

TITLE OF LESSON

Biology Unit 1 Lesson 33 – Gene Regulation in Bacteria and Eukaryotes
How do cells control what's on the inside and outside of a cell?

TIME ESTIMATE FOR THIS LESSON

One class period

ALIGNMENT WITH STANDARDS

California – Biol CB 1; G4, & G5

MATERIALS

Use material from Biology web site (Essential Cell Biology by Alberts et.al. 1998 has wonderful images as well. See fig 8-17, p. 258, fig. 8-21 p. 261, and fig. 8-26 p. 267) to show images of control

Venn Diagram – Student Page

Teacher's Notes Lesson 33 – Teacher Page

LESSON OBJECTIVES

- To learn about regulation of genes in prokaryotes and eukaryotes
 - To learn about negative and positive control of genes
 - To learn the regulatory units that contribute to gene control
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EXPLANATION OF LESSON

The function of the lesson is to present gene regulation in prokaryotes and eukaryotes, and to have the students understand the importance of regulation in a cell. The students should be incorporating what they have learned about the flow of information from DNA to mRNA to proteins, and then be thinking about how the cell must control the information in order to control which proteins are formed in a cell. Make sure you have photocopied a **Blank Venn Diagram** for each student prior to class.

FOCUS AND MOTIVATE STUDENTS – WARM-UP ACTIVITY

- 1) **Goal Setting** – Hand back all Evaluation Essays. Ask students to look at the grade they earned and compare it to the grade they were striving for. On a separate sheet of paper, ask them to write out what they will do differently next time to get the grade they want. Collect these. Have them place their Evaluation Essay #1 in their **Portfolios**. Remind them that they will be turning in their binders again for a grade in Lesson 30. So they should be organizing their binders now and making sure they have all assignments in the correct section, according to date.
 - 2) **Agenda** – Have students copy the agenda you posted.
 - 3) **Class Definition** – Write Gene Control on the board. Ask the class what it is. Quickly get a good definition of what gene control means.
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ACTIVITIES – INDIVIDUAL AND GROUP

1. Compare/Contrast – Then hand out a blank **Venn Diagram** to each student. Ask them to title it Gene Control. On the left side write positive control and on the right side write negative control. Have students brainstorm what is similar between the two systems and place the ideas in the space where the two circles connect. Then ask them to brainstorm ideas that are only positive and place them in the positive circle. Finally, have them list all of the qualities that only go with negative control and place them in the circle under negative control. Give them five minutes for the exercise.

2. Group **Venn Diagram** – In their groups, have them share their Venn Diagrams, adding to their individual diagrams any ideas their group mates had that they did not have. (5 minutes)
 3. Present – Call on one student from each group to share their group’s answers with the class. The rest of the students should be writing down any ideas that they did not have. Collect their **Venn Diagrams**.
 4. Questions – Afterwards, ask the students to work in groups to answer the following questions: A) Why do you think cells need to regulate their genes? B) Why can’t they just let them continuously form messages that get translated into proteins? C) What happens when the regulation fails? Give students five minutes and then have them report back to the class. Collect their answers.
 5. Display Images – Have images of available of positive and negative gene regulation in bacteria and regulatory units in eukaryotes. These images can be found in your textbooks or the biology web site <http://gened.emc.maricopa.edu/Bio/BIO181/BIOBK/BioBookPROTSYn.html>
 6. Lecture – Present the key points from **Teacher’s Notes Lesson 33**. Have the assigned student take notes at the overhead, while the others take notes in their binders. Remind them to underline any new vocabulary they encounter.
 7. **Applaud/ Critique** the note taker.
 8. **Binders** – Have students organize their binders.
 9. Homework Review.
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HOMEWORK

- 1) Read Starr’s textbook *Biology Concepts and Applications*, chapter 14, pp. 212-221. If you are using another text have the students read about gene control in prokaryotes and eukaryotes. In prokaryotes they should read about negative and positive control of transcription. In eukaryotes they should read about the control of single genes. Write out 2 key ideas that you disagree with. Using any evidence you can find from your lecture notes or other readings, explain why you disagree.
 - 2) Finish organizing your binder.
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GROUP ROLES

None

DOCUMENTATION FOR PORTFOLIO

Lab Report #1
Method – Photoshop Image
Lab Report #2
Evaluation Essay #1
Method 2 – Photoshop Image