Name(s): _____ Date: _____ Period: ____

ACTIVITY #1 HUMAN WAVE

A Teacher Directed Engagement Activity

Prior to this activity pose the following questions. "What is the difference between a pulse and a continuous wave?" "How does the motion of a longitudinal pulse differ from that of a transverse pulse?"

Materials: Students and Rope

Procedure:

1. Arrange the students from tall to not so tall. The student's shoulders must be touching. As a safety precaution have a student stand at each end of the line to buffer the motion of the last student in the line.
2. Give the tallest student a gentle sideways push (Parallel to the line).
3. Have students discuss or record their observations emphasizing how the "push" was transferred and the approximate time it takes for the push to go from one end of the line to the other.
4. Repeat from the other end of the line, recording similarities and differences.
5. With the students in their original arrangement, gently push the taller person in a repetitive pattern of about one push every two seconds for approximately twenty seconds.
6. Have students record or orally discuss the differences between a single push and one that repeats itself.
7. With the students still in position and holding a long rope have shorter person raise his or hers arms straight out in front, lift his/her arms straight over his/her head and then lower them to front again.
8. When the first student has his or her arms over his/her head the next student places her/his arms in front of his/her body, lift his/her arms straight over his/her head and then lower them to front again. The process continues down the line with each successive, neighboring person raising his/her arms in front as the previous neighbor has his/her arm straight over his/her head.
9. Have students discuss or record their observations emphasizing how the "wave" was transferred and the approximate time it takes for the "wave" to go from one end of the line to the other end compared to the "pushing" pulse. Also discuss the difference between the direction of the students or their arm motions compared to the direction of the pulses' motions. Ask, "Did the people or their arms actually move down the line?" Ask, "What traveled from one end to the other end of the line of people?"
10. Repeat starting at 7. with the following addition. Students must repeat their motion sequence for ten repetitions.

Summing Up:

1. Compare the amount of time that it took for the "push" to travel through the line of students with the time it took for the "wave" to travel through the same line. _____
   _____
2. What is the difference between a single disturbance (i.e., pulse) and one that repeats (i.e., continuous wave)? _____
   _____
3. What is the difference between the direction of the students or their arm motions compared to the direction of the pulses' motions? _____
   _____
4. In a mechanical, longitudinal wave, the particles in the medium oscillate or vibrate in a direction parallel to the direction the wave travels. In a mechanical, transverse wave, the particles in the medium oscillate or vibrate in a direction perpendicular to the direction the wave travels. Classify the two types of waves based upon these two definitions.
   _____
   _____