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Sincerely,

REAL Science Challenge

Estimation Activities for Science Classrooms

Ontario's standardized test results show a 17-point gap between students who think they understand math and those who meet the standard. Science teachers can help close this gap by teaching numeracy skills through estimation activities linked to science concepts. This resource provides 4 hands-on activities, reflection questions, and assessment tips to integrate numeracy into your science lessons.

1. Tennis Ball Distance

- Objective: Estimate the distance between two tennis balls placed at different heights and depths without direct measurement.
- Materials: Two tennis balls, classroom space
- Instructions: Place two tennis balls at the front of the room. Students must estimate the distance between them without leaving their desks, using visual cues and relative object sizes.
- Science Connection: Demonstrates how scientists estimate distances when direct measurement is impossible (e.g., stars, atomic structures).
- Assessment Tips: Look for logical reasoning, use of reference points, and clear explanation of estimation method.

2. Height of School Building

- Objective: Estimate the height of the school building from a visible vantage point.
- Materials: Window view of building
- Instructions: Ask students to estimate the building height by counting bricks or using known object sizes as reference.
- Science Connection: Links to indirect measurement techniques in science and engineering.
- Assessment Tips: Evaluate assumptions, scaling logic, and explanation of steps.

3. Volume of Irregular Objects

- Objective: Estimate the volume of a large, irregular object without direct measurement.
- Materials: Backpack or sports bag
- Instructions: Students compare the object to familiar volumes (e.g., water bottles) and calculate an estimate.
- Science Connection: Relates to displacement and approximation methods in science.
- Assessment Tips: Assess logical comparisons and justification of estimates.

4. Number of Items in a Jar

- Objective: Estimate the number of small objects in a jar using sampling strategies.
- Materials: Jar of marbles or beads
- Instructions: Students count a small section and scale up to estimate the total.
- Science Connection: Connects to statistical sampling and scaling in research.
- Assessment Tips: Evaluate sampling technique and reasoning.

Reflection Questions for Students:

- How did you decide on your estimate?
- What assumptions did you make?
- What reference points or comparisons did you use?
- How would you improve your method if given more time or tools?
- Why is estimation an important skill in science?

Teacher Notes:

Differentiate by adjusting complexity: use simpler objects for younger students or introduce ratio and scaling for advanced learners. Link activities to curriculum outcomes in measurement, data analysis, and scientific inquiry. Encourage students to explain reasoning verbally or in writing for formative assessment.
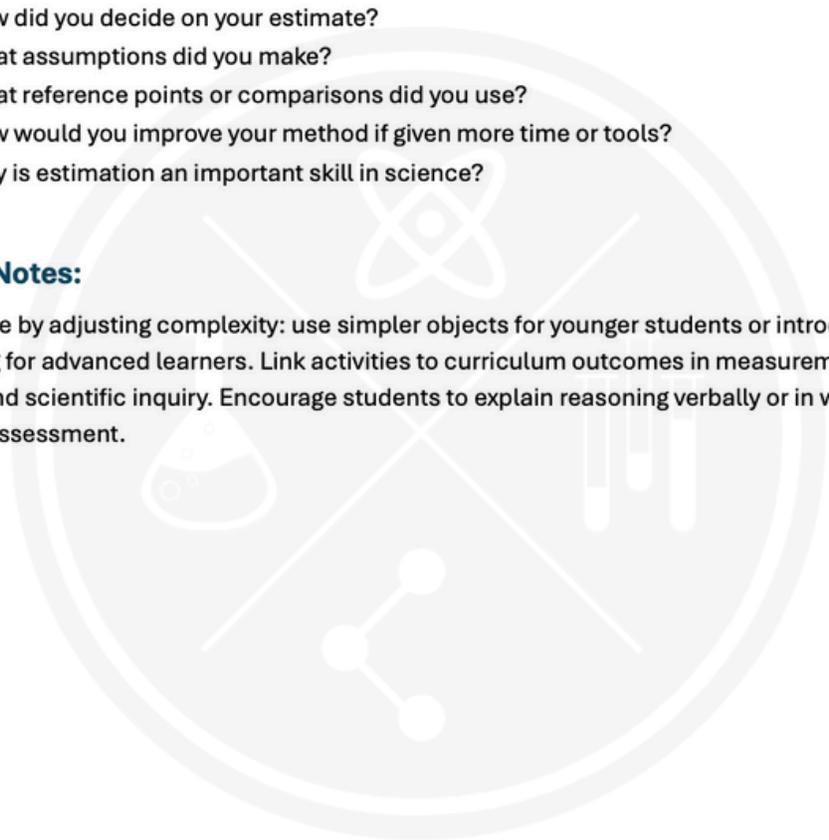
Why Estimation Matters in Science

Scientists often estimate when direct measurement is impossible—like the distance between stars or the size of an atom. Today, you'll practice estimation skills that help you think scientifically and mathematically.

Tennis Ball Distance

Instructions: Complete this activity as explained by your teacher.

My Estimate:

How I Got It:

Height of School Building

Instructions: Complete this activity as explained by your teacher.

My Estimate:

How I Got It:

Volume of Irregular Objects

Instructions: Complete this activity as explained by your teacher.

My Estimate:

How I Got It:

<u>Number of Items in a Jar</u>

Instructions: Complete this activity as explained by your teacher.

My Estimate: _____

How I Got It:

Reflection Questions

1. How did you decide on your estimate?

2. What assumptions did you make?

3. What reference points or comparisons did you use?

4. How would you improve your method if given more time or tools?

5. Why is estimation an important skill in science?