

KAILANI K. INVENTS ALL DAY!

Written by Jake Hunter

Illustrated by Bella Hunter, Watercolors by Beth Hunter,

India ink by Lilly Hunter



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Forms of Energy: Kailani K. Invents All Day!

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Learning unit by Jake Hunter, Beth Hunter, Damyn Chipman, Kylie Jespersen, Aysha Imtiaz, Sierra Garcia, Grant Cowell, and Nathan Price, PhD.

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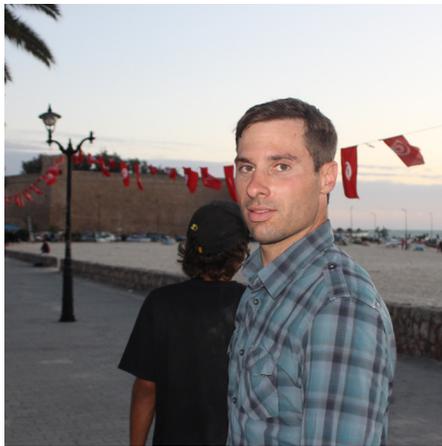
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STEMtaught® Grade 4 Next Generation Science

4-PS3-2 Energy: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. **4-PS3-4 Energy:** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. **4-ESS3-1 Earth and Human Activity:** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Featured author:



Jake Hunter

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My three little kids that love to invent inspired me to write the story “Kailani K. Invents All Day”. One day, my daughter Bella wanted to invent shoes that could walk on water. I helped her find tape and lots of foam pieces such as pool noodles. She taped together two amazing contraptions—one for each foot. Sure that the floating shoes would work perfectly, she jumped into the pool! Splash! Instead of running across the water, she found herself swimming. Disappointed, she went back to the drawing board. Inventing takes persistence and creativity! I hope you have fun exploring sound, light, heat and electricity as you read about Kailani K’s amazing inventions!



KAILANI K. INVENTS ALL DAY!

Part 1:

Inventor extraordinaire

Kailani rummaged through a messy box of interesting things from her garage.

"I'll need this... I think," she said as she held up an old wrinkled piece of sand paper, "... and maybe this too!" She held up an old rubber band.



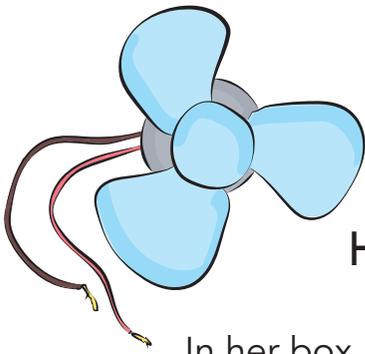
"There have got to be more tools here somewhere." Pulling down another box, Kailani found what she was looking for. "Screwdriver, pliers, tape and glue! That's what I need to make something new!"

As you can tell, Kailani loved to build stuff. Kailani's name means ocean and sky in the Hawaiian language. Her imagination was certainly as large as the ocean and when she thinks about what she wants to invent, she likes to say: "The sky's the limit!"

Kailani has a friendly, wiggly dog named Princess Buttermilk who never leaves her side. Kailani drags her newly found treasures to her bedroom. It's time to start building! Princess Buttermilk is interested too.

Why was Kailani's imagination compared to the ocean and the sky?





Part 2:

How do I make a spinny thing spin?

In her box, Kailani found some fan blades and a motor.

“What are you going to make today?” her mother asked.

“That’s easy,” Kailani quickly responded. “I’m going to make a Fantastic Flying Thing-a-ma-jiggy. For now, I just need to figure out how to make this spinny-thing spin.”

Princess Buttermilk looked impressed.

“Interesting,” responded mother. “It sounds like you have a few details to work out.”

“I just need some sort of energy.” Kailani grabbed her solar powered alarm clock. She pulled its solar panel right off! She hooked up the solar panel to her fan motor. “Aloha roto-chopper! Now, I have enough energy to spin my super roto-chopper-blades. They’ll go faster and faster until I fly away!”

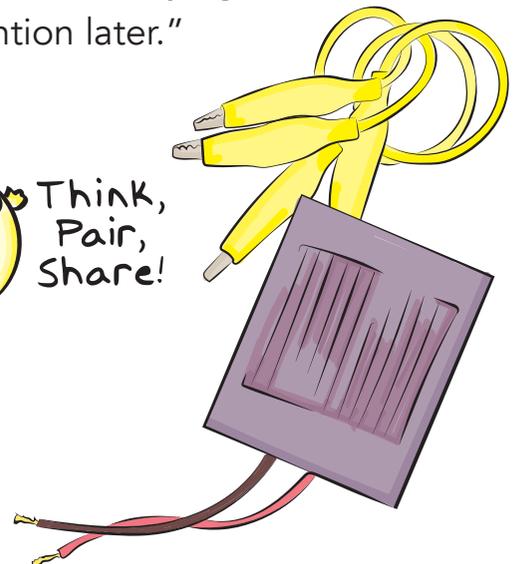
Holding the contraption, Kailani ran around the room as fast she could! With one great leap, she jumped up into the air.

“Wait...” she said breathlessly. “I’m supposed to be flying! “It’s got to be lighter! I’ll have to finish this invention later.”

How did Kailani convert energy from one form to another using her solar panel and a fan?



Think,
Pair,
Share!





Princess

Buttermilk
K.K

Kai lanis ☆
☆ inven ter

⊗ kit
glue ☆
17



Part 3:

Wing lights for a supersonic bird thing!

“Perhaps I could make a rubber band-powered engine flying contraption!” Kailani exclaimed.

The concept is quite simple. All you have to do is spin the propeller round and round until, voila! Lift off!

Kailani rushed to her box to get a rubber band. She connected the rubber band to a paperclip and her fan blades. Then, she began to wind up her contraption. She turned the fan round and round and round and round.

“Wow, this is taking a long time!” she thought.

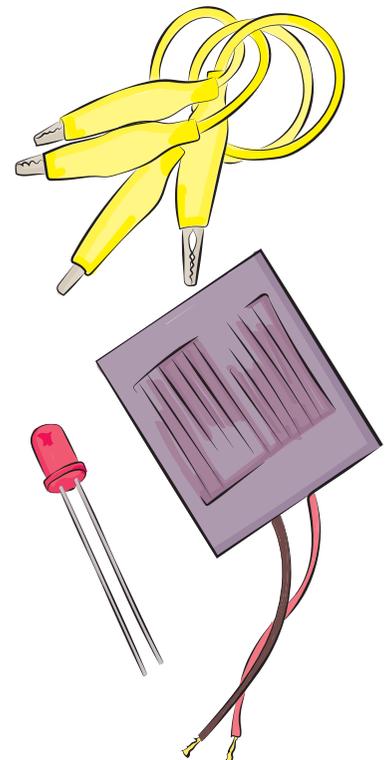
‘SNAP!’ The rubber band broke and shot across the room, hitting Princess Buttermilk on the head.

“Oops!” Kailani exclaimed. “Perhaps I’ll have to finish that part of the invention later. For now, I’ll work on my solar powered LED wing lights!”

How does an LED
light shine using solar
panels?



Think,
Pair,
Share!





Part 4:

A super balloon-powered skateboard contraption!

If flying wasn't going to work out today, surely Kailani could create a magnificent rolling invention—a super, balloon-powered skateboard contraption.

"I'm going to need a lot of balloons for this invention," she said. "If I can just blow them all up and let the air out at the same time, I wonder how far I could shoot myself across the room."

She imagined herself zooming away on her super balloon-powered skateboard contraption! How many balloons could she pinch shut with both of her hands? Maybe she could use her toes too! The more balloons, the faster she'd go! Kailani was sure she could pinch and unpinch at least eight balloons at the same time with just two ordinary hands and two ordinary feet.

"Zoom! This is fun!"

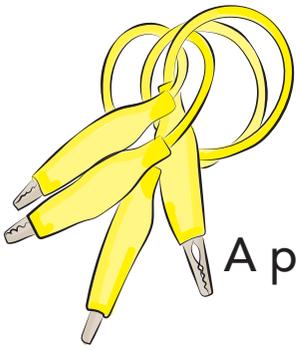
When an inflated balloon drains its air, what types of energy are produced?



Think,
Pair,
Share!







Part 5:

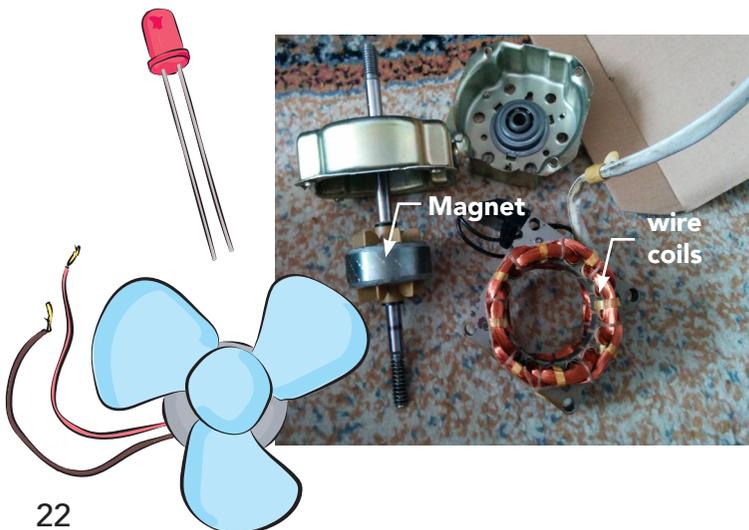
A pedal-powered monster-eliminating night light

It was almost time for bed, but there was just enough time for Kailani to try out one more amazing invention.

‘Perhaps I could use my dad’s exercise bike for my next creation,’ thought Kailani. ‘It’s getting dark and I could use a really good light invention. I will make a pedal-powered monster-eliminating night light that shines so bright, all the monsters lurking will simply just give up and go home!’

Kailani rushed to the box and grabbed the fan motor. She knew that when you spin a motor it can generate electricity. The wheel on the exercise bike would spin the motor and make the light shine.

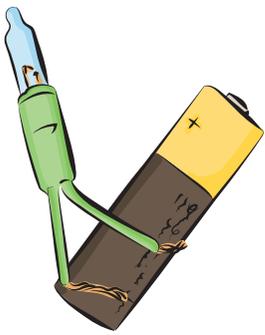
“Using this invention is really quite simple,” she said. “All you have to do is start pedaling from the safety and comfort of your own bedroom. Then, the lights will light up your whole room. The faster you pedal, the brighter they shine!”



Cool Fact:

An electric motor can be used as an electricity generator if you put motion into it instead of electricity. When you look inside a motor, you will find coiled wires and a magnet. When wire coils spin around a magnet, electricity is generated. Isn't that amazing?





Part 6:

A seed-powered hamster-wheeled light!

“It is time for bed,” Kailani’s mother called out. “Lights off, sweetie!”

Kailani was exhausted from pedaling so much! “The monsters have all gone home now. I need to rest!” Kailani exclaimed breathlessly.

She snuggled up under her covers and from the comfort of her cozy pillow, she listened to her hamster as it began to run on its hamster wheel.

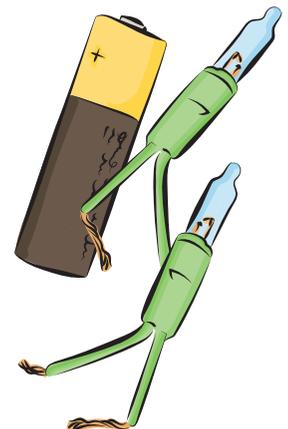
She began to think—Could she harness hamster power? Where do hamsters get their power? From seeds, of course! Tomorrow, she might try to make a seed-powered hamster-wheeled light!

“Hamsters have cheek pouches that can store extra fuel. That could come in really handy,” she said to Princess Buttermilk.

With that last thought, Kailani finally closed her eyes.

“Zzzzzzzz...”

How could Kailani convert energy from one form to another using a hamster?





Batteries
AA

Nom Nom



Food

Seeds
4 aya
hamsta

Part 7:

Kailani's balloon-powered pop-clock



The Sun's rays peeked through Kailani's window. It was morning! Kailani's eyes snapped open. "Oh, no! I slept in too long!"

Princess Buttermilk was waiting for sleepy Kailani to get up.

"This can never happen again!" declared Kailani. "Today I will invent a way for me to wake up earlier!"

When a balloon is inflated, it stores a lot of energy in the stretchiness of its skin. If you pop a balloon, you release its energy all at once!

Kailani had an idea! "Today, I will make a balloon-powered pop-starter. The 'pop' will help me 'start' my day.

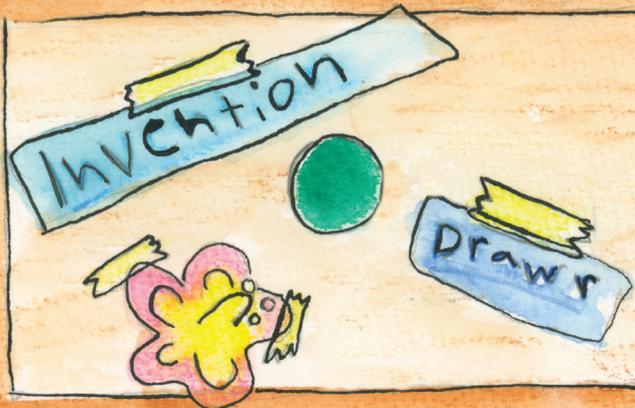
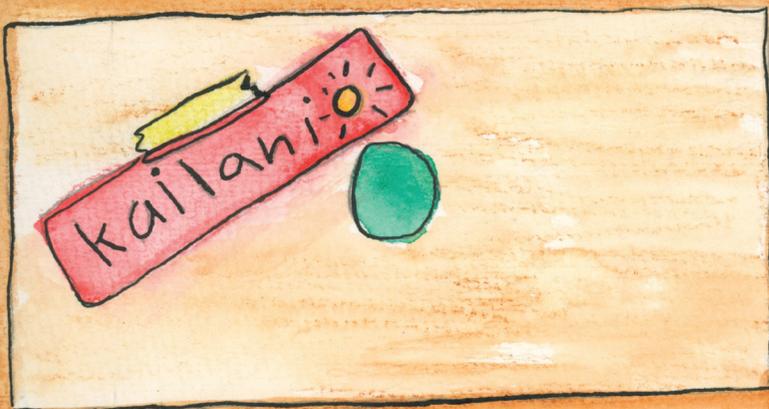
Everyone needs a good pop-starter in their lives! I can use the moving hands of my clock to tip a domino onto a thumbtack balanced on a balloon. Then, 'POP!' It will wake me up!"

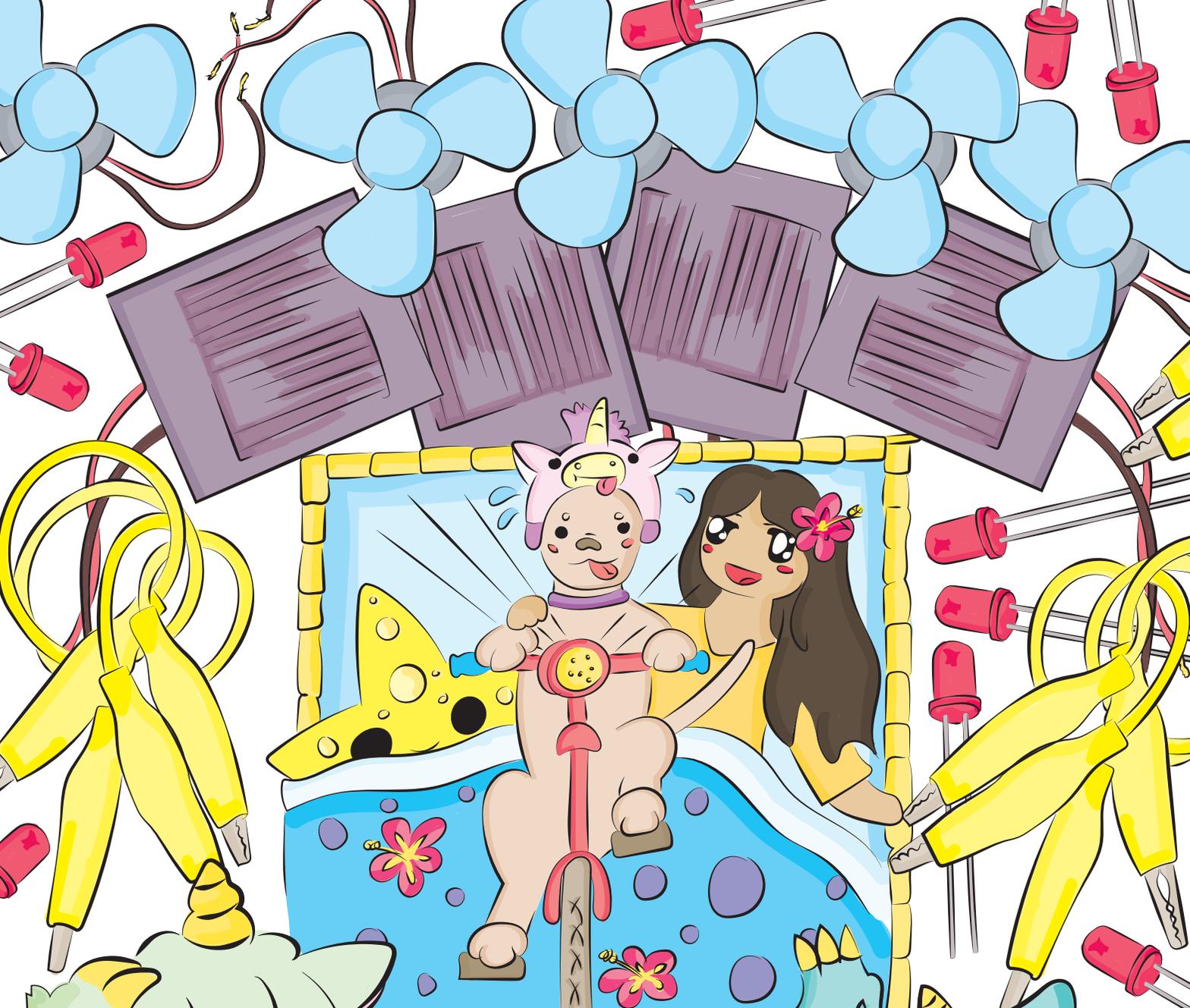
How did Kailani convert energy from one form to another with her balloon powered pop-clock?



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Pair,
Share!







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