

Down Points In

Use a clock-face Earth model to track local down.

GRADE 5 • 5-PS2-1

5-PS2-1 "Support an argument that the gravitational force exerted by Earth on objects is directed down. Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth..."

NAME _____

DATE _____

THE BIG IDEA

Down always points toward the center of Earth. On a round Earth shown as a clock face, find the center, then point from the object straight toward it.

WORKED EXAMPLE

An object is at 4 o'clock on a clock-face Earth. Which way is down?

1. Start at 4 o'clock.
2. Point straight toward Earth's center.
3. That direction is toward 10 o'clock.

Answer: Down points toward 10 o'clock, toward Earth's center.

PRACTICE 5 problems

- 1** An object is at 12 o'clock on a clock-face Earth. Which way is down?

ANSWER _____

- 2** An object is at 3 o'clock on a clock-face Earth. Which way is down?

ANSWER _____

- 3** An object is at 6 o'clock on a clock-face Earth. Which way is down?

ANSWER _____

- 4** An object is at 9 o'clock on a clock-face Earth. Which way is down?

ANSWER _____

- 5** An object is at 2 o'clock on a clock-face Earth. Which way is down?

ANSWER _____

APPLY IT Show your work

- 1** In a space adventure game, a backpack icon is at 3 o'clock on a round Earth. Priya draws an arrow from the backpack toward 9 o'clock. Does her arrow show down? Support your answer.

WORK SPACE

ANSWER _____

- 2** On a sports app's round Earth map, a soccer ball icon is at 6 o'clock. Leo draws an arrow from the ball toward 6 o'clock and says it shows down. Is Leo correct? Explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two objects are on a clock-face Earth, one at 12 o'clock and one at 6 o'clock. Mina says down points the same way for both objects. Is Mina correct? Explain in 2 sentences.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	An object is at 12 o'clock on a clock-face Earth. Which way is down?	Toward 6 o'clock, toward Earth's center.
2	An object is at 3 o'clock on a clock-face Earth. Which way is down?	Toward 9 o'clock, toward Earth's center.
3	An object is at 6 o'clock on a clock-face Earth. Which way is down?	Toward 12 o'clock, toward Earth's center.
4	An object is at 9 o'clock on a clock-face Earth. Which way is down?	Toward 3 o'clock, toward Earth's center.
5	An object is at 2 o'clock on a clock-face Earth. Which way is down?	Toward 8 o'clock, toward Earth's center.

PART 2 • APPLY IT

- Yes. From 3 o'clock, an arrow toward 9 o'clock points toward Earth's center, so it shows down.** At 3 o'clock, the center is directly toward 9 o'clock. Down is the direction toward the center.
- No. From 6 o'clock, down points toward 12 o'clock, which is toward Earth's center.** Leo's arrow points away from the center. The correct down direction goes from 6 o'clock toward the center, or toward 12 o'clock.

CHALLENGE

No. At 12 o'clock, down points toward 6 o'clock, while at 6 o'clock, down points toward 12 o'clock because both directions point toward Earth's center.

Accept equivalent direction wording when the student clearly identifies a direction toward Earth's center. Students should explain that local down changes with location on the spherical Earth.