

## Take Depth of Knowledge (DOK) to New Levels with Hands-on Activities

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### SUMMARY

The new education standards encourage students to use the higher-level thinking skills defined on Norman Webb's Depth of Knowledge (DOK) chart (see other resources). RAFT hands-on activities make this transition easier for both teachers and students.

### MOVING FROM LEVEL 1 TO 4

- ✓ DOK 1 can involve recalling a fact, such as: *"Name a food group."*
- ✓ DOK 2 applies the knowledge: *"Which food group is missing from this meal?"*
- ✓ DOK 3 invites deeper thought: *"Cite evidence that many teenagers have poor diets."*
- ✓ DOK 4 extends the learning: *"Design a campaign to improve teenage eating habits."*

### HANDS-ON TEACHING MAKES IT HAPPEN

Hands-on activities offer a perfect path to DOK 4. In fact, hands-on methods make the journey so painless you and your students might not notice the steps!

To get started, pick a specific subject and learning objective. For example, say the subject is "sound" and the learning objective is for students to understand the relationship between vibration and sound. Get the students engaged with an intriguing opening comment like, "Today we are going to make some noise!"

**Level 1 – Present some facts:** Arm the students with DOK 1 knowledge about sound waves, frequency, etc. Confirm the students have mastered the facts at a DOK 1 level.

**Level 2 – Explore a concept:** For this lesson, have the students make a RAFT [Glove-a-phone](#). Within five minutes, they will be observing vibrations and collecting data about sound. There will be excitement in the air as the students begin to use DOK 2 thinking.

**Level 3 – Take it deeper:** Pass out some additional materials and let the students experiment. Can they design sound-producing instruments of their own? Can they investigate and explain how each instrument works? This is DOK 3 in action!

**Level 4 – Extend the thinking:** Challenge teams to compose "music." Connect physics terms like "vibration" with musical terms like "harmony." Relate this activity to a life science lesson on the ear. Have each team create a 30-second music video that clearly demonstrates they understand the relationship between sound and vibration.

As the students do these steps, they practice higher-level thinking skills.

## MORE EXAMPLES

Any RAFT activity can be used to help students attain greater depth of knowledge. Here are four quick examples to show how this can be done in STEM subject areas.

**SCIENCE:** Use *Breadboard Circuits* - [http://www.raft.net/ideas/Breadboard\\_Circuits.pdf](http://www.raft.net/ideas/Breadboard_Circuits.pdf) to teach Electricity

Level 1 = Share facts about series and parallel circuits.

Level 2 = Guide the students as they assemble a battery, bulb(s), and switch.

Level 3 = Generalize so that students can identify series and parallel circuits anywhere.

Level 4 = Design a simple burglar alarm.

**TECHNOLOGY:** Use *The Energy Game* - [http://www.raft.net/ideas/Energy\\_Game.pdf](http://www.raft.net/ideas/Energy_Game.pdf) to teach Energy Conservation

Level 1 = Invite children to notice where they use energy in daily life.

Level 2 = Introduce the RAFT energy game and practice playing it.

Level 3 = Discuss cooperative strategies that allow everyone to win.

Level 4 = Connect behaviors noticed in the game to behaviors seen at school.

**ENGINEERING:** Use *Leonardo's Arched Bridge* - [http://www.raft.net/ideas/Leonardos\\_Arched\\_Bridge.pdf](http://www.raft.net/ideas/Leonardos_Arched_Bridge.pdf) to teach Design

Level 1 = Define engineering terms such as beam, bending, tension, etc.

Level 2 = Introduce the RAFT kit in the form of a "design challenge."

Level 3 = Have the students create instructions so others can build a bridge.

Level 4 = Extend the learning to create a stronger bridge.

**MATH:** Use *Salmon You Can Count On* - [http://www.raft.net/ideas/Salmon\\_You\\_Can\\_Count\\_On.pdf](http://www.raft.net/ideas/Salmon_You_Can_Count_On.pdf) to teach Ratios and Proportions

Level 1 = Share math methods needed to calculate a proportion.

Level 2 = Use the RAFT kit to collect data.

Level 3 = Ask students to explain why accuracy improves as more samples are taken.

Level 4 = Use the results to support an environmental claim or recommendation.

## OTHER RESOURCES

**More about Webb's Depth of Knowledge -**

[http://www.stancoe.org/SCOE/iss/common\\_core/overview/overview\\_depth\\_of\\_knowledge.htm](http://www.stancoe.org/SCOE/iss/common_core/overview/overview_depth_of_knowledge.htm)

**Compare Webb's Depth of Knowledge with Bloom's Taxonomy –**

<http://www.paffa.state.pa.us/PAAE/Curriculum%20Files/7.%20DOK%20Compared%20with%20Blooms%20Taxonomy.pdf>