


# Using Robotics To Engage Students in Authentic Problem Based Learning

## 2006 Georgia Educational Technology Conference


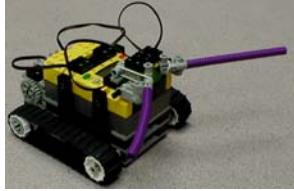


### Using Robotics to Engage Students in Authentic Problem Based Learning

Tonya Witherspoon  
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**Online Presentation Notes**  
<http://essdack.org/gaetc2006>

**ESSDACK.org** GaETC 2006

Mathematics    Science    Programming

Physics    Electronics    Sensor Feedback    Geometry    Measurement

Mechanics    Ratios & Proportions    Simple Machines    Computer Science

Mechanical Engineering



IR Receiver



Computer (RCX)


Motors



Gears



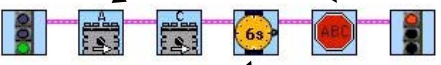
Lego Pieces

### RoboLab uses icons to build a program.

These icons turn on the robot's motors.

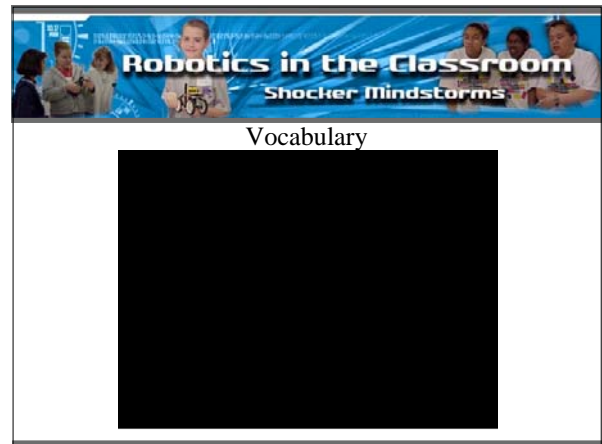
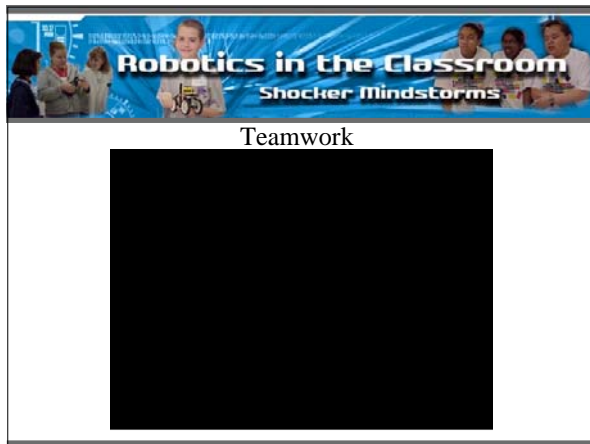
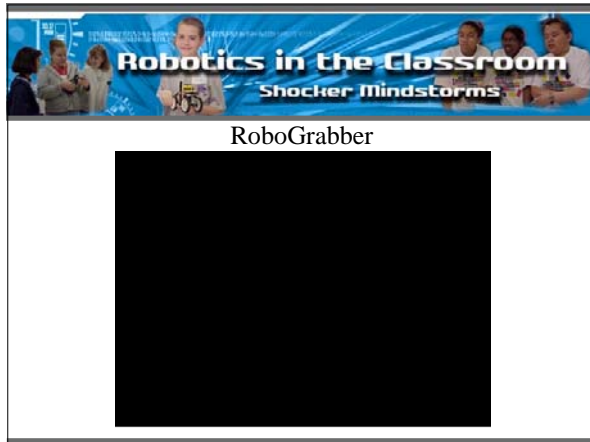
This icon makes the robot stop.



This icon makes the robot drive for 6 seconds.

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**Robotics in the Classroom**  
Shocker Mindstorms

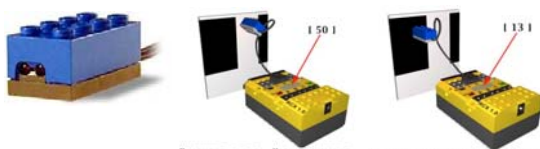
Sensors give the robots more intelligence.



Touch sensors detect contact with external objects.

**Robotics in the Classroom**  
Shocker Mindstorms


Light sensors can tell the difference between a black and white surface.



BRIGHTER AREAS = HIGHER NUMBER    DARKER AREAS = LOWER NUMBER

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Shocker Mindstorms

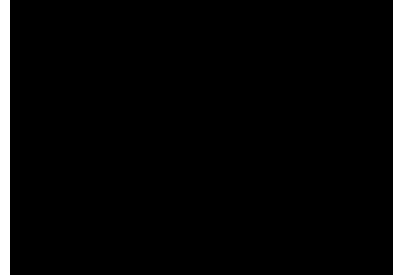
Rotation sensors measure the rotation of an axle.



They can be used to control how far the robot moves.

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Light Sensor

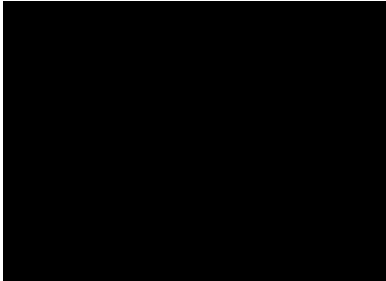


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Data Collection

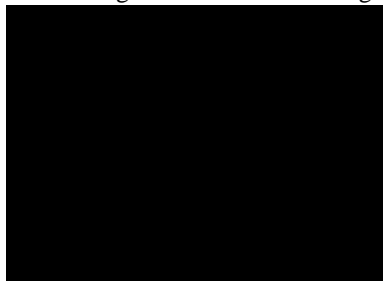


**Robotics in the Classroom**  
Shocker Mindstorms



**Robotics in the Classroom**  
Shocker Mindstorms

Journaling and Technical Writing



[Examples](#)

**Robotics in the Classroom**  
Technical Building Guide

Create 4 of these	Attach to motor	Place the bottom
		
Add lead and beam and small gear between large gear.	Add track and wheels and attach motor to A and C.	Add a touch sensor bumper using these parts: <ul style="list-style-type: none"> <li>1 - lead</li> <li>1 - touch sensor</li> <li>1 - 1 x 8 beam</li> <li>2 - axles 6 long</li> <li>3 - axles 4 long</li> <li>2 - 3 hole bracers</li> <li>2 - 3 hole bracers</li> <li>2 - gray axle pins</li> <li>2 - single connectors</li> <li>2 - yellow bush lift arms</li> <li>4 - bushings</li> <li>3 - half bushings</li> <li>2 - black friction pins</li> <li>1 - gray connecting arm</li> <li>2 - gray angle connectors</li> </ul>
		

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**Robotics in the Classroom**  
Shocker Mindstorms

- MLCAD - FREE Download for Windows  
<http://ldraw.org/>
- Example Building Guides  
<http://www.roboticslearning.com/examples/robots.htm>
- 10 Cool LEGO Mindstorms Books  
<http://www.syngress.com/catalog/?pid=2290>



**Robotics in the Classroom**  
Shocker Mindstorms

### Design a Mars Landscape



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### Build a Mars Landscape



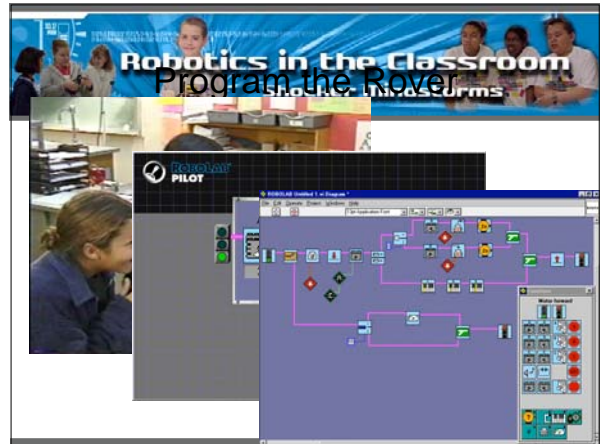
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Shocker Mindstorms

### Match the Pieces of the Room Terrain



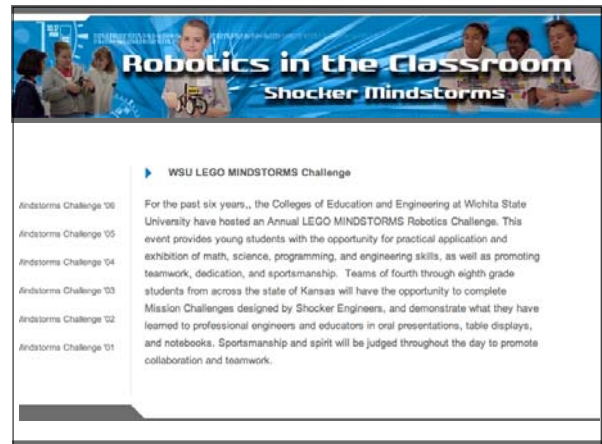
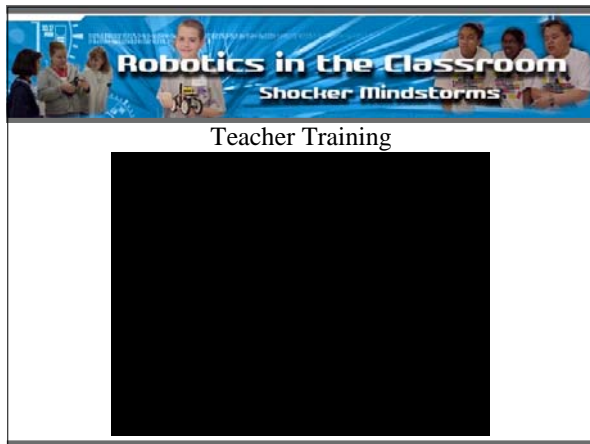
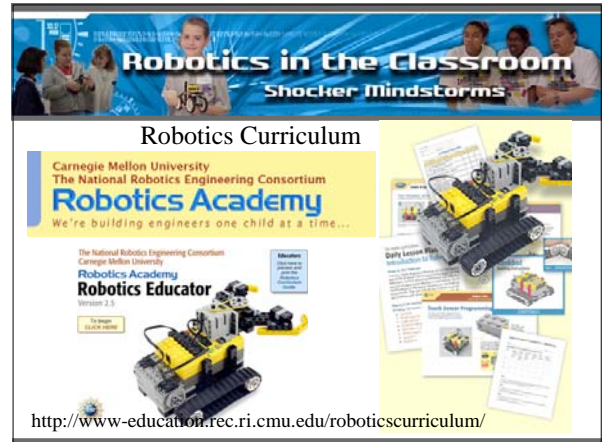
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 GaETC 2006

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