

# Will It Hit the Hoop?

CLASS CODE

30-45 minutes | Application

In this activity, students predict whether various basketball shots will go through the hoop, and then model these shots with parabolas to check their predictions.

Students use draggable points to model in this activity, and do not need to be familiar with symbolic forms of quadratic functions in advance.

## Activity Checklist

- ☐ Complete the activity using student preview.
- ☐ Identify your learning targets for the activity.
- ☐ Determine the screens where you'll bring the class together using Teacher Pacing and Pause Class. What will you discuss on those screens?
- ☐ Anticipate screens where students will struggle, then plan your response.
- ☐ Plan a challenge for students who finish the activity quickly and successfully.
- ☐ Make yourself available during the activity to students for individual help and questions when appropriate.
- ☐ Write out your summary of the activity's main ideas. How will you pull student work into that summary? Which parts of the activity can you skip to ensure that summary receives sufficient time?

My Learning Targets:

---

---

---

---

# Activity Screens: Teacher Pacing and Pause Class


Use this page to plan your use of Teacher Pacing and Pause Class. Teacher Pacing lets you restrict students to a single screen or a range of screens. Pause Class keeps students from interacting with whatever screens they are currently viewing. Use these two tools to create conversations in your classroom.

Consider these questions as you plan:

- Which screen(s) should everyone work on at the same time? Why?
- Which screen(s) do you want to keep students from seeing until you're ready for the class to see them together? (Perhaps because they reveal answers or require a whole class conversation for introduction.)
- Are there any points in the lesson where you will want to make sure students aren't playing with the screens while you discuss something as a class?


<b>1 Create the Best-...</b>  Drag the black points to create a line that models the blue points.	<b>2 Create the Best-...</b>  Lines used to be the only kind of 	<b>3 Create the Best-...</b>  Instead we need a relationship called a quadratic relationship.	<b>4 Shot #1 – Predict</b>  Press the play button. Then tell us: 
<b>5 Shot #2 – Predict</b>  What's your best guess? Does the ball 	<b>6 Shot #3 – Predict</b>  What's your best guess? Does the ball 	<b>7 Shot #4 – Predict</b>  What's your best guess? Does the ball 	<b>8 Shot #5 – Predict</b>  What's your best guess? Does the ball 
<b>9 Shot #6 – Predict</b>  What's your best guess? Does the ball 	<b>10 Shot #7 – Predict</b>  What's your best guess? Does the ball 	<b>11 Shot #1 – Analyze</b>  Now that you've predicted the 	<b>12 Shot #2 – Analyze</b>  Drag the black points to transform 
<b>13 Shot #3 – Analyze</b>  Drag the black points to transform 	<b>14 Shot #4 – Analyze</b>  Drag the black points to transform 	<b>15 Shot #5 – Analyze</b>  Drag the black points to transform 	<b>16 Shot #6 – Analyze</b>  Drag the black points to transform 
<b>17 Shot #7 – Analyze</b>  Drag the black points to transform 	<b>18</b> Let's see the answers. First, do you have more 	<b>19 Shot #1 - Verify</b>  Here is the answer. Let's look at what you said previously.	<b>20 Shot #2 - Verify</b>  Here is the answer. Let's look at what you said previously.

21 Shot #3 - Verify




Here is the answer. Let's look at what you said previously.

22 Shot #4 - Verify




Here is the answer. Let's look at what you said previously.

23 Shot #5 - Verify




Here is the answer. Let's look at what you said previously.

24 Shot #6 - Verify




Here is the answer. Let's look at what you said previously.

25 Shot #7 - Verify




Here is the answer. Let's look at what you said previously.

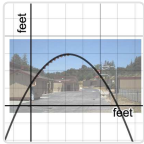
26 Class Results



What conclusions can you




27 Extensions




We'll spend more time talking about the quadratic model in the future.

28 Extension #1




COPY PREVIOUS

Approximately how tall is the shooter?




29 Extension #2




COPY PREVIOUS

What are the coordinates of the




30 Extension #3

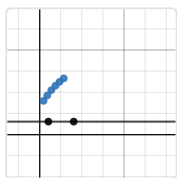


COPY PREVIOUS

The equation of the quadratic



### 1 Create the Best-Fit Li...



Drag the black points to create a line that models the blue points.

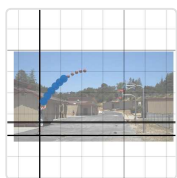
Drag the black points to create a line that models the blue points.

#### Teacher Tip:

Use "Responses" mode in the teacher dashboard to see how well your students understand the concept of a best-fit line.

My Notes:

### 2 Create the Best-Fit Li...



Lines used to be the only kind of mathematical

Lines used to be the only kind of mathematical relationship we needed. Lots of models are linear.

But lines are the wrong model here! What does your line say will happen to the basketball?

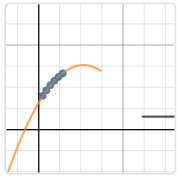
#### Teacher Tip:

Highlight unique answers for the class. Ask students to justify their responses and critique each others' reasoning.

Sample Answer: The ball will go up and up forever.

My Notes:

### 3 Create the Best-Fit Li...



Instead we need a relationship called a quadratic relationship, which is useful

Instead we need a relationship called a quadratic relationship, which is useful when problems involve gravity or area, among other contexts. This activity is an introduction to the graphs of quadratic relationships.

First, we're going to use our eyes alone to make some predictions about the basketball.

My Notes:

---

---

---

---

### 4 Shot #1 – Predict



Press the play button. Then tell us:



Press the play button. Then tell us:

What's your best guess? Does the ball go in or out?

**Teacher Tip:**

Emphasize the range of student responses on this screen. It's okay—even desirable—to lack consensus at this stage. The activity will build toward consensus later on.

My Notes:

---

---

---

---

5 Shot #2 – Predict



What's your  
best guess?  
Does the ball



What's your best guess? Does the ball go in or out?

Teacher Tip:

Emphasize the range of student responses on this screen. It's okay—even desirable—to lack consensus at this stage. The activity will build toward consensus later on.

My Notes:

---

---

---

---

6 Shot #3 – Predict



What's your  
best guess?  
Does the ball



What's your best guess? Does the ball go in or out?

Teacher Tip:

Emphasize the range of student responses on this screen. It's okay—even desirable—to lack consensus at this stage. The activity will build toward consensus later on.

My Notes:

---

---

---

---

## 7 Shot #4 – Predict



What's your  
best guess?  
Does the ball



What's your best guess? Does the ball go in or out?

**Teacher Tip:**

Emphasize the range of student responses on this screen. It's okay—even desirable—to lack consensus at this stage. The activity will build toward consensus later on.

My Notes:

---

---

---

---

## 8 Shot #5 – Predict



What's your  
best guess?  
Does the ball



What's your best guess? Does the ball go in or out?

**Teacher Tip:**

Emphasize the range of student responses on this screen. It's okay—even desirable—to lack consensus at this stage. The activity will build toward consensus later on.

My Notes:

---

---

---

---

9 Shot #6 – Predict



What's your best guess?  
Does the ball



What's your best guess? Does the ball go in or out?

Teacher Tip:

Emphasize the range of student responses on this screen. It's okay—even desirable—to lack consensus at this stage. The activity will build toward consensus later on.

My Notes:

---

---

---

---

10 Shot #7 – Predict



What's your best guess?  
Does the ball



What's your best guess? Does the ball go in or out?

Teacher Tip:

Emphasize the range of student responses on this screen. It's okay—even desirable—to lack consensus at this stage. The activity will build toward consensus later on.

My Notes:

---

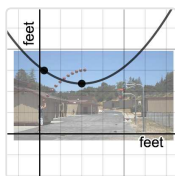
---

---

---



### 11 Shot #1 – Analyze



Now that you've predicted the



Now that you've predicted the shots using your eyes, let's analyze the shots using math.

Drag the black points to transform the parabola and help you decide if the ball goes in the hoop or not.

#### Teacher Tip:

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

My Notes:

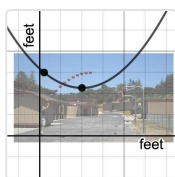
---

---

---

---

### 12 Shot #2 – Analyze



Drag the black points to transform the



Drag the black points to transform the parabola and help you decide if the ball goes in the hoop or not.

#### Teacher Tip:

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

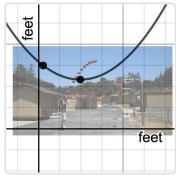
My Notes:

---

---

---

---

**13 Shot #3 – Analyze**

Drag the black points to transform the



Drag the black points to transform the parabola and help you decide if the ball goes in the hoop or not.

**Teacher Tip:**

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

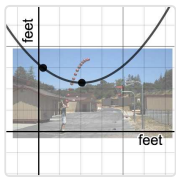
My Notes:

---

---

---

---

**14 Shot #4 – Analyze**

Drag the black points to transform the



Drag the black points to transform the parabola and help you decide if the ball goes in the hoop or not.

**Teacher Tip:**

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

My Notes:

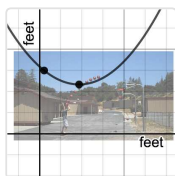
---

---

---

---

## 15 Shot #5 – Analyze



Drag the black points to transform the



Drag the black points to transform the parabola and help you decide if the ball goes in the hoop or not.

## Teacher Tip:

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

My Notes:

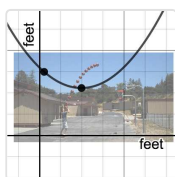
---

---

---

---

## 16 Shot #6 – Analyze



Drag the black points to transform the



Drag the black points to transform the parabola and help you decide if the ball goes in the hoop or not.

## Teacher Tip:

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

My Notes:

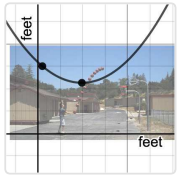
---

---

---

---

## 17 Shot #7 – Analyze



Drag the black points to transform the



Drag the black points to transform the parabola and help you decide if the ball goes in the hoop or not.

## Teacher Tip:

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

My Notes:

---



---



---



---

18

Let's see the answers.

First, do you have more



Let's see the answers.

First, do you have more confidence in your predictions or your parabolas?

## Teacher Tip:

Show the balance of responses to the class. At the end of the activity, we'd like students to be more confident in the parabolas than their predictions.

My Notes:

---



---



---



---

## 19 Shot #1 - Verify



Here is the answer. Let's look at what you said previously.

Here is the answer. Let's look at what you said previously.

**Teacher Tip:**

Invite students to notice that our answer using parabolas is more accurate than our answers using estimation from earlier in the activity (if that's true). Math is power, not punishment!

My Notes:

---

---

---

---

## 20 Shot #2 - Verify



Here is the answer. Let's look at what you said previously.

Here is the answer. Let's look at what you said previously.

**Teacher Tip:**

Invite students to notice that our answer using parabolas is more accurate than our answers using estimation from earlier in the activity (if that's true). Math is power, not punishment!

My Notes:

---

---

---

---

## 21 Shot #3 - Verify



Here is the answer. Let's look at what you said previously.

Here is the answer. Let's look at what you said previously.

**Teacher Tip:**

Invite students to notice that our answer using parabolas is more accurate than our answers using estimation from earlier in the activity (if that's true). Math is power, not punishment!

My Notes:

---

---

---

---

## 22 Shot #4 - Verify



Here is the answer. Let's look at what you said previously.

Here is the answer. Let's look at what you said previously.

**Teacher Tip:**

Invite students to notice that our answer using parabolas is more accurate than our answers using estimation from earlier in the activity (if that's true). Math is power, not punishment!

My Notes:

---

---

---

---

## 23 Shot #5 - Verify



Here is the answer. Let's look at what you said previously.

Here is the answer. Let's look at what you said previously.

**Teacher Tip:**

Invite students to notice that our answer using parabolas is more accurate than our answers using estimation from earlier in the activity (if that's true). Math is power, not punishment!

My Notes:

---

---

---

---

## 24 Shot #6 - Verify



Here is the answer. Let's look at what you said previously.

Here is the answer. Let's look at what you said previously.

**Teacher Tip:**

Invite students to notice that our answer using parabolas is more accurate than our answers using estimation from earlier in the activity (if that's true). Math is power, not punishment!

My Notes:

---

---

---

---

## 25 Shot #7 - Verify



Here is the answer. Let's look at what you said previously.

Here is the answer. Let's look at what you said previously.

**Teacher Tip:**

Invite students to notice that our answer using parabolas is more accurate than our answers using estimation from earlier in the activity (if that's true). Math is power, not punishment!

My Notes:

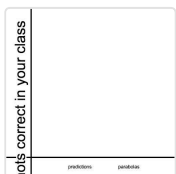
---

---

---

---

## 26 Class Results



What conclusions can you draw



What conclusions can you draw from this graph?

(The green points represent your individual scores.)

**Teacher Tip:**

Highlight unique answers for the class. Ask students to justify their responses and critique each others' reasoning.

If the parabolas resulted in more accuracy than the predictions, make sure to emphasize that fact for the class. Parabolas are power, not punishment.

My Notes:

---

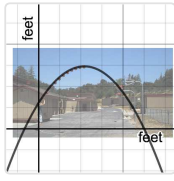
---

---

---



## 27 Extensions



We'll spend more time talking about the quadratic model in the future.

We'll spend more time talking about the quadratic model in the future.

Questions on the following screens will preview those conversations. Answer them as well as you can. We'll discuss their answers another time.

**Teacher Tip:**

Use "Responses" mode in the teacher dashboard to check student progress. Offer individual support where needed, or lead a brief whole-class discussion if enough students are struggling.

My Notes:

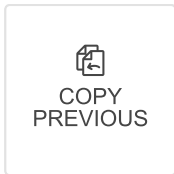
---

---

---

---

## 28 Extension #1



Approximately how tall is the shooter?



Approximately how tall is the shooter?

**Teacher Tip:**

Highlight unique answers for the class. Ask students to justify their responses and critique each others' reasoning.

Answer: The shooter's driver's license says he's 6' 7".

My Notes:

---

---

---

---

## 29 Extension #2



What are the coordinates of the basketball



What are the coordinates of the basketball hoop and what does it say about the hoop?

**Teacher Tip:**

Highlight unique answers for the class. Ask students to justify their responses and critique each others' reasoning.

Answer: The coordinates are (19,10) meaning the hoop is ten feet off the ground and the shooter is standing 19 feet away.

My Notes:

---

---

---

---

## 30 Extension #3



The equation of the quadratic relationship is



The equation of the quadratic relationship is

$$y = -0.07(x - 10.76)^2 + 14.8.$$

That equation references the coordinates (10.76,14.8).

What is the significance of those coordinates?

**Teacher Tip:**

Highlight unique answers for the class. Ask students to justify their responses and critique each others' reasoning.

Answer: That gives the coordinates of the ball at its highest point.

My Notes:

---

---

---

---

Summary Notes:

---

---

---

---

---