



## Old Cell Phones

Activity M.x

GRADE LEVELS: Middle School

OBJECTIVE: To raise student awareness that cell telephones create a disposal problem in terms of toxic materials and large quantity.

VOCABULARY: Toxic

TIME: 30 minutes for class discussion, 45 minutes for Web quest, 15 minutes wrap up discussion.

MATERIALS: Old cell phone, Cell Phone Web Quest Worksheet.

PROCEDURE:

Large Group Discussion:

How many of you have a cell phone?

How many people in your family carry a cell phone?

How many cell phones have you owned during the last five years?

When you got a new cell phone what did you do with the old one?

Small Group Discussion:

What are potential problems of disposing of a cell phone?

How many cell phones are retired each year in the USA?

What can you do with a cell phone after you retire it?

Large Group Report:

Student(s) or teacher lists on the board answers to the three small group questions.

Class goes over the lists.

Web Quest:

Students takes the "Cell Phone Web Quest" to the computer lab or library to find answers to their questions.

Wrap up discussion:

Students present findings from Web quest and inform one another where they can donate or recycle a used cell phone in their community or where they can send a used cell phone for reuse. How can you reduce the number of cell phones you need to donate or recycle over your lifetime?

Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Period: \_\_\_\_\_

### Cell Phone Web Quest

The cell phone that you carry in your pocket or purse looks quite innocent. It is convenient and fun to use. Unfortunately, the circuitry, batteries, and liquid crystal displays can contain toxic materials like arsenic, beryllium, cadmium, copper, and lead. So what is the problem with that?

1. Visit the U.S. Environmental Protection Agency Web site on recycling (<http://www.epa.gov/epaoswer/hazwaste/recycle/ecycling/faq.htm>) to learn the effects of toxic materials found in a cell phone. Fill in the chart below.

Toxic Material	Where is it in cell phone?	What is the effect of human health
Cadmium		
Lead		
Mercury		
Hexavalent Chromium (Chromium IV)		
Brominated Flame Retardants		

2. What would happen to the above toxic materials if a cell phone was thrown in the trash and incinerated?

3. Is there a problem with that?

4. What would happen to the above toxic materials if a cell phone was thrown on a trash heap in the backyard and stayed there for years?

5. What could be contaminated? Is there a problem with that?

6. How many cell phones are retired each year?  
(Visit <http://www.epa.gov/epaoswer/hazwaste/recycle/ecycling/>)

7. How large is the disposal problem?

8. Use a search engine, such as Google or Ask Jeeves to answer this question, What can you do with a cell phone besides throw it away?

EXTENSION:

9. Ask one question about disposal of electronic (e.g., cell phones, computers, televisions).  
Write the questions here.

10. What search engine could you use to answer this question?

11. What key words will you use?

12. Research your question and answer it here.

Name: \_\_\_\_\_ **Key** \_\_\_\_\_  
 Date: \_\_\_\_\_ Period: \_\_\_\_\_

**Answer Key: Cell Phone Web Quest**

The cell phone that you carry in your pocket or purse looks quite innocent. It is convenient and fun to use. Unfortunately, the circuitry, batteries, and liquid crystal displays can contain toxic materials like arsenic, beryllium, cadmium, copper, and lead. So what is the problem with that?

1. Visit the U.S. Environmental Protection Agency Web site on recycling (<http://www.epa.gov/epaoswer/hazwaste/recycle/ecycling/faq.htm>) to learn the effects of toxic materials found in a cell phone. Fill in the chart below.

Toxic Material	Where is it in cell phone?	What is the effect of human health
Cadmium	found in chip resistors, infrared detectors, and semiconductors	Cadmium can accumulate in, and negatively impact, the kidneys. Cadmium is persistent, bioaccumulative, and toxic.
Lead	found in glass panels in the display monitors and in lead soldering of printed circuit boards	Lead can cause damage to the central and peripheral nervous systems, blood systems, and kidneys in humans. Lead has also been shown to have negative effects on the development of childrens' brains.
Mercury	found in relays and switches (e.g., on printed circuit boards), and batteries	mercury can cause brain damage.
Hexavalent Chromium (Chromium IV)	steel plates	can damage DNA and has been linked to asthmatic bronchitis
Brominated Flame Retardants	found on printed circuit boards, components such as plastic covers	might act as an endocrine disrupter and may increase cancer risk to the of the digestive and lymph systems

2. What would happen to the above toxic materials if a cell phone was thrown in the trash and incinerated?

The toxic materials in the cell phone would be released into the air and found in the ashes.

3. Is there a problem with that?

Yes, these toxic chemicals will be in the environment where people may breathe them in or they may enter the food chain, depending where the ashes are disposed of.

4. What would happen to the above toxic materials if a cell phone was thrown on a trash heap in the backyard and stayed there for years?

The toxic materials could leach out and contaminate something

5. What could be contaminated? Is there a problem with that?

The soil and water. From there the toxic materials could enter the food chain.

6. How many cell phones are retired each year?  
(Visit <http://www.epa.gov/epaoswer/hazwaste/recycle/ecycling/>)

130 million

7. How large is the disposal problem?

Large

8. Use a search engine, such as Google or Ask Jeeves to answer this question, What can you do with a cell phone besides throw it away?

Reuse, such as donating it to a charity so someone else can use it.  
Recycle.

EXTENSION:

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