Activities (full instructions)

"Be the Earth" — every child an Earth

All children spread out, each wearing a "you are here" sticker, and spin SLOWLY in place together while the fixed lamp shines. As each child's face crosses the light they call the cycle together: "Sunrise!… noon!… sunset!… midnight!" Chant several turns; then ask what always comes after midnight, no matter how many spins. (Sunrise. Always. That is a pattern you can trust your life to.)

Lamp-and-globe model — the day's heart

Dark room. The owned bare-bulb lamp clamps at globe height as the sun; rice-grain Joe stands near the equator. Turn the globe slowly COUNTERCLOCKWISE (rehearse: from above the North Pole). Children put their eyes at globe level and watch Joe's sunrise arrive, his noon, his sunset, his night. Each child takes a turn as the narrator while another turns. **Sally sub-part:** add the second grain in California; sunrise strikes Joe first and Sally three hours of turn later — the phone call after lunch makes it personal. **Arrows sub-part:** sticky arrows for spin direction, sunrise side, sunset side; because the turn is one-way, the appearing and disappearing happen on opposite horizons, forever.

The sunset argue case

"The sun is setting" vs "we are turning away" — let both sides argue with the globe at hand. Land it: both describe the same event; only one names the true mover. Watching tonight's sunset with that sentence is the day's take-home.

SAFETY

Clear the floor lanes BEFORE lights-out; the clamp lamp's bare bulb runs hot — teacher's hands only, cord taped down. Swivel-chair spins are slow, one child at a time, a spotter behind. Never look at the real sun for the sky strip — note its place sideways-on.

Common Misconceptions

- "The sun moves across the sky" → the day's whole work; the globe and the chair both say otherwise.
- "Night is the sun turning off" → the lamp never dims; Joe just turns his back.
- "It's the same time everywhere" → the phone call settles it in one question.
- "The stars sweep past us" → the swivel chair: the ceiling "moved" too, and it never went anywhere.

STRETCH (ranch, adult-run, weather/luck-dependent)

(1) Real-sun shadow-stick tracking — the outdoor twin of the required indoor shadow-clock. (2) Star-trails night: a phone on a tripod at the North Star for an hour of long exposures — the children's own photograph of the sky wheeling. (3) Sunrise-point watch from one porch spot against a landmark. (4) A permanent fence-post sundial, mounted and calibrated with the kids.

Review Hooks

- Tonight: the draw-the-sky strip comes home filled in; the sunset sentence gets said at the window.

- All week: the evening moon found twice in one night — who lifted it?
- Notebooks: Joe's four moments around one drawn globe.

Prep-Ahead Checklist (night before)

□ test the blackout; tape cord runs □ clamp the OWNED bare-bulb lamp at globe height (do not buy one) □ toothpaste Joe (equator) + Sally (California) onto the globe; rehearse the counterclockwise turn □ build the shadow-clock: pencil upright in clay on the lazy Susan/stool, lamp fixed to one side; chalk/tape ready □ ceiling sticker-dot directly above the swivel chair □ sticky arrows cut □ line up the time-zone relative (world-clock backup) □ "you are here" stickers, one per child

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Opening Oration — The Sun That Never Rises

read aloud, 2–3 minutes • the globe with rice-grain Joe sits beside you, lamp off for now

PROP: the globe with a rice grain toothpasted on near the equator — introduce him as Joe. Turn the globe slowly at the marked moment.

"I am going to tell you something that sounds impossible, and by the end of today you will know it is true. Ready? **The sun never rises.** It never sets, either. It has never once moved across our sky. Not this morning, not any morning of your whole life."

"But you have SEEN it rise! You've watched it climb the sky and sink down orange behind the hills. So have I. So has everyone who ever lived — and for thousands of years, people believed their eyes: surely the sun circles around us. It took some very stubborn thinkers to discover the trick. Meet Joe." *(show the rice grain on the globe)* "Joe is standing on the Earth, just like you. Watch what happens to him." *(turn the globe slowly)*

"The Earth — this whole enormous ball we live on — is **turning**. Slowly. Smoothly. So slowly you cannot feel it, but it never stops. One full turn takes a day and a night: that is what a day IS. When Joe's patch of ground turns toward the light — that's his sunrise. When it turns away — sunset. The sun stood perfectly still the whole time. The GROUND did the moving. A sunset is really you, tipping slowly backward, away from a sun that never budged."

"Today you will BE the Earth and feel your own sunrise come around. You will give Joe a whole day with one turn of this globe. You will spin in a chair and discover why the stars wheel in circles every night. And this evening, when the sun goes down — you will know the secret almost nobody watching beside you knows: it isn't going anywhere. **You are.**"

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D-2 Supply List — Day and Night and the Earth's Rotation

Everything for the full 9:30–2 day. **Nearly everything is owned — total new spend ~$12.**

Already Have (owned / household)

☐	Item	Used in
☐	**Bare-bulb clamp lamp (owned — do NOT re-buy)**	The sun, all morning
☐	Globe	The lamp-and-globe model
☐	Rice + toothpaste	Joe and Sally
☐	A swivel chair	The star-spin experiment
☐	A pencil + a lump of clay + chalk/tape	The indoor shadow-clock
☐	A darkenable room	The whole model block
☐	Stickers ("you are here" + one ceiling dot)	Be-the-Earth + star spin

TO BUY

☐	Item	Qty	~Price	Why	Order ahead?
☐	Sticky arrows/dots pack	1	$4	Spin direction + opposite horizons	No
☐	Lazy Susan turntable	1	$8	The shadow-clock platform (or rotate a stool free)	No

Check-you-own-it notes

- The lamp is the same owned clamp lamp — Rule 9; check its bulb before session day.
- The phone call needs a relative two-plus time zones away lined up in advance; a world clock

is the backup, not the plan.

> Tick the box beside each item as it goes in the box. Anything flagged **order ahead** ships — buy it a week before the lesson.

The Swivel-Chair Star Spin

KIDS HANDS-ON | RUN AT 11:00 | 25 MIN

The point

Spin slowly and the whole ceiling appears to circle the one point directly overhead — which never moves. That is EXACTLY why the night's stars wheel around the North Star: **the sky holds still; we turn beneath it.**

Materials

- A swivel chair
- A removable sticker dot on the ceiling, directly above the chair
- A spotter behind the chair

Steps

1. Point out the ceiling dot. Ask: when you spin, what will the dot do? What will the rest of the ceiling do?
2. One child sits, looks straight UP, and turns SLOWLY (the spotter keeps it gentle).
3. Watch: the lights, the corners, the whole ceiling glide in circles — around the dot. The dot alone stays put.
4. Stop. Ask the trap question: did the ceiling move?
5. Every child takes a spin; the group confirms the dot never moves.
6. Connect it: time-lapse photos of the night sky show every star wheeling in circles around the North Star — the star parked over Earth's axis. Same sight. Same cause. The sky is the ceiling; the Earth is your chair.

> *Say: "The ceiling never moved an inch — YOU turned. And tonight's stars will wheel around the North Star for exactly the same reason: the sky stands still, and we are the ones spinning."*



TEACHER PREP

Stick the dot truly overhead (plumb it with D-1's bob for the joy of it). Brief the spotter: slow spins only.

What to watch for

- The dot must be DIRECTLY above the chair or the effect smears
- The trap question lands before the astronomy: who moved?

EXPECTED RESULT

The ceiling appears to wheel around the never-moving dot for every spinner. The North Star's nightly circles now have a felt explanation.

The Indoor Shadow-Clock

KIDS HANDS-ON + PREDICT | RUN AT 11:30 | 30 MIN

The point

The lamp never moves — but turn the platform and the pencil's shadow sweeps, stretches, and shrinks like a whole day passing. **Rotation makes the moving shadow**, on demand, indoors, in any weather.

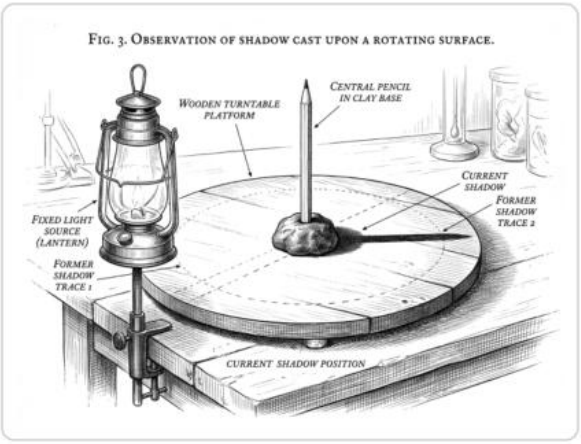
Materials

- Lazy Susan (or a stool to rotate)
- A pencil upright in a lump of clay
- The owned lamp, fixed to one side
- Chalk or tape for marks · the worksheet record boxes

Steps

1. Set the pencil at the platform's centre; fix the lamp low to one side. Lights otherwise dim.
2. Look first: where does the shadow point? Mark it.
3. **PREDICT:** if we turn the platform a little, where will the shadow swing?
4. Turn a small step. Mark the new shadow. Compare to the prediction.
5. Keep turning step by step: the shadow sweeps around, stretching long when the pencil faces the lamp edge-on (its sunrise and sunset) and shrinking short at its "noon."
6. Draw the record in the worksheet's three boxes. Then the closing question: the lamp never moved — so who moved the shadow?

> *Say: "All day long, real shadows sweep and stretch exactly like this — and the sun no more moves than our lamp did. The turning ground is the whole story, and you just held the world in your hands and turned it."*



TEACHER PREP

Assemble and test in prep: lamp LOW and close so shadows run long and readable; dim the room.

What to watch for

- Small turns beat big ones — the sweep should feel continuous
- The long-short-long stretch is the sunrise/noon/sunset shape; name it

EXPECTED RESULT

The shadow sweeps and changes length with every turn while the lamp sits still. The worksheet record fills, and the day's cause has been operated by hand.

Day and Night

The sun stands still — the Earth quietly turns us into the light and out again

The Big Idea

*The Earth makes one slow, smooth turn — one **rotation** — every ~24 hours, spinning around its **axis** like a wheel on a pin. That one turn IS the whole day-night cycle: **sunrise** is your patch of ground turning into the light, **sunset** is you turning away. The sun never moves at all.*

Because the turn runs one way (counterclockwise, seen from above the North Pole), the sun always appears on one horizon and disappears on the opposite one — and places to the east meet the light first, which is why clocks in Florida say morning three hours before California's do. Even the stars tell the story: photographed all night, they wheel in circles around the North Star — because it is US turning beneath them.

A sunset is really you, tipping slowly backward away from a sun that stayed put.



Fig. 1 — one turning ball, half in day and half in night — and the two proofs below: the spinning chair's circling ceiling, and the stars wheeling around the one still pole star

Words to Know

rotation
the Earth's slow, steady, one-way turn

axis
the line — the pin — the Earth turns around

sunrise
the moment your ground turns INTO the light

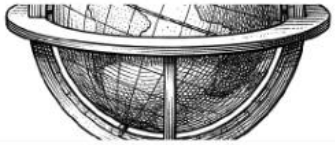
sunset
the moment you turn away — the sun never moved

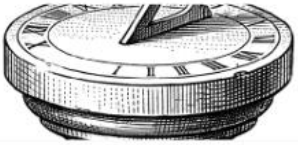
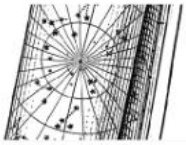
horizon
where the sky meets the ground — sunrise on one, sunset on the opposite

time zone
clocks set to when the turn brings each place its morning

Watch For This in Everyday Life

- Watch a sunset — *"say out loud what is really moving."*
- Find the evening moon, then look again later — *"who lifted it higher?"*
- Ask someone far east or west what their clock says *right now*.



rotation

rotation

axis

axis

sunrise

sunrise

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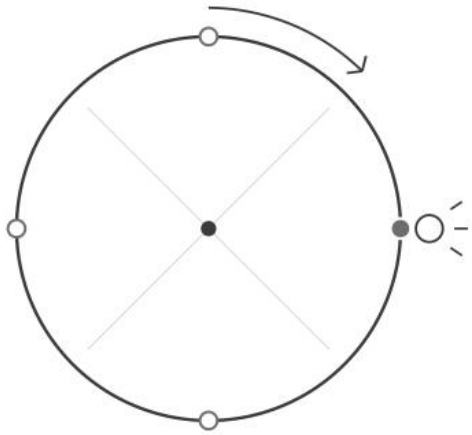
The My-Day Wheel

One turn of the Earth is your whole day

WORKSHEET

1 · Put your day on the turning wheel

The wheel is the Earth, the pin at the centre is its axis, and the lamp side is the sun. Draw a line from each routine picture to its place on the wheel — wake-up goes where the light first arrives.





wake up



lunch



dinner



sleep

2 · Guess first, then circle what really happened

Rice-grain Joe on the globe

When Joe faces AWAY from the lamp, it is his…

(morning) (night)

The two grains

Sunrise reaches Florida-Joe and California-Sally…

(at the same moment) (one before the other)

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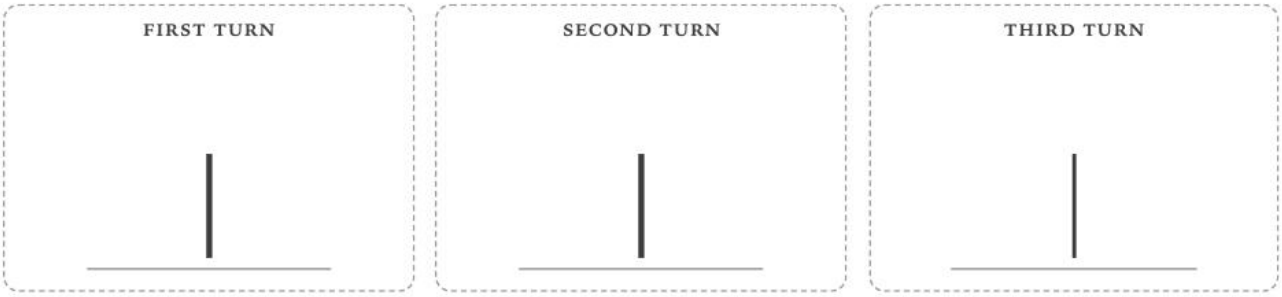
The Shadow-Clock Record

The lamp never moved — you turned the world

WORKSHEET

1 · Draw where the pencil's shadow pointed, turn by turn

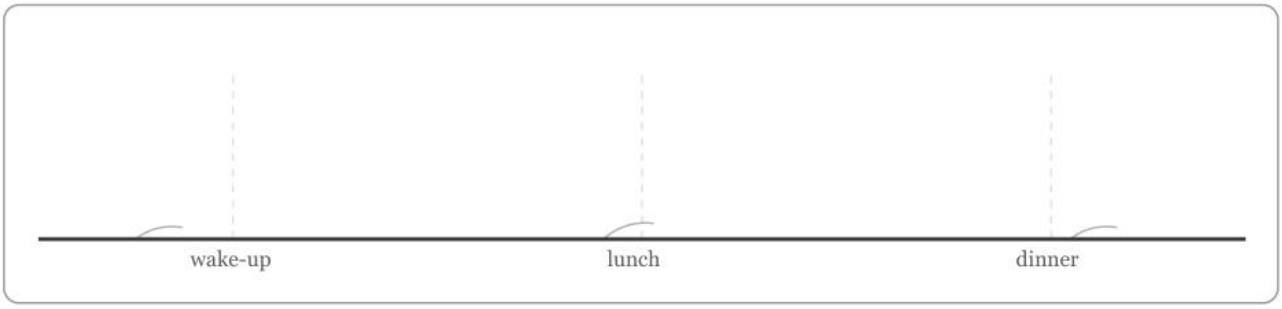
Each box shows the pencil standing on the turntable. After each turn of the platform, draw the shadow you saw — which way it pointed, and how long it was.



Tell a grown-up: did the lamp ever move? Then who moved the shadow?

2 · The draw-the-sky strip — a take-home observation

At wake-up, lunch, and dinner today, look where the sun stands (NEVER look straight at it). Colour a small sun into the strip at each height you saw.



Was the sun really climbing and sliding — or were you slowly turning under it? Say the true answer out loud.

BFSU D-2

We Are the Ones Turning

the lesson's song — sing it, then say what it means

SONG

Verse 1

They say the sun comes up at dawn,
They say it sets and then it's gone.
But watch it careful, watch it slow —
The sun's not going anywhere. Oh no!

Chorus

Rotation! Axis! Sunrise! Sunset!
One whole turn and one whole day.
Rotation! Axis! Sunrise! Sunset!
The sun is not going anywhere — we are the ones turning away!

Verse 2

Round and round on a line through the poles,
No real axle, no squeaks, no holes.
Just the steady way the whole world goes,
Twenty-four hours from your head to your toes.

(Chorus)

Verse 3

We turn toward the east, so that's where it shows,
And out in the west is where it goes.
Opposite sides, and it's always the same —
Sunrise and sunset, that's the game.

Verse 4

Somebody's breakfast is somebody's night,
Somebody's dark is somebody's light.
All at once on the turning ball,
One sun shining on us all.

(Chorus ×2)

Tag (spoken, kids): "Rotation... axis... sunrise... SUNSET!"

How to use it. Play the recording once while everyone just listens. Play it again and join in on the chorus only — that is the part carrying the lesson. By the third time most children have the chorus. Then close the binder and ask what the words actually mean; a child who can sing it and explain it has the idea for good.