

Dear Families,

Get ready for some stealthy science!

Your learner is entering the covert world of spies to explore science skills! Cracking codes and sneaky surveillance provides the perfect context to practice thinking critically. Science is more than just facts and calculations. Science is really a set of skills that helps a learner to figure out the world around them. While the *Science of Spies* activities center on the world of spies and explore concepts in physics and math, more than anything, they are a fun way to practice scientific thinking.



To engage with your learners and learn about their day, you can ask them the following questions after each *Science of Spies* activity:

- *Did you make observations today?*
 - *Which of your senses did you use to gather information?*
- *Did you send any secret messages today?*
- *What codes did you use?*
- *How would I decode your message?*
- *Did you work with anyone else today?*
- *What did you and your fellow scientists discover?*
- *How were you like a scientist today?*
- *What did you and your fellow scientists discover?*
 - *Did you make observations?*
- *Did you ask questions and make predictions?*
- *Did you test an idea?*
- *Did you learn something new?*

Science of Spies @ Home Activities

Attached are activities related to *Science of Spies* that are easy to do at home! Try out any of these activities with your learners to engage them in further scientific thinking!

Invisible Ink

Materials: hairdryer, white paper, cotton swabs, lemon juice, grape juice, baking soda, vinegar, water

1. Think about invisible ink with your learner.

- *Have you heard of invisible ink before?*
- *What do you already know?*
- *If the ink is invisible, how does the person receiving the message read it?*

2. Use the cotton swabs to write with each invisible ink (lemon juice, vinegar, baking soda solution)

- To make the baking soda solution, add 3 tablespoons of baking soda to 3 tablespoons of water

3. Have your learner make observations about the invisible inks:

- *What did you notice about the inks as you were writing with them?*
- *Were any of them easier or harder to write with?*
- *What do you notice about them now that they have dried? Do they look different than they did while they were wet?*
- *Are any of them more "invisible" than the others?*
- *How do you think the person who would be getting the message would read these inks?*

4. Invisible inks can be revealed in different ways. They typically have to go through some sort of chemical or physical change to be able to be read. Something is usually added to the paper that has the secret message.

- Both the lemon and vinegar can be revealed by heat. Give your learner a chance to use the hair dryer to warm the paper and reveal the message.
- The baking soda ink is revealed when grape juice is swiped across it. Allow your learner to use a cotton swab dipped in grape juice to rub gently over the baking soda message.

5. Review the inks with your learner:

- *Which ink would you use to send secret messages? Why?*
- *Which is the easiest to use for the sender? Is it easy to use for the receiver?*

Travelling Sound

Materials: wire hanger without plastic coating, 4 feet of cotton string, pencil

- 1. Spies often need to gather evidence through sound: listening through a wall, using recording devices, or magnifying small sounds.**
 - *What are some sounds you hear right now?*
 - *How do you hear things that are close to you? What about things that are far away?*
 - *Can you think of any tools that help you to hear things better?*
- 2. Cut 2 lengths of string about 24 inches long. Tie a length of string to each bottom corner of the wire hanger.**
- 3. Have your learner hold a length of string in each hand. Wrap each string around a finger. The hanger should now be hanging upside down by the strings.**
- 4. Have your learner hold it away from their body while you tap the hanger with a pencil.**
 - *What do you hear?*
- 5. Now, have your learner put the fingers with the string in their ears and have their tap the hanger again.**
 - *What do you hear now?*
 - *Why do you think the sound changed?*
 - *How were the sounds different? What made the sounds different?*