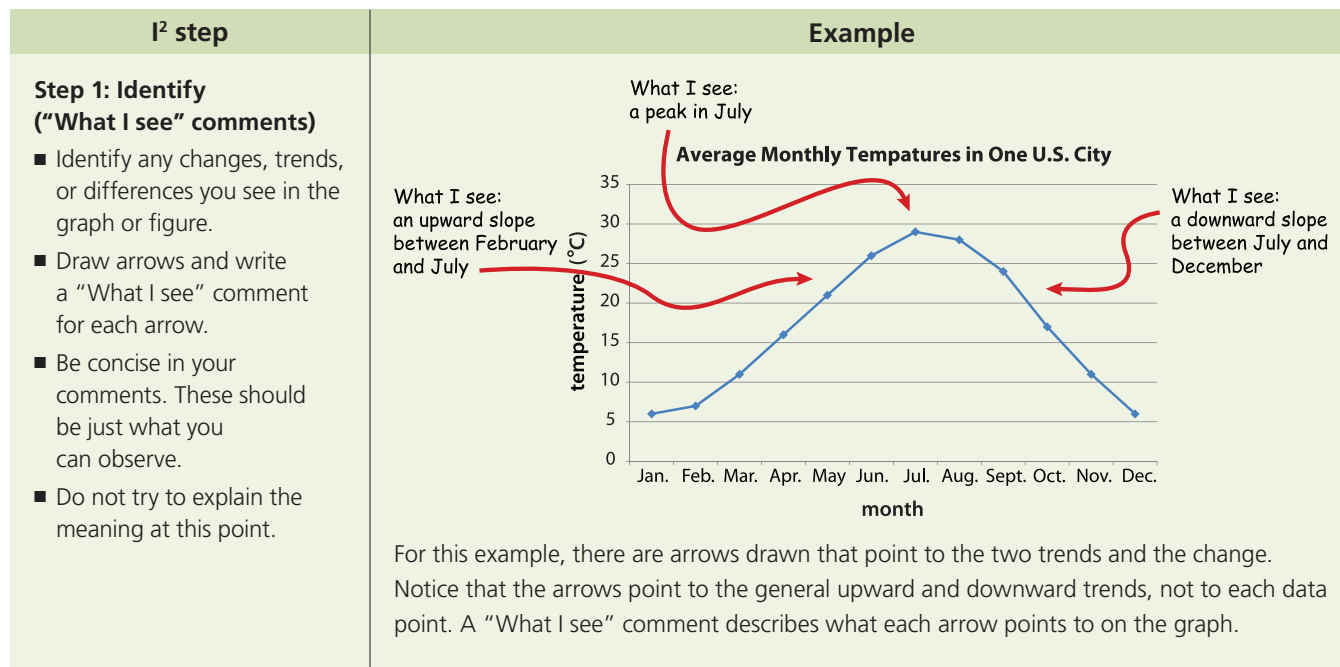


I Can Use the Identify and Interpret (I²) Strategy

Have you ever looked at a graph or figure and felt overwhelmed by it? Often there is a lot of information on graphs and in figures. The Identify and Interpret (I²) strategy helps you make sense of graphs, figures, sketches, and other ways to represent data. This strategy helps you break down the information into smaller parts. To do this, you first *identify* what you see in the graph or figure. Then you *interpret* each of those observations by deciding what they mean.

Once you have determined what the smaller parts of the graph or figure mean, you are ready to put all the information together. To do this, you write a *caption*. You have probably seen captions under figures in textbooks or magazines. Captions are a summary of the information in the graph or figure. They are written in complete sentences. Captions help you show your understanding of the material you are studying.

To help you understand how to use the I² strategy, look at the following example. This example will help you make sense of a graph. This graph shows the average monthly temperatures in one US city.



I ² step	Example
<p>Step 2: Interpret (“What it means” comments)</p> <ul style="list-style-type: none"> Interpret the meaning of each “What I see” comment by writing a “What it means” comment. Do not try to interpret the whole graph or figure. 	<p>What I see: a peak in July</p> <p>What it means: the hottest average temperatures in the city happen in July.</p> <p>What I see: an upward slope between February and July</p> <p>What it means: The average temperature in the city increases between February and July.</p> <p>What I see: a downward slope between July and December</p> <p>What it means: The average temperature in the city decreases between July and December.</p> <p>Average Monthly Temperatures in One U.S. City</p> <p>temperature (°C)</p> <p>month</p> <p>Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.</p> <p>In this example, “What it means” comments were added to each “What I see” comment. The “What it means” comments explain the changes, trends, and differences that were identified in Step 1.</p>

I ² step	Example
<p>Step 3: Caption</p> <ul style="list-style-type: none"> Write a caption for the graph or figure. Start with a topic sentence that describes what the graph or figure shows. Then join each “What I see” comment with its “What it means” comment to make a sentence. Build a coherent paragraph out of your sentences. 	<p>What I see: a peak in July</p> <p>What it means: The hottest average temperatures in the city happen in July. The city must be in the northern hemisphere.</p> <p>What I see: an upward slope between February and July</p> <p>What it means: The average temperature in the city increases between February and July.</p> <p>What I see: a downward slope between July and December</p> <p>What it means: The average temperature in the city decreases between July and December.</p> <p>Average Monthly Temperatures in One U.S. City</p> <p>temperature (°C)</p> <p>month</p> <p>Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.</p> <p>This graph shows the average temperature in a city over a year. There is an upward slope from February to July, showing that there is an increase in the average temperature during these months. There is a downward slope from July to December, which means the average temperature decreases during this time. There is a peak in July, which shows that the hottest average temperature in the city happens in July. The peak in July also means that the city must be in the Northern Hemisphere.</p> <p>In this example, the first sentence of the caption describes what the graph shows. Then each “What I see” comment was combined with its “What it means” comment to form complete sentences. Those sentences make up a paragraph that describes each part of the graph.</p>

I Can Use the Identify and Interpret (I²) Strategy

Teacher

Students can become overwhelmed when they try to interpret graphs, figures, or data tables. The Identify and Interpret (I²) strategy is a way to help students make sense of the information by breaking it down into smaller parts.

In the I² strategy, students first *identify* changes, trends, or differences. They draw an arrow to each observation and then write a “What I see” (WIS) comment. These comments should simply be what the student observes, such as a positive slope on a graph or increasing numbers in a data table. After students have made all their observations and written their WIS comments, they should *interpret* the meaning of their observations by writing a “What it means” (WIM) comment for each. Once students have mastered WIS and WIM comments, ask them to create a caption for the graph, figure, or table. A caption is a summary of all the information and helps show students’ understanding.

To use the I² strategy, you should have students place the graph, figure, or table that they are interpreting into their science notebooks. They should then draw the arrows and write their comments on and around the image. This helps them make the connections between the graphical information and their ideas. They should write the caption on the same page to help remind them of the interpretation.

Help students with page management as you use the strategy. Remind them to leave plenty of room around the graph, figure, or table so they can write their WIS and WIM comments. Also make sure they have room below the graph or figure to write their captions.

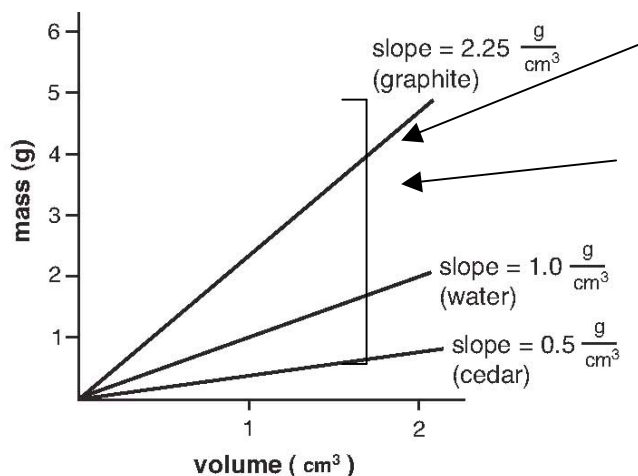
When you first begin using this strategy, model it for students. They can benefit greatly from watching you do a “think-aloud” as you complete the strategy on a graph, figure, or table. In the beginning, only ask students to complete the WIS and WIM comments without writing a caption. They will likely need help understanding what they should be looking for on the graph. Some students do not add enough arrows and WIS comments to interpret all the information. Other students try to add as many arrows and WIS comments as possible. These students soon find that they cannot interpret the meaning of some of their WIS comments. For example, if they identify that a graph is printed in black ink, they will discover that they cannot assign meaning to this WIS comment. This stage helps students begin to filter their numerous observations and only identify those that are significant to the graph, figure, or table.

Once students have become proficient at writing WIS and WIM comments, ask them to add a caption. Some students will find it repetitive since they are joining the WIS and WIM comments to create most of their captions; however, help them realize that the ability to create a coherent paragraph that interprets all parts of a graph, figure, or table is an important skill in science and other subjects. Later, when students have had a great deal of practice with this strategy, the ultimate goal should be for them to write a caption without having to list their WIS and WIM comments. Eventually, these comments become a habit of mind, and students should be able to notice all the pieces of a graph or figure to come up with a complete interpretation. Developing these habits of mind to identify and interpret data in many forms is a skill that will benefit students in all subjects, in their jobs as they get older, and in becoming a scientifically literate citizen.

Highlight Comments and Captions

Commenting Step	What the student should do:
What I see:	<ul style="list-style-type: none"> • Look for changes, trends, or differences. • Draw an arrow to each of these you notice in your graph or sketch. • Write what you see. Each arrow has a different description. Be concise. • Write only the essence, or <i>highlights</i>, of what you see.
What it means:	<ul style="list-style-type: none"> • Interpret what you see. • Write what each observation means. • Don't interpret the entire figure at once, just one observation at a time.
Caption:	<ul style="list-style-type: none"> • Think of the caption as an executive summary. • Begin your caption with a topic sentence describing the overview of the figure. • Join each "What I see" to its "What it means" to form a sentence. • Build a coherent description in 2 to 3 sentences.

Using the strategy with a graph:



What I see:

3 constant positive slopes that are not the same.

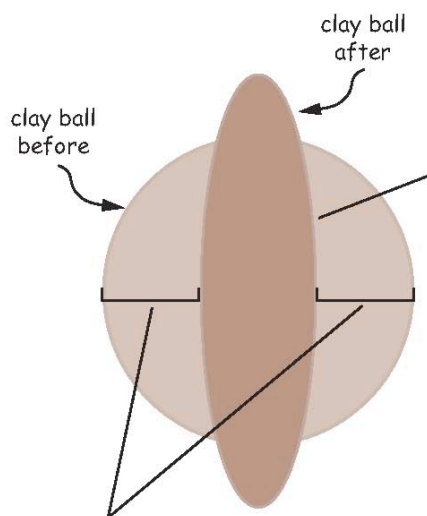
What it means:

Each substance has a constant density; graphite is the densest.

Caption: This is a graph of mass versus volume for three substances. The line for each substance shows a positive slope that is equal to its density. The graphed line for each substance is different meaning that they all have different

densities. Graphite has the largest slope and therefore is the densest.

Using the strategy with a diagram:



What I see:

clay ball squished a certain amount

What it means:

clay ball experienced a force to squish it

Caption: This sketch

shows how a clay ball behaves when it is "squeezed" in a collision. The ball shows the same amount of squish on both sides, so the amount of force is equal. The difference is the forces are in opposite directions.

What I see:

amount of squish on both sides is the same

What it means:

clay ball experienced equal squishing forces but from opposite directions

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