

# THE CASE OF THE MISSING COMPUTER CHIP

(IT'S PLUM CRAZY TO STEAL FROM US)

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## Teacher Directions

The activity uses a simulation of a crime scene to help illustrate several principles of the nature of science. The participants are divided into groups of no less than three or more than five. Each team is then presented with an envelope containing: a) an introductory sheet b) a diagram of the crime scene, and c) 14 clues.

After reading the introductory sheet and looking at the diagram, each team draws five of the clues from the envelope, at random. Using the information at hand they attempt to solve the crime by organizing the evidence in various ways that may lead them to a tentative hypothesis.

After a team feels they have exhausted their ideas with these clues, more evidence can be uncovered. Each team may then draw three more clues and begins the process anew. Observe groups for insights as to how the new information affects their old predictions. Once again, allow each group to work until they have exhausted their individual lines of thought, but do not discourage minority opinions.

Each team should then draw three more cards and proceed as before, but after a few moments groups should be encouraged to collaborate. After a time allow them to draw the final three clues and continue until there is some general agreement, always allowing for minority opinions.

**Discussion** This exercise is designed to help explain the idea that science is built on evidence that can be observed or deduced from the physical world. This exercise helps explain the concept that it is the nature of science to explain events as having natural causes. This evidence is often confusing, seemingly conflicting, and apparently random. Scientists, then, hope to be able to find more than one line of evidence to help them solve a problem. They would like to integrate this evidence into the larger framework of evidence that is already part of the knowledge base and make connections in new and different ways that may allow new and different ways of looking at a problem.

In the game there are several independent types of clues that may be used to develop a solution. This component of the game is used to illustrate the concept that scientists use a variety of criteria to compare explanations and select the better ones. This is one of the major objectives of the exercise. Another important aspect of science is the ability to connect disparate lines of evidence to form a new hypothesis. Hopefully, the game players will see that with new evidence comes new ways of connecting the clues. Evidence in science, and in this simulation is not all of equal value. In the simulation, the value of each clue is affected by the order in which it comes, and by the relative importance placed upon it by the various group members. Individuals with strongly held opinions or with strong personalities may have a major effect on the currently held opinions, even though their reasoning may not be clear. This aspect of the game best illustrates that human values deeply influence science, its terminology, the questions asked, and the criteria used for choosing among theories. Good science must also provide ways to exclude some alternatives for the larger universe of possible solutions. This may be illustrated by the combination of clues that seem to remove certain characters from suspicion, e.g. lack of motive, opportunity, etc.

Another important aspect of the game is that it is open ended. There is not enough information presented to say with certainty who the thief is and each clue may often create more questions than it helps answer. This is a dynamic aspect of both the game and science.

Finally, this is a simulation that encourages participants to equate the solving of the crime and seeking of justice with the search for scientific truth. Good science, just as good law, must be integrated into a larger cognitive framework.

**THE 14 CLUES: On separate sheet. Make enough copies so that there will be one set per team. For each set, cut the clues apart, mix them up, and put them in an envelope. Repeat for each set.**

## THE 14 CLUES

Doug, the man who operates the coffee cart in the parking lot (see map) reports that he has not seen any strangers today. In fact, this is what he reports: "I saw the security guard arrive at 7:00 for the shift change, same time as Cowboy Paul's delivery truck. The security guards came out playing with those night sticks and the Cowboy was listening to that 'Hillbilly' music on his headphones, when they came out for a cup of coffee."

According to Coffee Cart Doug, the lab assistant, Ginny, "arrived at 7:15, turned the lights on in the office for about 5 minutes, just like always. And then about 7:50, the lights came on and I could see Ginny working in the lab."

Coffee Cart Doug reports: "About 7:30, the lights came on again in the lab for about 5 minutes. They have those motion sensor lights, you know."

Coffee Cart Doug reports: "Then at 8:00 the loading crew arrived and started unloading Cowboy Paul's delivery truck."

Coffee Cart Doug reports: "Nobody else came or left till Randak arrived at 8:50 which was actually early for him. Couple minutes later the police arrived."

Ginny reports: "I got to work at the usual time and opened the office just before 8:00. Nothing unusual happened."

Security Guard Jim's statement: "My shift starts at 7:00; I had a cup of coffee with Cowboy Paul and Buck, the night guy; then I did my rounds and found everything was secure."

Cowboy Paul's statement: "I arrived about 7:00 a.m., had coffee with the security guards and waited for the loading crew to unload my trailer. I was just about to leave when the alarm went off and I got locked in. "

MOTIVE: Cowboy Paul: Seems to live beyond his means according to security guard; drives Porsche and wears Rolex watch. Owns three Kentucky thoroughbred race horses. But he still loves Levis. He needs money.

MOTIVE: Security Guard Jim: 'Hacker'; wants to be the first on his block to have new stuff.

MOTIVE : Ginny Fletcher: Actually developed algorithm for this computer chip and has received no financial or professional recognition for her contribution. She feels shortchanged.

EVIDENCE: Fingerprints: In the lab a single partially smudged print was found and since all employees have prints on file, it was easily ascertained it belonged to persons unknown.

EVIDENCE: Fiber Evidence: A small thread that was later identified by the police as denim was found by Randak when he microscopically examined the chip to verify it as his missing chip. Also found were small white crystals of sugar.

EVIDENCE: Misc. Evidence: The door to the private lab is secured by a tone lock. Known access is limited to president and assistant.