



WHAT'S HIDDEN INSIDE?

Student Section _____

Student Name _____

Lesson Objective

In this lesson, you will gather information about items you cannot see, using limited senses.

During this lesson, you will

- gather data through observations using your senses.
- make inferences about hidden items based upon your data collected.
- develop a conclusion based upon the results of this activity.

Problem

How can I determine what's hidden inside the bag?

Observation

Why should robots travel places before people? Robots can be programmed to do amazing things, but they can only do what they have been programmed to do. Robots, sometimes called uncrewed space probes, are tools for astronauts and scientists to safely gather information about the planets and moons.

Robots become a human's virtual eyes and ears in new places. They can observe from a distance. Some robots land, explore, and gather samples for close inspections. They search for sites for human landing and look for needed resources. Working together, astronauts and robots may make human space exploration more efficient.

In this activity, you will try to identify what's been hidden inside a bag. Similar to robotic exploration, you will use limited senses to predict what's inside the bag.

Use the first column of this KWL chart to organize your observations about robotic exploration.

Brainstorm with your group what you want to know about robotic exploration, then list in the second column of this KWL chart.

KNOW	WANT TO KNOW	LEARNED

9. Based on data gathered in your data chart, make your final prediction about the item inside the bag. Be as detailed as possible. Record this final prediction on your Hidden Objects Data Sheet.
10. Open the bag to see what's inside. Is it what you predicted? Record the actual item on your Hidden Objects Data Sheet.
11. After recording all data, study the data and draw conclusions by answering the questions following the Hidden Objects Data Sheet.

Record Data

Hidden Objects Data Sheet

Brainstorm Properties

The property I want to explore...	What I did to the bag...	What I discovered...	Predict what's inside the bag...

Extended Touch

What I discovered...	Predict what is in the bag...

New Properties (from other groups)

The property I want to explore...	What I did to the bag...	What I discovered...	Predict what is in the bag...

Clues

	Record the clue	My prediction
Clue # 1		
Clue # 2		

Final Prediction:	
Actual:	

Study Data

1. The more data collected from probes sent to other places, the more we know about those distant places, making travel to them easier for humans. As you collected more data and recorded it on your data sheet, did your prediction about what was hidden inside the bag change?
2. Your senses were like tools, gathering information about the properties of what was hidden inside the bag. Which “tools” gave you the best information or clues to what was inside the bag? Why?
3. Describe and sketch the environment that your item inside the bag came from.
4. Does this data support your hypothesis? Why or why not?
5. How do robots and humans work as a team? How will this teamwork help us in our quest for space exploration?

Conclusion

- Update the LEARNED column in your KWL chart.
- Restate your hypothesis and explain what happened during testing.