

**He loves me… he loves me not: The (somewhat accurate) love meter**

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| Title: Give the suggested title of the TEMI activity. | He loves me… he loves me not: The (somewhat accurate) love meter |
| Short abstract: Give a short description of the suggested TEMI activity. | The mystery deals with a 'love meter'. This is a device which according to folklore determines whether someone is in love. The scientific phenomenon is based gases expanding with increased temperature (the ideal gas law) and the vapour pressure of volatile liquids. The love meter is also an excellent starting point to discuss the difference between pseudoscience and science. |
| Domain(s): Give the domain (general science, biology, chemistry, physics, astronomy, technology). | Chemistry and Physics |
| Content: Outline the necessary prior-knowledge students need to have for solving the mystery; outline topics from the curriculum connected to the mystery. | The ideal gas law (the relation between pressure, volume and temperature for a gas)Vapour pressure of volatile liquids. |
| Grade-level: Estimated grade level range for the TEMI activity: Work with grade, start counting from grade 1(1st year in primary education;~6 years old). | 9th-12th  |
| Expected time:How much periods (45 min) does the activity take? | 2-3 periods. |
| Group Size:How many students can do this activity at once? | Preferably no more than 24 students. |
| Safety/Supervised:Do the students need to be supervised during the TEMI activity? Are there any restrictions due to safety regulations? | Students should be advised to hold the love meter gently and not to exert excessive pressure on the thin glass to prevent it from breaking.Other than that students do not require special supervision. |
| Costs:Rough costs of any materials needed for this TEMI-activity. | At least one love meter is required for each group of 3-4 students. The price of each love meter is around 4 euros. |
| Location: | * Indoors (small classroom)
* Indoors (large school hall)
* Outdoors
* Does not matter
 |
| Language(s):In what language(s) are the teaching materials written? | Hebrew, English |
| Enquiry mode(s): | The activity can be conducted at various levels of inquiryAllows for:* Open-ended enquiry
* Guided enquiry
* Structured enquiry
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| Enquiry scenario and pedagogies:Describe the scenario along the 5E Model. | Engage: A story is told about a love meter that was bought in a flea market and can determine whether someone is in love. |
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|  | Explore: Students are split into small groups of 3-4. Each group is given a love meter to explore and try to explain the phenomenon.  |
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| Explain: In the plenary the scientific principle of the love meter is explained. |
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|  Extend:.- Ask students to characterize the attributes of the love meter using guiding questions.- The love-meter is an excellent starting point to discuss the difference between pseudo-science and science (i.e. what are the foundations of scientific inquiry). |
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| Evaluation: Students prepare a lab report aligned with the Israeli curriculum which assesses skills such as making observations, asking questions, designing an experiment, writing explanations and hypothesis, etc. |
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| Learning objectives:Name objectives that can be used also for assessment. | Increasing motivation and interest among student.Exposing students to scientific principles underlying simple technology.Raising awareness to real- and pseudo-science. |
| Enquiry Skills:How is learning of enquiry skills operated? (engagement in scientific questions; giving priority to evidence; formulating explanations from evidence; connecting explanations to knowledge; communicating and justifying explanations to others) | Learning of enquiry skills is operated by: Engagement in scientific questions; giving priority to evidence; formulating explanations from evidence; connecting explanations to knowledge; communicating and justifying explanations to others. |
| Background information: Give references to journal or book articles related to the activity, e.g. a description or lab manual. | <http://en.wikipedia.org/wiki/Hand_boiler> |
| Comments:Add any further comments. | This activity is great for Valentine's day. |
| Data | Source: | Weizmann TEMI team |
| License: |  |
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Materials: (add a list of materials, e.g. material list, safety regulations, worksheets, solutions, assessment tasks, whatever you suggest to be helpful)

**List of materials:**

For each group of students for the Expand stage:

A love meter at least

Different equipment to heat or to cool different parts of the love meter.

Acetone and cotton wool.

During the inquiry, the extend stage; the materials depend on the research questions of the students.