

ASC 200  
EVOLUTION: THE IDEA THAT SHOCKED THE  
WORLD

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WEEK 6  
EYE EVOLUTION

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Go to the website:

[http://evolution.berkeley.edu/evolibrary/article/1\\_0\\_0/eyes\\_01](http://evolution.berkeley.edu/evolibrary/article/1_0_0/eyes_01)

Work through the screens and answer the questions as you go.

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DIVERSE EYES

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1. What function do simple light gathering pigment cells serve for organisms that currently have them?
  
  2. What would be the advantage to a tubellarian worm to be able to sense light?
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SIDE TRIP: HOW YOUR EYE WORKS

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3. What features of human eyes do we share with more primitive vertebrates such as fish? Why does it cause problems for humans?
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INTRODUCING THE VISIONARIES  
FINDING HOMOLOGIES

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Read through Introducing the Visionaries and Finding Homologies.

4. Click on each organism to view information about their eyes. Fill in the table on the next page as you go. Leave the gene information until later.

<b>Evolution of Eyes</b>					
	<b>Squid</b>	<b>Flat worms</b>	<b>Mouse</b>	<b>Flies</b>	<b>Sharks</b>
<b>How do they use their eyes?</b>					
<b>Eye Position</b>					
<b>Composition of the eye</b>					
<b>Development</b>					
<b>Gene involved in eye formation</b>					

5. Based on your table, take the quiz. Which eyes are homologous?

6. Which eyes are analogous?

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**MAPPING THE EYES ON THE TREE**

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7. What do genes do?

8. How do genes control other genes to build complex structures like eyes?
9. What is the name of the control gene involved in eye development? What kind of gene is it?

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### SURPRISINGLY SIMILAR

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10. How similar is the DNA sequence of the eye control genes (HOX genes) in flies and mice?
11. How similar are the proteins made by the eye control gene in flies and mice?
12. What is the relationship between the eyeless gene in flies, the pax6 gene in mice and the Aniridia gene in humans?
13. What do these genes tell the organism to do?

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### HOMOLOGOUS GENES

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Go back to your table. Add information about the genes to your table.

14. Are the genes for the formation of eyes homologous or analogous? What is the evidence that supports your answer?

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**EVOLVING TWO EYES WITH ONE GENE & HOMOLOGIES AT  
DIFFERENT LEVELS**

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15. Read through the material. Write a paragraph explaining how eye development in these animals can contain both homologous and analogous components.

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**TAKE A SIDE TRIP: EVOLVING COMPLEXITY**

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16. Identify how natural selection could favor steps in the evolution of a complex structure, such as the eye.

17. Do we have examples of living organisms that still survive with some of these "intermediate forms"? Give an example.