Review important information

1. What are the two key cellular processes involved in sexual reproduction?
2. What are the key steps of spermatogenesis?
3. What are the main hormonal processes involved in spermatogenesis?
4. What are the key steps of oogenesis?
5. What is ovulation?
6. How does fertilization occur in humans?
7. Explain how sperm and egg can fuse.
8. Explain the biochemical mechanism that prevents more than one sperm to fertilize the egg.
9. What experimental evidence do we have for the second-male advantage?
10. Explain how embryo development begins.
11. What do we call ovarian cycle and menstruation cycle? How are these two cycles coordinated?
12. What is viviparity? How is the fetus nourished in viviparous species?
13. What is ovoviviparity? What do you know about the evolution of oviparity and ovoviviparity?
14. What are the alternatives to sex for animal reproduction?
15. What is a remarkable feature of reproduction in Daphnia?
16. What do we call the ‘two-fold cost of ales’ and what is the ‘paradox of sex’?
17. Explain the ‘purifying selection hypothesis’ for the evolution of sex.
18. Explain the ‘changing environment hypothesis’ for the evolution of sex.

Test your knowledge

Q1. Primary oocytes form within _____. As a follicle cell grows and matures (~14 days), a primary oocyte undergoes _____. The resulting _____ is expelled from the _____ and then travels down the _____. The ruptured follicle becomes _____ and undergoes degradation (~14 days). _____ occurs only if the ovulated cell is actually fertilized.

A. corpus luteum
B. meiosis II
C. secondary oocyte
D. ovary
E. follicle cells
F. oviduct
G. meiosis I

Q2. In many animal species, females mate with more than one male before fertilization occurs. As a result, sperm from different males _____ with each other to fertilize the eggs. In insect and some other animal groups, there is a _____: sperm from the second copulating male physically
dislodges sperm from the first. In a wide variety of animals in which _____ occurs, this generates a _____ males with extraordinarily large testes which produce more sperm. But _____ may also take place: choosing the male copulating _____, or _____ from undesirable males.
A. last
B. storing sperm
C. selection pressure for
D. selection pressure against
E. ejecting sperm
F. compete
G. multiple mating
H. “second-male advantage”

Q3. During pregnancy in humans, a mother’s _____ and _____ increases by up to ___. Maternal and fetal blood _____ mix in _____; maternal _____ empty in space at junction of maternal and fetal portions in placenta. This space is packed with ______. Thus, a large surface area of the fetal circulatory system is bathed with ______.
A. arteries
B. do not
C. total blood volume
D. highly oxygenated maternal blood
E. cardiac output
F. placenta
G. 20%
H. 50%
I. villi of fetal blood vessels

Q4. Many animals reproduce _____, and when sexual reproduction occurs, it is not always ______. For example, Daphnia can _____ from asexual to sexual when environmental conditions ______. The evolution of sex raises a _____: the ______. This theoretical _____ to asexuals is likely to be reduced by (1) the cost of _____ in asexuals, and (2) the benefit of producing _____ offspring when the _____ across generations.
A. deteriorate
B. environment changes
C. obligate
D. numerical advantage
E. deleterious mutations
F. improve
G. two-fold cost of males
H. asexually
I. paradox
J. genetically diverse
K. switch