

Try this Activity (Nelson 12, p. 69)

- **Predicting Forces**

- In this activity, students predict the readings on spring scales that are set up in a variety of ways and support 9.8 N weights. They can check their predictions by reading the newton scales
- Time: 10 min

Teacher Preparation

- The teacher must set up three systems of weights and spring scales as shown in Figure 4 on page 69. To save time, teachers should arrange the scales so that the readings are hidden from students' views with a piece of paper.

Material/Equipment	Quantity per station	Quantity for 16 stations
5 newton spring scales 3 pulleys heavy string 4 1.0-kg masses	set up as a teacher demonstration	

Materials and Equipment Notes

- The spring scales should be calibrated in newtons, not grams.
- The string should be strong enough to support the loads.

Safety and Disposal

- If the systems of weights are suspended from retort stands, make sure the arrangement is adequately and safely supported.

Student Preparation

- Students should reflect on their past experiences with the concept of forces and Newton's laws of motion.
- Have students predict the readings on the various scales and give reasons for their predictions.

Teacher Suggestions

- Teachers should review Newton's laws of motion, particularly Newton's third law, with their students.
- Review the difference between mass and weight.
- This activity illustrates that a pulley system can redirect a force without affecting its magnitude. It also demonstrates Newton's third law of motion.

Extensions/Modifications

- Other arrangements of weights and spring scales can be used to produce the same scale readings. For example, remove one of the suspended weights and anchor the string to the desk for arrangement (c).
- Suspend a variety of different masses in arrangement (c) and have students observe any motion.