000	10
Tiger Salamander	land	100	100	8
Starfish	water	3,000	1,500	5
Garter Snake	land	35	35	6
Falcon	land	5	5	2
Clam	water	1,500,000	1,000,000	30

Questions:

- Fill in the table below by placing the names of the organisms from table 1 in the correct columns.

\*\*If number of zygotes produced is greater than 150, external fertilization occurred. \*\*

Lives in Water		Lives on Land	
Fertilization		Fertilization	
Internal	External	Internal	External

- Write a general statement that explains where fertilization will occur (internally or externally) based on where an organism lives (water or land).

- List the four organisms that produce the most female gametes and zygotes.

B. Do all of the female gametes get fertilized? \_\_\_\_\_ Support your answer.

C. Where do the organisms that produce the most gametes live? \_\_\_\_\_

D. Hypothesize why these organisms need to produce so many gametes/zygotes.

- What kind of fertilization do animals in the water typically use? \_\_\_\_\_  
Why is this possible in water and not on land?

- In which type of fertilization (internal or external) is there more success for the sperm (more likely to reach an egg)? \_\_\_\_\_ Support your answer.

6. Place an X in either internal or external based on what you have learned so far.

Animal	Number of zygotes produced	Fertilization	
		Internal	External
Blue Fish	15,000		
Chameleon	8		
Leech	60		
Lobster	8,500		
Rainbow trout	4,000		
Crayfish	40		
Lizard	10		
Cow	1		
Blue Crab	950,000		

**Part II: Internal vs. External Development**

Development of the embryo after internal fertilization can happen in one of two ways. In some animal species, the females will actually lay the fertilized egg and the embryo will develop outside of her body. In other animals, the embryo will implant in to the uterus and the embryo will develop inside of the female.

**Directions:**

Analyze table 2 below. Using this information and your knowledge of these animal species, complete questions 7 – 13.

Table 2: Reproduction in Various Animal Species with Internal Fertilization

Animal	Where an animal lives	Number of fertilized eggs (zygotes) produced	Parental Care		Number of Offspring that survive for at least 1 year
			Yes	No	
Horse	land	1	X		1
Spider	land	100	X		20
Tiger Salamander	land	100		X	8
Garter Snake	land	35	X		3
Falcon	land	5	X		2

**Questions:**

7. Fill in the table below by placing the names of the organisms from table 2 in the correct columns.

**\*\*If number of zygotes produced is greater than 50, external development occurred. \*\***

Lives on Land	
Development	
Internal	External

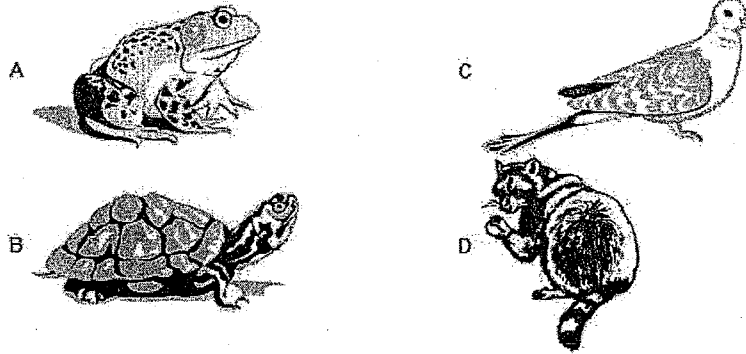
8. Hypothesize why species with more than 40 zygotes all have external development.
9. When animals provide parental care do they have many or a few offspring? \_\_\_\_\_  
Hypothesize why this occurs.
10. Which two animals produce the same number of zygotes?
11. Even though the species in question #10 produce the same number of zygotes, they do not have the same number of offspring that survive for at least 1 year. Explain why this difference in survival rates occurs.
12. A black bear had 12 babies and 7 survived. Did the bear provide parental care? \_\_\_\_\_
13. A centipede had 10,000 babies and 46 survived. Did it provide parental care? \_\_\_\_\_
14. Place an X in either internal or external development.

Animal	Number of zygotes produced	Development	
		Internal	External
Tarantula	100		
Cow	1		
Ape	1		
Robin	3		
Guppies	40		

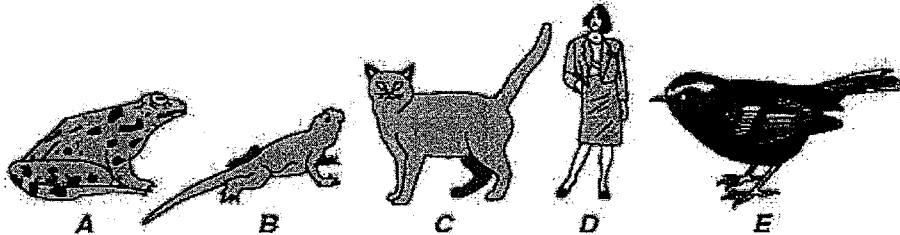
### Part III: Practice Regents Questions

1. Which type of fertilization and development is exhibited by birds and many reptiles?
- (1) Internal fertilization and external development
  - (2) Internal fertilization and internal development
  - (3) External fertilization and external development
  - (4) External fertilization and external development
2. Compared to animals that carry on internal fertilization, animals that carry on external fertilization usually
- (1) Produce fewer eggs
  - (2) Reproduce in water
  - (3) Display more parental care
  - (4) Reproduce on land

Use the diagrams below to answer questions 3 - 5.



3. Which diagram represents a type of organism that uses external fertilization for the production of offspring?  
 (1) A                                      (2) B                                      (3) C                                      (4) D
4. Which type of fertilization does organism D carry out? \_\_\_\_\_ Support your answer.
5. Which organism would:  
 (A) Produce the most female gametes \_\_\_\_\_ Support your answer.  
 (B) Produce the least female gametes \_\_\_\_\_ Support your answer.
6. The production of large numbers of eggs is necessary to insure the survival of most  
 (1) Molds                                      (2) Mammals                                      (3) Fish                                      (4) Yeasts
7. Examine the diagrams below.



Which organism(s) have the characteristics listed below?

Number of eggs produced per year...	greater than 500
Amount of parental care.....	none
Environment for deposited eggs.....	aquatic
Type of fertilization.....	external
Type of development.....	external

- (1) A, only                                      (2) C, only                                      (3) A and E                                      (4) D and E

8. Most organisms that live on land have adaptations for
  - (1) Internal fertilization and external development
  - (2) Internal fertilization and internal development
  - (3) External fertilization and external development
  - (4) External fertilization and external development
  
9. Which characteristic of sexual reproduction has specifically favored the survival of animals that live on land?
  - (1) Fusion of gametes in the outside environment
  - (2) Male gametes that may be carried by the wind
  - (3) Fertilization within the body of the female
  - (4) Female gametes that develop within ovaries