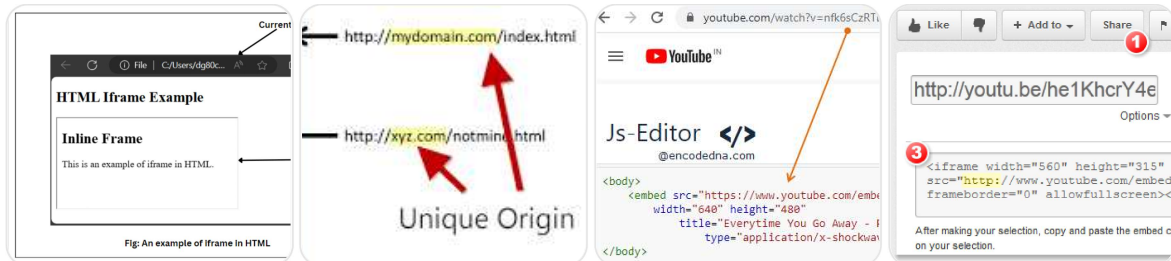# Homework - HTML Teaching Series

Good choice.

`<iframe>` is **simple to use but dangerous to misuse**, so we'll cover it **properly**: purpose, attributes, browser behavior, security, real-world usage, and production rules.

◆ HTML `<iframe>`

(Inline Frame — embedding another document inside a page)

1️⃣ What an `<iframe>` Really Is (Mental Model)

An `<iframe>` embeds **another HTML document** inside the current page.

Important:

- It is **not** just media
- It is a **full browsing context**
- The embedded page has its **own DOM, CSS, JS, and lifecycle**

Think of `<iframe>` as:

> "A browser window inside another browser window."

2️⃣ Basic `<iframe>` Syntax

```html
<iframe src="https://example.com"></iframe>
```

This loads the external page **inside your page**.

3️⃣ Core `<iframe>` Attributes (MUST KNOW)

◆ `src` — Source Document (MANDATORY)

```html
```

```
<iframe src="page.html"></iframe>
```

What it does

- Specifies the URL of the embedded document
- Can be:
  - Same-origin page
  - External website
  - Local HTML file

If `src` is missing → nothing loads.

◆ `width` and `height` — Size Control

html

```
<iframe src="page.html" width="600" height="400"></iframe>
```

Why this matters

- Browser needs dimensions to allocate space
- Prevents layout shifts
- Default size is **small and ugly**

Always define size in production.

◆ `title` — Accessibility (MANDATORY)

html

```
<iframe
  src="map.html"
  title="Office location map"
></iframe>
```

Why `title` is required

- Screen readers announce iframe purpose
- Without title → accessibility violation

Unlike `<img>` which uses `alt`, `<iframe>` uses `title`.

---

4 Browser Behavior (Important)

When the browser encounters an `<iframe>`:

1. Parent page continues loading
2. iframe creates **new browsing context**
```

3. iframe loads its own HTML, CSS, JS
4. Scripts inside iframe **do not block parent page**

Parent and iframe are **isolated by default**.

---

## 5 Same-Origin vs Cross-Origin (CRITICAL CONCEPT)

### Same-origin iframe

```html
<iframe src="/dashboard.html"></iframe>
```

- Parent can access iframe DOM via JS
- Used in internal apps

Cross-origin iframe

```html
<iframe src="https://youtube.com"></iframe>
```

- Parent **cannot access iframe DOM**
- Enforced by browser security (Same-Origin Policy)

This prevents:

- Data theft
- Session hijacking
- Malicious access

---

6 `sandbox` — Security Control (VERY IMPORTANT)

```html
<iframe
  src="external.html"
  sandbox
></iframe>
```

What `sandbox` does

- Restricts iframe capabilities
- Disables scripts, forms, popups by default

Allow specific permissions

```html
```

```html
<iframe
  src="app.html"
  sandbox="allow-scripts allow-forms"
></iframe>
```

Common sandbox flags

Flag	Allows
`allow-scripts`	JavaScript execution
`allow-forms`	Form submission
`allow-same-origin`	Treat as same-origin
`allow-popups`	Open new windows

Production rule:

> **Always sandbox untrusted iframes.**

---

7 `loading` — Lazy Loading (Performance)

html

```html
<iframe
  src="video.html"
  loading="lazy"
></iframe>
```

Why it matters

- iframe content is heavy
- Delays loading until needed
- Improves performance

Used for:

- Maps
- Ads
- Videos
- Analytics dashboards

---

8 `allow` — Feature Permissions (Modern)

html

```html
<iframe
  src="video.html"
```

```html
    allow="fullscreen autoplay"
></iframe>
```

Controls:

- Camera
- Microphone
- Fullscreen
- Autoplay

Common in:

- YouTube embeds
- Video conferencing
- Media players

9️⃣ Real-World `<iframe>` Use Cases

A. Embedded Videos (YouTube)

```html
<iframe
  src="https://www.youtube.com/embed/VIDEO_ID"
  title="YouTube video player"
  width="560"
  height="315"
  allow="fullscreen"
  loading="lazy"
></iframe>
```

B. Maps (Google Maps)

```html
<iframe
  src="https://maps.google.com/..."
  title="Office location map"
  loading="lazy"
></iframe>
```

C. Dashboards / Internal Tools

```html
<iframe src="/analytics.html"></iframe>
```

D. Third-party Widgets

- Chat widgets
- Payment gateways
- Ads

🔟 Common Beginner Mistakes

❌ Using iframe for layout

Never use iframe to split page sections.

❌ Missing `title`

Accessibility failure.

❌ Not sandboxing external iframes

Security risk.

❌ Assuming JS can access iframe content

Cross-origin rules block this.

1️⃣1️⃣ Production Rules (MEMORIZE)

- Always include `title`
- Always define size
- Sandbox untrusted sources
- Lazy-load heavy iframes
- Do NOT overuse iframes
- Prefer native HTML/SVG when possible

Senior developers **review iframe usage carefully**.

1️⃣2️⃣ Interview Questions (Very Common)

1. What is an iframe?
2. Difference between iframe and embed?
3. What is sandbox and why is it important?
4. Why can't JS access cross-origin iframes?
5. When should iframes be avoided?

🧠 Mental Model to Lock In

> **An iframe is a page inside a page.**
> **It has its own security boundary.**

> **Power comes with risk — sandbox it.`**

➡️ NEXT TOPICS (Remaining HTML)

We can continue with:

- HTML `<audio>` and `<video>`
- HTML `<embed>` vs `<object>`
- HTML `<canvas>` (conceptual)
- HTML Accessibility Basics (ARIA intro)

Say "**Next: audio/video**" or tell me which one you want next.