

# Pet Tech

## Activity 1: Grades 5-8 Locating Landmines

In [The Dog Nose Knows](#), you learned that millions of land mines have been buried all over the world. Since these small explosive devices are usually plastic, metal detectors cannot locate them. Instead, they are uncovered by using either a ground poking method, by employing animals, or by using devices that can detect the characteristic odors associated with their components, such as DNT (dinitrotoluene).



### MODELING THE DIFFICULTIES

Have you ever played the game "Operation"? If so, you know that this game challenged your dexterity as you manipulated metal tongs to remove target organs. If your tongs touched the conductive sides of a well, an alarm went off signaling an unsuccessful operation. In this activity, your dexterity will once again be challenged. This time, however, you'll use a metallic probe to uncover the location of a target that represents a buried land mine.

### OBJECTIVE

This activity page will offer:

- An experience in electric circuit construction
- Appreciation in the difficulty in uncovering model land mines
- A dexterity challenge

### MATERIALS

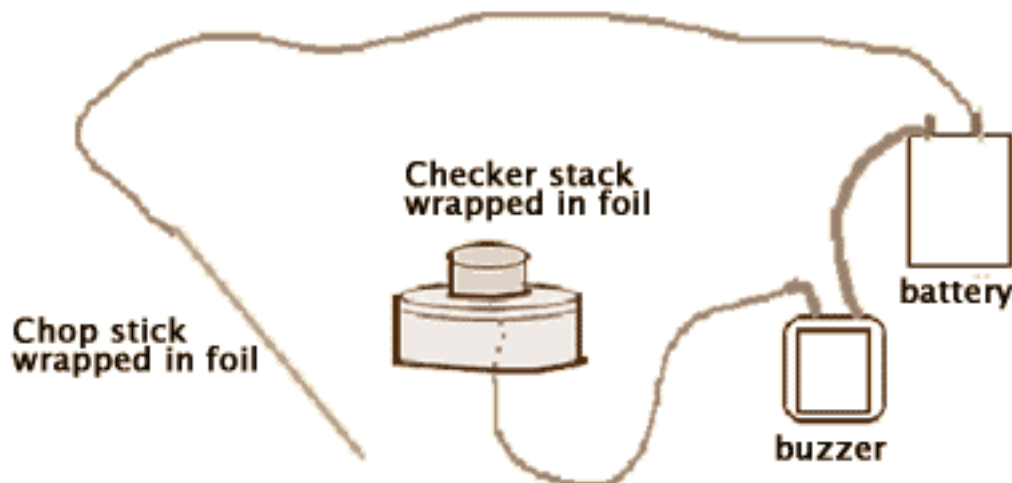
- Wire
- Battery
- Aluminum foil
- Buzzer
- Plastic food container (low sides, with cover)
- Push pin
- Four checkers

- Wooden chop stick
- Tape
- Access to outdoor field that has an area of loose soil\*

\*The activity can also be performed indoors using a large basin and clean, loose soil.

## **Part 1- Building the Model Mine PROCEDURE**

1. Work with a partner. Use a pushpin to punch a hole in the cover and bottom of the plastic food container.
2. Wrap a stack of four checkers in aluminum foil. Secure the stack with tape. Attach a 3-ft. length of wire to the bottom end of the checker stack and pass this wire through the hole in both the cover and container bottom as shown here. The checker will represent the triggering mechanism of the land mine.
3. Wrap the chopstick in aluminum foil. Attach another 3-foot length of wire to the chopstick. Connect this wire to a lantern battery and use another wire to attach the battery to a buzzer. The other buzzer terminal must be connected to the wire that comes off the land mine trigger. Here's what the setup will look like (SEE DIAGRAM).
4. Test the circuit. When the aluminum foil on the chopstick and checker stack makes contact, the buzzer should sound.

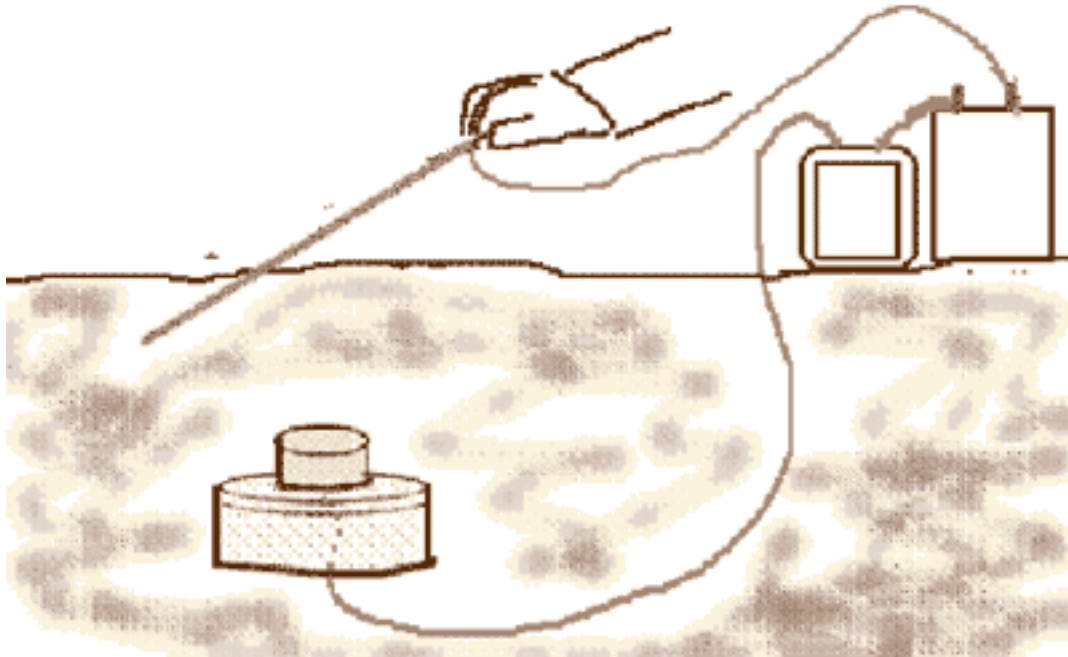


## **Part 2- Burying the Model**

1. If you are performing this activity outside, make sure that the material in which you'll bury the mine is clean and free of debris. You'll also need to loosen the soil so that the mine can be buried and the substrate easily probed.
2. With your partner looking away, place the mine about 6 inches below

the soil with the trigger mechanism facing upwards. Bury most of the wire at this depth and let it emerge about two feet from the mine (masking clues to the mine's location). (See Diagram)

3. If you are performing this activity inside, you'll need to fill a large tub or container halfway with loose soil. Place your mine in the soil - then cover it up with more loose soil. Again, keep the wire buried so that the mine's exact location remains hidden.



### **PART 3- The Challenge**

1. Have your partner try to locate the mine using the aluminum wrapped probe without activating the buzzer. Try mimicking the side-probing method used by Alan in the program. If the buzzer sounds, the "mine" has been triggered. Once the mine has been safely located, your partner should carefully remove it from the ground.
2. Switch roles and repeat the activity.

### **ANALYSIS**

Did you find the mine difficult or easy to locate? What techniques help in locating the explosive without setting it off? Put yourself in the role of people who actually look for real landmines. What types of skills would they need to complete this work?

### **A VALUE JUDGEMENT**

Even for a dog, the removal of land mines is a dangerous operation. If the animal unknowingly steps on a mine or pulls a trip cord, a deadly explosion

can occur. Think about it. Do you think that training dogs to sniff and locate land mines is an animal rights violation or is it a fair use of animals? How important is a dog's well being when weighed against a human's?

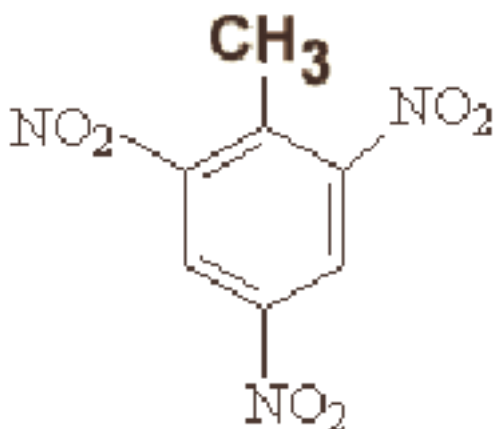
## **BECOMING INVOLVED**

Imagine if your neighborhood was mined with buried explosive devices. How might that change your life? Think about the problems associated with the more than one million landmines that have been buried throughout the world. Talk with your teacher and discuss ways that you and your class might become active in addressing this problem. Identify and contact local, national, and international organizations. Find out what you can do!

HINT: for more information, visit the Web Connection below, or the Resources page for this show

## **MOLECULE CONSTRUCTION**

Here's an illustration that represents the molecular structure of TNT (trinitrotoluene). Can you build it using gumdrops and toothpicks? Remember that a carbon atom is positioned at each of the intersections of the carbon ring structure. Think about it. How does this structure differ from that of DNT, dinitrotoluene?



**2,4,6- trinitrotoluene**

## **WEB CONNECTION**

**The International Red Cross site on landmines**

<http://www.icrc.org/eng/mines>

**International Campaign to Ban Landmines**

<http://www.icbl.org/>

For more Web links on this topic - visit our Resources Section  
<http://www.pbs.org/saf/1201/resources/resources-1.htm>.

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