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Sincerely,

Kent
REAL Science Challenge Founder
Science Department Head (Burnaby South Secondary)

Lessons Learned:

- 1.** Teachers need to discuss and unpack ideas brought up by ChatGPT if we want students to develop a deeper understanding of content knowledge. ChatGPT is a jumping off point. It's like a very sophisticated search engine that can write a response to you. But the response is just knowledge - to help students unpack it, we need to give students something to do with that knowledge. This is what AI cannot do so far that teachers can.

- 2.** When using ChatGPT, it needs to be goal oriented, not task oriented.
 - a.** When I made students use ChatGPT for an assignment (see Assignment 1 below), students were just concerned with completing the assignment and not the learning behind it. Thus, when students see using ChatGPT as a task, they are not going to deep dive into their own learning.
 - b.** However, in a separate, informal exercise (see Assignment 2 below), I got students to ask ChatGPT to help them with one issue in physics class and to share their conversation with me. The conversations were amazing. Some students asked questions and follow up questions about how to perform force calculations. Others asked for help on building their balloon powered car, which was the class project at the time. Thus, when students have a goal in mind - and not just a task to finish - the use of ChatGPT can help students dive deeper.

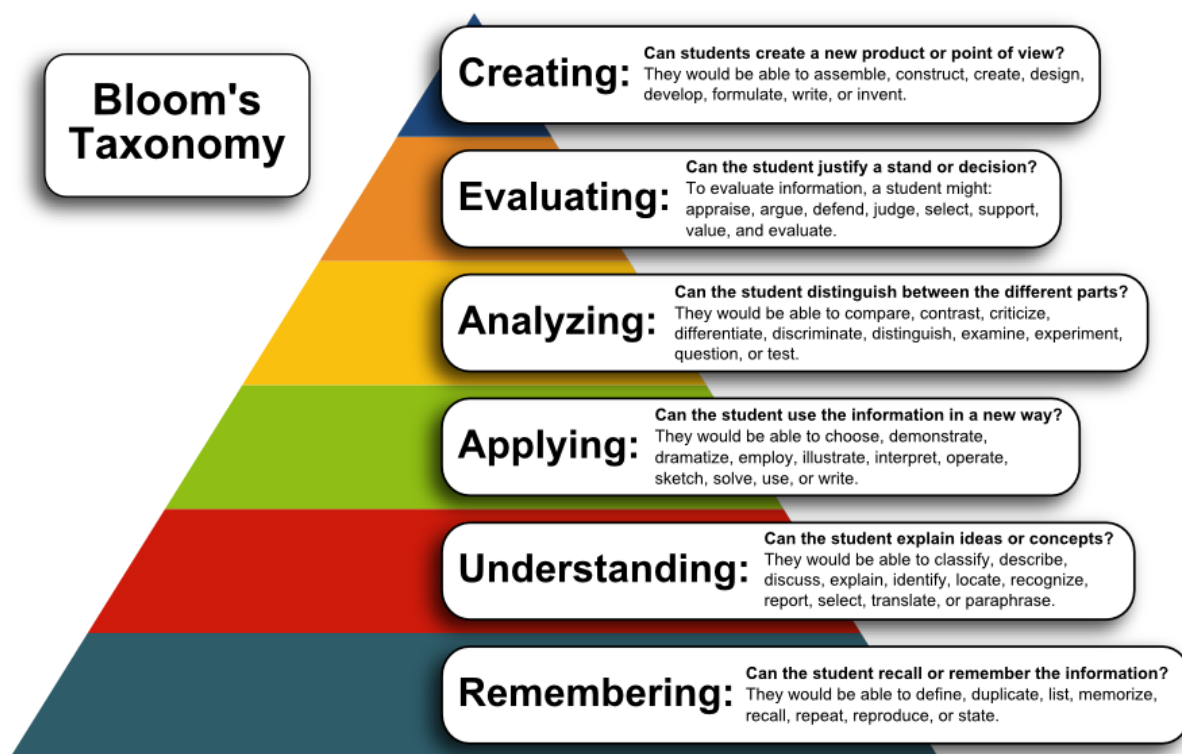
[Assignment 1] Learning with ChatGPT (and Bloom's Taxonomy)

By the end of today, you should know the meaning, examples, and applications of these key terms:

1. Work (in physics)
2. Power (in physics)

What is Bloom's Taxonomy?

Bloom's Taxonomy is a hierarchical ordering of cognitive skills that can, among countless other uses, help teachers teach, and students learn



Example of Bloom's Taxonomy with Goldilocks and the Three Bears

Remember: Describe where Goldilocks lived.

Understand: Summarize what the Goldilocks story was about.

Apply: Construct a theory as to why Goldilocks went into the house.

Analyze: Differentiate between how Goldilocks reacted and how you would react in each story event.

Evaluate: Assess whether or not you think this really happened to Goldilocks.

Create: Compose a song, skit, poem, or rap to convey the Goldilocks story in a new form.

[Assignment 1 cont'd] 1-1-1-1 Activity

Using ChatGPT, take 1 term from the above list, and ask 1 question from 3 different levels of Bloom's Taxonomy.

Level	Definition	Sample Verbs
Knowledge	Recall and remember information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states, memorizes, tells, repeats, reproduces
Comprehension	Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words. Establish relationships between dates, principles, generalizations or values	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives examples, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates, shows relationship of, characterizes, associates, differentiates, classifies, compares distinguishes
Application	Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the workplace. Facilitate transfer of knowledge to new or unique situations.	applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, solves, uses, systematizes, experiments, practices, exercises, utilizes, organizes
Analysis	Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates, investigates, discovers, determines, observes, examines
Synthesis	Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure. Originality and creativity.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes, synthesizes, imagines, conceives, concludes, invents theorizes, constructs, creates
Evaluation	Make judgments about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports, calculates, estimates, consults, judges, criticizes, measures, decides, discusses, values, decides, accepts/rejects

[Assignment 2] ChatGPT Playground

1. What did you want ChatGPT to help you with?
 - Test prep
 - Project help
 - other?
2. Please provide screenshots of the highlights of your conversation?
 - a. How did you ask ChatGPT for help?
 - b. What was ChatGPT's response?
3. Was ChatGPT helpful in achieving your goal? Explain.
4. What is something you learned about using ChatGPT that you didn't know before?