Unit 7 (Mechanisms): Exploring Wheels and Axles

Concept

Mechanisms are parts of structures which create or use motion. Wheels are mechanisms.

Content Objective

Explore shapes that do and do not roll.

Language Objectives

Students will use the following high-frequency English words to identify and discuss different kinds of movement and vehicles: *roll, slide, float, vehicle, boat, sled, bicycle, bus*

Students will listen to the teacher orally explain the Design Brief task, and will orally share questions they have Students will orally share their ideas and work putting a wheel on a cereal-type box in order to make the wheel turn.

Standards

- NGSS:
 - **K-2-ETS1-1.** Ask questions, make observations, and gather information about a situation people want to change to define problem that can be solved with a new or improved object or tool.
- TEKS:
 - 1A identify and demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations, including wearing safety goggles, washing hands, and using materials appropriately (identify)
 - o 2B plan and conduct simple descriptive investigations such as ways objects move (investigate movement)
 - 3B make predictions based on observable patterns in nature such as the shapes of leaves (predict from patterns)
 - 4A collect information using tools, including computers, hand lenses, primary balances, cups, bowls, magnets, collecting nets, and notebooks; timing devices, including clocks and timers; non-standard measuring items such as paper clips and clothespins; weather instruments such as demonstration thermometers and wind socks; and materials to support observations of habitats of organisms such as terrariums and aquariums (use tools)
 - **6D** observe and describe the ways that objects can move such as in a straight line, zigzag, up and down, back and forth, round and round, and fast and slow (how objects move)
- ELPS:
 - 1A Use prior knowledge and experiences to understand meanings in English.

- 4A Learn relationships between sounds and letters of the English language to represent sounds when writing in English.
- 1C Use strategic learning techniques such as concept mapping, drawing, memorizing, comparing, contrasting and reviewing to acquire basic and grade-level vocabulary.

Suggested Literature Connections:

"Wheels!" by Annie Cobb

Materials:

Assorted objects to test (e.g., cereal or oatmeal boxes; cans; milk cartons; cardstock paper; spools; paper towel rolls; ping pong balls; wooden blocks; funnel; marbles; dominoes; toy car)

Day 1: Engage/Explore

	Teacher Says/Does	Student Says/Does	Language requirements
1.	Gather all students on the rug and show three or four	Students point at objects in	This is a
	objects from the materials list. Or show pictures for	the material list or at pictures	It is used for
	these materials in the handout (K.7.1). Ask the following questions: <i>What is this? What is it for?</i> Invite students to	on handout and share what they know about them.	One word that rhymes
	point out and name each of the objects and share what	they know about them.	with slide is
	they know about them.		One word that rhymes
2.	Divide the students into pairs and give each pair one		with roll is
	object from the materials list that either rolls or slides.	Students share words that	
3.	Demonstrate and discuss how some objects will roll and others will slide.	rhyme with "slide" and with "roll"	We think this object slides because
4	Ask pairs of students who have objects that can roll to	1011	Decause
	stand up. Have each pair demonstrate why they can		We think this object rolls
	think the object rolls.		because
5.	Next, ask pairs of students who have objects that slide		
	to stand up. Have them take turns to demonstrate why they think their object slides.		
6.	Show them the <i>The Little Engine that Could</i> video:	Student pairs explain their	
0.	https://www.youtube.com/watch?v=8EhpqcXoxGI	understanding of sliding and	
7.	Show students a picture of a toy car. What has to	rolling objects	
	happen before a toy car can roll? Give students toy cars		
	and have them describe what is happening as the	Ctudente chere what they	
	wheel turns. Let them explain to each other.	Students share what they know about cars	
		know about cars	

Day 2: Explain/Elaborate

	Teacher Says/Does	Student Says/Does	Language requirements
	Go on a walk and find some things that vehicles do and how they travel. Or show them pictures of a bicycle, a sled, a boat and a bus from the handout (K.7.3). Ask the following questions: • What are vehicles for? • What do they do?	Students share their knowledge about vehicles	Vocabulary: roll, slide, float, vehicle, boat, sled, bicycle, bus
4. 5.	 How do they move? Which vehicles don't have wheels? Write down the children's ideas as you go and read them back to the children when you return. Do a choral reading of the paragraph constructed from children's ideas Show cards with the words "slides" and "rolls" (handout (K.7.2)). Read the words with the students. Ask students if the vehicles they saw on the visit rolls or slides. (Boats, sleds) How do they travel? (They float, or 	Children read a paragraph constructed from their ideas about vehicles Students decide if examples seen on the walk or on the handouts "slide" or "roll" and explain their choice.	
	slide.) Do the vehicles we saw today slide? Why not? Once they respond that the vehicles don't slide, ask students why not? You might want to let some of the children explore with		
9. 8.	pictures in the handout (K.7.3), decide if the vehicle slides or rolls, and put a checkmark on it.		

Day 3: Evaluate

	Teacher Says/Does	Student Says/Does	Language requirements
1.	Have students watch a video about 10 different vehicles with wheels, and ask them what they all have in common:	Students decide what vehicles and wheels have in common	Vehicles and wheels have in common
2	https://www.youtube.com/watch?v=P5FvarVt3us		Vocabulary: wheel, axle
Ζ.	Tell them they are going to make vehicles by putting a wheel on certain materials.		
3.	Form student teams. Give the students access to recycled materials and ask the teams to explore ways to put a wheel on a cereal-type box so that the wheel will turn.		
4.	Talk about axles, and whether axles turn or wheels turn in some toys that they are familiar with	Students explain how they	
5.	 During the exploratory work, go to each team individually and ask questions to help them focus on the materials they are using and the results of their actions. Here are some questions for coaching: How did you do that? What is happening to your materials when you 	put a wheel on the cereal- type box in order to make the wheel turn.	
	 what is happening to your materials when you connect them like that? 		

Day 4: Elaborate

	Teacher Says/Does	Student Says/Does	Language requirements
1.	Have the teams present some of their ways of attaching moving wheels. These students can advise others during design brief work.	Student teams make a short presentation explaining how they attached a wheel on	Vocabulary: roll, slide, limp, collage
	Explore further by testing various objects on the playground slide after predicting which ones will slide, roll, or limp, etc., down the slope	their cereal-box Students talk about playground objects and	
3.	Have students continue the exploration with rolling, sliding objects, by doing one of the following in different groups: cutting out pictures of things that roll and slide and making a collage	decide which ones slide, roll, limp Students make a collage with objects that roll or slide	

Examples of Materials:





(Explore/explain)

rolls

slides

(Engage/explore)

Name:	ame: Date:	
Object	rolls	slides