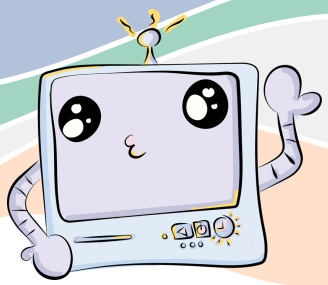


STEMTaught

# Engineering Adventure

## Plan 5

4TH- 8TH GRADE

### READING TIME
(30 min)

### READ CHAPTERS 17 TO 20 OF 'THE WILD ROBOT'

Continue reading the story with your students. Try calling on student volunteers to read one paragraph each aloud. Discuss.

**Discussion Questions:**

Ask: **What did Roz learn from the stick insect?**

Example: She learned that camouflaging could help her survive.

Ask: **What things does Roz disguise herself as?**

Example: A tuft of plants, a clump of seaweed, a bramble on the mountain, a log on the river, a rock.

Ask: **How does the author suggest that Roz stayed disguised for a long time?**

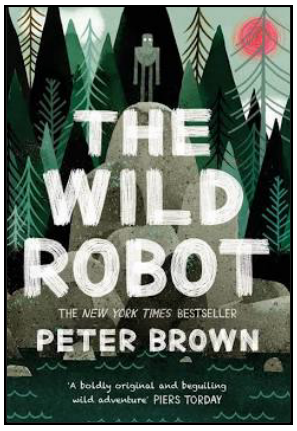
Example: In the chapter 'The Observations', Roz watches tadpoles become frogs and caterpillars become butterflies.

Ask: **What new skill has Roz developed at the end of this section, and what impact do you think it will have?**

Example: Roz can now understand animal words. I think she will be happy because she will be able to talk to the animals.

Ask: **What do you think will happen next? What has been your favorite part so far?**

Example: Students' own answers.




### STEM CRAFT
(30 minutes)

Materials:

- Pipe cleaners
- Natural materials

### CRAFT A STICK INSECT

**Say: The stick insect teaches Roz an important survival skill. Let's go outside and collect twigs to craft a fun stick insect of our own!**

**What you'll do:**

- Students explore and find a 'peculiar twig' to craft with.
- They wrap around pipe cleaner to make their stick insect.
- Let them enjoy varying the length, how they wrap and if they can use the cleaners to join multiple sticks.

## STEM CRAFT

(40 minutes)

Materials:

- Pipe cleaners
- Yarn+ Scissors

## FINGER KNIT A FOREST ANIMAL

**What you'll do:**

- Students use the finger knitting and coiling techniques they have learned to free knit an animal from the story.
- They can use pipe cleaners to bend and tie the shape, or knot it with yarn.
- The basic building blocks (the sausage-like knit rope and how to weave through to join it) remain the same. They can use two colors to knit for a dual-tone effect.

## GAME TIME

(20 min)

Materials:

- Volleyball
- Four square court, or chalk or masking tape to make a four square court

## PLAY FOUR SQUARE VOLLEYBALL

**How to play:**

- Depending on the group size, multiple groups can be organized and multiple courts can be made.
- Have groups line up at their four square court.
- Have the first four players in each line fill in the four squares. Have the first person in line pass the volleyball to player one.
- The first player will then state the name of another player in the court, and will hit the ball to them.
- Players will continue to play in this pattern. If a player misses the ball then they must go to the end of the line and the next player in line will take their place.
- The game continues until the STEM Coach decides.

## STEM ART

(60 min)

Materials:

- Available art supplies
- Paper

## CREATE A GROUP MURAL

Break students into groups and help them decide which chapters they will work on. (Example: 4 groups, with each group taking responsibility for 5 chapters. Group 1: Chapters 1 to 4, Group 2: Chapters 5 to 8 etc)

Say: **Did you know Peter Brown is both the author AND illustrator of *The Wild Robot*? Today, you get to create your own illustrations for the chapters your group is responsible for. Have fun creating and remember, in large scale engineering projects, many engineers and scientists each work together and each one takes responsibility for their part.**

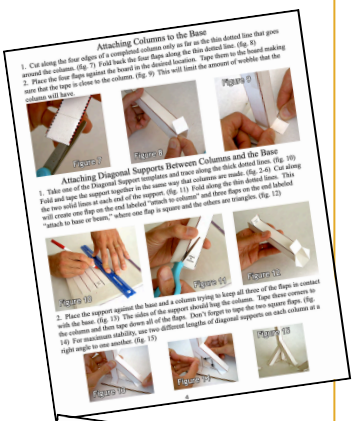
Student groups present their murals to the rest of the class.

## ENGINEERING CHALLENGE

(60-90 min)

### Materials:

- Scissors
- Tape
- Ruler
- Ball-point pens





# PAPER ROLLER COASTER: REINFORCE YOUR FRAMEWORK

Say: **If you only build vertical columns, your roller coaster will be tall, but it might not be very strong. One idea is to add diagonal reinforcements to make your foundation stronger!**

**What you'll do:**

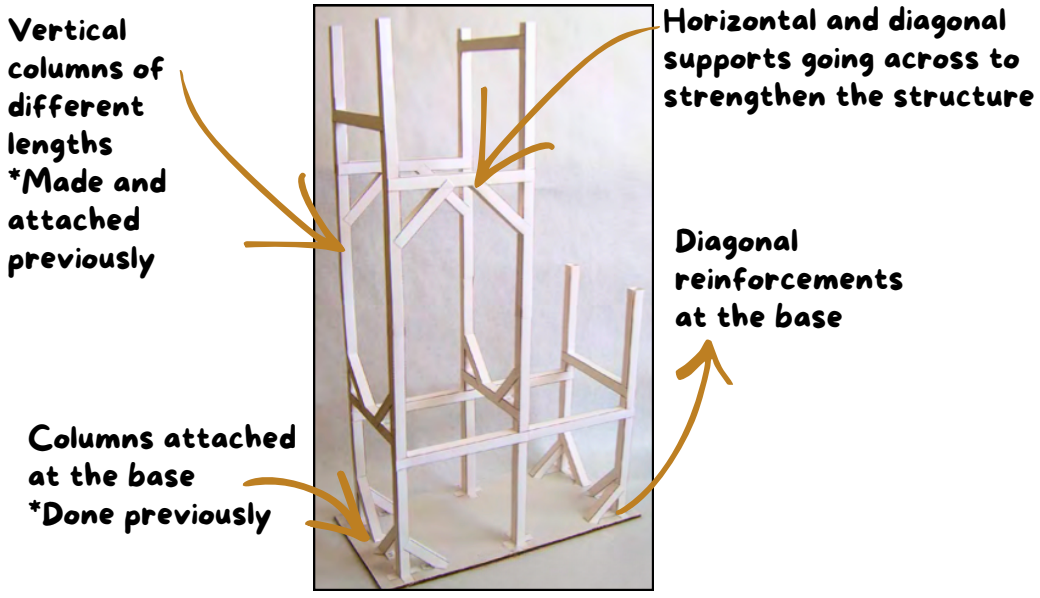
1. Students follow the printable instructions "Adding Diagonal Supports Between Columns and the Base". Note: They have already done the first section "Attaching columns to the base"

2. They trace and cut from the diagonal beam template and add diagonal reinforcement to strengthen their beams.

3. Students make and add beams using the template provided. They can add as many as they like. They will need to measure carefully and cut the beams to match the distance between two columns. Say: **Engineers must measure very carefully. Work together to hold the ruler and your columns steady, and record your measurements as precisely as possible.**

4. These beams can criss-cross like the letter 'Z' or go straight across like rungs of a ladder. Let students use their own ideas and keep on reinforcing their structure.

5. By the end of the activity, they should begin to have a structure that looks something like this reference image. It does not need to look exactly like this. Just circulate and see if they have largely similar parts. Here's what to look for:



## METRIC

### MAKE A STICK INSECT

**3-5-ETS1-1.**
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

### ROLLER COASTER DESIGN

**3-5-ETS1-1.**
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

**4-PS3-1.**
Use evidence to construct an explanation relating the speed of an object to the energy of that object. (Particularly for constructing loops)

**3-5-ETS1-1.**
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

**3-5-ETS1-3.**
Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.