



Anatomy of a Wave¹

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Students take on the roles of reporters and artists to draw and describe the nature of transverse waves.

Science Topics	Process Skills	Grade Level
Parts of a wave	Observing	3-12
Periodic motion of waves	Scientific inquiry	
Wave properties	Comparing	
	Communicating	

Time Required			
Preparation	Set-Up	Activity	Clean-Up
None	5 minutes	45 minutes	5 minutes

Learning Goals

Students will be able to...

- draw and label a basic transverse wave
- identify a wavelength on a transverse wave
- describe the difference between transverse and a longitudinal wave
- identify the source, receiver and medium for any type of wave

Materials	
In the Kit	Not in the kit
Transverse wave sheet* (pg. 4) - 1 per student pair Slide presentation	Computer with “ Wave on a String ” from PhET Interactive Simulations Lab notebooks or regular paper pencils

*You may want to laminate the transverse wave sheets so that they are reusable and will last longer

Set-Up

Gather materials and set up computer with the PhET simulator “Wave on a String” and the presentation. ([PowerPoint](#) or [PDF slides](#))

Introduce the Activity

Explain that the class will start by having students work in pairs and each student will take on the role of artists or reporters. If you have an odd number it’s possible to have a group with three and two students are reporters, but this is not ideal.

Doing the Activity

Anatomy of a Wave: part 1

Rules:

- One student is the reporter and will get the wave sheet. (The reporter can’t look it at or show it to anyone until told to by the teacher.

¹ Modified from Jackie Esler, Boulder Valley Schools

- The partner will be the artist. The artist will try to draw what the reporter describe.
- Reporters can't comment on the artists' work! They can answer questions, but cannot look at the artists' picture or clarify by showing the wave sheet.

NOTE: The activity does not work if students do not follow the directions. Once they “cheat” the activity is spoiled. It may be useful to do a practice activity with a simple picture like a smiley face. Once the rules are understood, then use the wave picture.

1. The Reporters will be given a copy of the wave sheet FACE DOWN and told not to look at it or show it to anyone until told to by the teacher. tell them it is top secret – no peeking! Tell the artists to close their eyes.
2. Once everyone understands the rules, allow the reporters to look at their wave sheet and remind them about how to tell the artist about the picture they will be drawing.
3. Once they have a good look, reporters should turn the wave picture face down and the artists can open their eyes and begin.
4. Give them about 5 minutes to draw. Walk around listening as the students instruct the artists.

Anatomy of a Wave: part 2

1. Collect the wave sheets from the reporters and ask the artists to turn their picture over. The reporters should get out a blank piece of paper.
2. Do the activity again, but this time, you give the instructions for all the students to draw this time.
3. After everyone is finished, the class will look at both drawings and you will display the original picture for the class
 - Have the students make any touch-ups necessary and talk about the difficulties with listening and creating images.
4. Introduce new terminology to the students, using the image as a reference.
 - Crest
 - Trough
 - Wavelength
5. Have the students add the new terms to their drawings.

NOTE: showing wavelength from crest to crest gives students the easiest view.
6. After the partner activity, begin the Slide presentation about the properties of waves. The presentation should include the class for discussions.
 - notes are included on each slide describing how to use them in class

Explanation

In-depth background information for teachers and interested students.

Key Lesson Terminology

- Crest – the top of the wave
- Trough – the bottom of the wave
- Wavelength – the distance between two successive, identical parts of the wave. Ex. Crest to crest, or trough to trough.

Modifications

- Hard of hearing students can be the reporter through an interpreter
- The PhET website can be viewed in many languages, and learners can experience the simulations in their native language to help them fully understand the material being presented

Supplemental Materials

Wave sheet below, page 4.

