

THE ELECTRIC MOTORS CATALYST™: THE STANDARDS

The Catalyst Challenges align with many of the Next Generation Science Standards and provide an engaging, hands-on method to bring principles to life and enable a deeper understanding of the core disciplines.

Organized by Challenge

CATALYST CHALLENGE	DISCIPLINE CORE IDEA	STANDARDS
CHALLENGE 1: Create something that can make a loud noise	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY- WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER- MOTION AND STABILITY: FORCES AND INTERACTIONS	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 4-PS3-4, 4-PS4-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4, MS-PS2-3, MS-PS3-5
CHALLENGE 2: Invent a tool that can cut a piece of paper.	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY- MOTION AND STABILITY: FORCES AND INTERACTIONS	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 4-PS3-4, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4, MS-PS2-3, MS-PS3-5
CHALLENGE 3: Build a machine that draws curvy lines.	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY- WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER- MOTION AND STABILITY: FORCES AND INTERACTIONS	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 3-PS2-1, 3-PS2-2, 4-PS3-1, 4-PS3-3, 4-PS3-4, 4-PS4-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4, MS-PS2-1, MS-PS2-2, MS-PS2-3, MS-PS3-1, MS-PS3-5
CHALLENGE 4: Make a ride for one of your toys.	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY- MOTION AND STABILITY: FORCES AND INTERACTIONS	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 3-PS2-2, 4-PS3-1, 4-PS3-3, 4-PS3-4, MS-PS2-2, MS-PS2-3
CHALLENGE 5: Create something that moves in a straight line	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY- MOTION AND STABILITY: FORCES AND INTERACTIONS	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 3-PS2-1, 3-PS2-2, 4-PS3-1, 4-PS3-3, 4-PS3-4, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4, MS-PS2-1, MS-PS2-2, MS-PS2-3, MS-PS3-1, MS-PS3-5
CHALLENGE 6: Build a creature with spinning arms.	<ul style="list-style-type: none">- ENGINEERING DESIGN	3-5-ETS1-1, 3-5-ETS1-3
CHALLENGE 7: Make a machine that can scramble an egg.	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 4-PS3-4, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4
CHALLENGE 8: Invent a robot that moves without wheels	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY- MOTION AND STABILITY: FORCES AND INTERACTIONS	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 3-PS2-1, 3-PS2-2, 4-PS3-1, 4-PS3-4, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4, MS-PS2-1, MS-PS2-2, MS-PS2-3, MS-PS3-1, MS-PS3-5
CHALLENGE 9: Build something that can launch a wheel across the room	<ul style="list-style-type: none">- ENGINEERING DESIGN- ENERGY- MOTION AND STABILITY: FORCES AND INTERACTIONS	3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 3-PS2-2, 4-PS3-1, 4-PS3-3, 4-PS3-4, 5-PS2-1, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4, MS-PS2-1, MS-PS2-2, MS-PS2-3, MS-PS3-1, MS-PS3-5
CHALLENGE 10: Create a vehicle with a suspension system.	<ul style="list-style-type: none">- ENGINEERING DESIGN	3-5-ETS1-1, 3-5-ETS1-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

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BOOSTER PACK CHALLENGE

DISCIPLINE CORE IDEA

STANDARDS

BOOSTER CHALLENGE 1:
Build a robot that can push or pull another toy.

- ENGINEERING DESIGN
- ENERGY
- MOTION AND STABILITY: FORCES AND INTERACTIONS

3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 3-PS2-1,
3-PS2-2, 4-PS3-1, 4-PS3-3, MS-ETS1-1, MS-ETS1-2,
MS-ETS1-3, MS-ETS1-4, MS-PS2-1, MS-PS2-2, MS-
PS2-3, MS-PS3-1, MS-PS3-5

BOOSTER CHALLENGE 2:
Invent something with blinking lights.

- ENGINEERING DESIGN
- ENERGY
- WAVES AND THEIR APPLICATIONS IN
TECHNOLOGIES FOR INFORMATION TRANSFER

3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 4-PS3-4,
4-PS4-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3,
MS-ETS1-4

BOOSTER CHALLENGE 3:
Make something with a light you can dim.

- ENGINEERING DESIGN
- ENERGY

3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 4-PS3-4,
MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

BOOSTER CHALLENGE 4:
Build a machine that can climb a string.

- ENGINEERING DESIGN
- ENERGY
- MOTION AND STABILITY: FORCES AND INTERACTIONS

3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 3-PS2-1,
3-PS2-2, 4-PS3-1, 5-PS2-1, MS-ETS1-1, MS-ETS1-2,
MS-ETS1-3, MS-ETS1-4, MS-PS2-2

BOOSTER CHALLENGE 5:
Create a device that can send a message in Morse code.

- ENGINEERING DESIGN
- ENERGY
- MOTION AND STABILITY: FORCES AND INTERACTIONS

3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3, 4-PS3-4,
4-PS4-3, MS-ETS1-1, MS-ETS1-2, MS-ETS1-3,
MS-ETS1-4