

Motion & Stability: Forces and Interactions

In this hands on lesson students will investigate the effects of balanced and unbalanced forces on the motion of an object. They will also observe, change the direction, and predict future motion of objects as they try to keep a boulder from destroying "Tiny Town". **Classroom teachers must provide the following: Cardboard Sheets (1/student), push pins, ping pong balls or other small ball (1/student) and Dixie cups (2/student)**

3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

You will need to provide the following materials for this lesson:

- Cardboard sheets – approximately 8-1/2 x 11 – these can be cut from regular corrugated cardboard boxes – thicker cardboard works best so if you only have thinner cardboard, I would suggest doubling up sheets! I would suggest asking the kitchen/custodial staff at your school to save boxes from deliveries. You will need 1 sheet cardboard for each student.
- Dixie cups – 2 per student
- Ping Pong (or other light weight ball that will fit in Dixie Cup) – 1 per student. Ask your PE teacher if they have these!
- Masking Tape – 2 small pieces and 1 longer piece/student (see picture of activity setup)
- 5 push pins/student (must not be the flat silver ones – they must stick up when pushed into the cardboard)
- Pencil Box – each student will use their pencil box to prop up their cardboard to make a "mountain"
- Model of "Tiny Town" – attached to this packet – one copy/student

Teacher preparation prior to the lesson:

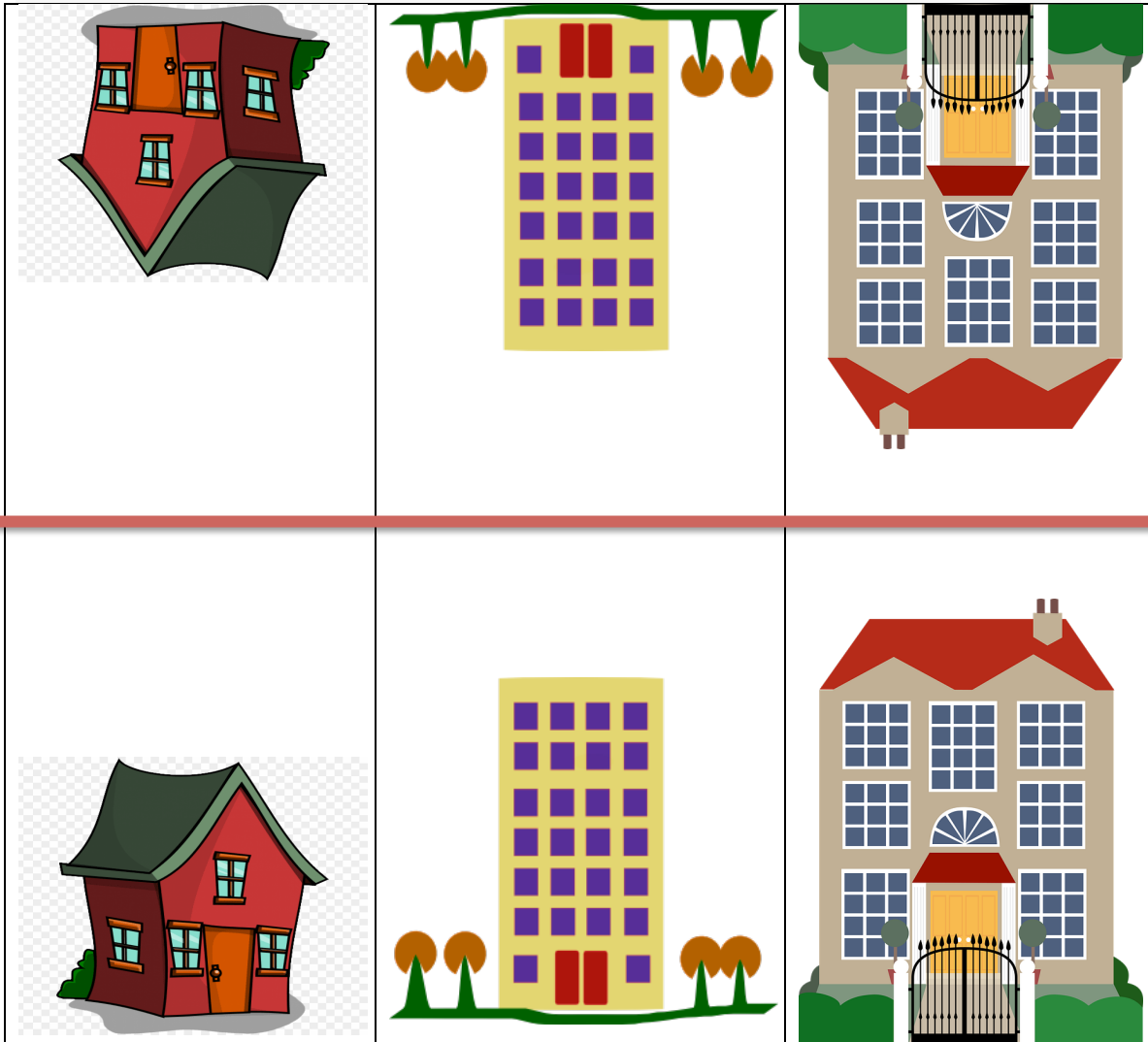
- Gather above supplies
- Cut cardboard sheets to size – approximately 8-1/2 x 11
- Have students cut out "Tiny Town" so that it is ready to use for this lesson.
- Tape Dixie Cups to each cardboard sheet to save time during the lesson. See setup picture below!

Activity Setup/Overview:

I will let you know when to start passing out materials. Below is a picture of what the setup will look like for each student. Students will use their pencil box to prop up the cardboard sheet. A Dixie cup will be taped to the cardboard at the top of the "mountain" and also at the bottom of the "mountain". The cardboard will also need taped to the desk to keep it from slipping. The cup at the top will be used to dump the ping pong ball (boulder) so that it will roll down the "mountain". Students will use push pins to change the direction of the ball so that it will roll into the cup at the base of the mountain so that it will avoid knocking down tiny town! This will take several moves of the push pins to accomplish! No worries...we will discuss push pin safety prior to starting the activity!



Tiny Town



Cut around the outside edges of Tiny Town. Cut on the lines to separate houses. Do NOT cut the red line because it is your folding line. Fold each house on the red line to make houses set up tent style.

Program Connection Information

Please use an external microphone (conference style) rather than the integrated one in the computer for the audio for your class and locate it centrally in the room. It can be difficult for the Greenbush teacher to hear the students using the computer microphone and therefore it reduces the interactive nature of the lesson. It is fine to use the computer webcam for your video source.

All classes will take place using Zoom desktop video. If your building is already set up to use a desktop video application with a computer, simply open a browser and enter <https://greenbush.zoom.us/j/2326746414> in the URL space. You may need to download Zoom launcher software (free download) if you don't already have it. This needs to be done in advance of the lesson.

If using a Polycom video conferencing unit (or any legacy type video conferencing unit) to connect to a ZOOM conference, make sure the unit is in "encrypted mode" then dial the following IP on the internet: 162.255.37.11 or 162.255.36.11 and once connected, they will ask for a MEETING ID: enter 232 674 6414 (for Lisa at Science Center).

It's always a good idea to touch base with your district technology facilitator prior to your program to make sure all systems/equipment are in place and operational and that there aren't any firewalls in place that might prevent you from connecting to Zoom.

Once you connect, you will enter a Zoom waiting room. Your Greenbush teacher will admit you into the final meeting room.

If you have questions, please email me at lisa.little@greenbush.org