Enchanted by the Forces of STEM

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How do we raise the ceiling on STEM activities to better suit the needs of our gifted learners?

Source: https://blogs.tip.duke.edu/teachersworkshop/engaging-gifted-students-with-inquiry-stem-tasks/

“Many traditional, ready-made laboratory activities limit the actual inquiry that students perform by directing students through a series of predetermined steps that lead them to an expected endpoint. A series of questions may accompany the activity to help them to consider key takeaways or steps in the procedure, but often isolate critical thinking to brief moments before and after the laboratory portion. The Next Generation Science Standards address limitations of traditional STEM curricula and encourages instructors to incorporate science and engineering practices as a way to equip students with skills to study the natural world. By embedding brief lab-based learning experiences and by modifying traditional labs to facilitate critical thinking, we can increase the rigor in our classrooms and develop students’ investigative skills.”

Let’s be specific...

- **Frame the STEM challenge with a driving question.** Don’t begin by telling students they are building a chair for Goldilocks. Instead, set the stage with Goldi’s problem and ask for ideas about how to solve it.
- **Remove critical components of the procedure and prompt students to fill in specific information needed.** For example, rather than directing students to measure rainfall in centimeters, pose the question: What types of data do we need to collect? What materials do we need?

By implementing these two ideas, we can move from identifying and solving to **exploring and discovering**.

Affective and Soft Skill Benefits for Gifted Students

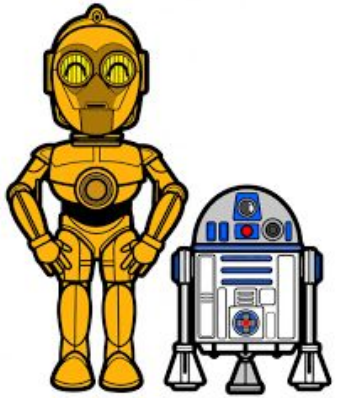
Rigorous, exploratory STEM activities also benefit our quest to help our gifted students develop soft skills such as:

- Precision
- Tenacity
- Resilience
- The importance of a Plan B
- Anticipating the needs of others
- Active listening
- Eliminating killer words from their dialogue

Check out this great piece by The Grayson School for further explanations about these and other soft skills that are so important for our gifted students to develop.

Source: https://thegraysonschool.org/soft-skills-gifted-students/

PBL and STEM Challenges: Better Together!



- Why is it important to ask good questions?
- What is the difference between closed and open questions?

Closed Questions: have a right or wrong answer. Closed questions are appropriate at times, and do have some advantages: quick answer, need specific info, teaches convergent thinking, easier to grade.

Open Questions: allow for multiple answers to the same question. Advantages of open questions include creativity, more options, more comfortable to take risks, flexible.

How can we move from hands-on to minds-on?

The goal of good questioning is for kids to **feel ownership of their answers.** Rather than a teacher giving answers, or kids memorizing the correct answers, let kids **discover** the answers.

- How can we plan effective projects for our students?

  If we have kids change or modify their end projects based on feedback and constructive criticism, it teaches them to continually refine their work. In a real life setting, it takes a team effort to arrive at best solutions.

How can we use evaluation and feedback to move our projects to a higher level?

Sticky note feedback

Each student gets 3 sticky notes to evaluate 3 other projects. On each sticky note, write “I like…,” “I wonder…”, and “What if…”

Helpful Friends Feedback Stragegy

Talk about project itself, not the designers
Presentation 3-5 min (presenters explain)
Clarification 2 min (listeners ask questions)
Assessment 1 min (Audience quietly looks at rubric)
I Like 2 min (Audience shares likes)
I wonder 2 min (Audiences shares wonderings)
Reflection 2 min (Presenters reflect on input)

How do you display PBL and STEM projects in the classroom?

Project Wall:

“Driving Question” in middle
“Need to Know Questions” all around (kids develop)
Vocabulary Word/Concept List
Calendar of deadlines
Checklist of requirements
Rubric
Pictures of students working at various progress checkpoints in addition to showcasing final designs, or QR codes that link to videos of projects.

PBL Resource: https://www.pblworks.org/pblu-welcome

Fairy Tale STEM: A Unit for Elementary Gifted Students

Once upon a time, in a classroom not so far away, gifted students engaged in new ways with familiar fairy tale characters in an effort to live happily ever after.

Jack's Beanstalk Parachute

Cinderella's Wedding Celebration

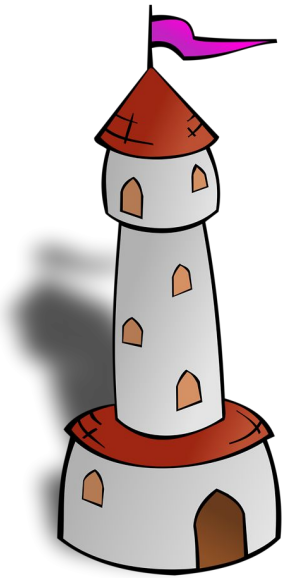
Gingerbread Man River Crossing

Hansel and Gretel's Candy Grabber

A Bridge for the Billy Goats

A Chair for Goldilocks

The Neverland Arcade



Forces of STEM: A Unit for Elementary Gifted Students

Whether it's May the 4th, an extension to a unit on space, or the force is just calling you...this Star Wars stem unit is sure to tap into the imagination and creativity of gifted students all over the galaxy.

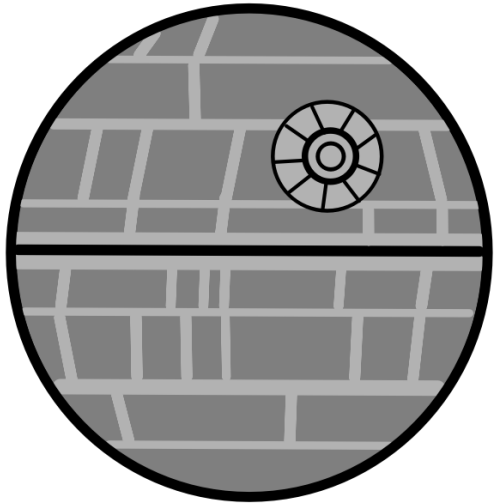
New Droids Needed!

Ewok Village Architect

Clone Trooper Battle

Lightsaber Building

Spaceship Flight Competition



Resources

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https://thegraysonschool.org/soft-skills-gifted-students/

https://www.pblworks.org/pblu-welcome

Next Generation Science Standards

https://docs.google.com/presentation/d/1DlljwVjRy9XtsnOHDC_fF3y5M-LUc-BF3Pkmj-B1q3w/edit?usp=sharing

Contact Information

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