

Burning Issue of a Candle

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Lesson Plan

Objectives

- To re-introduce higher level thinking skills
- To test your observational skills
- To test your ability to explain some phenomenon of scientific nature
- To go through one cycle of the Scientific Method
- To reinforce how higher level thinking skills can be taught using simple investigation of open-ended questions

Concepts to be covered

- Higher level thinking skills, open-ended problem, observation, prediction, hypothesis, the scientific method, investigation,

Skills to be covered

- The ability to make observations and record them
- The ability to distinguish between an observation and an explanation
- The ability to plan a simple investigation studying an open-ended question and execute the plan
- The ability to evaluate an investigation and its results and conclusion

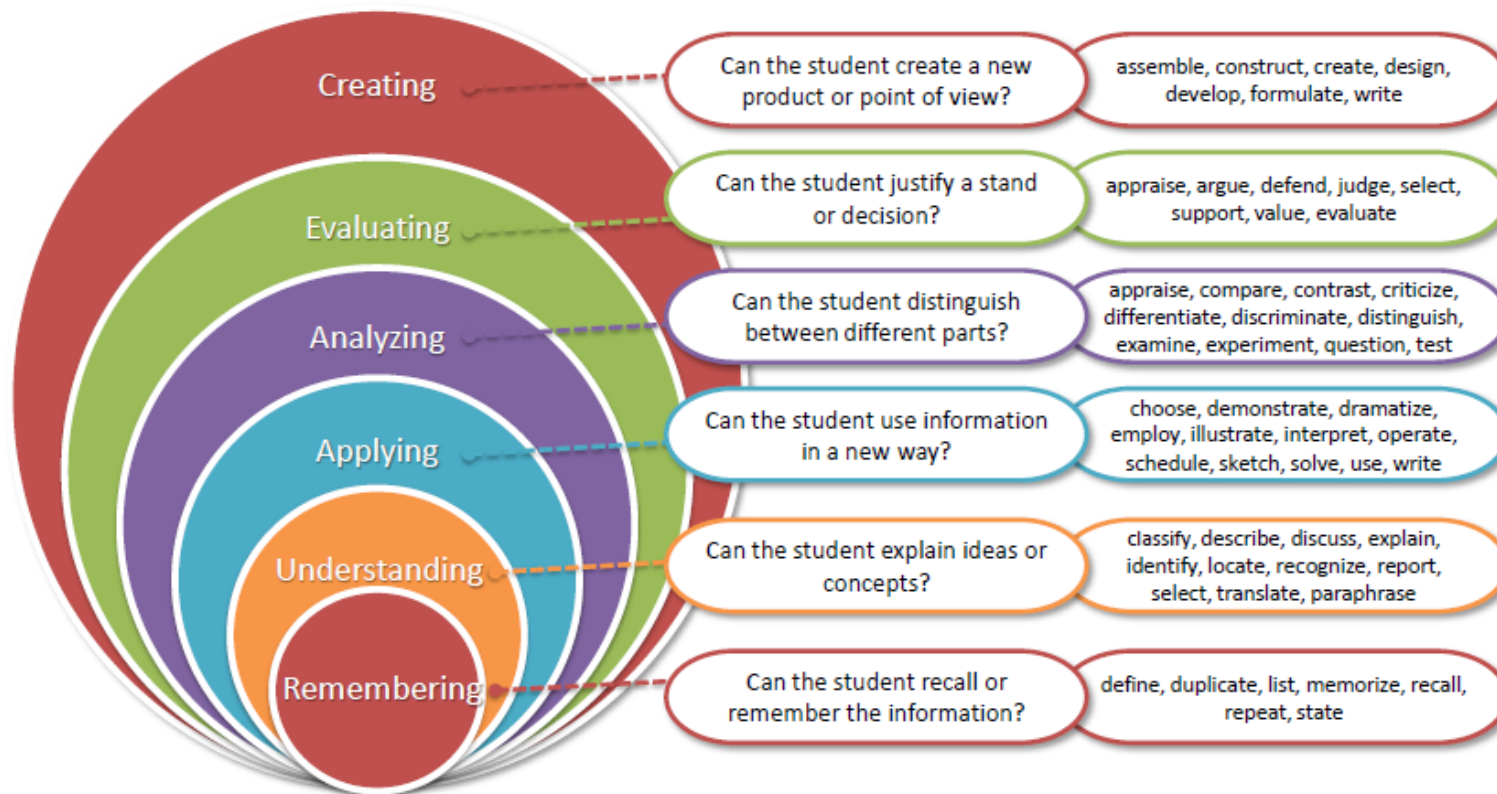
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Science Education

- Crucial component of Science education: Skills
- Most critical: critical thinking skills, skills that are transferable

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Bloom's Taxonomy (Revised)



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Higher Level Thinking Skills

- Way to impart: Open-ended problems
- Forces students to engage in processes that impart and reinforce those skills

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Set-up Instructions

1. Four to a table - one of you, the Speaker, must have something to write with and on
2. Elect a speaker
3. Light the three candles

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Task One

- *Observe* the burning candles and share within your group your observations – what you see, what you hear etc.
 - Challenge is to try to observe something that you might NOT have noticed at all about a burning candle
- *Explain* your observations to the rest of your group

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Task Two

- You are going to perform an experiment.
- You'll invert the glass over the candles in turn and determine which one burns the longest.
- But first, do two things:
 - Predict which one will
 - Explain your prediction (hypothesize)

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Conducting The Test

- Then,
 - Decide on a procedure (write it out completely)
 - Decide on the measurements to make and the number of trials to conduct
 - Gather everything you need
- Conduct your test, record your data/measurements.
- Speaker of each group will share the results with the rest of the class

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The Findings

- What did you discover?
- Did you encounter any problems?
- Evaluation: How would you change/modify/improve on the experiment so that you get results/data that
 1. you can work with to determine which one burns the longest
 2. are more conclusive, more precise, i.e. more reliable

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| Achievement Level | | Criterion C: KNOWLEDGE AND UNDERSTANDING OF SCIENCE | | |
|-------------------|---------|--|---|--|
| Student | Teacher | Knowledge and Understanding of Scientific Information and Concepts | Application of Scientific Information and Concepts | Mastery and Evidence of Critical Thinking Skills |
| 5-6 | 5-6 | Uses scientific ideas, concepts and/or processes correctly in the analysis section of the write-up. | Applies understanding of ideas, concepts and/or processes involved to provide a clear and complete solution to the discrepant event. | Analyses and evaluates the solution provided and makes judgments about the observations and/or solution supported by scientific understanding. |
| 3-4 | 3-4 | Uses some scientific ideas, concepts and/or processes in the analysis section of the write-up | Applies understanding of ideas, concepts and/or processes involved to provide | Analyses scientific information by identifying parts, relationships or causes. |

Extension

- How do you know it's the candle wax that's burning and not something else? What evidence do you have or how can you prove/show that indeed it's the wax?
- How do you know it's oxygen from the air that's combining with the wax and not another gas? I don't SEE or HEAR oxygen combining with the wax.
- How can you prove or show indirectly that indeed it is oxygen from the air that combines with the candle wax?

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