

**Title:** Multiplying Exponents vs. Powers of Powers  
*How will Alice's height change after eating magic cake?*

**Grade level/course:** 8-9

**Time Frame:** 80 minutes

**Content Objectives:**

- Students will find products of powers and powers of powers
- Students will distinguish when exponents are added and when they are multiplied

**Language Objectives:**

- Students will correctly use math vocabulary to explain accurately the difference between products of powers and powers of powers
- Vocabulary: coefficient, variable, evaluate, factor, base, exponent, product and power, increasing and decreasing

**Higher Order Thinking:**

- Differentiate between multiplying exponents and powers of powers
- Apply the correct algorithm based on contextual cues
- Justify their choice

**Materials:**

- Alice in Wonderland Story- p. 1 IMP, *Alice in Wonderland*
- Overhead transparencies and copies- Alice's Exponents
- Worksheet on multiplying exponents and powers and powers – your choice for Homework

**Initiation:** Journal entry—review your notes from previous two lessons, and summarize the processes of multiplying exponents and powers of powers in your own words, and point out any similarities and differences

**Procedures:**

1. Read Alice story on overhead. The rest can be done as a full group activity to better monitor the discussion or in small groups to encourage more participation. Perhaps starting in a small group then breaking into smaller groups or pairs for the last question in each section.
2. Read the story aloud. Ask students for any challenges with the language. Highlight, circle and discuss these challenges as the story is read aloud.
3. Work through questions on overhead- reminding students
  - to explain how they know,
  - tell why they feel their strategy is a good one,
  - *etc.*
4. *When someone asks how tall Alice is, ask them does it matter? Try assigning different heights. What happens to each?*
5. Bring the class back together and ask for conclusions.

**Closure:**

1. Once several students have shared their conclusions. Distribute the “Ticket to leave” and collect student responses.
2. Assign a good old-fashioned drill sheet (your choice) that requires students to multiply exponents or find powers of powers

**Student Work Products:**

- Completed sheets for them to save as a reference

**Assessment:** Ticket to leave and Homework results the following class

**Differentiation:**

- Students are encouraged to develop their own wording for distinguishing powers or powers and multiplying exponents
- “Keep thinking” at the bottom of the page provide additional work for students who complete the chart and answer questions quickly.