

Teacher's Guide

Chemical & Human Health Website

Environmental Tobacco Smoke and Lung Development Activity

1. Pre-activity discussion session - discuss the scientific method with the students and introduce the terms: hypothesis, methods, data collection, and interpretation of results.
2. Tell the students that they will be doing an Internet activity based on a real experiment that took place at the University of Arizona.
3. Have the students go to the Chemical & Human Health website at www.biology.arizona.edu and select the Environmental Tobacco Smoke and Lung Development Activity.
4. Hand out the accompanying worksheet to the students and have them answer the questions as they go through the activity. Tell them you will be discussing this activity with them later.
5. Answers to questions & points per question in parenthesis:

1. What is the hypothesis for this experiment? **(1)**

exposure to cigarette smoke while pregnant and after birth will result in changes in lung growth and development

2. Methods:

- a. What is the control group? **(1)**

The group of mice that were not exposed to the environmental tobacco smoke (ETS).

- b. What is the experimental group? **(1)**

The group of mice that were exposed to the ETS.

- c. What was the exposure frequency? **(2)**

1 hour per day, 5 days per week until the birth of the pups. After birth the pups were exposed to ETS for 1 hour per day, 5 days per week for 3 weeks.

- d. Why do you think the mice were exposed to the tobacco smoke before and after they were born? (refer back to the Lung Toxicology Activity) **(1)**

Because the lungs are developing both while in the womb and in infancy

e. Is this an acute or chronic exposure? Explain why. (2)

This is a chronic exposure because the exposure occurs over a longer period of time with smaller doses.

3. This activity is based on a real experiment done at the University of Arizona. But, what are two differences between this activity and the real experiment? (2)

1. We analyze only 6 samples rather than 120.

2. In a real-world experiment, a scientist would collect the counting data without knowing whether the slide is from a control or experimental animal. This helps to prevent unconscious bias from occurring.

4. What was the mean (or average) of your control group and your experimental group? (2)

This will vary some, but ~ 13 for the control and 6 for the experimental group

5. Does your result support your hypothesis? Describe your interpretation of the data. (3)

Yes.

The experimental group have less septa than the controls. This means that ETS exposed animals have less surface area in their lungs and probably a reduced capability for gas exchange.

6. What was the result of the complete experiment? (1)

They found that the experimental group had 20% less septa than the control group.

7. Your opinion: Does this result mean anything to you personally? Do you think this type of research is useful? Why or why not. (3)

Answers will vary.

NAME: _____

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www.biology.arizona.edu/chh

1. What is the hypothesis for this experiment?

2. Methods:
 - a. What is the control group?

 - b. What is the experimental group?

 - c. What was the exposure frequency?

 - d. Is this an acute or chronic exposure? Explain why.

 - e. Why do you think the mice were exposed to the tobacco smoke before and after they were born? (refer back to the Lung Toxicology Activity)

3. This activity is based on a real experiment done at the University of Arizona. But, what are two differences between this activity and the real experiment?

4. What was the mean (or average) of your control group and your experimental group?

5. Does your result support your hypothesis (yes or no)? Describe your interpretation of the data.

6. What was the result of the complete experiment?

7. Your opinion: Does this result mean anything to you personally? Do you think this type of research is useful? Why or why not (you can write on the back)