# Enginuity!

**Open Dance Project** **Performance Grades: K-8**

ABOUT THE PERFORMANCE
Experience the fast-moving fun of spark plugs and pistons in this hyperphysical romp through the mechanics of motors and engines and the inventive minds of their creators. Everyday applications of math, science and engineering are highlighted in this live performance featuring original music, theatre and dance

**TEKS** (Texas Essential Knowledge and Skills):

| | Dance | Science | Lang. Arts | Math | Social Studies |
|---|---|---|---|---|---|
| K | | K.2 | K.1, 12 | K.1 | K.14 |
| 1 | | 1.3 | 1.1, 13 | 1.1 | 1.16 |
| 2 | | 2.2, 3 | 2.1, 13 | 2.1 | 2.17 |
| 3 | | 3.2, 3 | 3.1, 13 | 3.1 | 3.16 |
| 4 | | 4.2, 3 | 4.1, 13 | 4.1 | 4.20 |
| 5 | | 5.2, 3 | 5.1, 13 | 5.1 | 5.23 |
| 6 | (1) 1, 2, 5 | 6.2, 3 | 6.1, 2, 12 | 6.1 | 6.20 |
| 7 | (2) 1, 2, 5 | 7.2, 3 | 7.1, 2, 12 | 7.1 | 7.20 |
| 8 | (3) 1, 2, 5 | 8.2, 3 | 8.1, 2, 12 | 8.1 | 8.27 |

**The Students Will:**
*Demonstrate good audience etiquette.
*Practice positive speaking and listening skills.
*Engage in original writing.
*Practice problem solving.
*Research mechanics and energy

**STAAR** (State of Texas Assessments of Academic Readiness):

| | | |
|---|---|---|
| **Writing** | Grade 4, 7 | Reporting Category 1 |
| **Science** | Grade 5, 8 | Reporting Category 2 |

**The Students Will:**
*Demonstrate an ability to compose a variety of written texts with a clear, controlling idea; coherent organization; sufficient development; and effective use of language and conventions.
*Demonstrate an understanding of force, motion, and energy and their relationships.

Academic Vocabulary:

| | |
|---|---|
| spark plug | * a device for firing the explosive mixture in an internal combustion engine. |
| piston | * a disk or short cylinder fitting closely within a tube in which it moves up and down against a liquid or gas, used in an internal combustion engine to derive motion. |
| motor | *a machine, especially one powered by electricity or internal combustion, that supplies motive power for a vehicle or for some other device with moving parts. |
| engine | * a machine with moving parts that converts power into motion. |
| engineering | * the branch of science and technology concerned with the design, building, and use of engines, machines, and structures. |
| mechanics | * the branch of applied mathematics dealing with motion and forces producing motion. |

**CLASSROOM CONNECTIONS:**

***Before the performance***

- Ask: "Have you ever looked at the engine of car? What do you know about the parts you see? What makes the car 'go'?"
- Try making a pencil roll from one side of a desk to the other. Try different sources of energy. Ask: "Can you move it without touching it?"
- Make a chart about engineering and fill in the first two columns:

| K | W | L |
|---|---|---|
| What do we **know** about engines and engineering? | What do we **want** to know? | What did we **learn**? |
| | | |

***After the performance:***

- Ask: "What did you learn about engines and engineering?"
- Finish the K-W-L chart.
- Write, draw, tell, sing, dance, or act out your favorite part of the presentation.

**Language Arts:**

- Write a song, rap, poem or short story about an engine.
- Create words from the letters below. Have students put each letter on a card. Make the vowels a different color from the consonants. Re-arrange the cards to make new words. Ideas: egg, gin, inn, nine, ring, ringing, green, engine, engineer, engineering. Create a poem or story using as many of the words as possible.

| | | | |
|---|---|---|---|
| e | e | e | g |
| g | i | i | n |
| n | n | r | |

Math:

- Create math problems about engines. Use ideas from https://sciencing.com/mechanics-use-math-4570197.html Ideas: wrench sizes, nuts and bolts, torque, horsepower, engine sizes, translating metric sizes into English units, etc.

Social Studies:

- Explore different forms of transportation in different cultures and in different historical periods. Examples: bicycles, horses, covered wagons, boats, ships, trains, cars, airplanes, buses, trucks, chariots, skateboards, kayaks, camels, zip lines, segways, etc. Ask: "What powers each form?"

Science:

- Create vehicles, using different forms of energy: rubber bands, batteries, motors, solar energy, wind, water, etc.

Resources:
**Related Websites:**

Making vehicles: https://littlebinsforlittlehands.com/building-vehicle-stem-activities-kids/
Engineering: http://www.sciencekids.co.nz/engineering.html and https://www.instructables.com/id/Project-Based-Engineering-for-Kids/
https://houstonpbs.pbslearningmedia.org/resource/agd14_vid_engagetech/engaging-students-in-technology-and-engineering-projects/

**Related SmartBoard and Interactive Activities**
http://exchange.smarttech.com/search.html?q=engineering&subject=All+subjects&grade=All+grades&region=en_US

ABOUT THE ARTIST:

Open Dance Project is a contemporary dance theater company whose highly stylized performance experiences break down conventional barriers between artist and audience to make dance more accessible and meaningful for both. Dynamic, three-dimensional architectural environments and the engagement of interactive technologies collapse the distance between the subject and the stage, live performance, and new media, dance and theater. Open Dance Project's performance and education programs invite the audience to explore dance and dance making from their own self-determined vantage point – simultaneously demystifying dance and making dance matter.