

## 6 Scoring Points

### Build Knowledge

#### INTRODUCTION

##### What Students Do in this Activity

In this activity, students continue to lay out their own pinball playfields. They try to determine where additional targets should be placed based on their observations about where the pinball can be easily targeted and where the more difficult areas to hit are. As they conduct their investigations, they refer back to their science notebooks.

##### A-Ha

Students will assign scores to targets based on how hard or easy they are to hit. Targets that are harder to hit should be assigned higher point values.

##### Objectives

*Students will:*

- Use information gathered to make design decisions
- Lay out additional targets on their playfield
- Choose how they will assign points

##### Time

30–40 minutes

##### Materials

*For the teacher:*

- 1 copy of **Letter from EarthToy Designs: Part 3, Reproducible Master 9**
- 1 pinball playfield
- 1 launch ramp
- 1 pinball (marble)
- 1 target
- 1 piece of removable adhesive putty
- Chart paper or whiteboard
- Markers

For each team:

- Their pinball playfield
- 1 launch ramp
- 5 pinballs (marbles)
- 5 targets
- 1 piece of removable adhesive putty
- Sticky notes (2" x 1.5")
- 1 pen

For each student:

- 1 copy of **Letter from EarthToy Designs: Part 3, Reproducible Master 9**
- Their completed **Where Does the Pinball Roll?, Reproducible Master 7**
- Science notebook (see Introduction, page 27, for more information)

### Preparation for the Activity

Make sure that students have their completed **Where Does the Pinball Roll?, Reproducible Master 7**.

Set up a playfield in the center of the space for *Discussing and Interpreting*.

## CLASSROOM ACTIVITY

### Presenting the Activity – Whole Group

1. Gather students for a whole group discussion.
2. Remind students of the targets they added in the previous activity.
3. Explain that in this activity teams will be adding more targets and assigning points to them.
4. Hand out a copy of **Letter from EarthToy Designs: Part 3, Reproducible Master 9**, to each student.
5. Read **Letter from EarthToy Designs: Part 3, Reproducible Master 9**, to students.

Discuss what EarthToy Designs wants them to do.

6. Remind students that in the last activity they placed two hard-to-hit targets and one easy-to-hit target. Discuss how students think points should be assigned to these targets.

Ask students, "Should the hard-to-hit targets get a lot of points or a few points?"

As a class, decide how many points to award for hitting each target and write the numbers on sticky notes.

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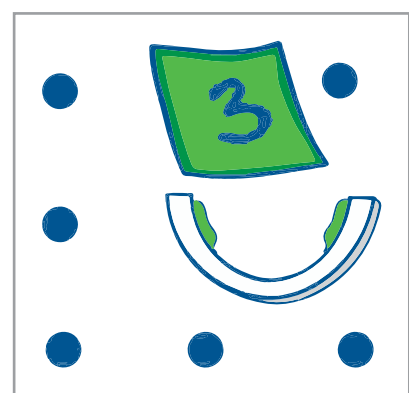
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Demonstrate how to label the targets with sticky notes. Explain that they can easily change the point values on targets if they use sticky notes, rather than write on the playfield.

7. **Explain that teams will decide where they should place two more targets on their playfields and assign point values to all the targets.**

Explain to students that after teams determine where to place a target, they will test their game to see if the target is in a good position.

Tell students that they can move their targets if they do not like the way the game plays.

Remind students that they can only use the following point values: 0, 1, 2, 3, and 4 points.

### **Facilitating Student Exploration – Teams**

8. **Begin the exploration by having students break into their teams, making sure that students have their science notebooks available. Hand out playfields to the teams.**

Explain to students the following:

- It is their job to decide where they should place the five targets on the playfield and to assign point values to each target.
- They can only use five point values for the targets: 0, 1, 2, 3, or 4 points.
- A typical score should be between 7 and 12 points.
- They should use the information from their science notebook about the parts of the playfield that are easy to hit and the parts that are more difficult to hit to decide where to place the targets.

9. **Encourage students to look at the paths they drew on their completed *Where Does the Pinball Roll?*, Reproducible Master 7, to help them make their decisions.**

10. **As teams add targets, have them test their games to see if the targets are where they want them to be.**

11. **As teams work, circulate among them to observe what they are doing and to listen to their conversations.**

Use this as an opportunity to assess students informally by asking yourself the following questions:

- Are students following the guidelines?
- What are they noticing about where they place their targets?
- Are they noting ways in which the placement of one target affects the ease with which another target can be hit?
- How are students communicating with one another about their observations and findings?
- Are they using their science notebooks to help them make their decisions?



## LETTER FROM EARTHTOY DESIGNS: PART 3



### **Hello Again Students:**

Your game needs to have 5 targets. Each target needs to score points for the player. You can only have targets that score 0, 1, 2, 3, and 4 points.

Most importantly, we want players to score between 7 and 12 points after launching 5 pinballs most of the time.

You're getting close!

A handwritten signature in black ink that reads "I. M. Green". The signature is written in a cursive style with a large, looping "G" at the end.

I. M. Green  
President