

PROJECT DESIGN: OVERVIEW

Name of Project: CARNIVAL LEGO! http://bit.do/CarnivalLEGO		Duration: 6 weeks
Subject/Course:	Teacher(s):	Grade Level: 3-5
Other subject areas to be included, if any:		
Key Knowledge and Understanding (Iowa Core Standards or other standards) I can statements	Scholars will know: How simple machines and motorized mechanisms are used in the function of carnival rides. Scholars will understand: - The advantages of using simple machines - Basic construction skills using LEGOs and other materials The Carnival LEGO Project allows scholars to engage in Deeper Learning, as defined by the Hewlett Deeper Learning Initiative: Mastery of Core Academic Content: Scholars learned the advantages of using simple machines. Critical Thinking and Problem Solving: Scholars had the opportunity to think critically, analytically, and creatively in order to design their carnival ride. Scholars also designed their own solutions to complex problems that they encountered during the design process. Collaboration: Scholars worked collaboratively with their group members to design the various components of the project. Effective Communication: Scholars communicated effectively with their exhibition audience, explaining the design process, function of their ride using simple machines, and their project roles. Scholars also structured information effectively in “Project Reflection” section of their Digital Portfolio. Self-directed Learning: Scholars developed their own schedules to complete the project requirements on time. Scholars within the project groups relied on each other for information necessary to complete tasks. An “Academic Mindset”: Scholars researched real-life amusement park rides for inspiration, and received feedback/expert critique from a professional with work experience in theme park design. Scholars made quick design changes with easily disassembled LEGO structures, providing confidence in the “evaluation” and “improvement” stages of the design process. Scholars modeled their work for their classmates, elevating the level of expectation and motivation to create their best work. Engineering Standards: 3-5 ETS1.2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5 ETS1.3 Plan and carry out fair tests in which variable are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. 3-PS2.1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. 3-PS2.2 Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion.	

	Technology Literacy Standards: 21.3–5.TL.2 Use interactive technologies in a collaborative group to produce digital presentations or products in a curricular area. 21.3–5.TL.3 Utilize digital tools and resources to investigate real–world issues, answer questions, or solve problems. Davenport Priority ELA Standards: RI.3, RI.5, RI.7, W.2, W.7, W.8 I can... • Identify the advantages of simple machines. • Think critically, analytically, and creatively while creating my designs. • Work collaboratively with my co-designers. • Communicate effectively with my co-designers throughout the project and with my intended final presentation audience. • Self-regulate my schedule and effectively use time management skills to complete the project. • General and compare multiple solutions to problems. • Plan and carry out fair tests with controlled variables and failure points to identify improvement. • Plan and conduct an investigation to provide evidence of the effects of balanced/unbalanced forces on the motion of my object. • Make observations/measurements of my objects motion to provide evidence that a pattern can be predictable. • Use interactive technologies in a collaborative group to produce digital presentations or products in a curricular area. • Utilize digital tools and resources to investigate, answer questions and solve problems. • Create a digital portfolio to share my thinking process and reflections.
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	(Universal Constructs) Complex Communication
Project Summary (include student role, issue, problem or challenge, action taken, and purpose/beneficiary)	Everyone loves a good carnival! In addition to the fun, adrenaline, and excitement that carnival rides bring us, they also provide a perfect example of simple machines and motorized mechanisms in action. During this project, we will combine our understanding of simple machines, motorized mechanisms, LEGO construction, 3D modeling, and engineering design thinking to create our very own LEGO Carnival! Project Details/Design Constraints: • You will be working in groups of three to design and build a LEGO carnival ride • Use the models constructed with the LEGO sets as an example, and build upon these designs • You may research examples of LEGO rides online and use resources provided

Essential Question	• How are simple machines and motorized mechanisms used to provide entertainment in the form of carnival rides? • How are simple machines utilized to solve a real-life problem?	
Project Launch	LEGO Build Challenges (Legos Creative Brick Box Set - modify as you need to fit your audience)	
Products and Deliverables (Individual and Team)	Completed LEGO Carnival Ride: • All carnival rides must incorporate a MOTOR, and include at least ONE GEAR or PULLEY • Your ride must be designed to operate on its own once the battery pack/motor is turned on Unique LEGO Piece, 3D modeled: • Drawn to scale in 3D model using Tinkercad and printed on 3D printer • Fit into LEGO Carnival Ride • Must improve the functionality of the ride Carnival Feature (example: Popcorn Cart, Park Bench, Tree, etc.): • Drawn to scale in 3D model Carnival Ride Sign: • Sign must be computer-generated (Google Drawing, Photoshop, etc.) • Sign includes: ○ Name of ride ○ Picture of final ride ○ Names of group members ○ Simple machines used Carnival Ride Digital Portfolio • Scholars will document their learning process and reflections.	

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Making Products Public

(include how the products will be made public and who scholars will engage with during/at end of project)

Digital Portfolio: Each scholar will compile a digital portfolio that includes their drawings of ideas, prototypes, and reflections of their learning journey. (www.Flipgrid.com)

Presentation: All Carnival LEGO! deliverables will be presented to all scholars, parents and invitees on the celebration of learning day.

Resources Needed

On-site people, facilities:
Teachers to facilitate weekly collaborative sessions with scholar groups.

Equipment:

[LEGO® Education WeDo 2.0 Core Set](#) and ScienceTeacherGuide (Only accessed online), VR headsets, 3D Printer

Materials:

- [Simple Machines Learning Path \(Symbaloo\)](#) (Scholar access code: 55292)
- LEGO WeDo 2.0 Building Set
- Any kind of building materials around school or home.

Helpful Websites:

- <http://teacher.scholastic.com/dirtrep/simple/pulley.htm>
- [MiKids: Simple Machines](#)

Community Resources and Partners:

Putnam Museum Science Area, Bettendorf Family Museum, STEAM 212, [Davenport Lego BUILDS](#) play area, [Robert Reppert](#) - 3D Printer

Reflection Methods

(how individual, team, and/or whole class will reflect during/at end of project)

Journal/Learning Log

- Data Notebooks
- Digital Portfolio using [Flipgrid.com](http://www.Flipgrid.com)

Whole-Class Discussion

- Critical Friends feedback loop

Survey

- [Pre Assessment of simple machines](#)
- [Post Assessment of simple machines](#)

Focus Group

Rubrics

Other:

PROJECT DESIGN: SCHOLAR LEARNING GUIDE

Project: [Design Thinking Brain WarmUp](#) (Legos Creative Brick Box Set)

Driving Question: What can I create?

WEEK 1

Final Product(s) Presentations, Performances, Products and/or Services	Learning Outcomes/Targets knowledge, understanding & success skills needed by scholars to successfully complete products	Checkpoints/Formative Assessments to check for learning and ensure scholars are on track	Instructional Strategies for All Learners provided by teacher, other staff, experts; includes scaffolds, materials, lessons aligned to learning outcomes and formative assessments
(individual and team)	- I can think critically, analytically, and creatively while creating my designs - I can work collaboratively with my co-designers - I can communicate effectively with my co-designers throughout the project. - I can self-regulate my schedule and effectively use time management skills to complete the project.	Week 1: In your Data Notebook, record the following: - Simple Machines Pre-Assessment score - Scavenger Hunt findings	Week 1: Design Thinking Brain WarmUp - Simple Machines Day One Lesson Simple Machines LEGO Definitions - Review the types of Simple Machines. - Pair up to find more examples on a Simple Machines Scavenger Hunt inside Jefferson School and outside the building.

PROJECT DESIGN: SCHOLAR LEARNING GUIDE

Project: Dive into Simple Machines

Driving Question: How are simple machines useful in my world? How can simple machines be used in carnival rides?

WEEK 2-3

Final Product(s) Presentations, Performances, Products and/or Services	Learning Outcomes/Targets knowledge, understanding & success skills needed by scholars to successfully complete products	Checkpoints/Formative Assessments to check for learning and ensure scholars are on track	Instructional Strategies for All Learners provided by teacher, other staff, experts; includes scaffolds, materials, lessons aligned to learning outcomes and formative assessments
(individual and team)	- I can identify the advantages of simple machines. - I can make general and compare multiple solutions to problems. - I can plan and carry out fair tests with controlled variables and failure points to identify improvement. - I can plan and conduct an investigation to provide evidence of the effects of balanced/ unbalanced forces on the motion of my object. Make observations/ measurements of my objects motion to provide evidence that a pattern can be predictable. - I can use interactive technologies in a collaborative group to produce digital presentations or products in a curricular area. - I can utilize digital tools and resources to investigate, answer questions and solve problems.	Week 2: In your Data Notebook, record the following: - ebooks read - Station Rotation drawings - Catapult drawings, tries, results and adjustments made	Week 2: Small Groups Rotations Simple Machine Exploration: Simple Machines Stations Rotations - Exploration of MackinVIA Simple Machines ebooks Symbaloo Learning Path Catapult Creation: - Partners or groups of 3 work together to design a catapult with levers, wheel and axle and wedges, that will shoot the cereal into a cup. Materials: cereal, popsicle sticks, rulers, meter sticks, straws, string, cups and tape.
		Week 3: In your Data Notebook, record the following: Identify the simple machines used in the VR carnival rides.	Week 3: Carnival Rides VR : Use VR headsets to explore the varied carnival rides. - Explore the LEGO® Education WeDo 2.0 Core Set - Begin building your LEGO Carnival Ride

PROJECT DESIGN: SCHOLAR LEARNING GUIDE

Project: Build

Driving Question: How do simple machines create carnival rides?

WEEK 4-5

Final Product(s) Presentations, Performances, Products and/or Services	Learning Outcomes/Targets knowledge, understanding & success skills needed by scholars to successfully complete products	Checkpoints/Formative Assessments to check for learning and ensure scholars are on track	Instructional Strategies for All Learners provided by teacher, other staff, experts; includes scaffolds, materials, lessons aligned to learning outcomes and formative assessments
(individual and team)	- I can use interactive technologies in a collaborative group to produce digital presentations or products in a curricular area. - I can utilize digital tools and resources to investigate, answer questions and solve problems. - I can create a digital portfolio to share my thinking process and reflections.	Week 4-5: Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid Early Finishers may go through a Critical Friends Protocol to gain constructive and structured feedback. Mini-version of the protocol. - The presenter explains the project and shares any specific concerns for which he/she would like feedback. - The group asks clarifying questions. - The presenter can no longer speak but can take notes. - Critical Friends: <i>I like the fact that...</i> In turn each member praises one aspect of the project <i>I wonder if...</i> In turn each member asks a coaching question. <i>A theme or big idea I'm hearing...</i> - The presenter can ask clarifying questions...	Week 4-5: Build, test, refine...repeat 1. LEGO Carnival Ride: - All carnival rides must incorporate a MOTOR, and include at least ONE GEAR or PULLEY - Your ride must be designed to operate on its own once the battery pack/motor is turned on 2. Unique LEGO Piece, 3D model: - Must be drawn to scale in 3D model using Tinkercad Example 1 Example 2 - Must fit into LEGO Carnival Ride - Must improve the functionality of the ride 3. Carnival Feature - Popcorn Cart, Park Bench, Tree, etc. - Must be drawn to scale in 3D model 4. Carnival Ride Sign: - Sign must be computer-generated (Google Drawing, Photoshop, etc.) - Sign must include: - Name of ride - Picture of final ride - Names of group members - Simple machines used

PROJECT DESIGN: SCHOLAR LEARNING GUIDE

Project: Presentation of Learning

Driving Question:

WEEK 6

Final Product(s) Presentations, Performances, Products and/or Services	Learning Outcomes/Targets knowledge, understanding & success skills needed by scholars to successfully complete products	Checkpoints/Formative Assessments to check for learning and ensure scholars are on track	Instructional Strategies for All Learners provided by teacher, other staff, experts; includes scaffolds, materials, lessons aligned to learning outcomes and formative assessments
(individual and team)		Carnival LEGO!! presentation of learning and digital portfolio presentation	

PROJECT CALENDAR

Week 1 (June 11-14)

Notes: What are simple machines and where to I see them in my world?

Monday	Tuesday	Wednesday	Thursday
Introduction to Camp Re-Imagine	Design Thinking Brain WarmUp (Legos Creative Brick Box Set)	Simple Machines Pre-Assessment Simple Machines Day One Lesson Simple Machines LEGO Definitions	Review the types of Simple Machines. Pair up to find more examples of Simple Machines and do the Scavenger Hunt inside Jefferson School and outside the building.

Week 2 (June 18-21)

Notes: How are simple machines useful in my world?

Monday	Tuesday	Wednesday	Thursday
Simple Machine Exploration: Simple Machines Station Rotations - Exploration of MackinVIA Simple Machines ebooks Symbaloo Learning Path Small groups in rotation-style Record findings in data notebooks	Continuation... Simple Machines Stations Rotations - Exploration of MackinVIA Simple Machines ebooks Symbaloo Learning Path Small groups in rotation-style Record findings in data notebooks	Catapult Create: Partners or groups of 3 work together to design a catapult with levers, wheel and axle and wedges, that will shoot the cereal into a cup. Materials: cereal, popsicle sticks, rulers, meter sticks, straws, string, cups and tape. Record the tries, results and adjustments in the data notebook.	Complete the catapult and share results. Large group Review Data Notebooks Introduce/practice using Flipgrid for reflection of thinking Post-Assement of Simple Machines

Week 3 (June 25-28)

Notes: How can simple machines be used in carnival rides?

Monday	Tuesday	Wednesday	Thursday
Carnival Rides VR	LEGO® Education WeDo 2.0 Core	Continue the exploration of the WeDo	1. Begin building your LEGO Carnival

Use VR headsets to explore the varied carnival rides. Identify and record the simple machines used in the rides in the data notebook.	Set Explore the WeDo 2.0 set.	2.0 set	Ride: • All carnival rides must incorporate a MOTOR, and include at least ONE GEAR or PULLEY • Your ride must be designed to operate on its own once the battery pack/motor is turned on
Week 4 (July 9-12) Notes: Build Week			
Monday	Tuesday	Wednesday	Thursday
(First five minutes): Sharing Success and Struggles Build, test, refine...repeat Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid	(First five minutes): Sharing Success and Struggles Build, test, refine...repeat 2. Begin building your Unique LEGO Piece, 3D modeled: • Must be drawn to scale in 3D model using Tinkercad • Must fit into LEGO Carnival Ride • Must improve the functionality of the ride Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid	(First five minutes): Sharing Success and Struggles Build, test, refine...repeat Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid	(First five minutes): Sharing Success and Struggles 3. Begin creating your Carnival Feature Popcorn Cart, Park Bench, Tree, etc. Must be drawn to scale in 3D model Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid
Week 5 (July 16-19) Notes: Build and Refine			
Monday	Tuesday	Wednesday	Thursday
		PD Printing training w/Robert Repper,	

		July 18th	
(First five minutes): Sharing Success and Struggles 4. Begin creating your Carnival Ride Sign: • Sign must be computer-generated (Google Drawing, Photoshop, etc.) • Sign must include: ◦ Name/Picture of ride ◦ Names of group members ◦ Simple machines used	(First five minutes): Sharing Success and Struggles Build, test, refine...repeat Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid	(First five minutes): Sharing Success and Struggles Build, test, refine...repeat Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid	(First five minutes): Sharing Success and Struggles Build, test, refine...repeat Carnival Ride Digital Portfolio Scholars will document their learning process and reflections through flipgrid
Early Finishers ideas: • Merge projects together to create their own mini-carnival within the whole carnival. • Add another simple machine to an existing ride. • Read more ebooks. • Review the Symbaloo Learning Path Week 6 (July 23-26) Notes: Final touches and presentation of learning			
Monday	Tuesday	Wednesday	Thursday
Work Day	Work Day	Carnival LEGO!! Presentation of learning and digital portfolios	Reflection Day