Introduction to the ISLE approach

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Have you ever seen what happens to wet clothes left to dry on a winter day?



OALG 12.1.1 Observe and explain

Equipment: 90% isopropyl alcohol, strips of paper.

Dip a piece of paper in rubbing alcohol (or rub the paper with alcohol) and place it on a table. Observe what happens. Describe your observations in simple words. Note that you should observe the paper with rubbing alcohol for several minutes. Alternatively, you may view the experiment by watching the following video.

[https://mediaplayer.pearsoncmg.com/assets/ frames.true/sci-phys-egv2e-alg-12-1-1]

Describe your observations in simple words that a 5 year old can understand. Put your ideas on the slide.

Patterns that we found

How can we explain the "gradual" aspect of disappearance?

What are possible mechanisms that can explain HOW little parts disappeared?

Propose testing experiments to test those explanations

Testing experiments and predictions based on each explanation

| Experiment | Prediction based on Explanation 1 | Prediction based on Explanation 2 | Prediction based on Explanation 3 | Prediction based on Explanation 4 |
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Testing experiments and their outcomes

https://mediaplayer.pearsoncmg.com/assets/ frames.true/sci-phys-egv2e-alg-12-1-3a

https://mediaplayer.pearsoncmg.com/assets/ frames.true/sci-phys-egv2e-alg-12-1-3b

https://mediaplayer.pearsoncmg.com/assets/ frames.true/sci-phys-egv2e-alg-12-1-<u>3c</u> What can we say about the mechanisms responsible for the disappearance of the alcohol parts?

Imagine that somebody sprayed air freshener in a corner of the room. What do you think would happen next?

Graphical representations

Imagine that you have eyes that can see the particles of air in the room. Draw a picture representing the behavior of several particles as they move through the room. Think of their possible collisions and how the collisions will affect the directions of their motion and the magnitudes of their speeds.

What other questions can we ask about this phenomenon?

Returning to the need to know



The Investigative Science Learning Environment (ISLE) approach



Etkina and Van Heuvelen, 2001, 2007; Etkina, 2015

The Investigative Science Learning Environment (ISLE) approach



Etkina and Van Heuvelen, 2001, 2007; Etkina, 2015

The Investigative Science Learning Environment (ISLE) approach



Etkina and Van Heuvelen, 2001, 2007; Etkina, 2015;

https://docs.google.com/document/d/1EGJAPCHBIJGLLt7NS0B0WkimPbbFyf5225vFss1567s/edit?usp=sharing

What did you learn today and how does what you have learned helps you with your teaching?

Follow up activities

OALG 12.2.1 Observe and explain

Equipment: a balloon.

Blow up a balloon and carefully observe how its shape changes during the process. Use the idea of moving particles to explain why it expands when you blow air into it. Explain why the balloon does not expand any more when you stop blowing. Describe an experiment you can perform to test your explanation(s).

OALG 12.2.2 Test multiple explanations

In the experiment in the video [https://mediaplayer.pearsoncmg.com/assets/_frames.true/secs-egv2e-testing-themodel-of-moving-gas-particles-pushing-on-the-surface], a partially inflated (and tied) balloon will be placed in the bell-jar and the air will be removed by the vacuum pump. Use each of the ideas you came up with in Activity 12.2.1 to make predictions about what the balloon will do when the air is pumped out of the bell-jar (state one prediction for each idea being tested). Write down your predicted outcome(s). Then watch the experiment. Which of your predictions was consistent with the experimental outcome? What is your judgment on each of the ideas you were testing?